Korenix JetNet 3018G/5012G/5018G Series
Industrial Managed Ethernet Switch

User Manual

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korenix

www.korenix.com

Korenix JetNet 3018G/5012G/5018G Series
Industrial Managed Ethernet Switch
User's 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 3018G/5012G/5018G Series* Industrial Managed Ethernet Switch User Manual. Following models are applied to this document.

JetNet 3018G Industrial 16+2G Gigabit Ethernet Switch

JetNet 5012G Industrial 8+4G Gigabit Managed Ethernet Switch

JetNet 5018G Industrial 16+2G Gigabit Managed Ethernet Switch

Following topics are covered in this chapter:

1.1 Overview

1.2 Major Features

1.3 Package Checklist

1.1 Overview

The JetNet **3018G/5012G/5018G**, the Korenix Industrial Ethernet Switches, are specially designed for industrial environments requesting support of high access ports or multiple Gigabit ports. With fewer unit installation capability, the access ports share wider on-chip backplane, faster local transmission latency, efficient upstream transmission. The summary of the model list are as below. The JetNet 3018G is gigabit plug-and-play Ethernet switch. The JetNet 5012G/5018G is managed switch which supports abundant software features and can be managed through a single management agent. You can refer to the chapter 3 and 4 for software management.

Model Name	10/100 Base-TX	10/100/1000 Base-T	1000 Base-X SFP	Note
JetNet 3018G	16	2 (Combo with SFP)	2	Unmanaged Switch. Check chapter 1,2 and 5.
JetNet 5012G	8	2 (Combo with SFP)	4	Managed Switch. Check chapter 1,2,3,4 and 5.
JetNet 5018G	16	2 (Combo with SFP)	2	Managed Switch. Check chapter 1,2,3,4 and 5.

The **JetNet 3018G** equips with 16 ports 10/100TX Fast Ethernet ports and 2 ports 1000Base-T/Gigabit SFP combo ports. The SFP ports accept all type of Gigabit SFP transceivers, such as Gigabit SX, LX, LHX, ZX and XD for several connections and distances.

The on board gigabit port of the JetNet 3018G always acts as uplink port or server port, they are much important than other ports. The JetNet 3018G provides 2 Digital Output to indicate the alarm when gigabit port link failure. Additionally, the JetNet 3018G supports Jumbo frame, up to 9,216 bytes packet size for large size file transmission, pre-configured QoS policy to forward prioritized packets without any problem.

The **JetNet5012G**, the 8+4G Industrial Managed Ethernet Switch, is equipped with 8 10/100TX Fast Ethernet ports, 2 Gigabit SFP and 2 Gigabit RJ-45/SFP combo ports. The SFP ports accept all types of Gigabit SFP transceivers, including Gigabit SX, LX, LHX, ZX and XD for several connections and distances. The copper interface of the 2 Gigabit combo ports supports 10M,100M or 1000M speed. The switch can work as 8+4G, 7+3G or 10+2G switch. Besides, the speed is auto-negotiated or software configured and all the port types have non-blocking and wire-speed switching capability. The 8+4G design allows aggregating up to 4 100M rings plus 2 Gigabit rings, which is a unique and Korenix patent protected ring technology.

The **JetNet 5018G** is equipped with 16 10/100TX Fast Ethernet ports and 2 1000Base-T/Gigabit SFP combo ports. The SFP ports accept all types of Gigabit SFP transceivers, including Gigabit SX, LX, LHX, ZX and XD for several connections and distances. The 16+2G design allows aggregating up to 8 100M rings plus 1 Gigabit rings.

The embedded software of **JetNet 5012G/5018G** supports RSTP and Multiple Super Ring technology for ring redundancy protection. Besides, JetNet 5012G/5018G support full layer 2 management features, such as the VLAN, IGMP Snooping, LACP for network control, SNMP, LLDP for network management. The secured access is protected by Port Security, 802.1x and flexible Layer 2/4 Access Control List. The switch can work with JetView Pro, the Korenix patented Industrial Innovation Network Management system which can draw the network topology, automatically update ring and port status, remotely manage the switch or monitor its status through LLDP and SNMP protocols. With JetNet 5012G/5018G, you can fulfill the technicians' needs of having the best solution for the industrial Ethernet infrastructure.

1.2 Major Features

The following are the common major features:

- 8 or 16 10/100-TX
- 2 Gigabit RJ-45/SFP combo ports (10/100/1000 Base-TX, 1000Base-X) (JetNet 3018G, 5012G, 5018G); Additional 2 Gigabit SFP socket in JetNet 5012G.
- Auto Gigabit RJ-45/SFP module detection
- Non-Blocking Switching Performance, high backplane single chip solution
- Jumbo Frame up to 9,216 byte
- Dual 24V (12-48V) DC power inputs
- 2 Relay Outputs indicate Gigabit port Link Failure (JetNet 3018G) or configured other failures by software (JetNet 5012G/5018G)

- IEEE 802.1p Quality of Service (QoS) compliant (JetNet 3018G, the Tag Priority ID is as following: Higher (6,7), High (4,5), Low (0,3), Lowest (1,2))
- Rigid Aluminum Case complies with IP31
- -25~70℃ operating temperature

Software Features applied to JetNet 5012G/5018G:

- Korenix Multiple Super Ring pattern aggregates multiple rings within one unit
- IEEE 1588 Precision Time Protocol for precise time synchronization
- RSTP/STP, 256 802.1Q VLAN, QoS and up to 6/8 trunk groups
- IGMP Snooping, GMRP Rate Control for multicast message management
- LLDP for network topology live update
- SNMP V1/V2c/V3, RMON for remote management
- Works with JetView Pro Network Management software
- Advanced Security supports IP/Port Security, 802.1x and Access Control List

Note: The detail spec is listed in latest datasheet. Please download the latest datasheet in Korenix Web site.

1.3 Package List

Korenix JetNet 3018G/5012G/5018G Series products are shipped with following items:

JetNet 3018G/5012G/5018G (no SFP transceivers)

Rack Mount Kit

Console Cable (JetNet 5012G/5018G)

Quick Installation Guide

Document CD

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

LED

Diagnostic LED:

System: Power 1, Power 2, Ring Master (Green), Relay 1, Relay 2, Ring Failure (Red)

10/100 RJ-45: Link (Green/Left), Activity (Yellow Blinking/Right)

1000Base-T RJ-45: 10/100/1000 Link (Green/Left), Full Duplex (Yellow/Right), Activity (Green Blinking)

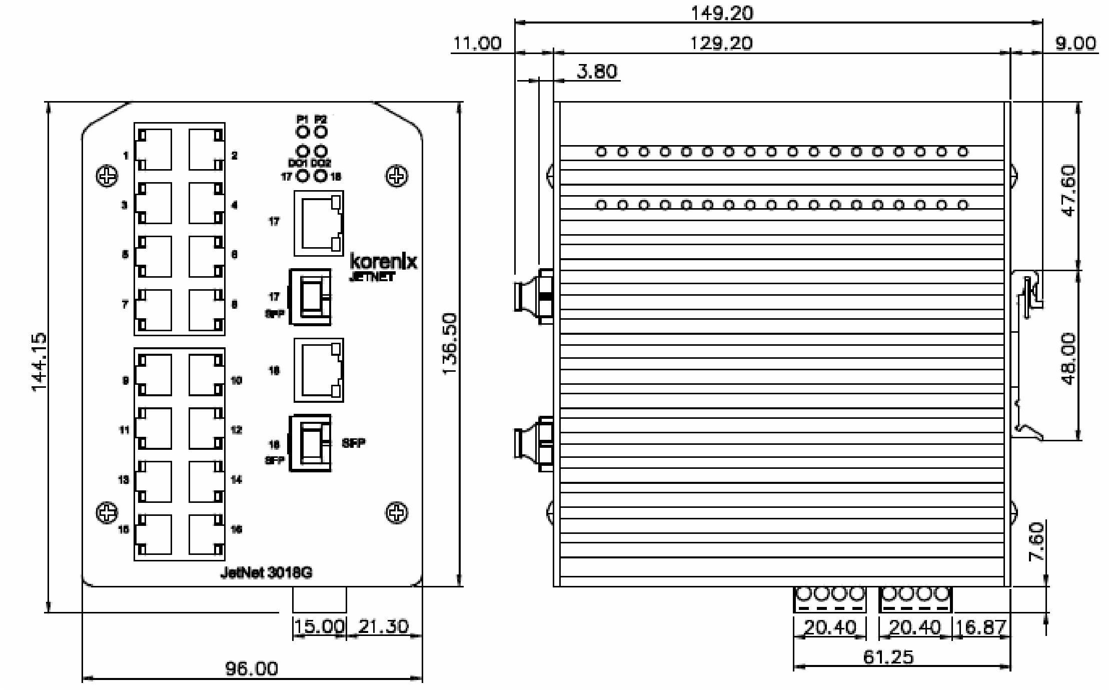
Gigabit SFP: Link/Activity (Green/Green Blinking)

JetNet 3018G does not support R.M. and R.F. LED. The RO 1 indicates gigabit port 17 link down/failure, the RO 2 indicates gigabit port 18 link down/failure.

Dimension

JetNet 3018G/5012/5018G Industrial Managed Ethernet Switch share the same mechanical. The dimension (W x H x D) is **137mm(H) x 96mm (W) x 129mm (D)**

Figure of the JetNet 3018G



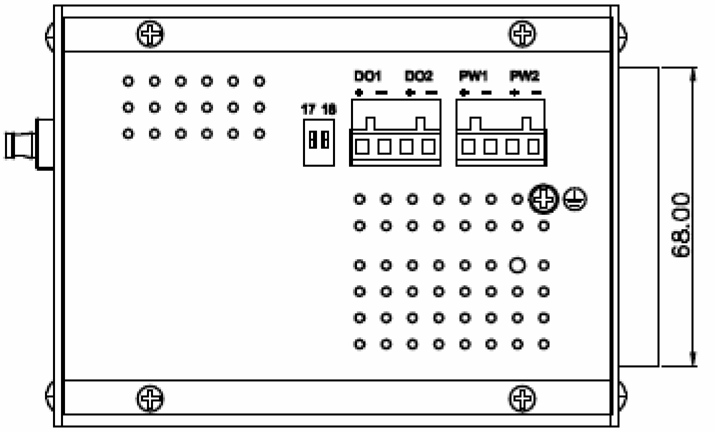


Figure of the JetNet 5018G

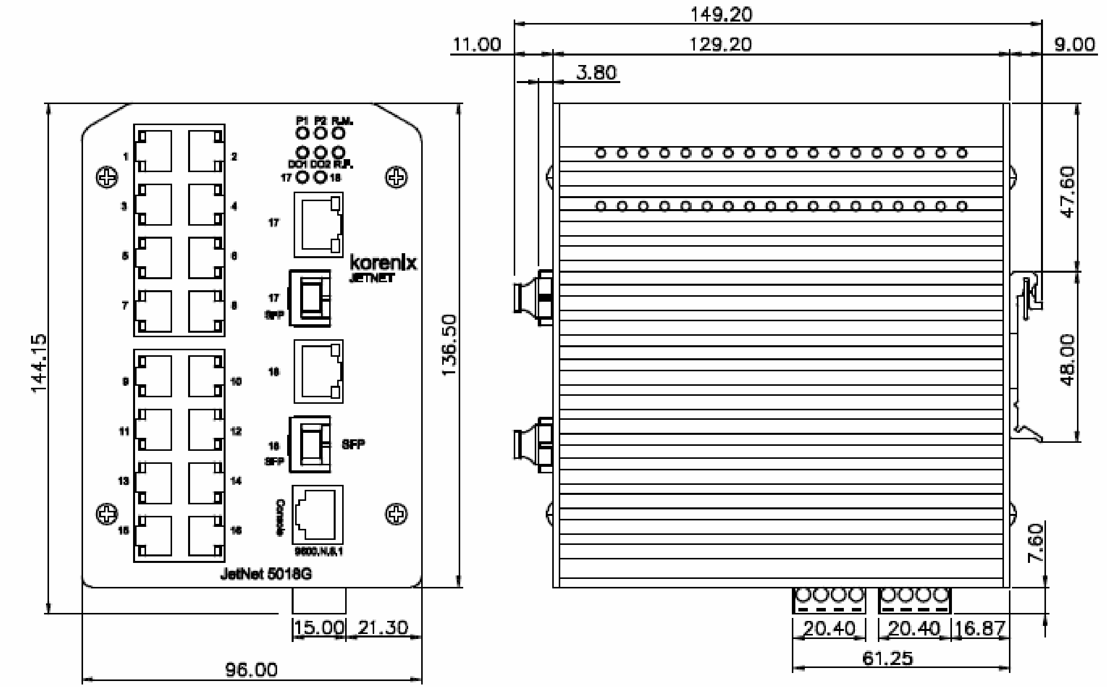
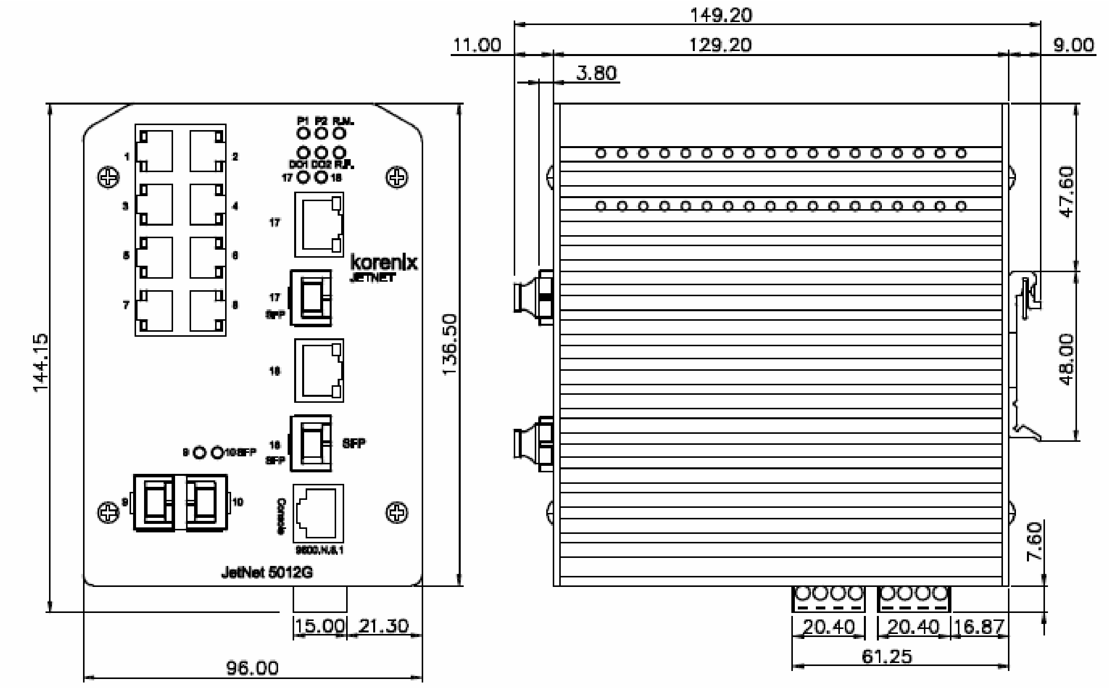


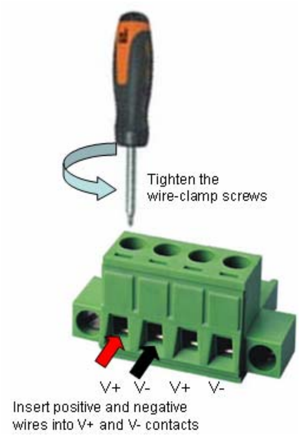
Figure of the JetNet 5012G



2.2 Wiring Power Inputs

DC Power Input

Follow below steps to wire redundant DC power inputs.


Tighten the wire-clamp screws
V+ V- V+ V-
Insert positive and negative wires into V+ and V- contacts

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. Power 1 and Power 2 support power redundancy and polarity reverse protection functions.
4. Positive and negative power system inputs are both accepted, but Power 1 and Power 2 must apply the same mode.

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

Note 2: The range of the suitable DC electric wire is from 12 to 24 AWG.

Note 3: If the 2 power inputs are connected, the switch will be powered from the highest connected voltage. The unit will alarm for loss of power, either PWR1 or PWR2.

2.3 Wiring Digital Output

JetNet 3018G/5012G/5018G provide 2 digital outputs, also known as Relay Output.

In JetNet 5012G/5018G, 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 management UI.

In JetNet 3018G, the Digital Output indicates gigabit port 17 and 18 link down or failure. Click the equipped DIP 1 to enable the port 17 link failure DO alarm, the DIP 2 to enable the port 18 link failure DO alarm.

The default (without power) state of the Digital Output is normal **CLOSE** state. The ON/OFF state are controlled by software configuration.

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

2.4 Wiring Earth Ground

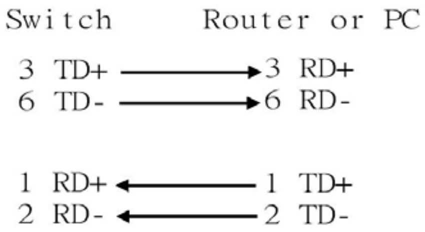
To ensure the system will not be damaged by noise or any electrical shock, we suggest you to make exact connection with switch with Earth Ground.

For DC input, loosen the earth ground screw by screw drive; then tighten the screw after earth ground wire is connected.

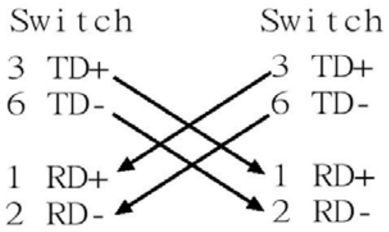
2.5 Wiring Fast Ethernet Ports

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.

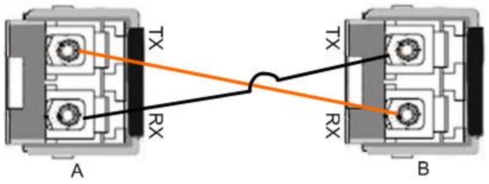
10Base-T: 2-pair UTP/STP Cat. 3, 4, 5 cable, EIA/TIA-568 100-ohm (100m)
100 Base-TX: 2-pair UTP/STP Cat. 5 cable, EIA/TIA-568 100-ohm (100m)
1000 Base-TX: 4-pair UTP/STP Cat. 5 cable, EIA/TIA-568 100-ohm (100m)

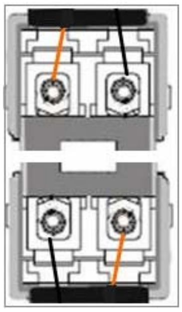
2.6 Wiring Fiber Ports

Small Form-factor Pluggable (SFP)

The SFP ports accept standard MINI GBIC SFP transceiver. But, to ensure system reliability, **Korenix recommends using the Korenix certificated Gigabit SFP Transceiver.** The web UI will show Unknown vendor type when choosing the SFP which is not certificated by Korenix. The certificated SFP transceiver for JetNet 5012G/5018G includes 1000Base-SX/LX single/multi mode ranger from 550m to 120KM.

The way to connect the SFP transceiver is to Plug in SFP fiber transceiver fist. Cross-connect the transmit channel at each end to the receive channel at the opposite end as illustrated in the figure below. The SPF cage of JetNet 5012G 2G SFP is 2x1 design, check the direction/angle of the fiber transceiver and fiber cable when inserted.





Note: This is a Class 1 Laser/LED product. Don't stare at the Laser/LED Beam.

2.7 Wiring Gigabit Combo Ports

The JetNet 3018G/5012G/5018G includes 2 Gigabit RJ-45/SFP Combo ports. The speed of the gigabit Ethernet copper port supports 10Base-T, 100Base-TX and 1000Base-TX. **The speed of the SFP port supports 1000Full Duplex.** The available gigabit SFP supports Gigabit Single-mode, Multi-mode, BIDI/WDM single-mode SFP transceivers. (The 100Base-FX is not supported in gigabit combo ports.) **Only one of the type, Copper or Fiber can be used in one time.**

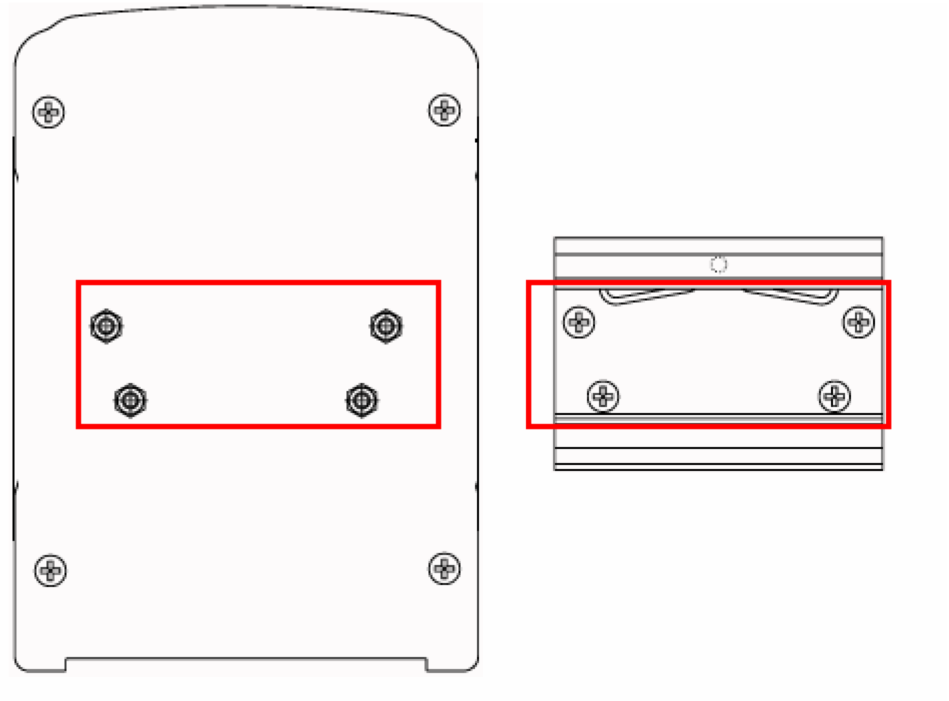
2.8 Wiring RS-232 Console Cable

Korenix JetNet 5012G/5018G attaches one RS-232 DB-9 to RJ-45 cable in the box. Connect the RJ-45 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.

2.9 DIN-Rail Mounting Installation

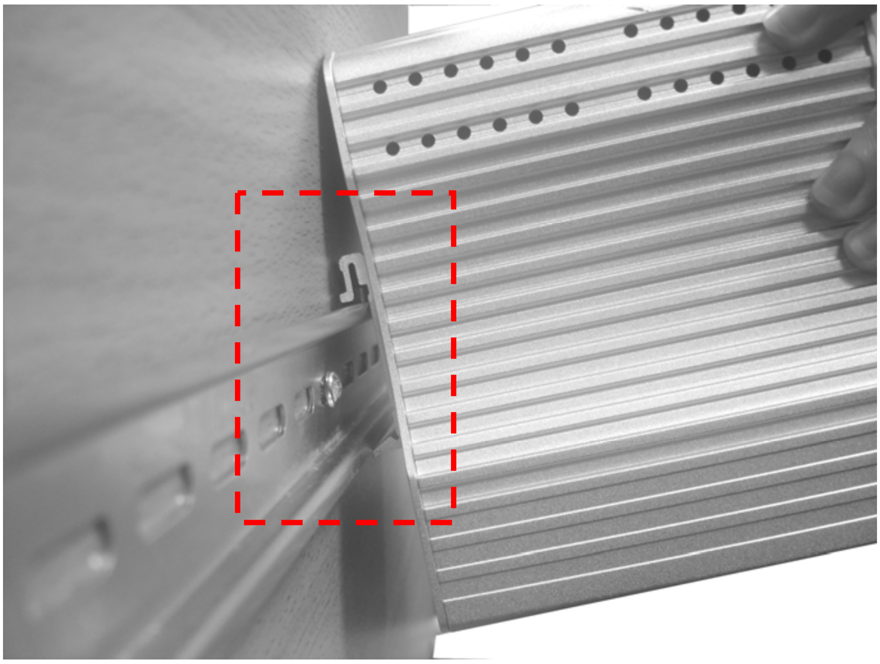
The DIN-Rail clip is already attached to the JetNet Switch when packaged. If the DIN-Rail clip is not screwed on the JetNet Switch, follow the instructions and the figure below to attach DIN-Rail clip to JetNet Switch.



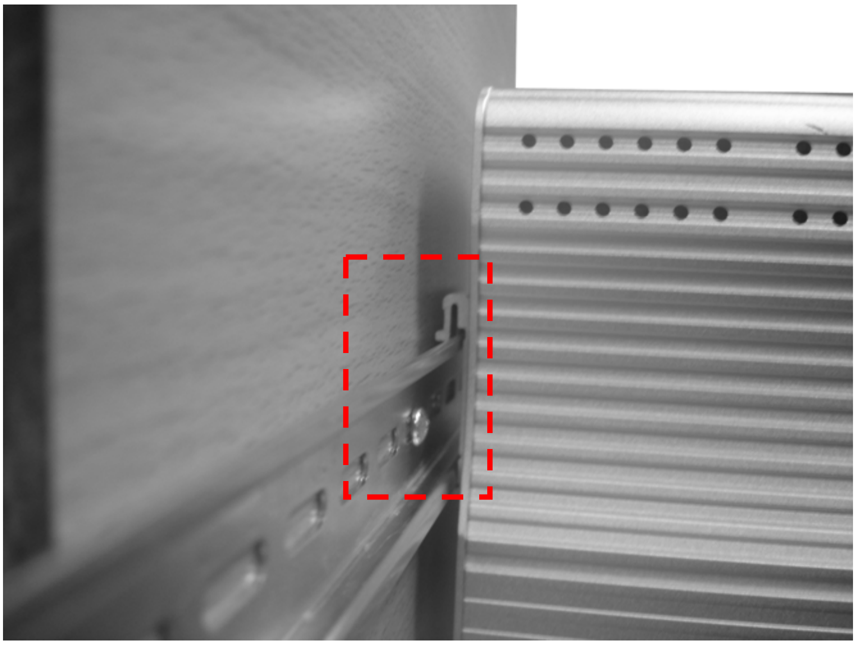
1. Use the screws to attach DIN-Rail clip to the real panel of JetNet Din Rail Switch.
2. To remove DIN-Rail clip, reverse step 1.

Follow the steps below to mount JetNet Switch to the DIN-Rail track:

1. First, insert the upper end of DIN-Rail clip into the back of DIN-Rail track from its upper side.



2. Lightly push the bottom of DIN-Rail clip into the track.

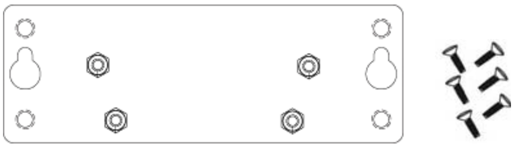


3. Check if DIN-Rail clip is tightly attached on the track.
4. To remove JetNet Switch from the track, reverse the steps above.

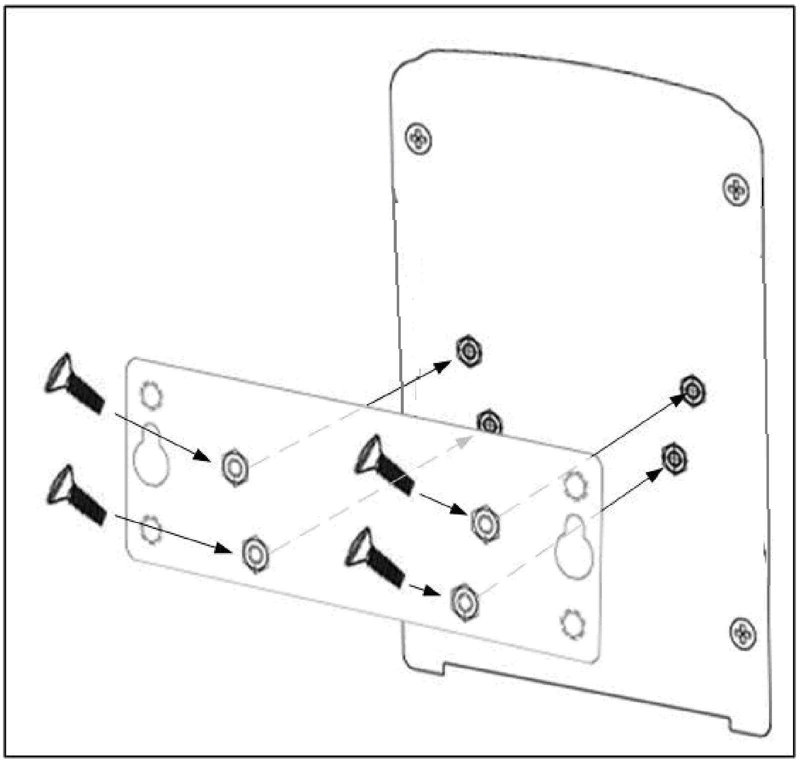
2.10 Wall Mounting Installation

Follow the steps below to install JetNet Switch with the wall mounting plate.

1. To remove DIN-Rail clip from JetNet Switch, loosen the screws from DIN-Rail clip.
2. Place the wall mounting plate on the rear panel of JetNet Switch.
3. Use the screws to tighten the wall mounting plate onto JetNet Switch.
4. Use the hook holes at the corners of the wall mounting plate to hang JetNet Switch onto the wall.
5. To remove the wall mounting plate, reverse the steps above.



Wall-Mounting plate and screws.



2.11 Safety Warming

2.2.1 The Equipment intended for installation in a Restricted Access Location.

Access Restricted! **Restricted Access Location:**

This equipment is intended to be installed in a RESTRICTED ACCESS LOCATION only.

2.2.2 The warning test is provided in user manual. Below is the information:

”For tilslutning af de ovrige ledere, se medfolgende installationsvejledning”.

“Laite on liitettava suojamaadoitus-koskettimilla varustettuun pistorasiaan”

„Apparatet ma tilkoples jordet stikkontakt“

”Apparaten skall anslutas till jordat uttag”

3 Preparation for Management

JetNet Industrial Managed Switch provides both in-band and out-band configuration methods. You can configure the switch via RS232 console cable if you don't attach your admin PC to your network, or if you lose network connection to your JetNet managed switch. 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.

Should you forget the IP address, you can use JetView Utility to discover the device, check its IP address or assign new IP address. The JetView Utility can discover the device across the subnet. Please download the newest version of JetView from Korenix's web site.

Following topics are covered in this chapter:

3.1 Preparation for Serial Console

3.2 Preparation for Web Interface

3.3 Preparation for Telnet console

3.1 Preparation for Serial Console

In JetNet Managed Switch package, Korenix attached one RS-232 DB-9 to DB-9/RJ-45 console cable. Please attach RS-232 DB-9 connector to your PC COM port, connect the other end to the Console port of the JetNet Managed Switch. 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 Managed Switch 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”.

```
Booting...
          Sun Jan  1 00:00:00 UTC 2006

Switch login: admin
Password:

JetNet5018G (version 0.2.25-20090414-11:04:13).
Copyright 2006-2009 Korenix Technology Co., Ltd.

Switch>
```

3.2 Preparation for Web Interface

JetNet Managed Switch 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 Industrial Managed 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.

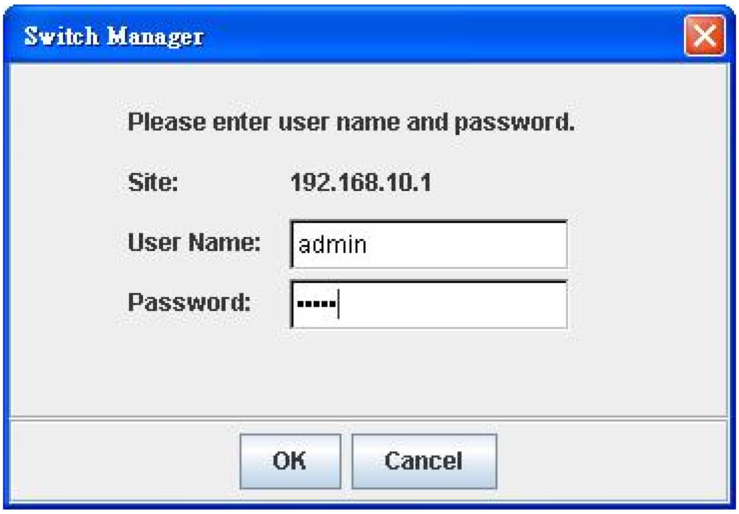
Launch the web browser and Login.

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**.



Switch Manager

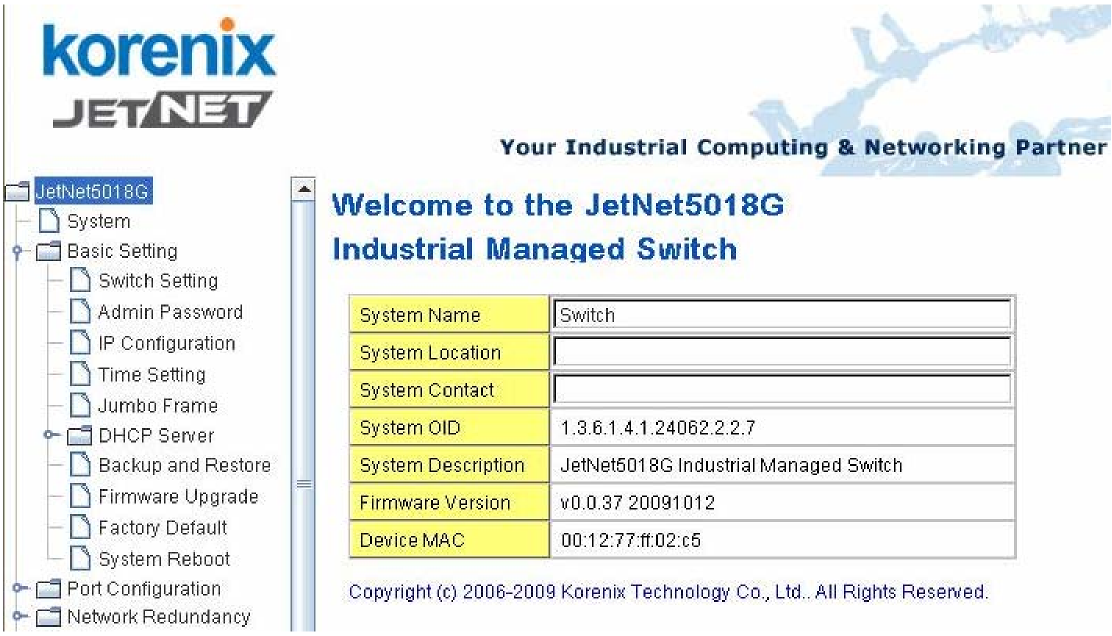
Please enter user name and password.

Site: 192.168.10.1

User Name: admin

Password: •••••

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



Welcome to the JetNet5018G
Industrial Managed Switch

System Name	Switch
System Location	
System Contact	
System OID	1.3.6.1.4.1.24062.2.2.7
System Description	JetNet5018G Industrial Managed Switch
Firmware Version	v0.0.37 20091012
Device MAC	00:12:77:ff:02:c5

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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.

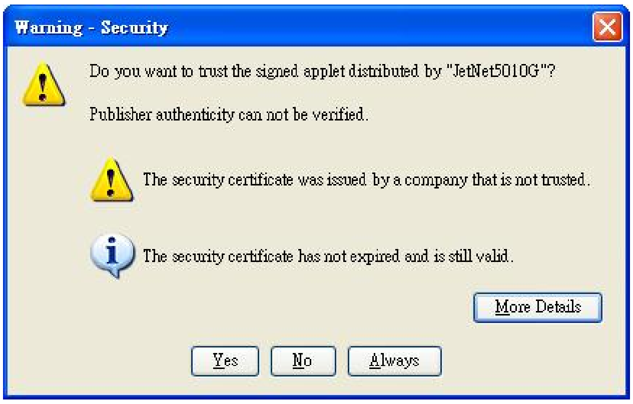
Note 2: The Web UI connection session of JetNet Managed Switch will be logged out automatically if you don't give any input after 30 seconds. After logged out, you should re-login and key in correct user name and password again.

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 Managed Switch first. Press **Yes** to trust it.



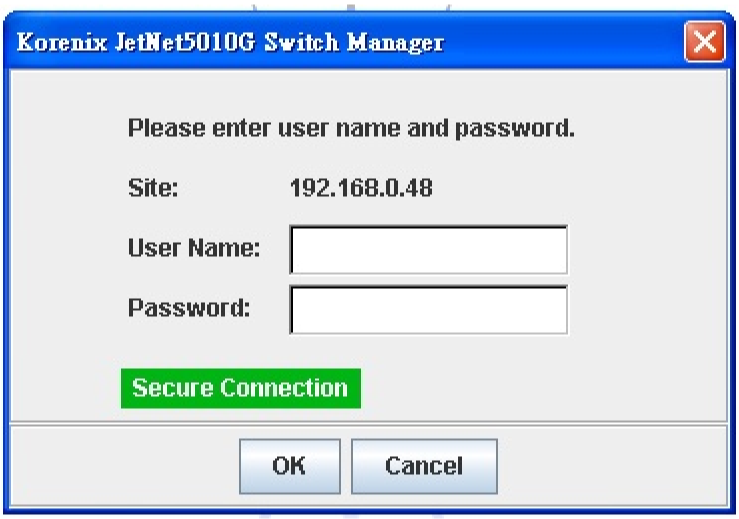
Do you want to trust the signed applet distributed by "JetNet5010G"?

Publisher authenticity can not be verified.

The security certificate was issued by a company that is not trusted.

The security certificate has not expired and is still valid.

4. The login screen will appear next.



Korenix JetNet5010G Switch Manager

Please enter user name and password.

Site: 192.168.0.48

User Name:

Password:

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

6. Click on **Enter** or **OK.** 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 managed Switch supports Telnet console. You can connect to the switch by Telnet and the command lines are the same as what you see by RS232 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 Managed Switch 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.

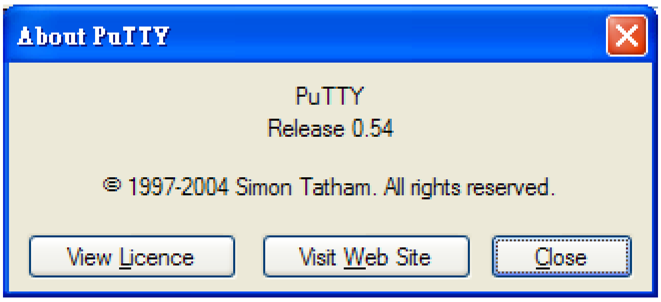
SSH is a client/server architecture while JetNet Managed Switch is the SSH server. When you want to make SSH connection with the switch, you should download the SSH client tool first.

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**

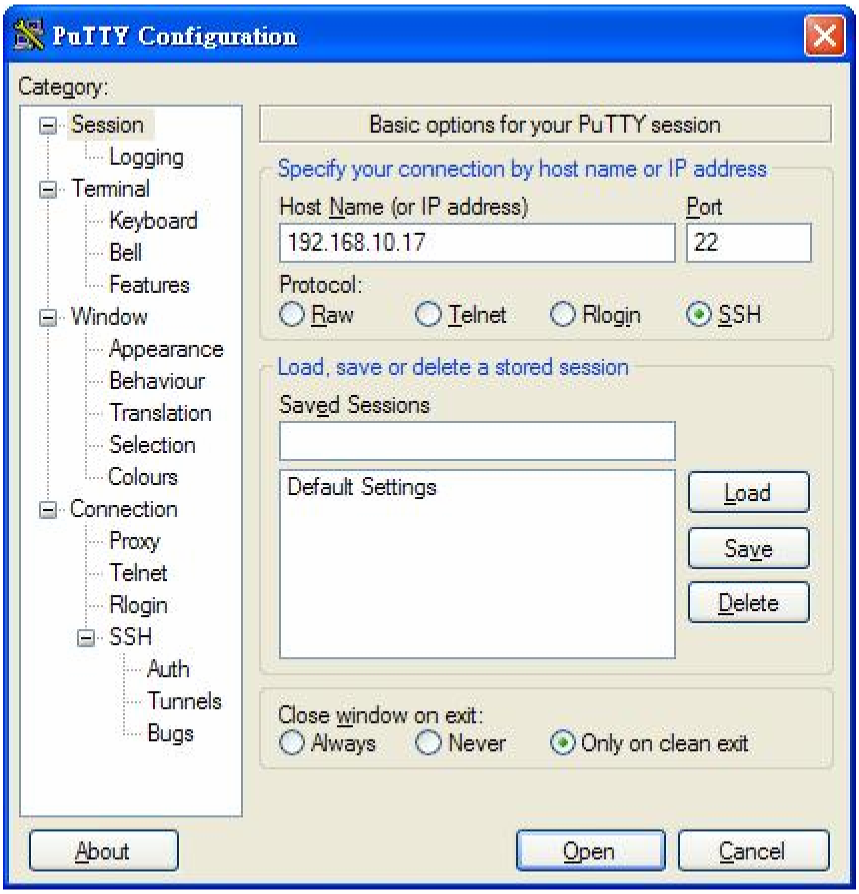


PuTTY
Release 0.54

© 1997-2004 Simon Tatham. All rights reserved.

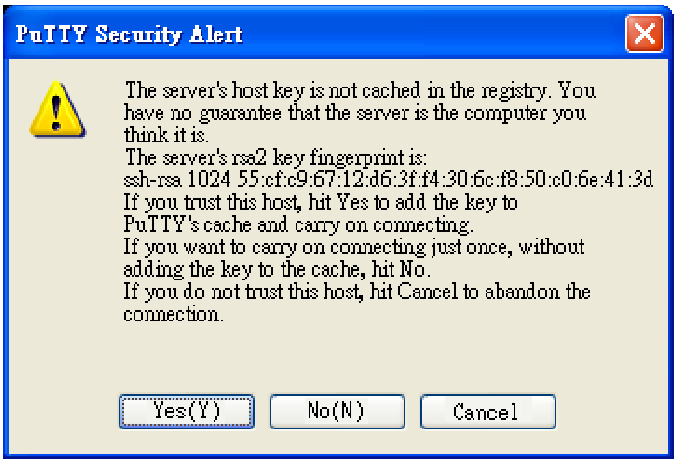
1. Open SSH Client/PuTTY

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



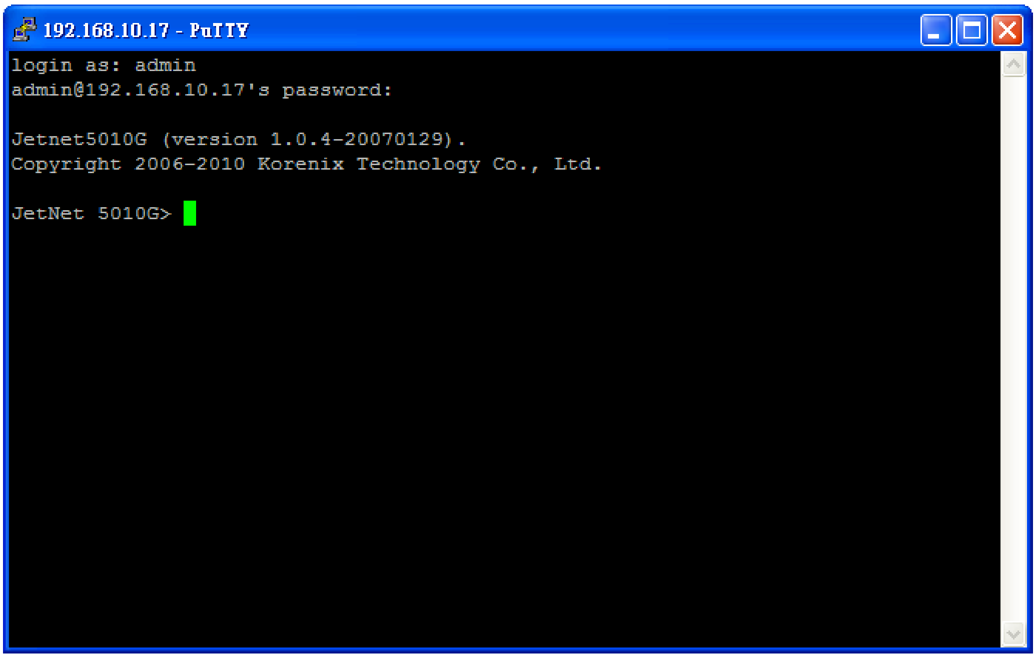
Host Name (or IP address): 192.168.10.17
Port: 22
Protocol: ○ Raw ○ Telnet ○ Rlogin ● SSH
Close window on exit: ○ Always ○ Never ● Only on clean exit

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



The server's host key is not cached in the registry. You have no guarantee that the server is the computer you think it is.
The server's rsa2 key fingerprint is:
ssh-rsa 1024 55:cf:c9:67:12:d6:3f:f4:30:6c:f8:50:c0:6e:41:3d
If you trust this host, hit Yes to add the key to PuTTY's cache and carry on connecting.
If you want to carry on connecting just once, without adding the key to the cache, hit No.
If you do not trust this host, hit Cancel to abandon the connection.

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



```
login as: admin
admin@192.168.10.17's password:

Jetnet5010G (version 1.0.4-20070129).
Copyright 2006-2010 Korenix Technology Co., Ltd.

JetNet 5010G>
```

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 RS232 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 Managed Switch's software features. There are four ways to access the switch: Serial console, Telnet, Web browser and SNMP.

JetNet Industrial Managed Switch Series provides both in-band and out-band configuration methods. You can configure the switch via RS232 console cable if you don't attach your admin PC to your network, or if you lose the network connection to your JetNet Managed Switch. 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 (CLI) Introduction

4.2 Basic Setting

4.3 Port Configuration

4.4 Network Redundancy

4.5 VLAN

4.6 Traffic Prioritization

4.7 Multicast Filtering

4.8 SNMP

4.9 Security

4.10 Warning

4.11 Monitor and Diag

4.12 Device Front Panel

4.13 Save

4.14 Logout

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 User EXEC, Privileged EXEC, Global Configuration, (Port/VLAN) Interface Configuration modes.

User EXEC mode: As long as you login the switch by CLI. You are in the User EXEC mode. You can ping, telnet remote device, and show some basic information.

Type **enable** to enter next mode, **exit** to logout. **?** to see the command list

```
JN5018G>
   enable       Turn on privileged mode command
   exit         Exit current mode and down to previous mode
   list         Print command list
   ping         Send echo messages
   quit         Exit current mode and down to previous mode
   show         Show running system information
   telnet       Open a telnet connection
   traceroute   Trace route to destination
```

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. Types 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
```

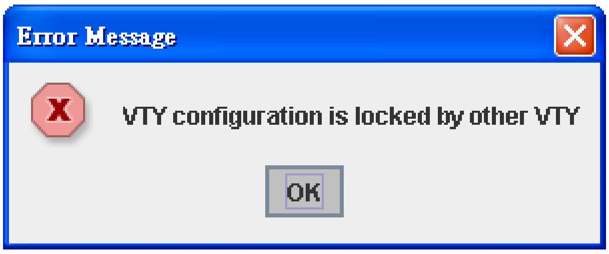
Ctrl+C To stop executing the unfinished command.

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 Managed Switch allows only one administrator to configure the switch at a time.



VTY configuration is locked by other VTY

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

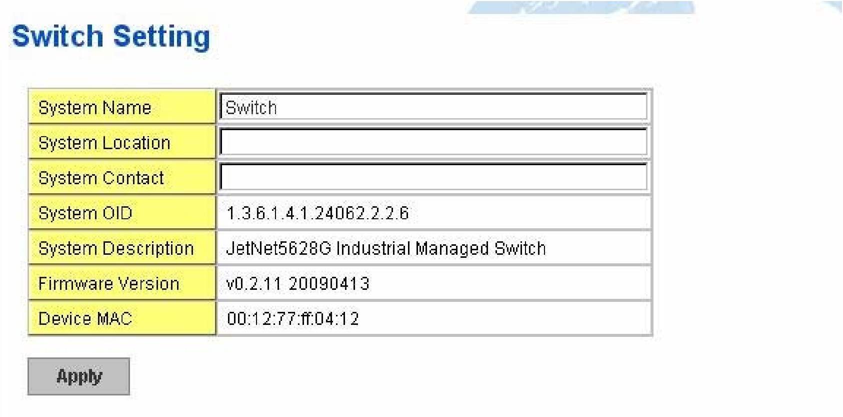
4.2.10 System Reboot

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



Switch Setting

System Name	Switch
System Location	
System Contact	
System OID	1.3.6.1.4.1.24062.2.2.6
System Description	JetNet5628G Industrial Managed Switch
Firmware Version	v0.2.11 20090413
Device MAC	00:12:77:ff:04:12

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 (Model name) Industrial Managed 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.

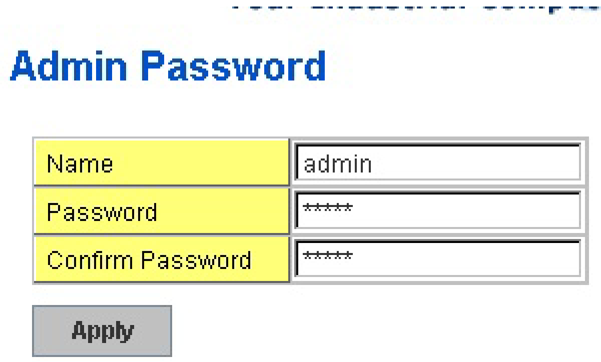
Once you finish the configuration, click on **Apply** to apply your settings.

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



Admin Password

Name	admin
Password	*****
Confirm Password	*****

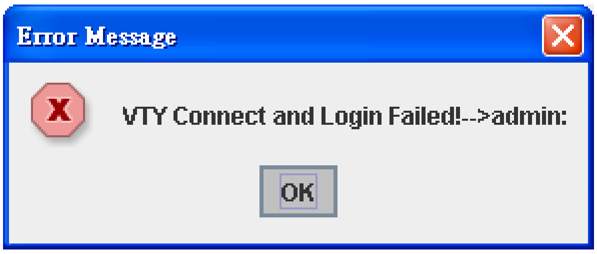
User name: You can key in new user name here. The default setting is **admin**.

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.

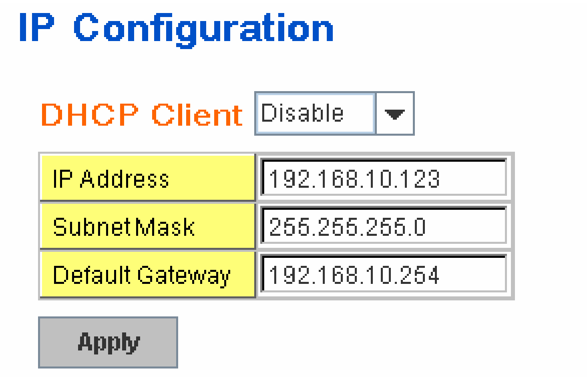
Figure 4.2.2.2 Popup alert window for Incorrect Username.



VTY Connect and Login Failed!-->admin:

4.2.3 IP Configuration

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



IP Configuration

DHCP Client: Disable

IP Address	192.168.10.123
Subnet Mask	255.255.255.0
Default Gateway	192.168.10.254

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.

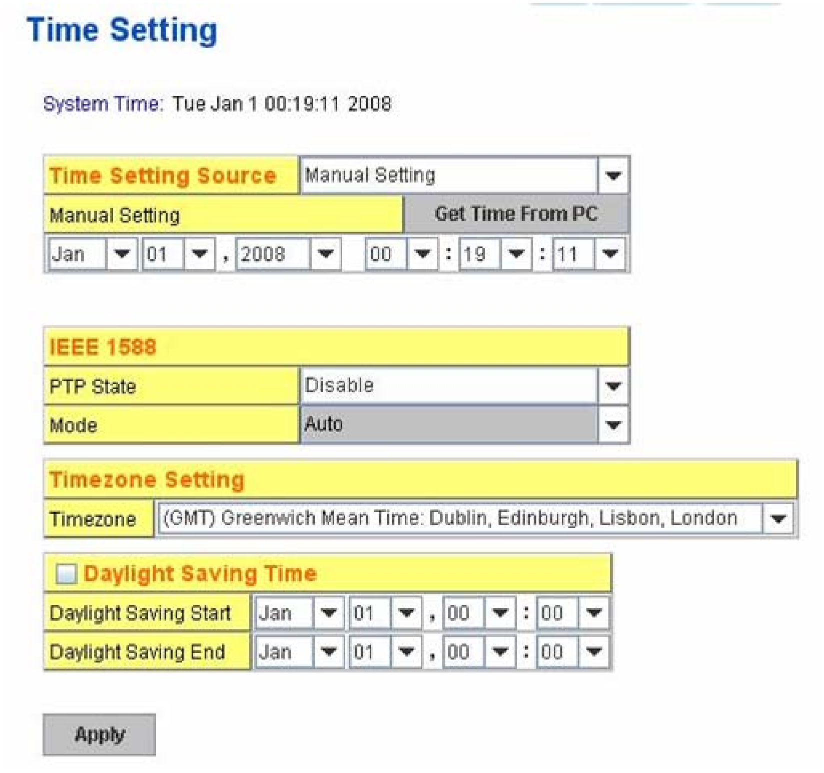
Once you finish configuring the settings, click on **Apply** to apply your configuration.

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.

JetNet Managed Switch also provides Daylight Saving function.

System Time: The current time of the system. The time possibly synchronizes from PC, NTP Server, IEEE 1588 server or device startup duration.



Time Setting

System Time: Tue Jan 1 00:19:11 2008

Time Setting Source	Manual Setting
Manual Setting	Get Time From PC
Jan 01 , 2008	00 : 19 : 11

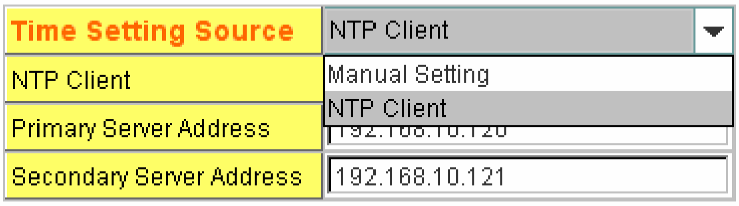
IEEE 1588	
PTP State	Disable
Mode	Auto

Timezone Setting	
Timezone	(GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London

□ Daylight Saving Time	
Daylight Saving Start	Jan 01 , 00 : 00
Daylight Saving End	Jan 01 , 00 : 00

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.

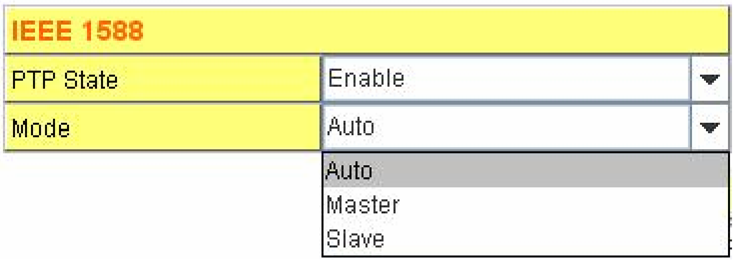
NTP client: Select the Time Setting Source to NTP client can let device enable the NTP client service. NTP client will be automatically enabled if you change Time source to NTP Client. The system will send request packet to acquire current time from the NTP server you assigned.



Time Setting Source	NTP Client
NTP Client	
Primary Server Address	192.168.10.120
Secondary Server Address	192.168.10.121

IEEE 1588: With the **Precision Time Protocol IEEE 1588** there is now, for the first time, a standard available which makes it possible to synchronize the clocks of different end devices over a network at speeds faster than one microsecond.

To enable IEEE 1588, select Enable in PTP Status and choose Auto, Master or Slave Mode. After time synchronized, the system time will display the correct time of the PTP server.



IEEE 1588	
PTP State	Enable
Mode	Auto

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
   01   (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: Set when Enable Daylight Saving Time start and end, during the Daylight Saving Time, the device's time is one hour earlier than the actual time.

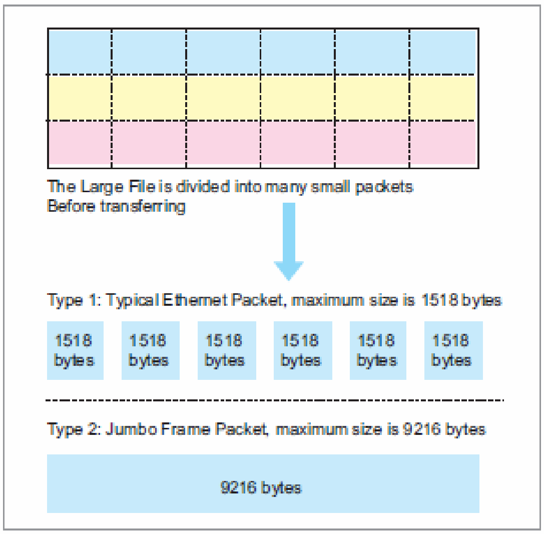
Once you finish your configuration, click on **Apply** to apply your configuration.

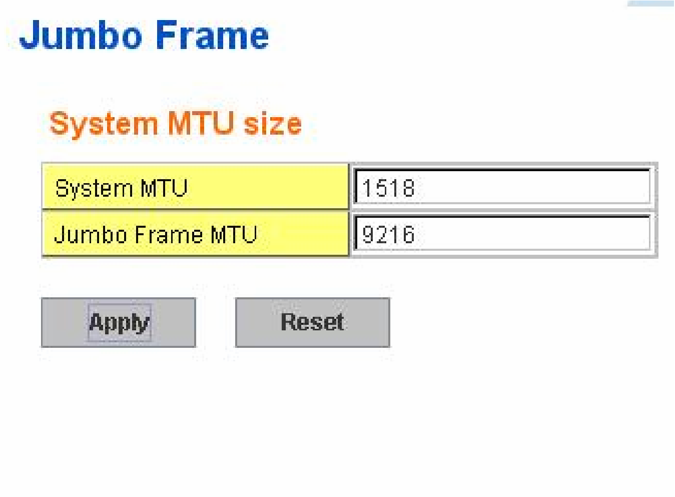
4.2.5 Jumbo Frame

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.


The Large File is divided into many small packets
Before transferring
Type 1: Typical Ethernet Packet, maximum size is 1518 bytes
1518 bytes
1518 bytes
1518 bytes
1518 bytes
1518 bytes
1518 bytes
Type 2: Jumbo Frame Packet, maximum size is 9216 bytes
9216 bytes



Jumbo Frame

System MTU size

System MTU	1518
Jumbo Frame MTU	9216

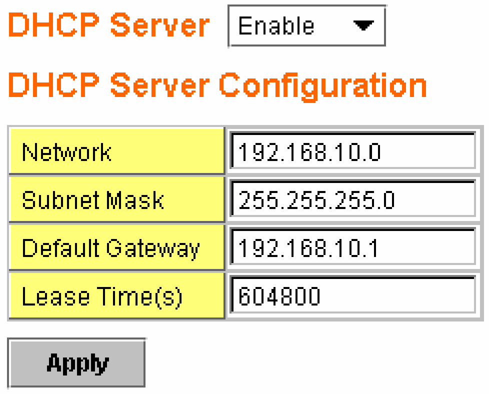
Once you finish your configuration, click on **Apply** to apply your configuration.

4.2.6 DHCP Server

You can select to **Enable** or **Disable** DHCP Server function. JetNet Managed Switch 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.



DHCP Server: Enable

DHCP Server Configuration

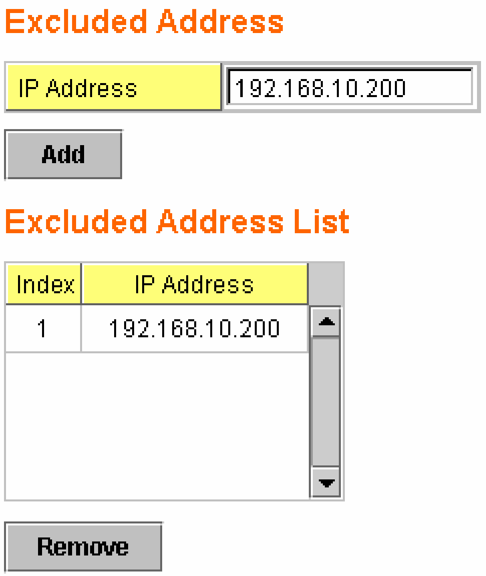
Network	192.168.10.0
Subnet Mask	255.255.255.0
Default Gateway	192.168.10.1
Lease Time(s)	604800

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**.



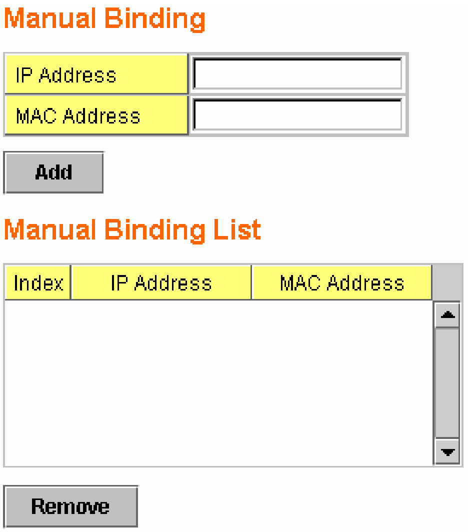
Excluded Address

IP Address	192.168.10.200

Excluded Address List

Index	IP Address
1	192.168.10.200

Manual Binding: JetNet Managed Switch provides a MAC address and IP address binding and removing function. You can type in the specified IP and MAC address, 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**.



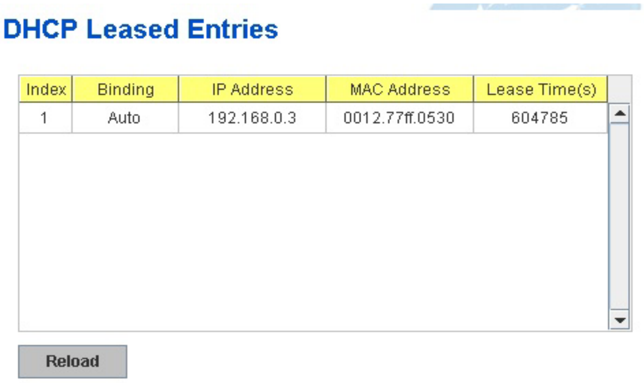
Manual Binding

IP Address	
MAC Address	

Manual Binding List

Index	IP Address	MAC Address

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



DHCP Leased Entries

Index	Binding	IP Address	MAC Address	Lease Time(s)
1	Auto	192.168.0.3	0012.77ff.0530	604785

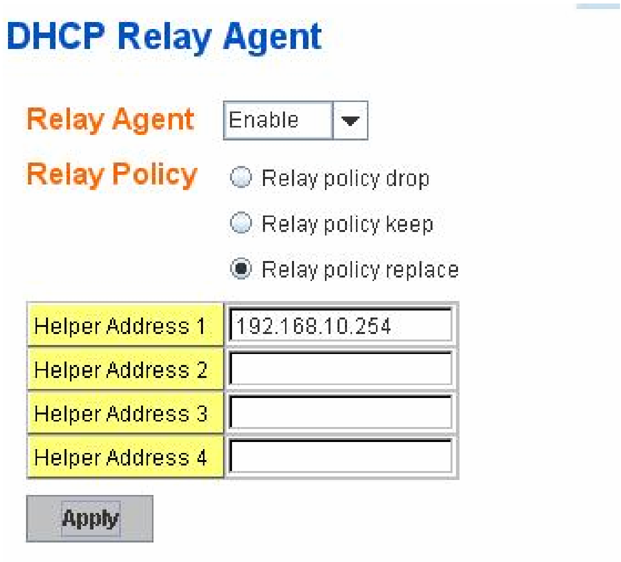
DHCP Relay Agent: The DHCP Relay Agent is also known as DHCP Option 82. It can help relay the DHCP Request to remote DHCP server located in different subnet.

Note: The DHCP Server can not work with DHCP Relay Agent at the same time.

Relay Agent: Choose Enable or Disable the relay agent.

Relay Policy: The Relay Policy is used when the DHCP request is relayed through more than one switch. The switch can drop, keep or replace the MAC address of the DHCP Request packet.

Helper Address: Type the IP address of the target DHCP Server. There are 4 available IP addresses.



DHCP Relay Agent

Relay Agent: Enable

Relay Policy:
○ Relay policy drop
○ Relay policy keep
● Relay policy replace

Helper Address 1	192.168.10.254
Helper Address 2	
Helper Address 3	
Helper Address 4	

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.

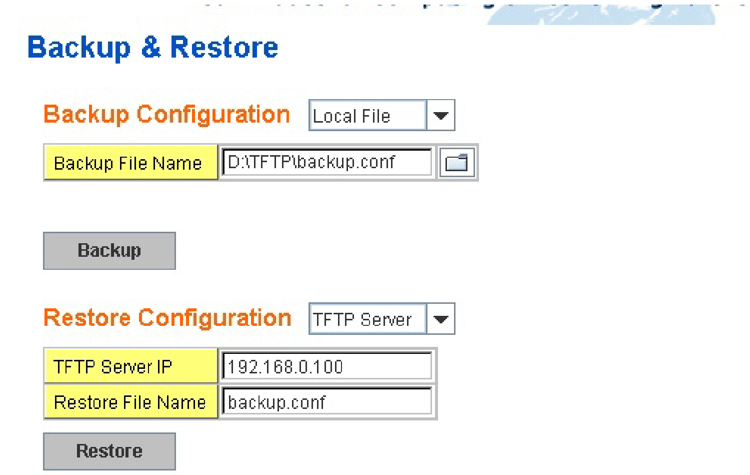
Backup/Restore File Name: Please type the correct file name of the configuration file..

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 4.2.5.1 Main UI of Backup & Restore



Backup & Restore

Backup Configuration: Local File

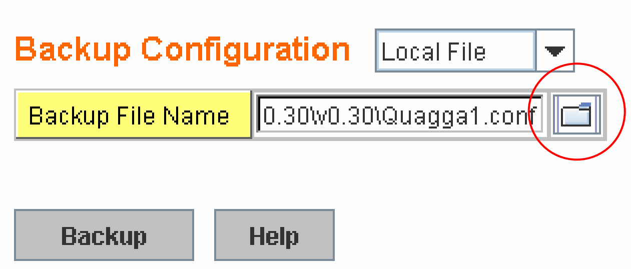
Backup File Name: D:\TFTP\backup.conf

Restore Configuration: TFTP Server

TFTP Server IP: 192.168.0.100

Restore File Name: backup.conf

Figure 4.2.5.2 Bacup/Restore Configuration – Local File mode.



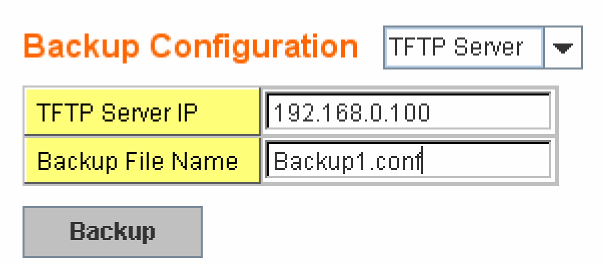
Backup Configuration: Local File

Backup File Name: 0.30\v0.30\Quagga1.conf

🗀 Click on Folder 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 4.2.5.3 Backup/Restore Configuration – TFTP Server mode



Backup Configuration: TFTP Server

TFTP Server IP	192.168.0.100
Backup File Name	Backup1.conf

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

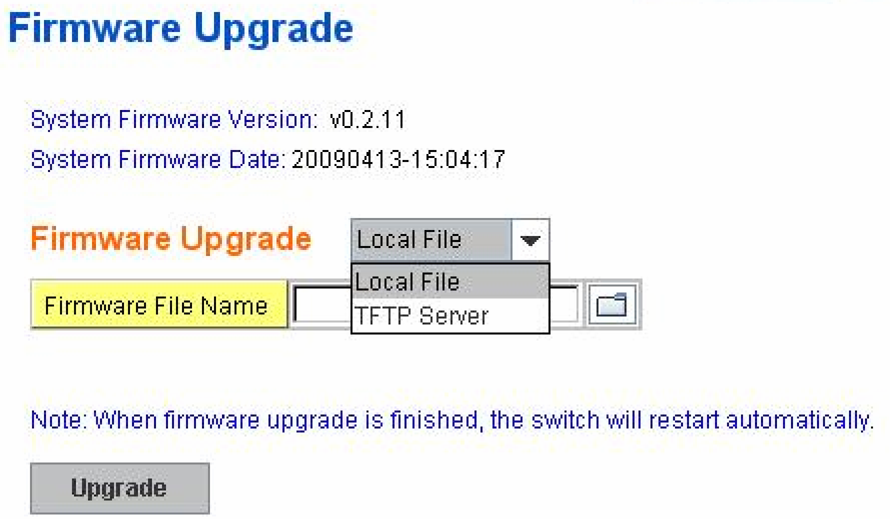
Note: point to the wrong file will cause the entire configuration missed

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 must be rebooted after you finished upgrading new firmware. Please remind the attached users before you reboot the switch.

Figure 4.2.5.1 Main UI of Firmware Upgrade



Firmware Upgrade

System Firmware Version: v0.2.11

System Firmware Date: 20090413-15:04:17

Firmware Upgrade: Local File

Firmware File Name:

Note: When firmware upgrade is finished, the switch will restart automatically.

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 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.

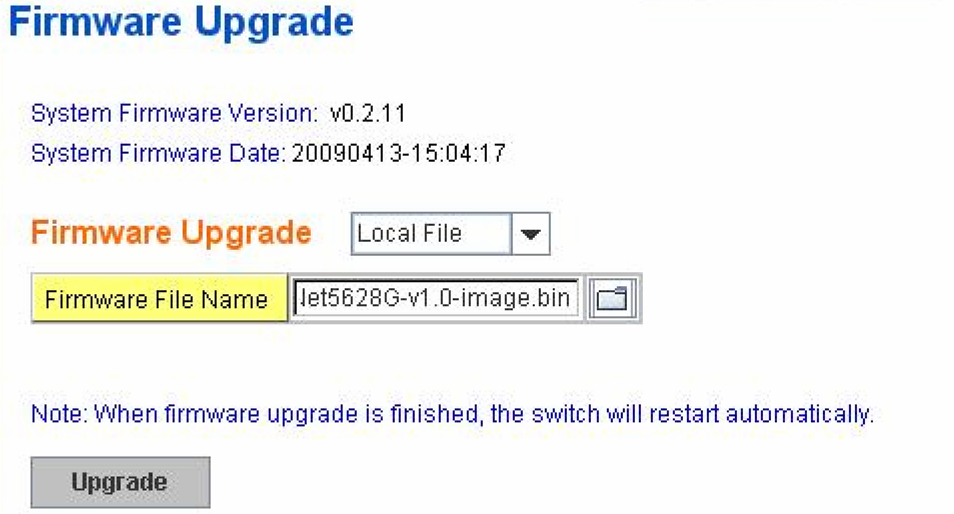
TFTP Server mode: In this mode, the switch acts as the TFTP client. Before you do so, make sure that your TFTP server is ready. And then please type the IP address of TFTP Server IP address. This mode can be used in both CLI and Web UI.

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.

Figure 4.2.6.2 Firmware Upgrade – Local File mode.



Firmware Upgrade

System Firmware Version: v0.2.11

System Firmware Date: 20090413-15:04:17

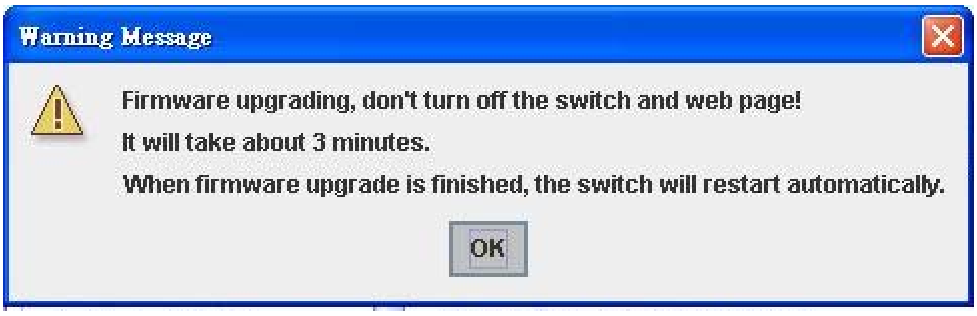
Firmware Upgrade: Local File

Firmware File Name: Jet5628G-v1.0-image.bin

Note: When firmware upgrade is finished, the switch will restart automatically.

Click on Folder icon to select the target firmware file you want to upgrade.

Figure 4.2.6.3 Warning Message.



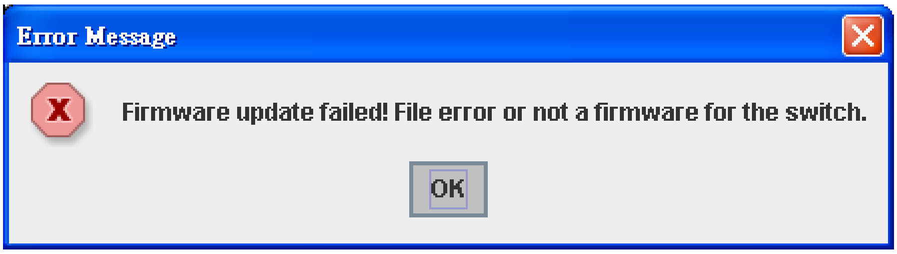
Warning Message

Firmware upgrading, don't turn off the switch and web page!

It will take about 3 minutes.

When firmware upgrade is finished, the switch will restart automatically.

Figure 4.2.6.3 Error Message due to the file error or not a firmware for the switch.

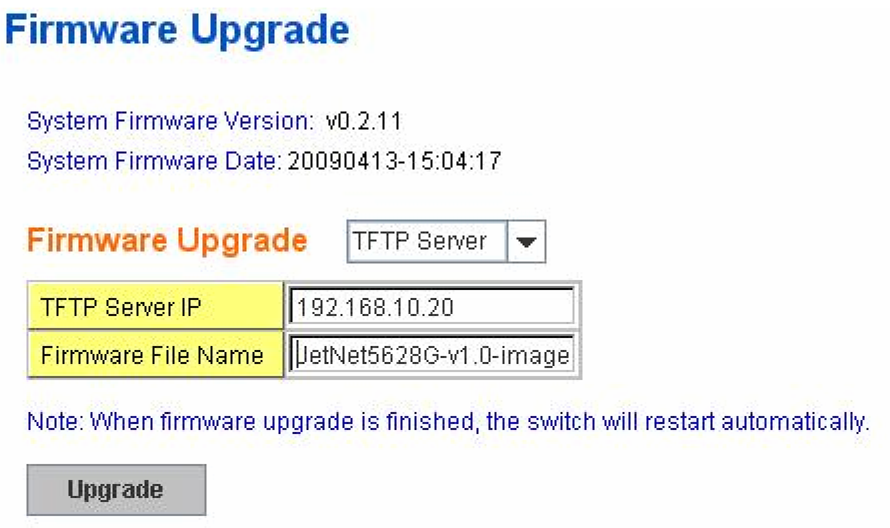


Error Message

Firmware update failed! File error or not a firmware for the switch.

Before upgrading firmware, please check the file name and switch model name first and carefully. Korenix switch provide protection when upgrading incorrect firmware file, the system would not crash even download the incorrect firmware. Even we have the protection, we still ask you don't try/test upgrade incorrect firmware, the unexpected event may occure or damage the system.

Figure 4.2.6.5 Firmware Upgrade – TFTP Server mode.



Firmware Upgrade

System Firmware Version: v0.2.11

System Firmware Date: 20090413-15:04:17

Firmware Upgrade: TFTP Server

TFTP Server IP	192.168.10.20
Firmware File Name	JetNet5628G-v1.0-image

Note: When firmware upgrade is finished, the switch will restart automatically.

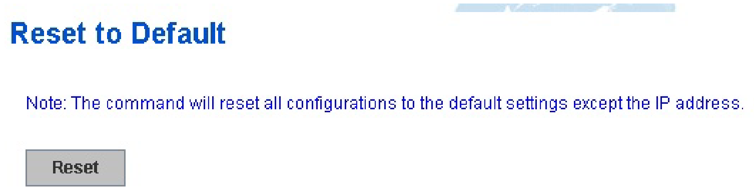
Type the IP address of TFTP Server and Firmware File Name. Then click on **Upgrade** to start the process.

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 Factory 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.

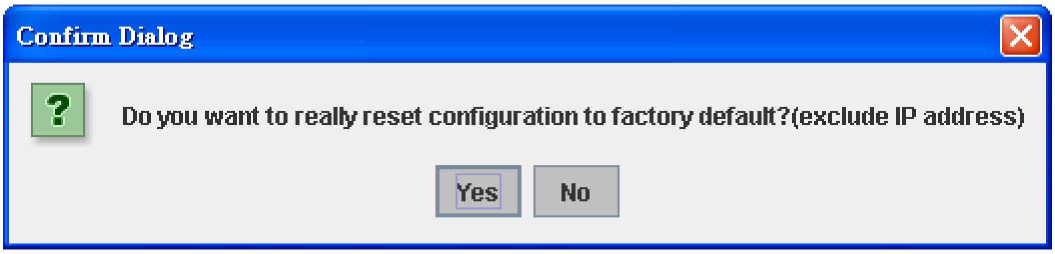
Figure 4.2.7.1 The main screen of the Reset to Default



Reset to Default

Note: The command will reset all configurations to the default settings except the IP address.

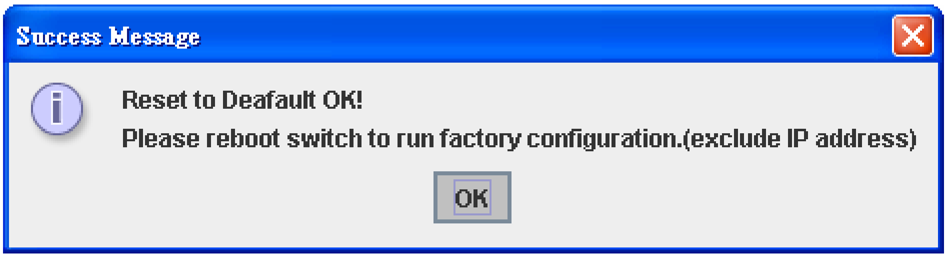
Figure 4.2.7.2 Popup alert screen to confirm the command. Click on **Yes** to start it.



Confirm Dialog

Do you want to really reset configuration to factory default?(exclude IP address)

Figure 4.2.7.2 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.



Reset to Deafault OK!

Please reboot switch to run factory configuration.(exclude IP address)

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

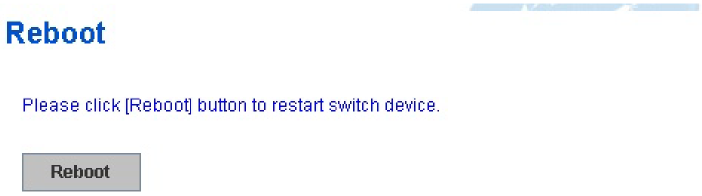
Note: If you already configured the IP of your device to other IP address, when you use this command by CLI and Web UI, our software will not reset the IP address to default IP. The system will remain the IP address so that you can still connect the switch via the network.

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.*

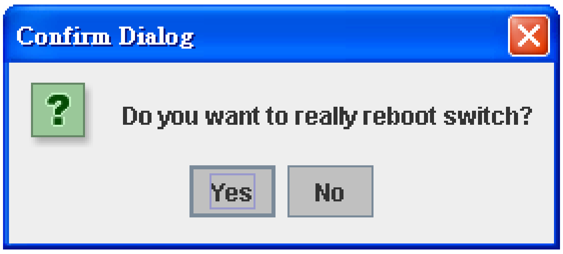
Figure 4.2.8.1 Main screen for Rebooting



Reboot

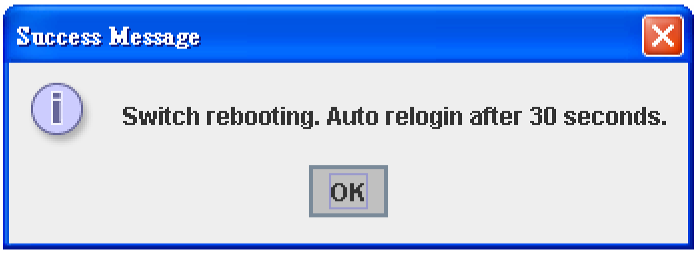
Please click [Reboot] button to restart switch device.

Figure 4.2.8.2 Pop-up alert screen to request confirmation. Click on **Yes**. Then the switch will be rebooted immediately.



Do you want to really reboot switch?

Figure 4.2.8.3 Pop-up message screen appears when rebooting the switch..



Switch rebooting. Auto relogin after 30 seconds.

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 JN5018G 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 igmp SWITCH(config-if)# ip address 192.168.10.8/24

	(DHCP Client) 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 !
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 Switch# show ptpd PTPd is enabled Mode: Slave
Jumbo Frame	
Jumbo Frame	Switch(config)# system mtu jumbo <1500-9216> Switch(config)# system mtu jumbo 9000

DHCP Server/Relay Agent	
DHCP Commands	Switch(config)# router dhcp Switch(config-dhcp)# default-router DHCP Default Router end Exit current mode and down to previous enable mode exit Exit current mode and down to previous mode ip IP protocol lease DHCP Lease Time list Print command list network dhcp network no remove quit Exit current mode and down to previous mode service enable service
DHCP Server Enable	Switch(config-dhcp)# service dhcp <cr>
DHCP Server IP Pool (Network/Mask)	Switch(config-dhcp)# network A.B.C.D/M network/mask ex. 10.10.1.0/24 Switch(config-dhcp)# network 192.168.10.0/24
DHCP Server – Default Gateway	Switch(config-dhcp)# default-router A.B.C.D address Switch(config-dhcp)# default-router 192.168.10.254
DHCP Server – lease time	Switch(config-dhcp)# lease TIME second Switch(config-dhcp)# lease 1000 (1000 second)
DHCP Server – Excluded Address	Switch(config-dhcp)# ip dhcp excluded-address A.B.C.D IP address Switch(config-dhcp)# ip dhcp excluded-address 192.168.10.123 <cr>
DHCP Server – Static IP and MAC binding	Switch(config-dhcp)# ip dhcp static MACADDR MAC address Switch(config-dhcp)# ip dhcp static 0012.7700.0001 A.B.C.D leased IP address Switch(config-dhcp)# ip dhcp static 0012.7700.0001 192.168.10.99
DHCP Relay – Enable DHCP Relay	Switch(config-dhcp)# ip dhcp relay information option Option82 policy Option82 Switch(config-dhcp)# ip dhcp relay information option
DHCP Relay – DHCP policy	Switch(config-dhcp)# ip dhcp relay information policy drop Relay Policy keep Drop/Keep/Replace option82 field replace Switch(config-dhcp)# ip dhcp relay information policy drop <cr> Switch(config-dhcp)# ip dhcp relay information policy keep <cr> Switch(config-dhcp)# ip dhcp relay information policy replace <cr>
DHCP Relay – IP Helper Address	Switch(config-dhcp)# ip dhcp helper-address A.B.C.D Switch(config-dhcp)# ip dhcp helper-address 192.168.10.200

Reset DHCP Settings	Switch(config-dhcp)# ip dhcp reset <cr>
DHCP Server Information	Switch# show ip dhcp server statistics DHCP Server ON Address Pool 1 network:192.168.10.0/24 default-router:192.168.10.254 lease time:604800 Excluded Address List IP Address --------------- 192.168.10.123 Manual Binding List IP Address MAC Address --------------- -------------- 192.168.10.99 0012.7701.0203 Leased Address List IP Address MAC Address Leased Time Remains --------------- -------------- --------------------
DHCP Relay Information	Switch# show ip dhcp relay DHCP Relay Agent ON -- IP helper-address : 192.168.10.200 Re-forwarding policy: Replace
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 4.12 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 JN5018G.bin Firmware upgrading, don't turn off the switch! Tftping file JN5018G.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 Understand the port mapping

4.3.2 Port Control

4.3.3 Port Status

4.3.4 Rate Control

4.3.5 Port Trunking

4.3.6 Command Lines for Port Configuration

4.3.1 Understand the port mapping

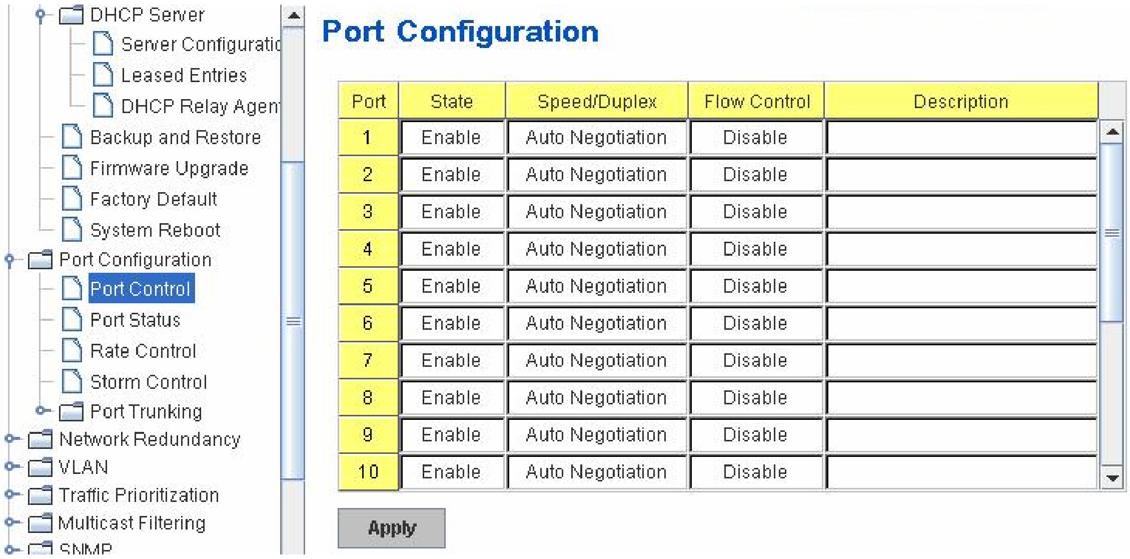
Before configuring the port settings, understand the port number in Managed Switch first.

The port ID is print on the front panel. Follow the port ID to configure your managed switch.

4.3.2 Port Control

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

Figure 4.3.2.1 The main Web UI of the Port Configuration.



Port Configuration

Port	State	Speed/Duplex	Flow Control	Description
1	Enable	Auto Negotiation	Disable	
2	Enable	Auto Negotiation	Disable	
3	Enable	Auto Negotiation	Disable	
4	Enable	Auto Negotiation	Disable	
5	Enable	Auto Negotiation	Disable	
6	Enable	Auto Negotiation	Disable	
7	Enable	Auto Negotiation	Disable	
8	Enable	Auto Negotiation	Disable	
9	Enable	Auto Negotiation	Disable	
10	Enable	Auto Negotiation	Disable	

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~N (fa1~faN): 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 1~N (gi1~giN): 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.

Note: The JetNet 5012G/5018G Gigabit SFP port only support 1000M Full 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.

In **Description** column, you can add description to indicate the port's location, connected device or other information. This is a friendly design especially when remotely managed the device.

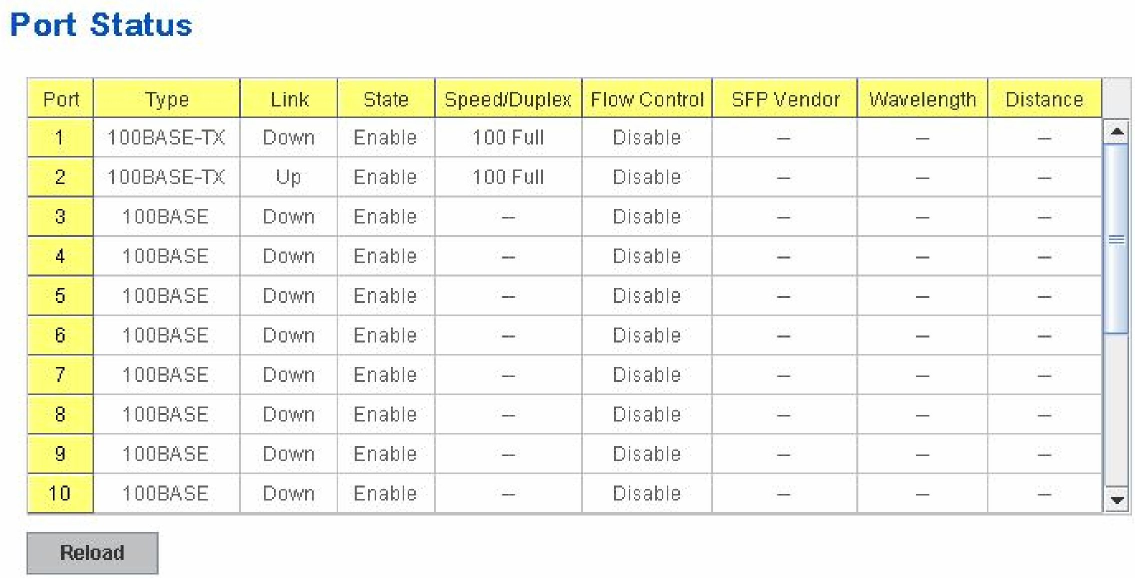
Once you finish configuring the settings, click on **Apply** to save the configuration.

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.

4.3.3 Port Status

Port Status shows you current port status.

Figure 4.3.3.1 shows you the port status of the Fast Ethernet Ports. The blank area (port 1-8) means the module 1 are not inserted.



Port Status

Port	Type	Link	State	Speed/Duplex	Flow Control	SFP Vendor	Wavelength	Distance
1	100BASE-TX	Down	Enable	100 Full	Disable	–	–	–
2	100BASE-TX	Up	Enable	100 Full	Disable	–	–	–
3	100BASE	Down	Enable	–	Disable	–	–	–
4	100BASE	Down	Enable	–	Disable	–	–	–
5	100BASE	Down	Enable	–	Disable	–	–	–
6	100BASE	Down	Enable	–	Disable	–	–	–
7	100BASE	Down	Enable	–	Disable	–	–	–
8	100BASE	Down	Enable	–	Disable	–	–	–
9	100BASE	Down	Enable	–	Disable	–	–	–
10	100BASE	Down	Enable	–	Disable	–	–	–

The description of the columns is as below:

Port: Port interface number.

Type: 100BASE-TX -> Fast Ethernet copper port. 100BASE-FX -> 100Base-FX Fiber Port.

1000BASE-TX -> Gigabit Ethernet Copper port. 1000BASE-X-> Gigabit Fiber Port

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. The information is only applied to on board ports.

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

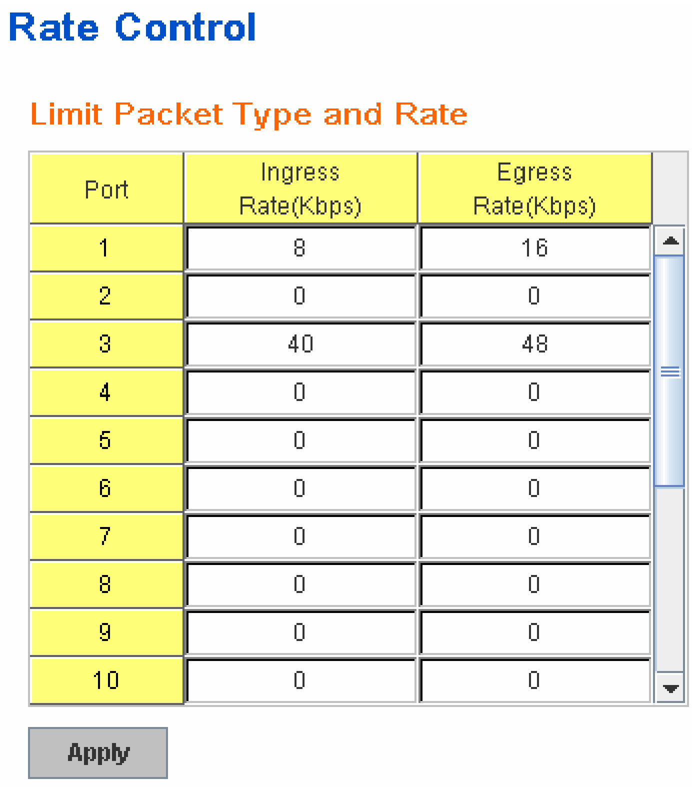
Distance: The transmission distance of the SFP transceiver you plugged.

Note: 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.

4.3.4 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 4.3.4.1 shows you the Limit Rate of Ingress and Egress. You can type the volume in the blank. The volume of the JetNet 5018G/5012G is step by 8Kbps.



Rate Control

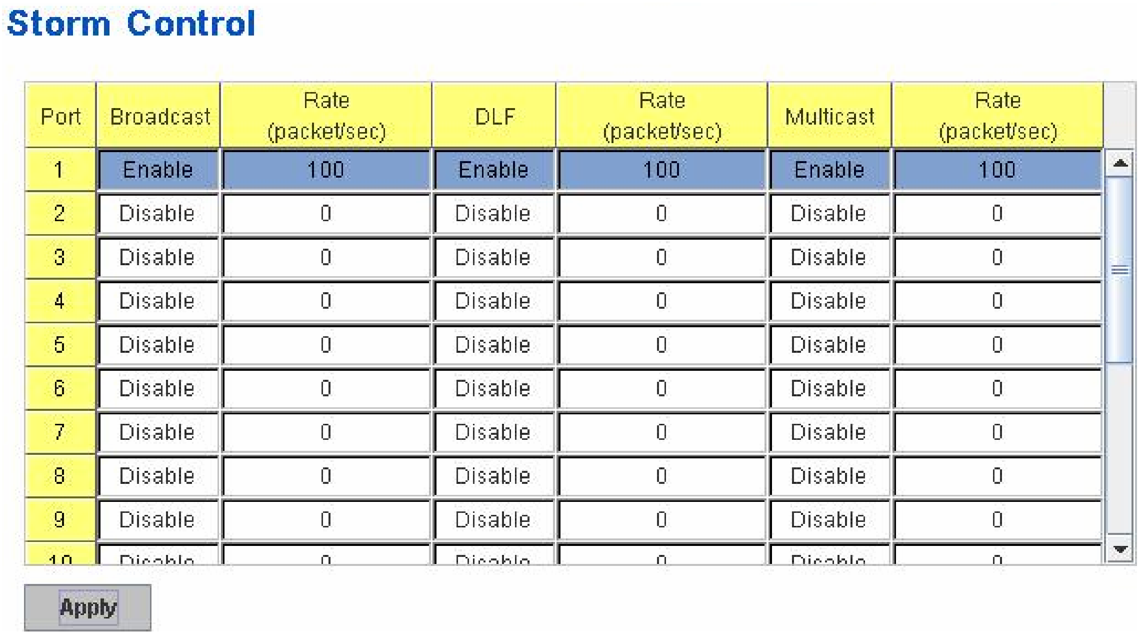
Limit Packet Type and Rate

Port	Ingress Rate(Kbps)	Egress Rate(Kbps)
1	8	16
2	0	0
3	40	48
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0

4.3.5 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.

Figure 4.3.5.1



Storm Control

Port	Broadcast	Rate (packet/sec)	DLF	Rate (packet/sec)	Multicast	Rate (packet/sec)
1	Enable	100	Enable	100	Enable	100
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.

4.3.6 Port Trunking

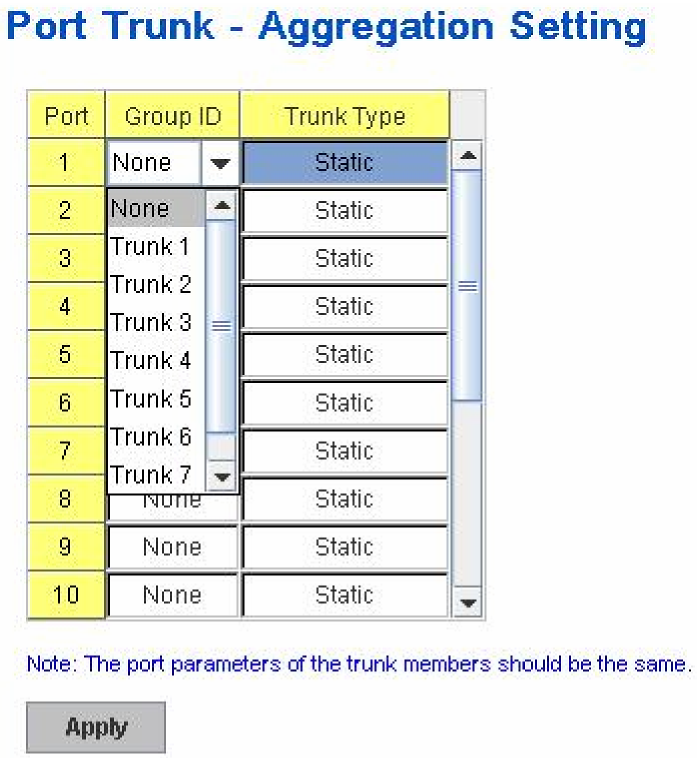
Port Trunking configuration allows you to group multiple Ethernet ports in parallel to increase link bandwidth. The aggregated ports can be viewed as one physical port so that the bandwidth is higher than merely one single Ethernet port. The member ports of the same trunk group can balance the loading 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. **In practical, the Static Trunk is suggested.**

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

Aggregation Setting



Port Trunk - Aggregation Setting

Port	Group ID	Trunk Type
1	None	Static
2		Static
3		Static
4		Static
5		Static
6		Static
7		Static
8	None	Static
9	None	Static
10	None	Static

Note: The port parameters of the trunk members should be the same.

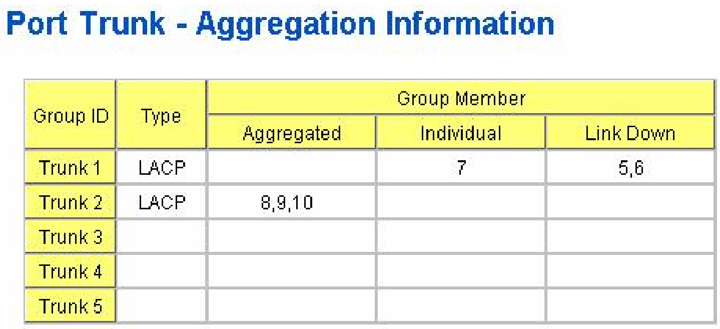
Trunk Size: The switch can support up to 8 trunk groups. Each trunk group can support up to 8 member ports. Since the member ports should use same speed/duplex, the maximum trunk size is decided by the port volume.

Group ID: Group ID is the ID for the port trunking group. Ports with same group ID are in the same group. Click None, you can select the Trunk ID from Trunk 1 to Trunk 8.

Trunk Type: Static and **802.3ad LACP.** Each Trunk Group can only support Static or 802.3ad LACP. Choose the type you need here. The not active port can't be setup here.

Aggregation Status

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



Port Trunk - Aggregation Information

Group ID	Type	Group Member		
		Aggregated	Individual	Link Down
Trunk 1	LACP		7	5,6
Trunk 2	LACP	8,9,10		
Trunk 3				
Trunk 4				
Trunk 5				

Group ID: Display Trunk 1 to Trunk 5 set up in Aggregation Setting.

Type: Static or LACP set up in Aggregation Setting.

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

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

4.3.7 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 UP interface fastethernet1 is up now.
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 set the speed mode ok! Switch(config-if)# duplex full set the duplex mode ok!
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 MTU: 1518 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. *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 - Bandwidth	Switch(config-if)# rate-limit ingress bandwidth <0-1000000> Limit in kilobits per second (FE: 0-100000, GE: 0-1000000, 0 is no limit) Switch(config-if)# rate-limit ingress bandwidth 800 Set the ingress rate limit 800Kbps 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 Control - Rate	Switch(config-if)# storm-control broadcast <0-262143> Rate limit value 0~262143 packet/sec Switch(config-if)# storm-control broadcast 10000 Enables rate limit for Broadcast packets for Port 13. Switch(config-if)# storm-control multicast 10000 Enables rate limit for Multicast packets for Port 13. Switch(config-if)# storm-control dlf 10000 Enables rate limit for Destination Lookup Failue packets for Port 13.
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	JetNet 5018G# 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 Network Redundancy

It is critical for industrial applications that network remains non-stop. JetNet Managed Switch firmware supports standard RSTP, Multiple Super Ring, Rapid Dual Homing and backward compatible with Legacy Super Ring Client modes.

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.

To become backwards compatible with the Legacy Super Ring technology implemented in *JetNet 4000/4500* switches, *JetNet 5000/6000 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.

Besides Korenix ring technology, JetNet Managed Switch also supports 802.1D-2004 version Rapid Spanning Tree Protocol (RSTP). New version of RSTP standard includes 802.1D-1998 STP, 802.1w RSTP.

Following commands are included in this group:

4.4.1 RSTP

4.4.2 RSTP Info

4.4.3 Multiple Super Ring

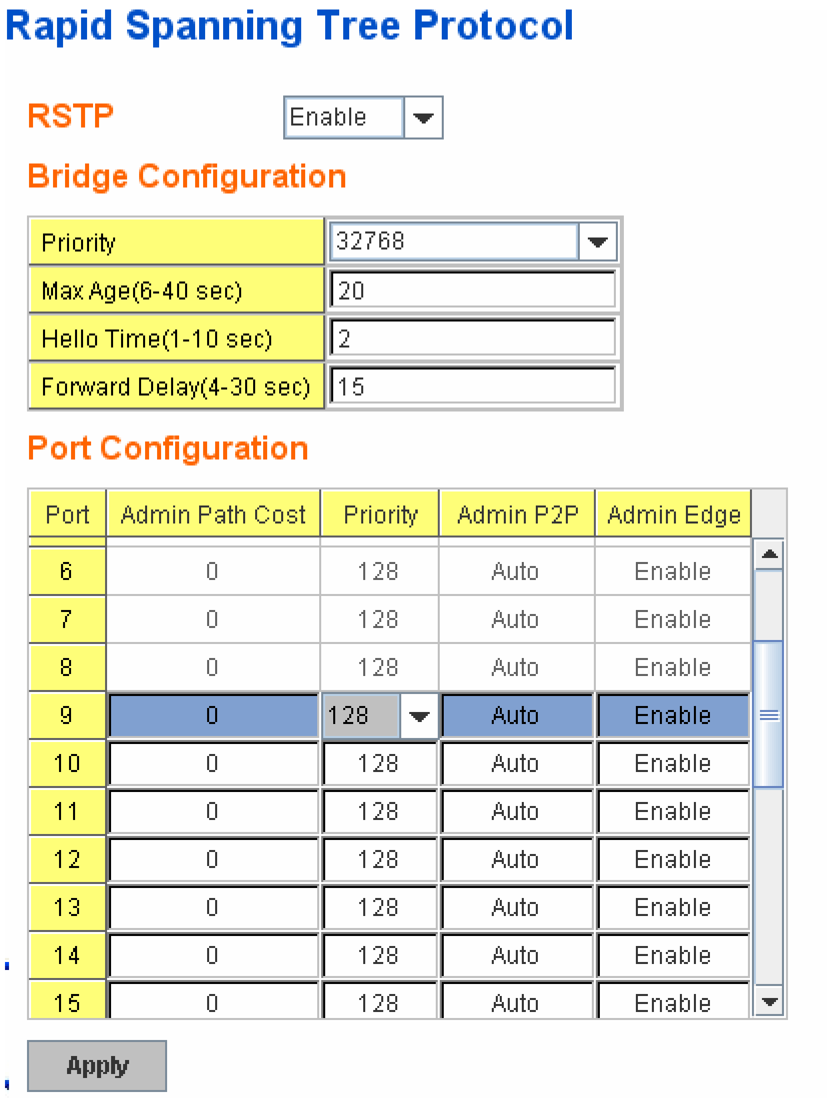
4.4.4 Ring Info

4.4.5 Command Lines for Network Redundancy

4.4.1 RSTP

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).

Figure 4.4.1.1 show the web page which allows you to enable/disable RSTP, configure the global setting and port settings.



Rapid Spanning Tree Protocol

RSTP: Enable

Bridge Configuration

Priority	32768
Max Age(6-40 sec)	20
Hello Time(1-10 sec)	2
Forward Delay(4-30 sec)	15

Port Configuration

Port	Admin Path Cost	Priority	Admin P2P	Admin Edge
6	0	128	Auto	Enable
7	0	128	Auto	Enable
8	0	128	Auto	Enable
9	0	128	Auto	Enable
10	0	128	Auto	Enable
11	0	128	Auto	Enable
12	0	128	Auto	Enable
13	0	128	Auto	Enable
14	0	128	Auto	Enable
15	0	128	Auto	Enable

RSTP Mode: You must first enable STP/RSTP mode, before configuring any related parameters. Parameter settings required for both STP and RSTP are the same. Note that 802.1d refers to STP mode, while 802.1w refers to faster RSTP mode.

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.

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)

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.

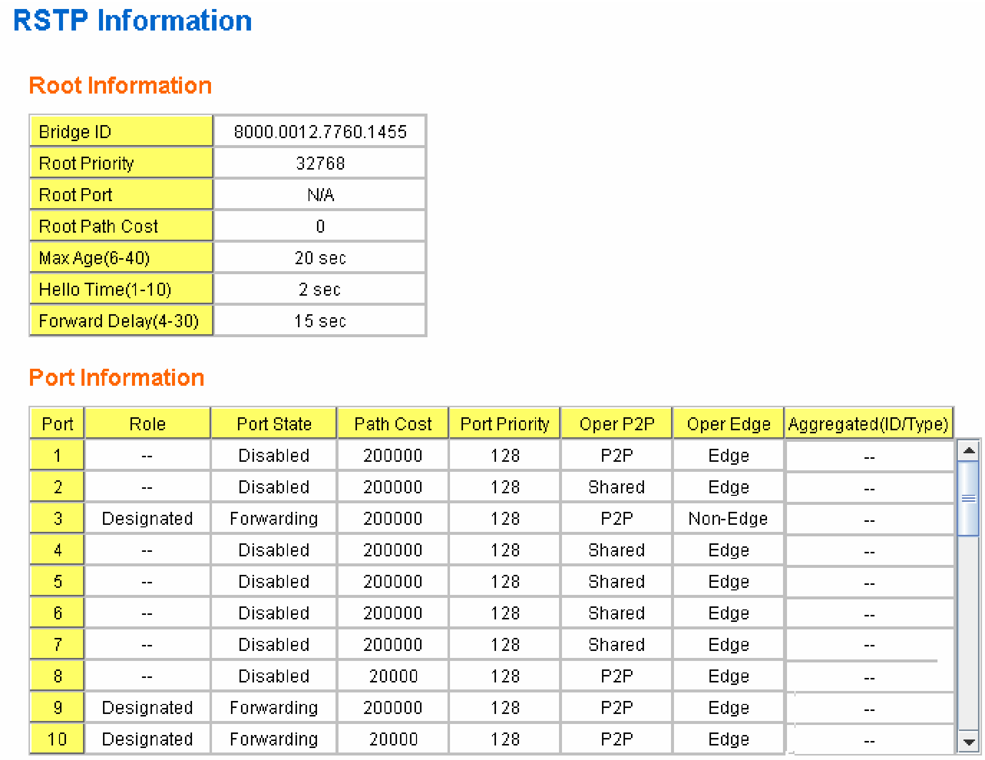
Admin P2P: Some of the rapid state transitions that are possible within RSTP depend upon whether the port of concern can only be connected to another bridge (i.e. it is served by a point-to-point LAN segment), or if it can be connected to two or more bridges (i.e. it is served by a shared-medium LAN segment). This function allows P2P status of the link to be manipulated administratively. “**Auto**” means to auto select P2P or Share mode. “**P2P”** means P2P is enabled, while “**Share”** means P2P is disabled.

Admin 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.

4.4.2 RSTP Info

This page allows you to see the information of the root switch and port status.



RSTP Information

Root Information

Bridge ID	8000.0012.7760.1455
Root Priority	32768
Root Port	N/A
Root Path Cost	0
Max Age(6-40)	20 sec
Hello Time(1-10)	2 sec
Forward Delay(4-30)	15 sec

Port Information

Port	Role	Port State	Path Cost	Port Priority	Oper P2P	Oper Edge	Aggregated(ID/Type)
1	--	Disabled	200000	128	P2P	Edge	--
2	--	Disabled	200000	128	Shared	Edge	--
3	Designated	Forwarding	200000	128	P2P	Non-Edge	--
4	--	Disabled	200000	128	Shared	Edge	--
5	--	Disabled	200000	128	Shared	Edge	--
6	--	Disabled	200000	128	Shared	Edge	--
7	--	Disabled	200000	128	Shared	Edge	--
8	--	Disabled	20000	128	P2P	Edge	--
9	Designated	Forwarding	200000	128	P2P	Edge	--
10	Designated	Forwarding	20000	128	P2P	Edge	--

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).

4.4.3 Multiple Super Ring (MSR)

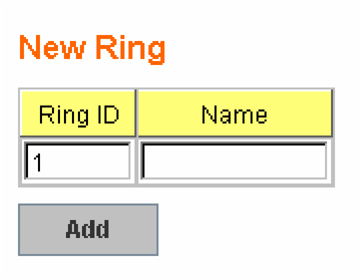
The most common industrial network redundancy is to form a ring or loop. Typically, the managed switches are connected in series and the last switch is connected back to the first one. In such connection, you can implement Korenix Super Ring, Rapid Super Ring, and Multiple Super Ring technology.

Super Ring is Korenix 1st generation ring redundancy technology released with JetNet 4000 and 4500 series managed switches. Rapid Super Ring is Korenix 2nd generation Ring redundancy technology released with old version of JetNet 5010G/4510.

Multiple Super Ring is Korenix 3rd generation Ring redundancy technology. This is Korenix pattern and protected in countries all over the world. The Multiple Super Ring has enhanced Ring Master selection and faster recovery time. It is also enhanced for more complex ring application.

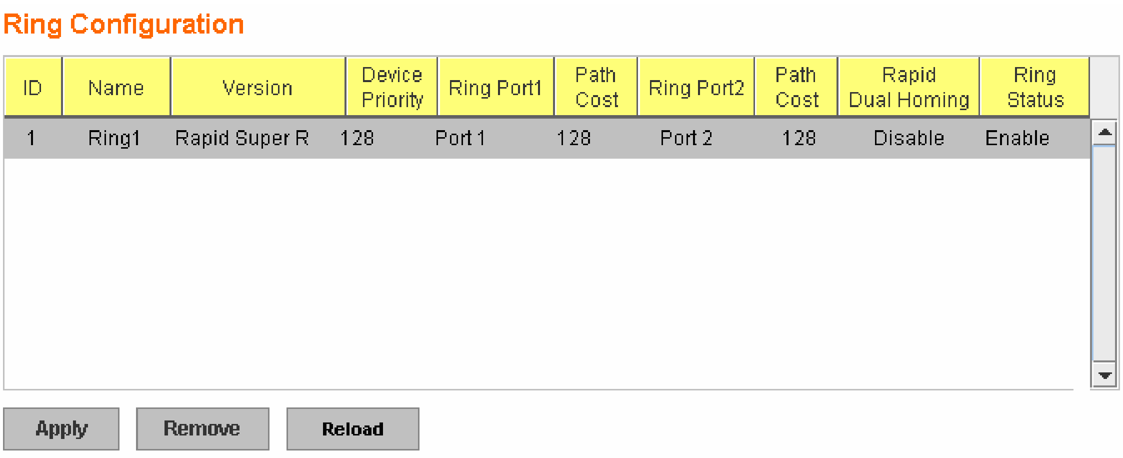
This page allows you to enable the settings for Multiple Super Ring and Rapid Dual Homing.

New Ring: To create a Rapdis Super Ring. Jjust 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.



New Ring

Ring ID	Name
1	



Ring Configuration

ID	Name	Version	Device Priority	Ring Port1	Path Cost	Ring Port2	Path Cost	Rapid Dual Homing	Ring Status
1	Ring1	Rapid Super R	128	Port 1	128	Port 2	128	Disable	Enable

Ring Configuration

ID: Once a Ring is created, it appears and can not be changed. In multiple rings' environment, the traffic can only be forwarded under the same ring ID. Remember to check the Ring ID when there are more than 1 ring existed.

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 "Ring ID".

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 practical, 2 uplinks for RDH is suggested.

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.

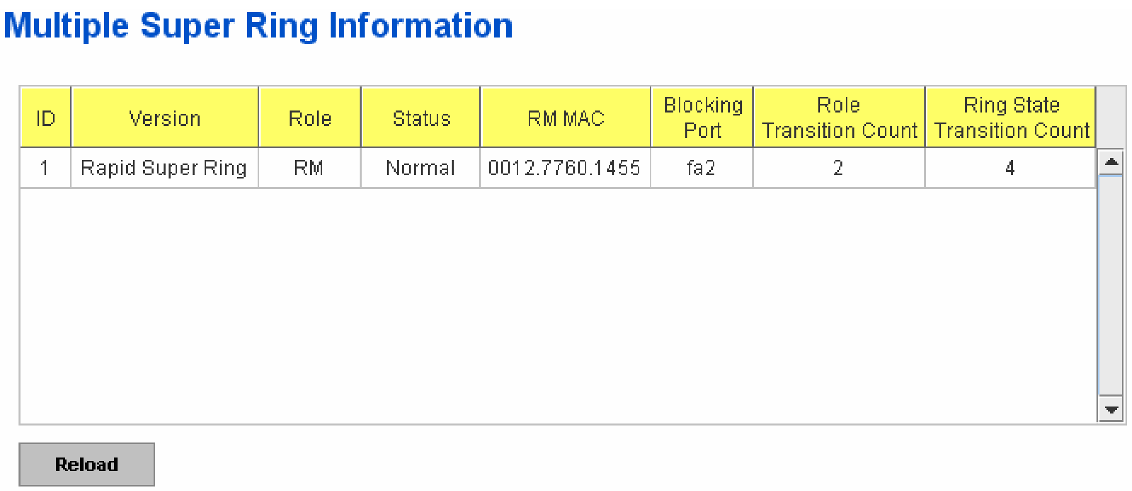
MultiRing: The MultiRing technology is one of the pattern of the MSR technology, the technology allows you to aggregate multiple rings within one switch. Create multiple ring ID and assign different ring port 1 and port 2 to each ring, thus the switch can have up to 9 rings in one JetNet 5018G.

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 power volume limitation, JetNet 5012G supports up to 6 rings, JetNet 5018G supports up to 9 rings.

Trunk Ring: 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, the Trunk ID can be one of the port ID of the MSR technology. Configured the port trunking first then you can configure Trunk Ring in managed switch.

4.4.4 Ring Info

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

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.

4.4.5 Command Lines:

Feature	Command Line
RSTP	
Enable	Switch(config)# spanning-tree enable
Disable	Switch (config)# spanning-tree disable
RSTP mode	Switch(config)# spanning-tree mode rapid-stp SpanningTree Mode change to be RST(802.1w) .
STP mode	Switch(config)# spanning-tree mode stp SpanningTree Mode change to be STP(802.1d) .
Priority	Switch(config)# spanning-tree priority <0-61440> valid range is 0 to 61440 in multiple of 4096 Switch(config)# spanning-tree priority 4096
Max Age	Switch(config)# spanning-tree max-age <6-40> Valid range is 6~40 seconds Switch(config)# spanning-tree max-age 10
Hello Time	Switch(config)# spanning-tree hello-time <1-10> Valid range is 1~10 seconds Switch(config)# spanning-tree hello-time 2
Forward Delay	Switch(config)# spanning-tree forward-time <4-30> Valid range is 4~30 seconds Switch(config)# spanning-tree forward-time 15
Port Path Cost	Switch(config-if)# spanning-tree cost <1-200000000> 16-bit based value range from 1-65535, 32-bit based value range from 1-200,000,000 Switch(config-if)# spanning-tree cost 200000
Port Priority	Switch(config-if)# spanning-tree port-priority <0-240> Number from 0 to 240, in multiple of 16 Switch(config-if)# spanning-tree port-priority 128
Link Type - Auto	Switch(config-if)# spanning-tree link-type auto
Link Type - P2P	Switch(config-if)# spanning-tree link-type point-to-point
Link Type – Share	Switch(config-if)# spanning-tree link-type shared
Edge Port	Switch(config-if)# spanning-tree edge-port enable Switch(config-if)# spanning-tree edge-port disable
RSTP Info	
Active status	Switch# show spanning-tree active Rapid Spanning-Tree feature Enabled Spanning-Tree BPDU transmission-limit 3

	Root Address 0012.7701.0386 Priority 4096 Root Path Cost : 200000 Root Port : 7 Root Times : max-age 20 sec, hello-time 2 sec, forward-delay 15 sec Bridge Address 0012.77ff.0102 Priority 4096 Bridge Times : max-age 10 sec, hello-time 2 sec, forward-delay 15 sec Aging time : 300 Port Role Port-State Cost Prio.Nbr Type ------- ---------- ------------ --------- ---------- ----------- fa6 Designated Forwarding 200000 128.6 Auto(RST) fa7 Root Forwarding 200000 128.7 Shared(STP)
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 16 #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
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 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

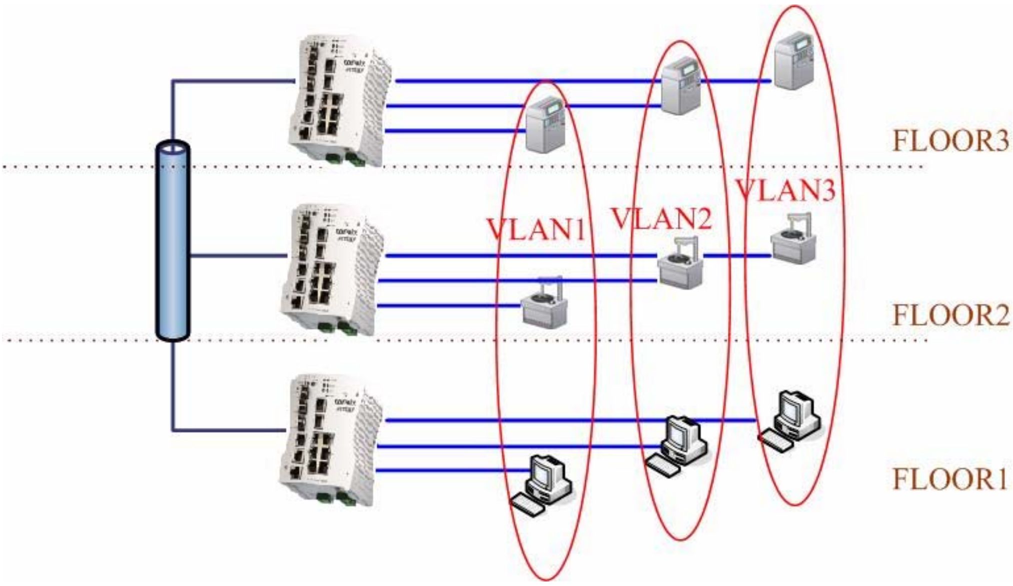
Ring Port	Switch(config-multiple-super-ring)# port IFLIST Interface list, ex: fa1,fa3-5,gi8-10 cost path cost Switch(config-multiple-super-ring)# port fa1,fa2
Ring Port Cost	Switch(config-multiple-super-ring)# port cost <0-255> valid range is 0 or 255 default set default (128)valid range is 0 or 255 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.

4.5 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 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 (see Figure 1). 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 4.5.1 802.1Q VLAN



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:

4.5.1 VLAN Port Configuration

4.5.2 VLAN Configuration

4.5.3 GVRP Configuration

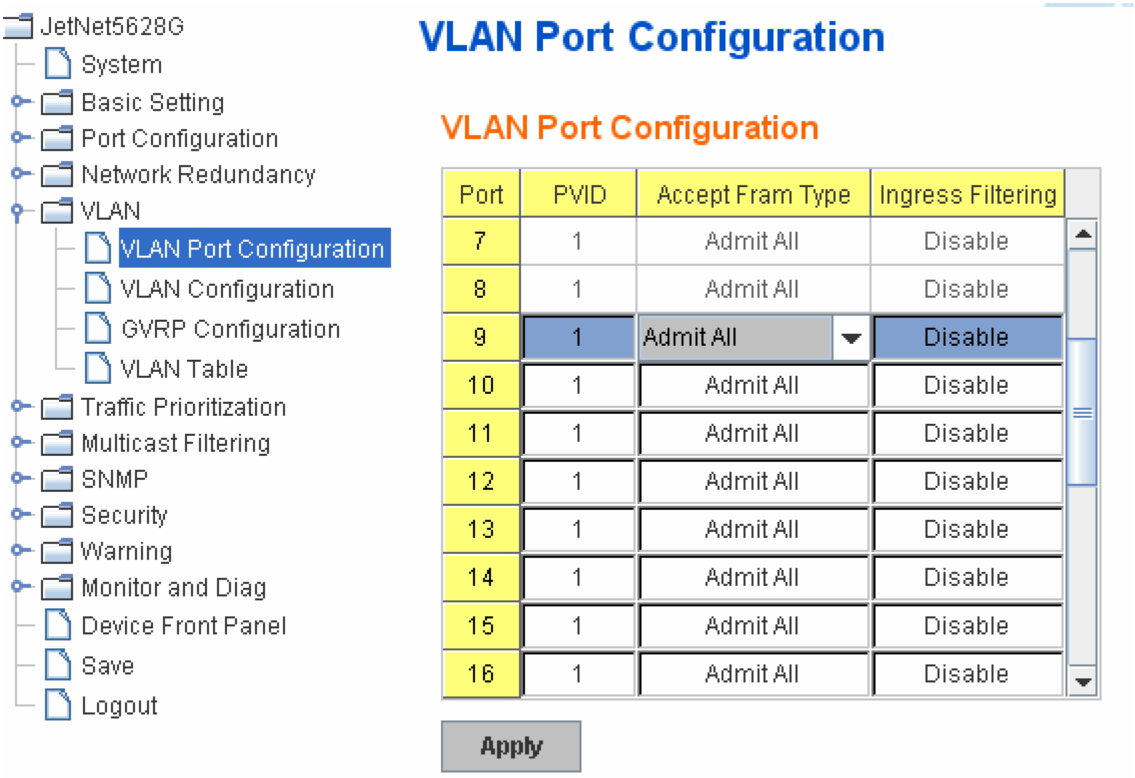
4.5.4 VLAN Table

4.5.5 CLI Commands of the VLAN

4.5.1 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 4.5.2 Web UI of VLAN configuration.



VLAN Port Configuration

VLAN Port Configuration

Port	PVID	Accept Fram Type	Ingress Filtering
7	1	Admit All	Disable
8	1	Admit All	Disable
9	1	Admit All	Disable
10	1	Admit All	Disable
11	1	Admit All	Disable
12	1	Admit All	Disable
13	1	Admit All	Disable
14	1	Admit All	Disable
15	1	Admit All	Disable
16	1	Admit All	Disable

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.

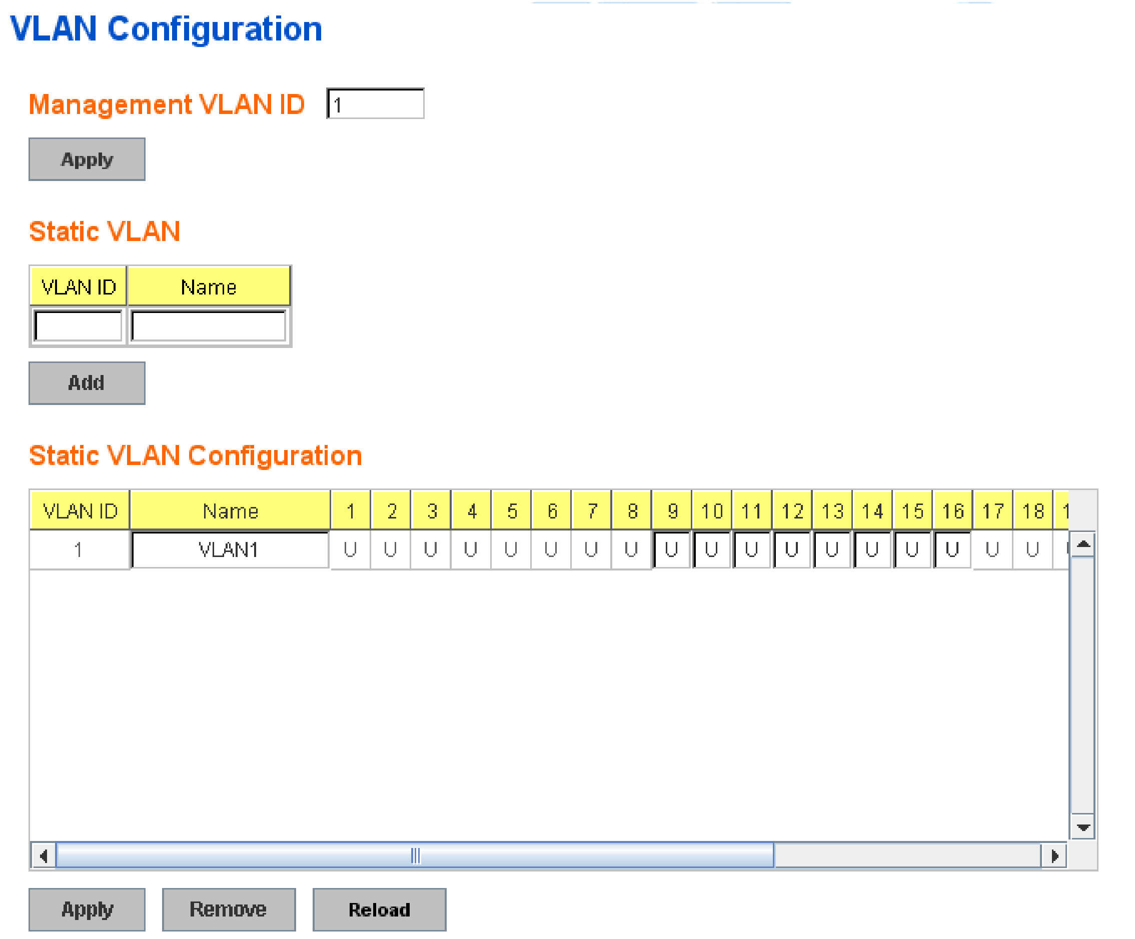
Accept Frame Type: This column defines the accepted frame type of the port. There are 2 modes you can select, **Admit All** and **Tag Only**. Admit All mode means that the port can accept both tagged and untagged packets. Tag Only mode means that the port can only accept tagged packets.

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.

4.5.2 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 4.5.2.1 Web UI of the VLAN Configuration.



VLAN Configuration

Management VLAN ID: 1

Static VLAN

VLAN ID	Name

Static VLAN Configuration

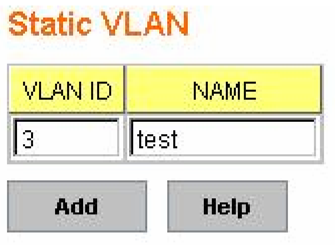
VLAN ID	Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	VLAN1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

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).



Static VLAN

VLAN ID	NAME
3	test

Figure 4.5.2.2 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 4.5.2.3

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

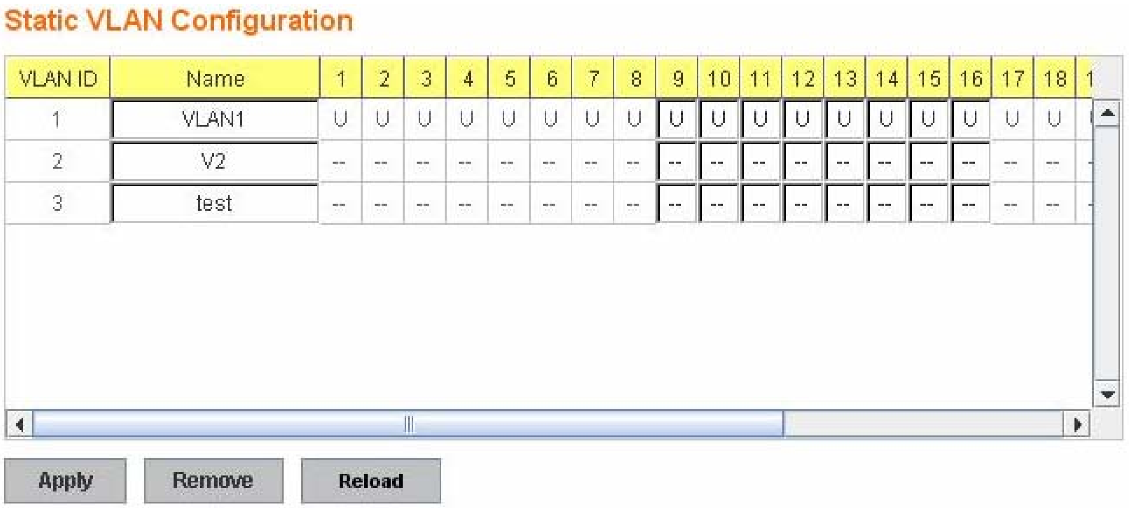
Note: *Before you change the management VLAN ID by Web and Telnet, remember that* *the port attached by the administrator should be the member port of the management VLAN; otherwise the administrator can't access the switch via the network.*

***Note:** Currently JetNet 5012/5018G supports max 255 group VLAN.*

Static VLAN Configuration

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

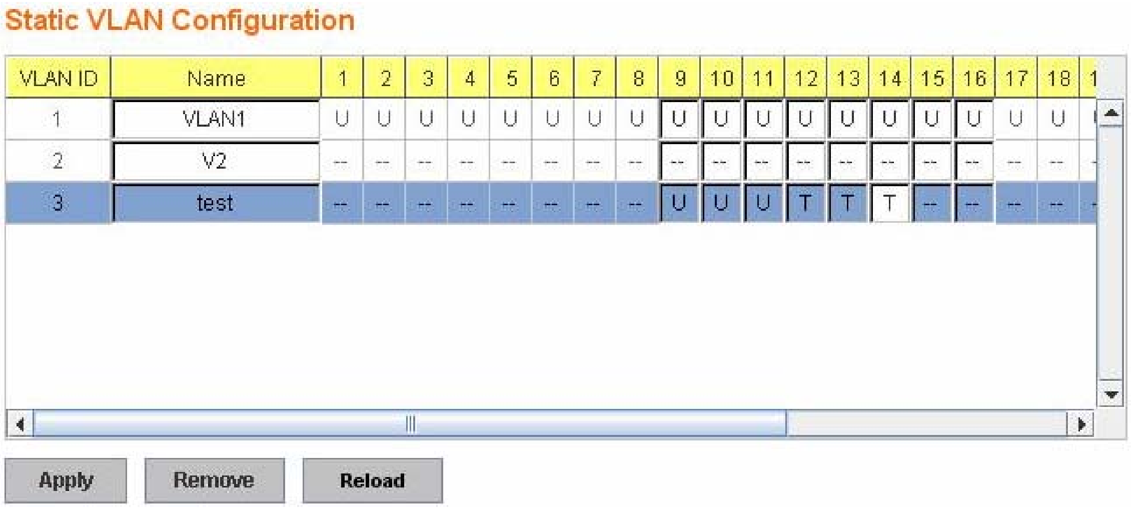
Figure 4.5.2.3 Static VLAN Configuration table. You can see that new VLAN 3 is created. VLAN name is test. Egress rules of the ports are not configured now.



Static VLAN Configuration

VLAN ID	Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	VLAN1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2	V2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	test	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Figure 4.5.2.4 Configure Egress rule of the ports.



Static VLAN Configuration

VLAN ID	Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	VLAN1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2	V2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	test	--	--	--	--	--	--	--	--	U	U	U	T	T	T	--	--	--	--

-- : Not available

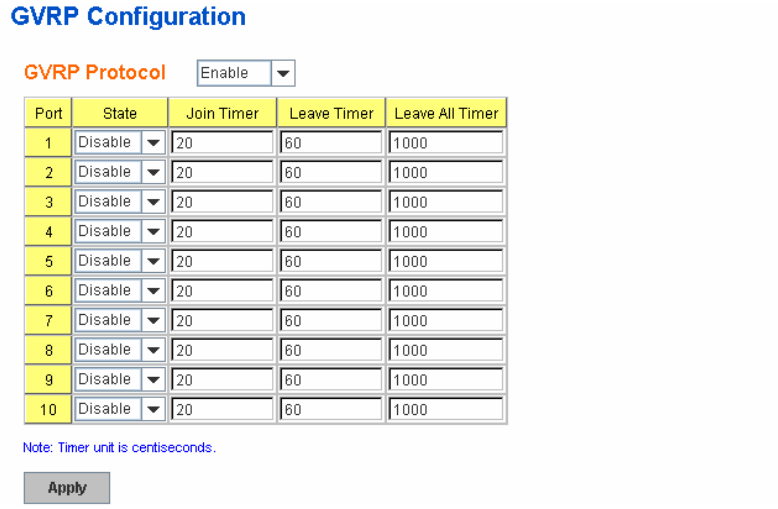
U: **Untag**: Indicates that egress/outgoing frames are not VLAN tagged.

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.

4.5.3 GVRP configuration

GVRP allows users to set-up VLANs automatically rather than manual configuration on every port of every switch in the network. In low volume and stable network, the GVRP can reduce the configuration effort. For high volume and high secure request network, the Static VLAN configuration is always preferred.



GVRP Configuration

GVRP Protocol: Enable

Port	State	Join Timer	Leave Timer	Leave All Timer
1	Disable	20	60	1000
2	Disable	20	60	1000
3	Disable	20	60	1000
4	Disable	20	60	1000
5	Disable	20	60	1000
6	Disable	20	60	1000
7	Disable	20	60	1000
8	Disable	20	60	1000
9	Disable	20	60	1000
10	Disable	20	60	1000

Note: Timer unit is centiseconds.

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

4.5.4 VLAN Table

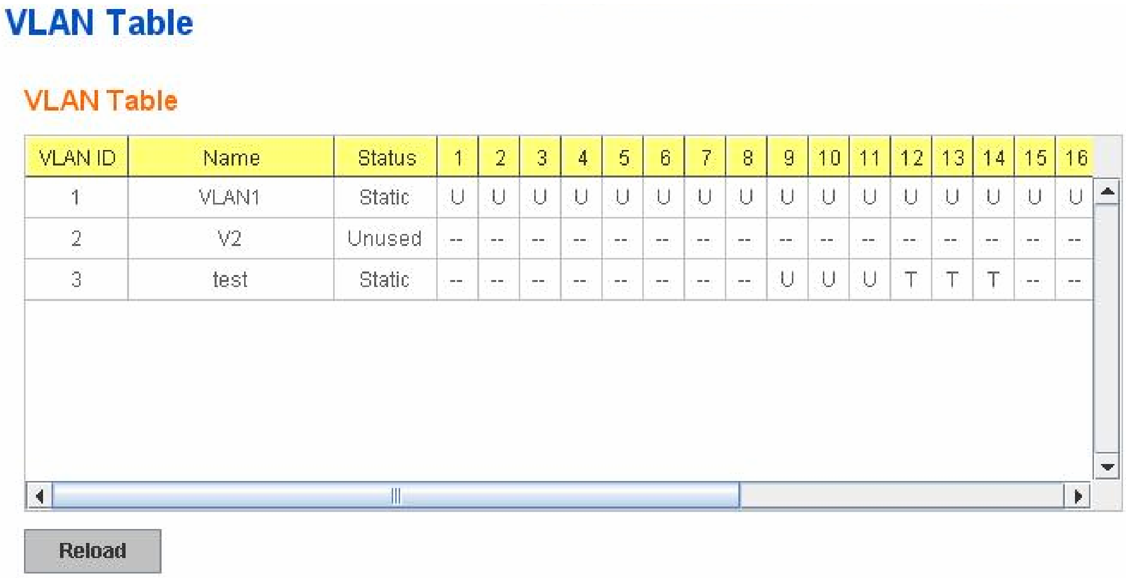
This table shows you current settings of your VLAN table, including VLAN ID, Name, Status, and Egress rule of the ports.

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.



VLAN Table

VLAN Table

VLAN ID	Name	Status	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	VLAN1	Static	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2	V2	Unused	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	test	Static	--	--	--	--	--	--	--	--	U	U	U	T	T	T	--	--

4.5.5 CLI Commands of the VLAN

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

Feature	Command Line
VLAN Port Configuration	
VLAN Port PVID	Switch(config-if)# switchport trunk native vlan 2 Set port default vlan id to 2 success
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
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 join-timer Join timer leave-timer Leave timer leaveall-timer Leaveall timer <10-10000> Switch(config-if)# garp join-timer <10-10000> the timer values Switch(config-if)# garp join-timer 20 Garp join timer value is set to 20 centiseconds on port 2! Switch(config-if)# garp leave-timer 60 Garp leave timer value is set to 60 centiseconds on port 2! Switch(config-if)# garp leaveall-timer 1000 Garp leaveall timer value is set to 1000 centiseconds on port 2! 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 ! ….

4.6 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:

4.6.1 QoS Setting

4.6.2 QoS Priority Mode

4.6.3 CoS-Queue Mapping

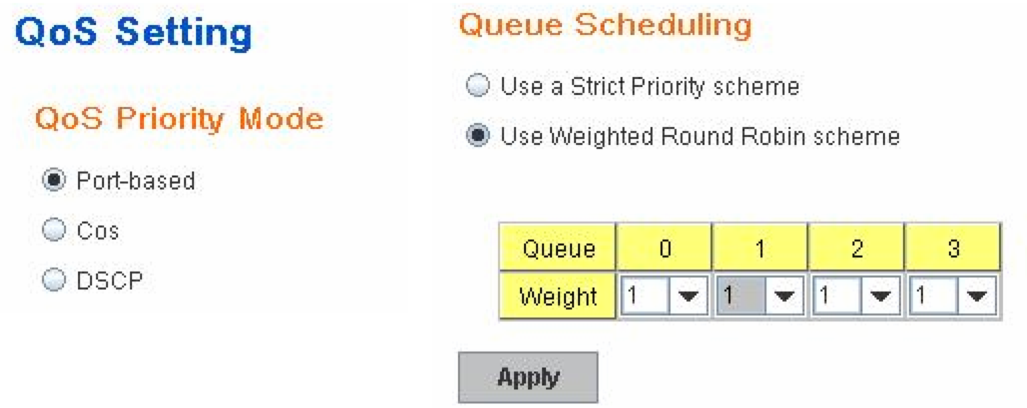
4.6.4 DSCP-Queue Mapping

4.6.5 CLI Commands of the Traffic Prioritization

4.6.1 QoS Setting

In QoS setting, you should choose the QoS Priority Mode first, Port-Based, Cos or DSCP modes. Choose the preferred mode and you can configure the next settings in its own configuration pages. The other page of the mode you don't select can't be configured.

Queue Scheduling



QoS Setting

QoS Priority Mode

● Port-based

○ Cos

○ DSCP

Queue Scheduling

○ Use a Strict Priority scheme

● Use Weighted Round Robin scheme

Queue	0	1	2	3
Weight	1	1	1	1

You can select the Queue Scheduling rule as follows:

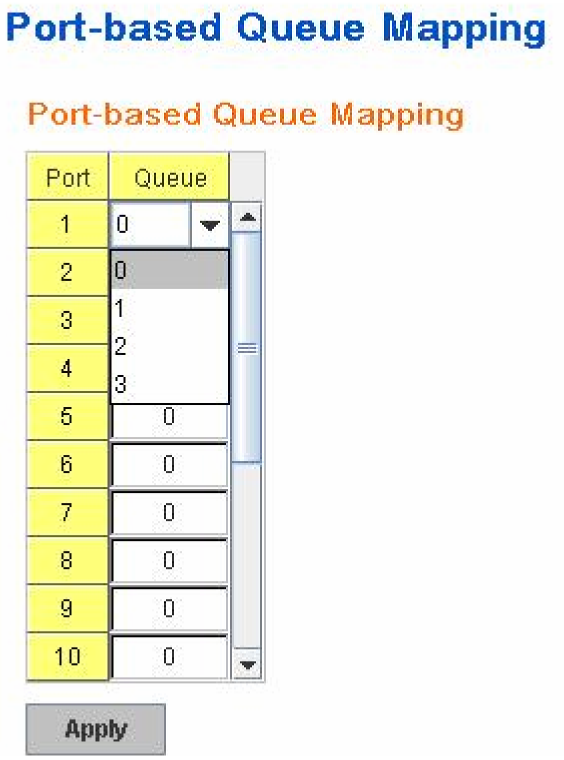
Use a strict priority scheme. Packets with higher priority in the queue will always be processed first, except that there is no packet with higher priority.

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)

4.6.2 Port-based Queue Mapping

Choose the Queue value of each port, the port then has its default priority. The Queue 3 is the highest port-based queue, 0 is the lowest queue. The traffic injected to the port follows the queue level to be forwarded, but the outgoing traffic doesn't bring the queue level to next switch.



Port-based Queue Mapping

Port-based Queue Mapping

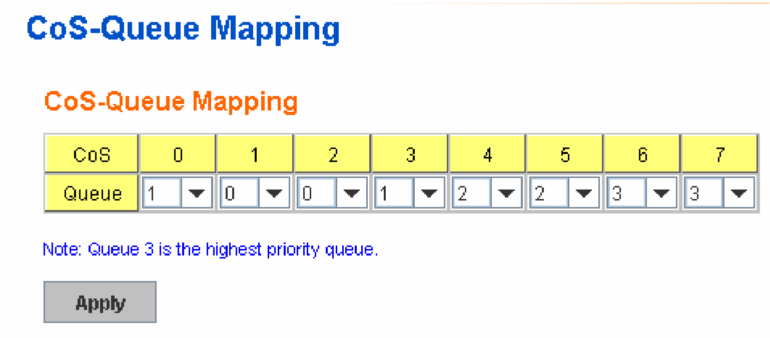
Port	Queue
1	0
2	
3	
4	
5	0
6	0
7	0
8	0
9	0
10	0

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

4.6.3 CoS-Queue Mapping

This page is to change CoS values to Physical Queue mapping table. Since the switch fabric of JetNet only supports 4 physical queues, Lowest, Low, Middle and High. Users should therefore assign how to map CoS value to the level of the physical queue.

In JetNet, users can freely assign the mapping table or follow the suggestion of the 802.1p standard. Korenix uses 802.p suggestion as default values. You can find CoS values 1 and 2 are mapped to physical Queue 0, the lowest queue. CoS values 0 and 3 are mapped to physical Queue 1, the low/normal physical queue. CoS values 4 and 5 are mapped to physical Queue 2, the middle physical queue. CoS values 6 and 7 are mapped to physical Queue 3, the high physical queue.



CoS-Queue Mapping

CoS-Queue Mapping

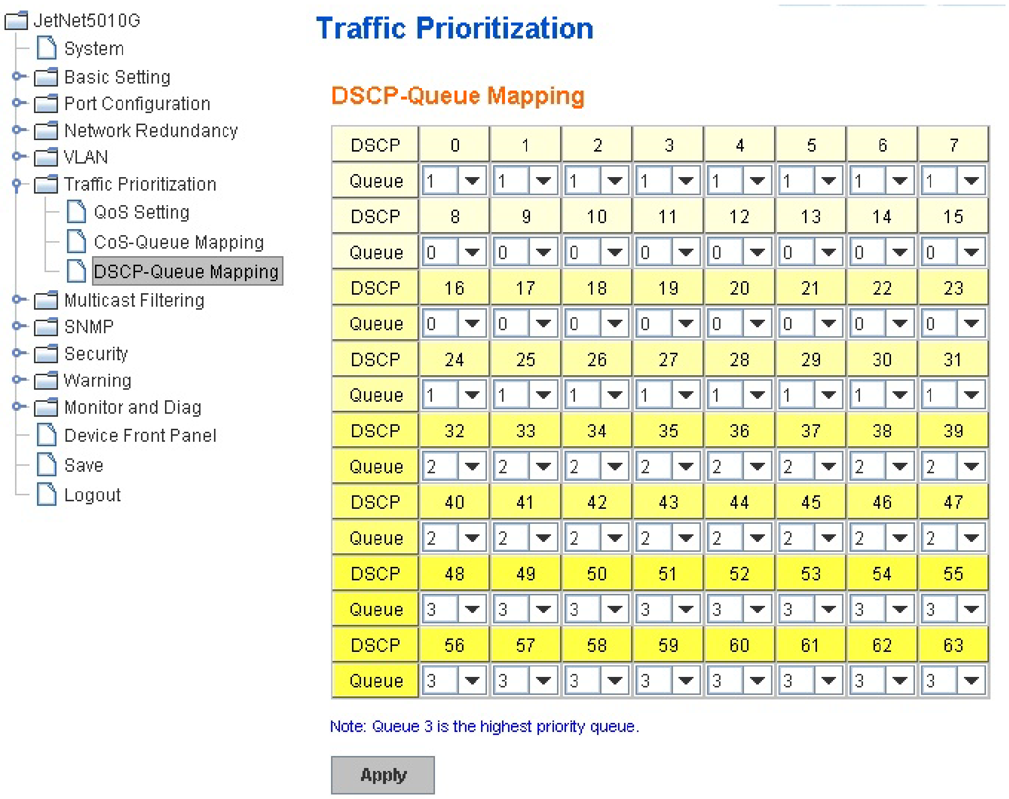
CoS	0	1	2	3	4	5	6	7
Queue	1	0	0	1	2	2	3	3

Note: Queue 3 is the highest priority queue.

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

4.6.4 DSCP-Queue Mapping

This page is to change DSCP values to Physical Queue mapping table. Since the switch fabric of JetNet only supports 4 physical queues, Lowest, Low, Middle and High. 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.



Traffic Prioritization

DSCP-Queue Mapping

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

Note: Queue 3 is the highest priority queue.

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

4.6.5 CLI Commands of the Traffic Prioritization

Command Lines of the Traffic Prioritization configuration

Feature	Command Line
QoS Setting	
Queue Scheduling – Strict Priority	Switch(config)# qos queue-sched sp Strict Priority wrr Weighted Round Robin Switch(config)# qos queue-sched sp The queue scheduling scheme is setting to Strict Priority.
Queue Scheduling – Round Robin	Switch(config)# qos queue-sched rr The queue scheduling scheme is setting to Round Robin. (Note: Not all switch support this feature! Please check the specification first.)
Queue Scheduling - WRR	Switch(config)# qos queue-sched wrr <1-10> Weights for COS queue 0 (queue_id 0) Switch(config)# qos queue-sched wrr 10 <1-10> Weights for COS queue 1 (queue_id 1) ………..

	Switch(config)# qos queue-sched wrr 1 2 3 4 The queue scheduling scheme is setting to Weighted Round Robin. ***Assign the ratio for the 4 classes of service.***
Port Setting – CoS (Default Port Priority)	Switch(config)# interface **fa1** Switch(config-if)# qos priority DEFAULT-PRIORITY Assign an priority (3 highest) Switch(config-if)# qos priority 3 The default port priority value is set 3 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 COS queue 0 = 1 COS queue 1 = 2 COS queue 2 = 3 COS queue 3 = 4

Display – Port Priority Setting (Port Default Priority)	Switch# show qos port-priority
	Port Default Priority :
	Port Priority
	-----+----
	    1 7
	    2 0
	    3 0
	    4 0
	    5 0
	    6 0
	    7 0
	    8 0
	    9 0
	   10 0
	   11 0
	   12 0
	   13 0
	   14 0
	   15 0
	   16 0
	   17 0
	   18 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 (0-3) ***Note: Format: qos cos-map priority_value queue_value***
Map CoS 0 to Queue 1	Switch(config)# qos cos-map 0 1 The CoS to queue mapping is set ok.
Map CoS 1 to Queue 0	Switch(config)# qos cos-map 1 0 The CoS to queue mapping is set ok.
Map CoS 2 to Queue 0	Switch(config)# qos cos-map 2 0 The CoS to queue mapping is set ok.

Map CoS 3 to Queue 1	Switch(config)# qos cos-map 3 1 The CoS to queue mapping is set ok.
Map CoS 4 to Queue 2	Switch(config)# qos cos-map 4 2 The CoS to queue mapping is set ok.
Map CoS 5 to Queue 2	Switch(config)# qos cos-map 5 2 The CoS to queue mapping is set ok.
Map CoS 6 to Queue 3	Switch(config)# qos cos-map 6 3 The CoS to queue mapping is set ok.
Map CoS 7 to Queue 3	Switch(config)# qos cos-map 7 3 The CoS to queue mapping is set ok.

Display – CoS-Queue mapping	Switch# sh qos cos-map
	CoS to Queue Mapping :
	CoS Queue
	  ---- + ------
	    0 1
	    1 0
	    2 0
	    3 1
	    4 2
	    5 2
	    6 3
	    7 3

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 (0-3) ***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 | 1 1 1 1 1 1 1 1 0 0
	    1 | 0 0 0 0 0 0 0 0 0 0
	    2 | 0 0 0 0 1 1 1 1 1 1
	    3 | 1 1 2 2 2 2 2 2 2 2
	    4 | 2 2 2 2 2 2 2 2 3 3
	    5 | 3 3 3 3 3 3 3 3 3 3
	    6 | 3 3 3 3

4.7 Multicast Filtering

For multicast filtering, JetNet Managed Switch 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:

4.7.1 IGMP Snooping

4.7.2 IGMP Query

4.7.3 Unknown Multicast

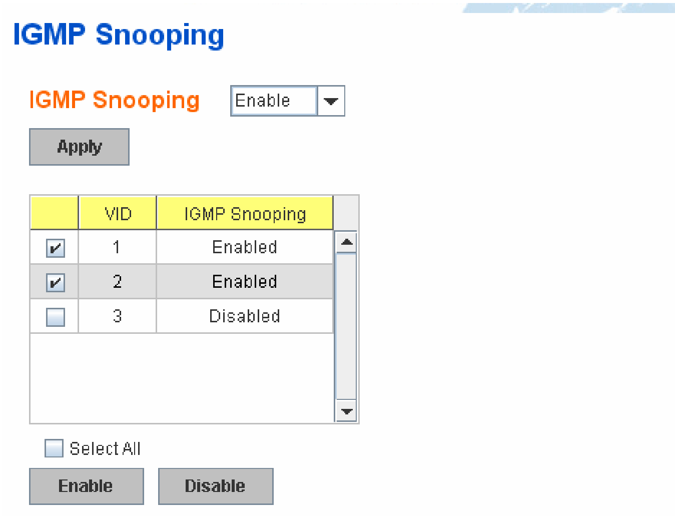
4.7.4 CLI Commands of the Multicast Filtering

4.7.1 IGMP Snooping

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. JetNet5018G / 5012G 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.



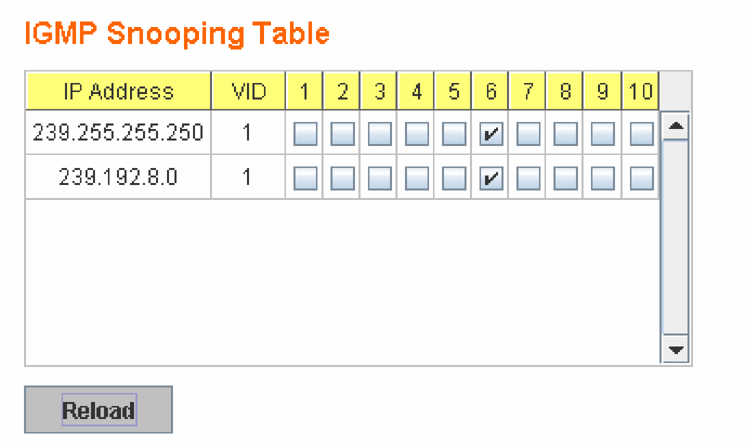
IGMP Snooping

IGMP Snooping: Enable

	VID	IGMP Snooping
☑	1	Enabled
☑	2	Enabled
□	3	Disabled

□ Select All

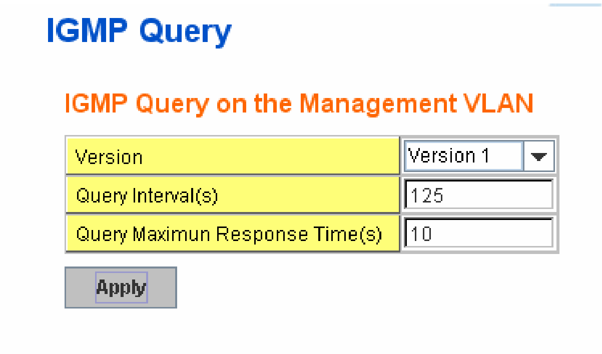
IGMP Snooping Table: In the table, you can see multicast group IP address, VLAN ID it belongs to, and member ports of the multicast group. JetNet 5018G/5012G supports 256 multicast groups. Click on **Reload** to refresh the table.



IGMP Snooping Table

IP Address	VID	1	2	3	4	5	6	7	8	9	10
239.255.255.250	1	□	□	□	□	□	☑	□	□	□	□
239.192.8.0	1	□	□	□	□	□	☑	□	□	□	□

4.7.2 IGMP Query



IGMP Query

IGMP Query on the Management VLAN

Version	Version 1
Query Interval(s)	125
Query Maximun Response Time(s)	10

This page allows users to configure **IGMP Query** feature. Since JetNet Managed Switch can only be configured as the member port 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.

4.7.3 Unknown Multicast

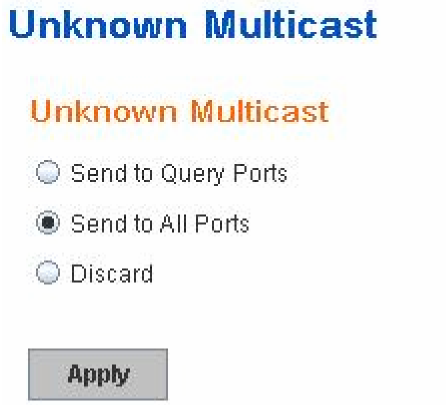
After enabled IGMP Snooping, the known multicast can be filtered by IGMP Snooping mechanism and forwarded to the member ports of the known multicast groups. The other multicast streams which are not leant is so-called unknown multicast, the switch decide how to forward them based on the setting of this page.

Send to Query Ports: The unknown multicast will be sent to the Query ports. The Query port means the port received the IGMP Query packets. It is usually the uplink port of the switch.

Send to All Ports: The unknown multicast will be flooded to all ports even they are not the member ports of the groups.

Discard: The unknown multicast will be discarded. Non-member ports will not receive the unknown multicast streams.

This page allows you to decide how to forward the unknown multicast traffic. can be is still flooded to all ports. The **Force filtering** function allows the switch to filter the



Unknown Multicast

Unknown Multicast

○ Send to Query Ports
● Send to All Ports
○ Discard

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

4.7.4 CLI Commands of the Multicast Filtering

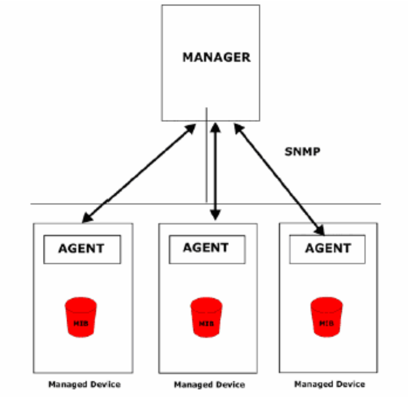
Command Lines of the multicast filtering configuration

Feature	Command Line
IGMP Snooping	
IGMP Snooping - Global	Switch(config)# ip igmp snooping IGMP snooping is enabled globally. Please specify on which vlans IGMP snooping enables Switch(config)# ip igmp snooping <?> immediate-leave leave group when receive a leave message last-member-query-interval the interval for which the switch waits before updating the table entry source-only-learning Source-Only-Learning vlan Virtual LAN
IGMP Snooping - 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 IGMP snooping is enabled on vlan 2
Disable IGMP Snooping - Global	Switch(config)# no ip igmp snoopin IGMP snooping is disabled globally ok.
Disable IGMP Snooping - VLAN	Switch(config)# no ip igmp snooping vlan 3 IGMP snooping is disabled on VLAN 3.
Display – IGMP Snooping Setting	Switch# sh ip igmp interface vlan1 enabled: Yes version: IGMPv1 query-interval; 125s query-max-response-time: 10s Switch# sh ip igmp snooping IGMP snooping is globally enabled Vlan1 is IGMP snooping enabled immediate-leave is disabled last-member-query-interval is 100 centiseconds Vlan2 is IGMP snooping enabled immediate-leave is disabled last-member-query-interval is 100 centiseconds Vlan3 is IGMP snooping disabled immediate-leave is disabled last-member-query-interval is 100 centiseconds
Display – IGMP Table	Switch# sh 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	Switch# sh 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	
Unknown Multicast - Enable Force filtering (Send to All Ports) Disable Force filtering (Discard)	Switch(config)# mac-address-table multicast filtering Filtering unknown multicast addresses ok! Switch(config)# no mac-address-table multicast filtering Flooding unknown multicast addresses ok!
Unknown Multicast – Send to All Ports	Switch(config)# ip igmp snooping source-only-learning

4.8 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 5018G / 5012G 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:

4.8.1 SNMP Configuration

4.8.2 SNMPv3 Profile

4.8.3 SNMP Traps

4.8.4 SNMP CLI Commands for SNMP

4.8.1 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.

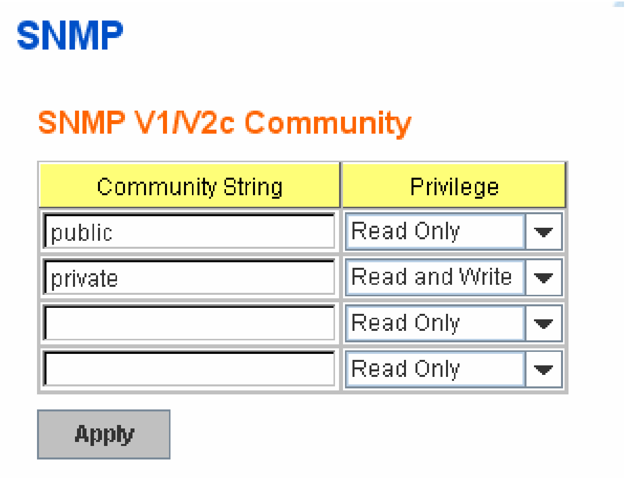
The community includes 2 privileges, Read Only and Read and Write.

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 Managed Switch 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.*



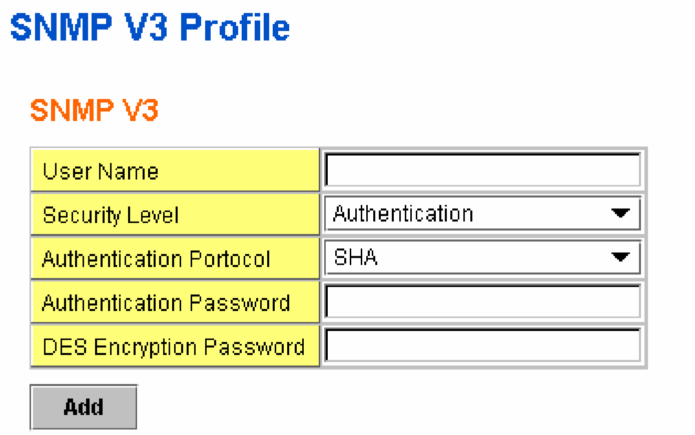
SNMP

SNMP V1/V2c Community

Community String	Privilege
public	Read Only
private	Read and Write
	Read Only
	Read Only

4.8.2 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 Managed Switch and the administrator are encrypted to ensure secure communication.



SNMP V3 Profile

SNMP V3

User Name	
Security Level	Authentication
Authentication Portocol	SHA
Authentication Password	
DES Encryption Password	

Security Level: Here the user can select the following levels of security: None, User Authentication, and Authentication with privacy.

Authentication 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 Managed Switch 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.

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

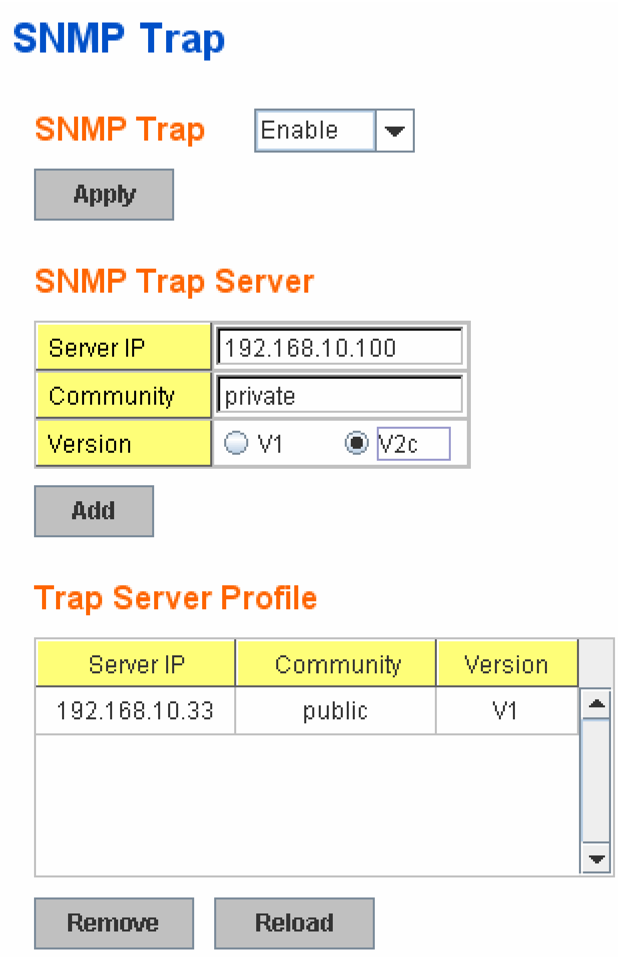
DES Encryption Password: Here the user enters the password for SNMP v3 user DES Encryption.

4.8.3 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 V2c**. After configured, choose "**Add**", you can see the trap server profile in below.

The NMS or the trap server you assigned can receive 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.



SNMP Trap

SNMP Trap: Enable

SNMP Trap Server

Server IP	192.168.10.100
Community	private
Version	○ V1 ● V2c

Trap Server Profile

Server IP	Community	Version
192.168.10.33	public	V1

4.8.4 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 ……..

4.9 Security

JetNet Layer 2+ Managed Switch 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:

4.9.1 Filter Set (Access Control List)

4.9.2 IEEE 802.1x

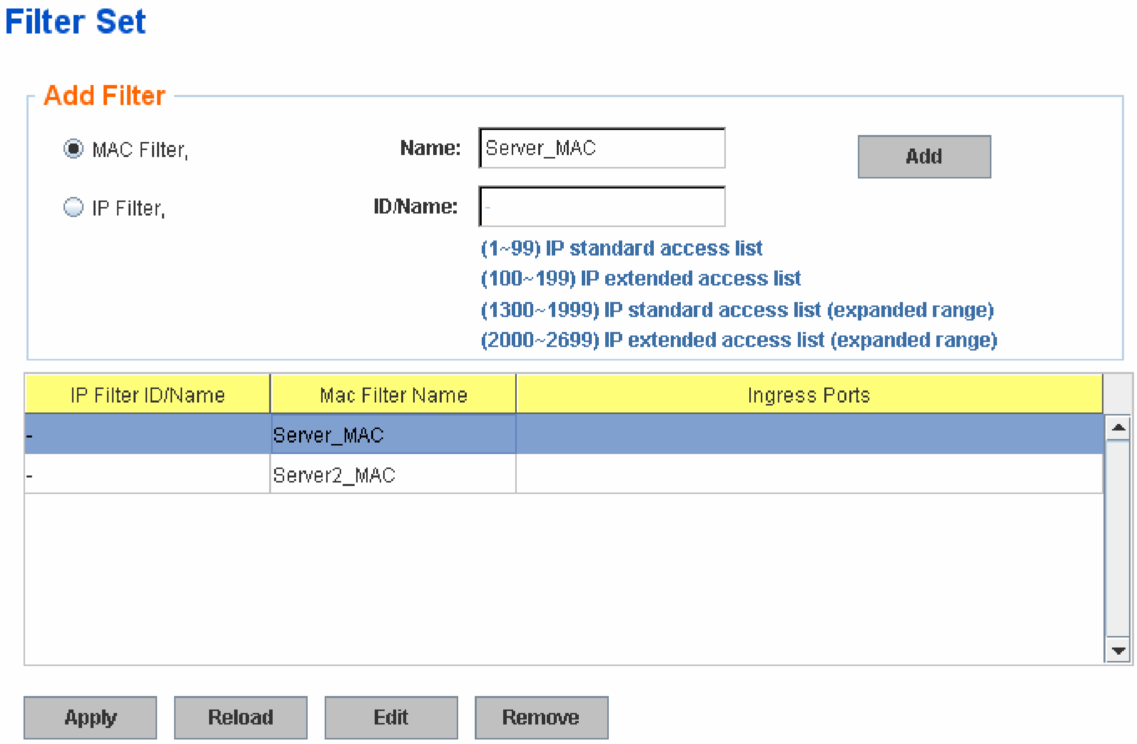
4.9.3 CLI Commands of the Security

4.9.1 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.



Filter Set

Add Filter

● MAC Filter,   Name: Server_MAC

○ IP Filter,   ID/Name: -

(1~99) IP standard access list

(100~199) IP extended access list

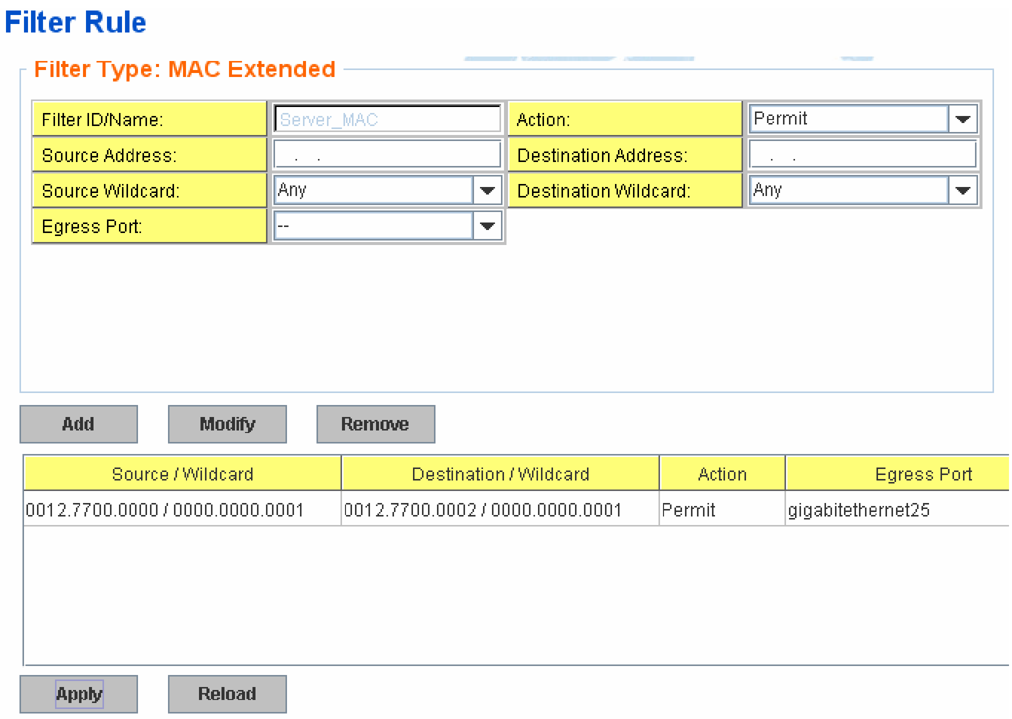
(1300~1999) IP standard access list (expanded range)

(2000~2699) IP extended access list (expanded range)

IP Filter ID/Name	Mac Filter Name	Ingress Ports
-	Server_MAC	
-	Server2_MAC	

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 Rule

Filter Type: MAC Extended

Filter ID/Name:	Server_MAC	Action:	Permit
Source Address:	. .	Destination Address:	. .
Source Wildcard:	Any	Destination Wildcard:	Any
Egress Port:	--		

Source / Wildcard	Destination / Wildcard	Action	Egress Port
0012.7700.0000 / 0000.0000.0001	0012.7700.0002 / 0000.0000.0001	Permit	gigabitethernet25

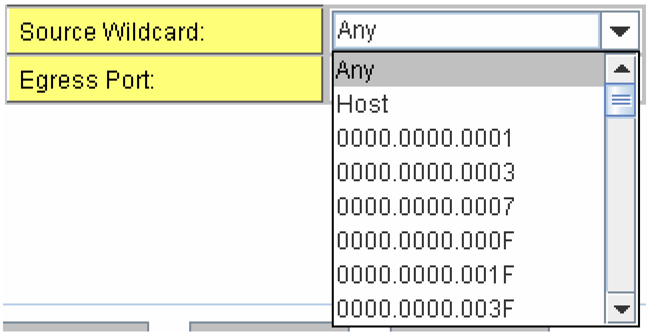
Filter ID/Name: The name for this MAC Filter entry.

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:

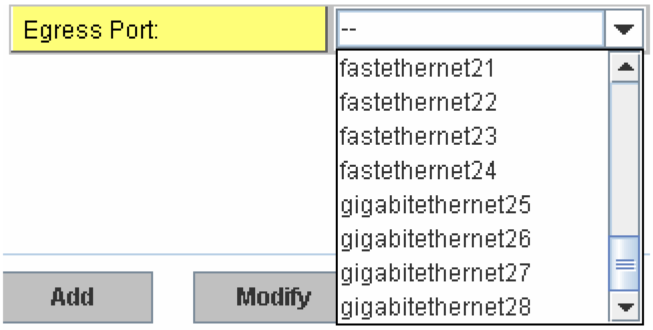
Wildcard	Bit	Number of allowance	Note
Any	1111.1111.1111	All	
Host		1	Only the Source or Destination.
0000.0000.0003	0000.0000.000(00000011)	3	
0000.0000.0007	0000.0000.000(00000111)	7	
0000.0000.000F	0000.0000.000(11111111)	15	
….			



Source Wildcard: Any

Egress Port:

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



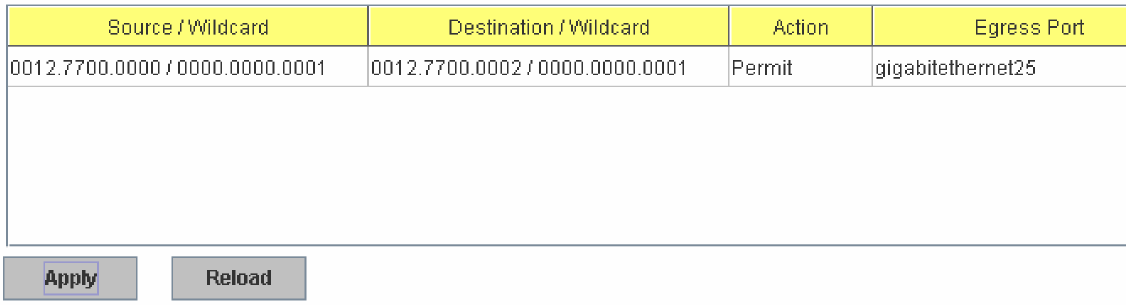
Egress Port: --

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.



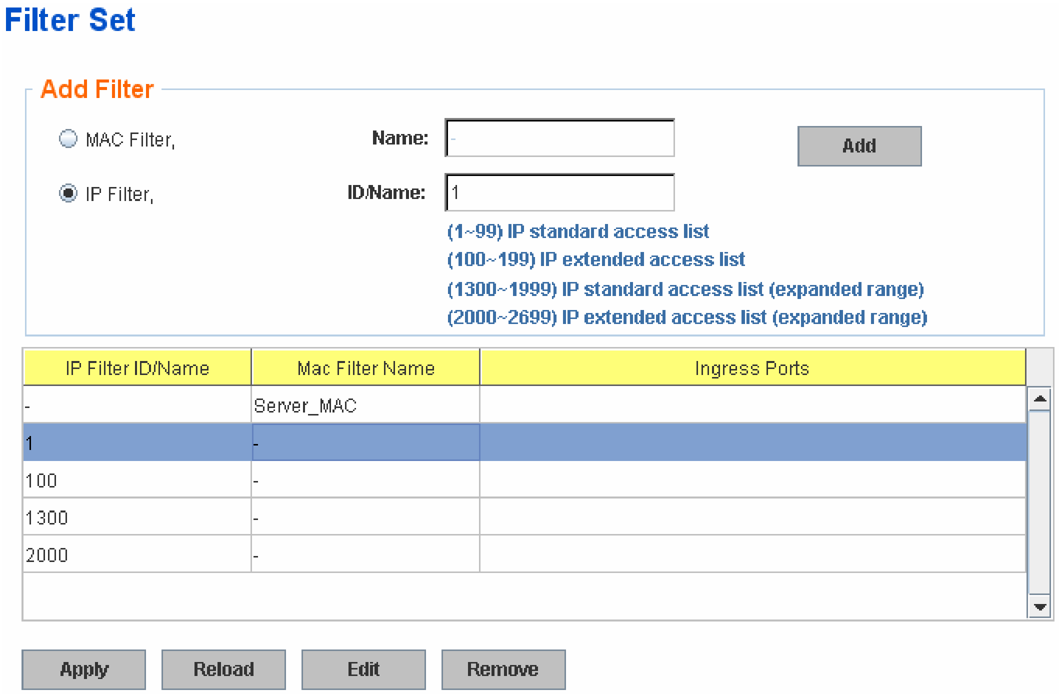
Source / Wildcard	Destination / Wildcard	Action	Egress Port
0012.7700.0000 / 0000.0000.0001	0012.7700.0002 / 0000.0000.0001	Permit	gigabitethernet25

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:



Filter Set

Add Filter

○ MAC Filter, Name: -

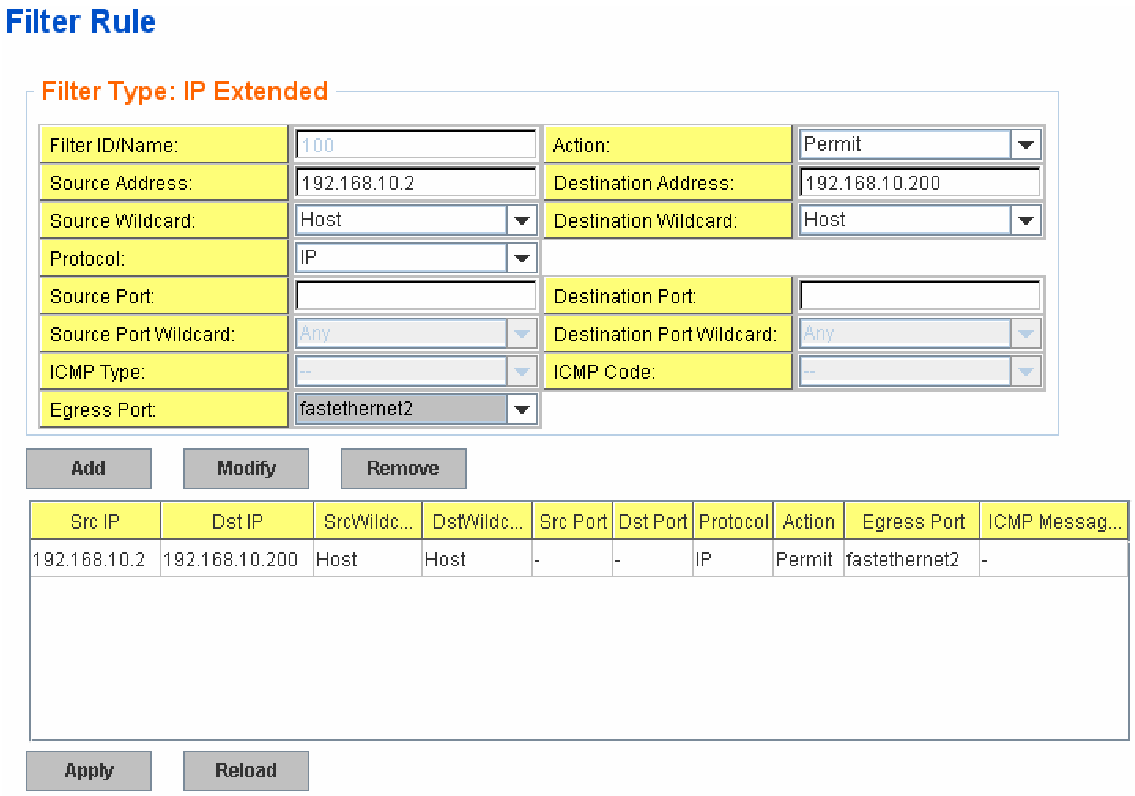
● IP Filter, ID/Name: 1

(1~99) IP standard access list
(100~199) IP extended access list
(1300~1999) IP standard access list (expanded range)
(2000~2699) IP extended access list (expanded range)

IP Filter ID/Name	Mac Filter Name	Ingress Ports
-	Server_MAC	
1	-	
100	-	
1300	-	
2000	-	

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 Rule

Filter Type: IP Extended

Filter ID/Name:	100	Action:	Permit
Source Address:	192.168.10.2	Destination Address:	192.168.10.200
Source Wildcard:	Host	Destination Wildcard:	Host
Protocol:	IP		
Source Port:		Destination Port:	
Source Port Wildcard:	Any	Destination Port Wildcard:	Any
ICMP Type:	--	ICMP Code:	--
Egress Port:	fastethernet2		

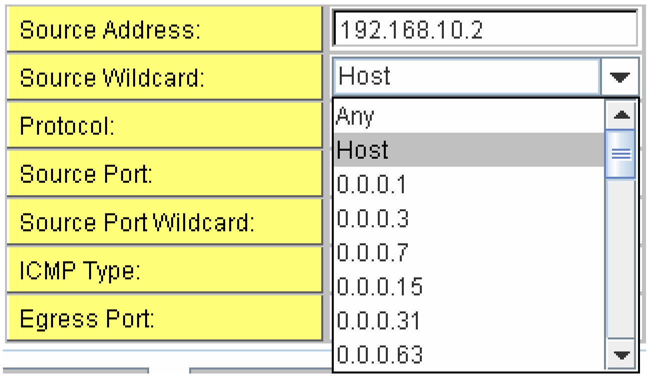
Src IP	Dst IP	SrcWildc...	DstWildc...	Src Port	Dst Port	Protocol	Action	Egress Port	ICMP Messag...
192.168.10.2	192.168.10.200	Host	Host	-	-	IP	Permit	fastethernet2	-

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:



Source Address: 192.168.10.2

Source Wildcard: Host

Protocol:

Source Port:

Source Port Wildcard:

ICMP Type:

Egress Port:

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.

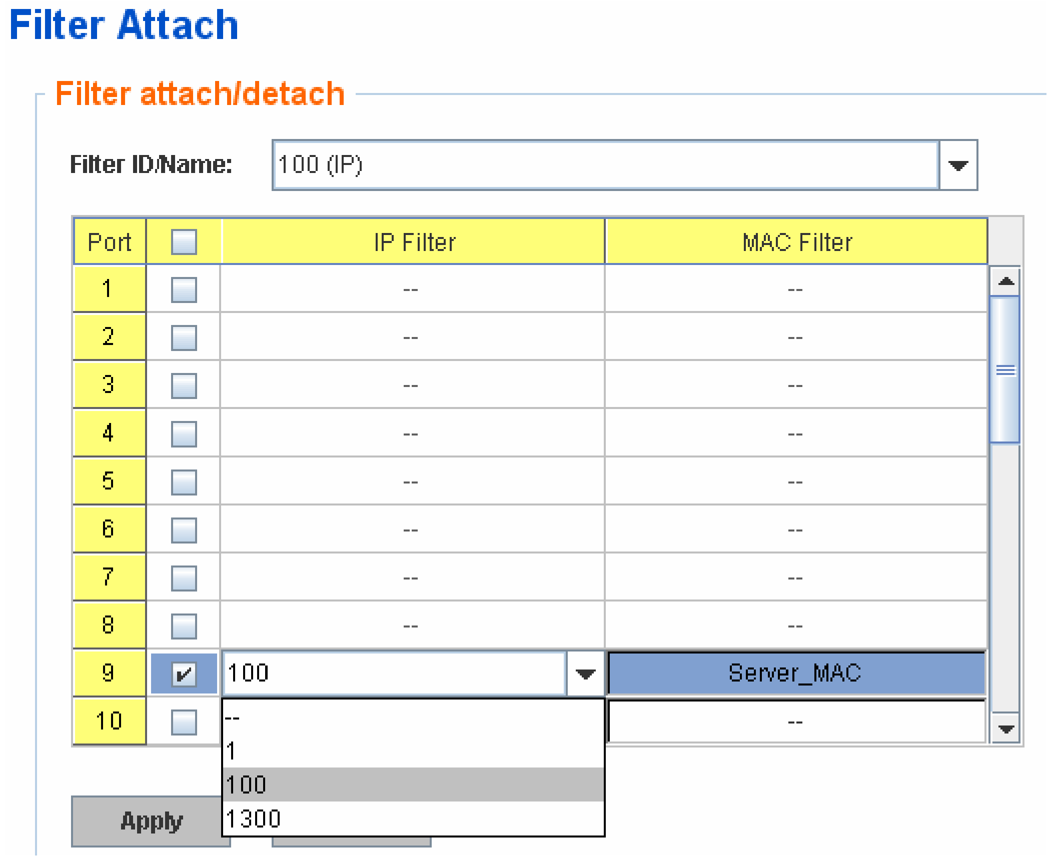
ICMP Type: The ICMP Protocol Type range from 1 ~ 255.

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.



Filter Attach

Filter attach/detach

Filter ID/Name: 100 (IP)

Port	☐	IP Filter	MAC Filter
1	☐	--	--
2	☐	--	--
3	☐	--	--
4	☐	--	--
5	☐	--	--
6	☐	--	--
7	☐	--	--
8	☐	--	--
9	☑	100	Server_MAC
10	☐		--

Filter Attach (Access Control List)

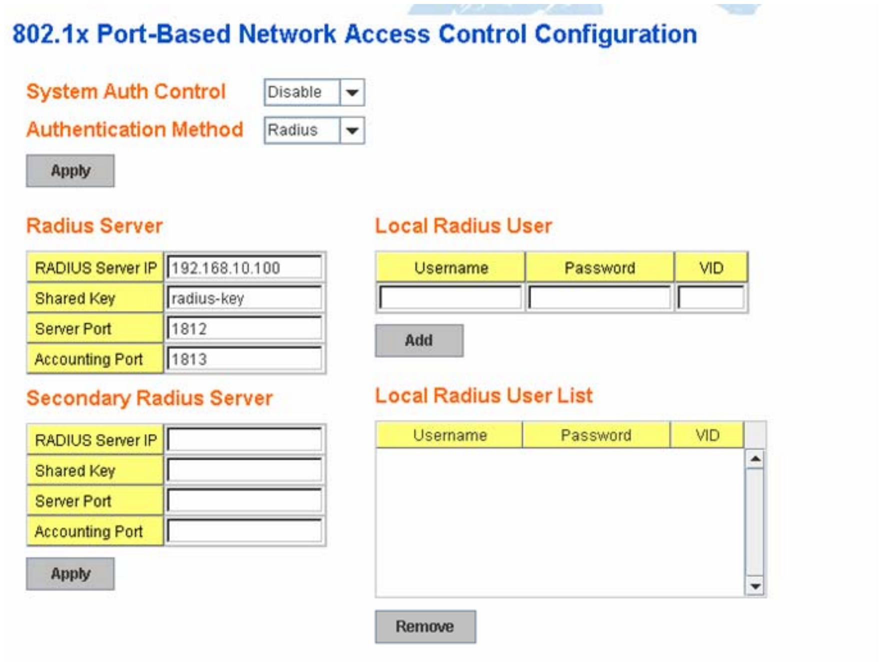
After configured the ACL filter rules, remember associate this filter with the physical ports. Then the port has the capability to filter traffic/attach based on the packets lost.

Note: Different model may support different access control capability, the above commands are applied to generic Korenix managed switch. But, due to the hardware restriction, some of the above command may not support in your product. Please check the web and CLI of your product.

4.9.2 IEEE 802.1x

4.9..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 Managed Switch could control which connection is available or not.



802.1x Port-Based Network Access Control Configuration

System Auth Control: Disable

Authentication Method: Radius

Radius Server

RADIUS Server IP	192.168.10.100
Shared Key	radius-key
Server Port	1812
Accounting Port	1813

Secondary Radius Server

RADIUS Server IP	
Shared Key	
Server Port	
Accounting Port	

Local Radius User

Username	Password	VID

Local Radius User List

Username	Password	VID

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 for communicate 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.

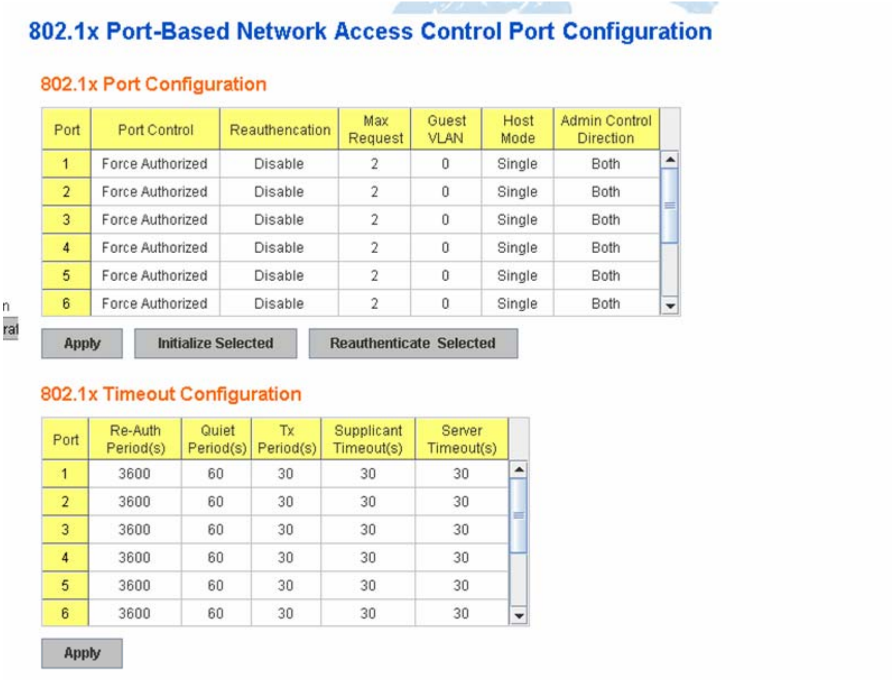
Secondary Radius Server IP: Secondary Radius Server could be set in case of the primary radius server down.

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.

4.9.3.2 802.1x 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.



802.1x Port-Based Network Access Control Port Configuration

802.1x Port Configuration

Port	Port Control	Reauthencation	Max Request	Guest VLAN	Host Mode	Admin Control Direction
1	Force Authorized	Disable	2	0	Single	Both
2	Force Authorized	Disable	2	0	Single	Both
3	Force Authorized	Disable	2	0	Single	Both
4	Force Authorized	Disable	2	0	Single	Both
5	Force Authorized	Disable	2	0	Single	Both
6	Force Authorized	Disable	2	0	Single	Both

802.1x Timeout Configuration

Port	Re-Auth Period(s)	Quiet Period(s)	Tx Period(s)	Supplicant Timeout(s)	Server Timeout(s)
1	3600	60	30	30	30
2	3600	60	30	30	30
3	3600	60	30	30	30
4	3600	60	30	30	30
5	3600	60	30	30	30
6	3600	60	30	30	30

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.

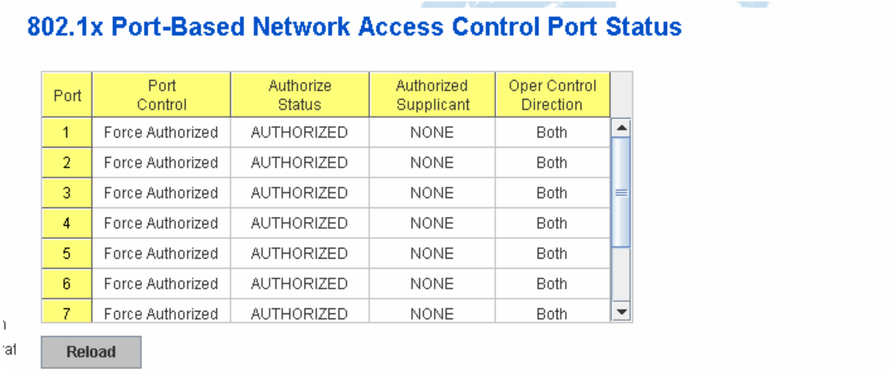
Click **Initialize Selected** to set the authorize state of selected port to initialize status.

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.

4.9.3.3 802.1X Port Status

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



802.1x Port-Based Network Access Control Port Status

Port	Port Control	Authorize Status	Authorized Supplicant	Oper Control Direction
1	Force Authorized	AUTHORIZED	NONE	Both
2	Force Authorized	AUTHORIZED	NONE	Both
3	Force Authorized	AUTHORIZED	NONE	Both
4	Force Authorized	AUTHORIZED	NONE	Both
5	Force Authorized	AUTHORIZED	NONE	Both
6	Force Authorized	AUTHORIZED	NONE	Both
7	Force Authorized	AUTHORIZED	NONE	Both

4.9.3 CLI Commands of the Security

Command Lines of the Security configuration

Feature	Command Line
Port Security	
Add MAC access list	Switch(config)# mac access-list extended NAME access-list name Switch(config)# mac access-list extended server1 Switch(config-ext-macl)# permit Specify packets to forward deny Specify packets to reject end End current mode and change to enable mode exit Exit current mode and down to previous mode list Print command list no Negate a command or set its defaults quit Exit current mode and down to previous mode
Add IP Standard access list	Switch(config)# ip access-list extended Extended access-list standard Standard access-list Switch(config)# ip access-list standard <1-99> Standard IP access-list number <1300-1999> Standard IP access-list number (expanded

	range) WORD Access-list name Switch(config)# ip access-list standard 1 Switch(config-std-acl)# deny Specify packets to reject permit Specify packets to forward end End current mode and change to enable mode exit Exit current mode and down to previous mode list Print command list no Negate a command or set its defaults quit Exit current mode and down to previous mode remark Access list entry comment
Add IP Extended access list	Switch(config)# ip access-list extended <100-199> Extended IP access-list number <2000-2699> Extended IP access-list number (expanded range) WORD access-list name Switch(config)# ip access-list extended 100 Switch(config-ext-acl)# deny Specify packets to reject permit Specify packets to forward end End current mode and down to previous mode exit Exit current mode and down to previous mode list Print command list no Negate a command or set its defaults quit Exit current mode and down to previous mode remark Access list entry comment
Example 1: Edit MAC access list	Switch(config-ext-macl)#permit MACADDR Source MAC address xxxx.xxxx.xxxx any any source MAC address host A single source host Switch(config-ext-macl)#permit host MACADDR Source MAC address xxxx.xxxx.xxxx Switch(config-ext-macl)#permit host 0012.7711.2233 MACADDR Destination MAC address xxxx.xxxx.xxxx any any destination MAC address host A single destination host Switch(config-ext-macl)#permit host 0012.7711.2233 host MACADDR Destination MAC address xxxx.xxxx.xxxx Switch(config-ext-macl)#permit host 0012.7711.2233 host 0011.7711.2234 [IFNAME] Egress interface name Switch(config-ext-macl)#permit host 0012.7711.2233 host 0011.7711.2234 gi25 *Note: MAC Rule: Permit/Deny wildcard Source_MAC wildcard Dest_MAC Egress_Interface*
Example 1: Edit IP Extended access list	Switch(config)# ip access-list extended 100 Switch(config-ext-acl)#permit ip Any Internet Protocol tcp Transmission Control Protocol udp User Datagram Protocol icmp Internet Control Message Protocol Switch(config-ext-acl)#permit ip A.B.C.D Source address any Any source host host A single source host

	Switch(config-ext-acl)#permit ip 192.168.10.1 A.B.C.D Source wildcard bits Switch(config-ext-acl)#permit ip 192.168.10.1 0.0.0.1 A.B.C.D Destination address any Any destination host host A single destination host Switch(config-ext-acl)#permit ip 192.168.10.1 0.0.0.1 192.168.10.100 0.0.0.1 [IFNAME] Egress interface name Switch(config-ext-acl)#permit ip 192.168.10.1 0.0.0.1 192.168.10.100 0.0.0.1 gi17 *Note: Follow the below rule to configure ip extended access list.* *IP Rule: Permit/Deny Source_IP wildcard Dest_IP wildcard Egress_Interface* *TCP Rule: Permit/Deny tcp Source_IP wildcard Dest_IP wildcard eq Given_Port_Number Egress_Interface* *UDP Rule: Permit/Deny udp Source_IP wildcard Dest_IP wildcard eq Given_Port_Number Egress_Interface* *ICMP Rule: Permit/Deny icmp Source_IP wildcard Dest_IP wildcard ICMP_Message_Type ICMP_Message_Code Egress_Interface*
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 1: Rule: Add the static MAC, VLAN and Port binding first, then enable the port security to stop new MAC learning.* *Note 2: Not all the model support this feature, check the product detail specification.*
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
802.1x	
Enable Disable	Switch(config)# dot1x system-auth-control The Port-Based Network Acess Control is globally enabled Switch(config)# no dot1x system-auth-control The Port-Based Network Acess Control is globally disabled
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 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

4.10 Warning

JetNet 5012G/5018G 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:

4.10.1 Fault Relay

4.10.2 Event Selection

4.10.3 Syslog Configuration

4.10.4 SMTP Configuration

4.10.5 CLI Commands

4.10.1 Fault Relay

JetNet 5012G/5018G provides 2 digital outputs, also known as Relay Output. The relay contacts are energized (open) for normal operation and will close under fault conditions. Fault conditions include Dry Output, 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.

Relay 2: Click on checkbox of the Relay 2, then select the Event Type and its parameters.

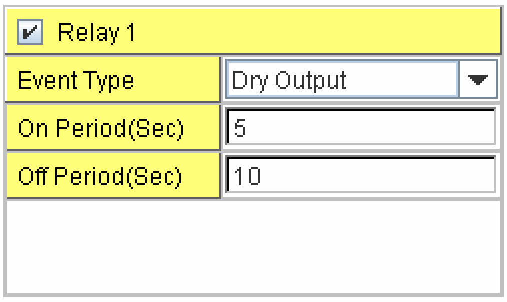
Event Type: Dry Output, Power Failure, Link Failure, Ping Failure and Super Ring Failure. Each event type has its own parameters. You should also configure them. Currently, each Relay can has one event type.

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. If you connect DO to DI of the other terminal unit, the setting can help you to change DI state. If you connect DO to the power set of other terminal units, this setting can help you to turn on or off the unit.

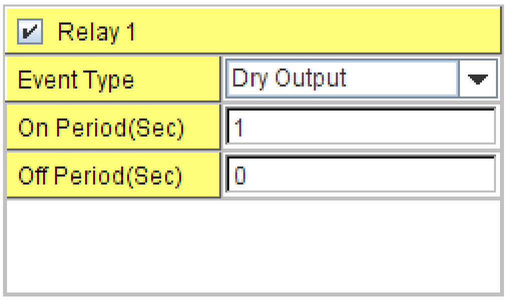


☑ Relay 1

Event Type	Dry Output ▼
On Period(Sec)	5
Off Period(Sec)	10

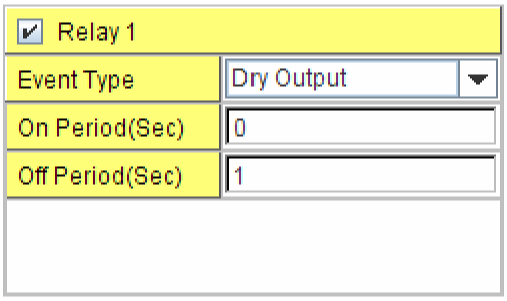
Relay turn on for 5 seconds then off for 10 seconds

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.



☑ Relay 1	
Event Type	Dry Output
On Period(Sec)	1
Off Period(Sec)	0

Turn on the relay output

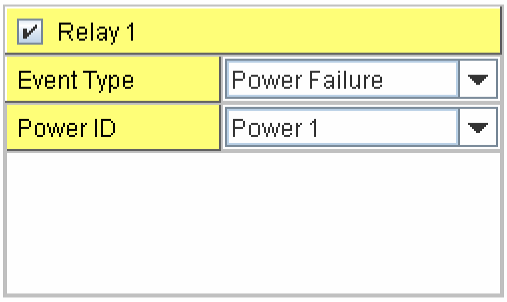


☑ Relay 1	
Event Type	Dry Output
On Period(Sec)	0
Off Period(Sec)	1

Turn off the relay output

Event Type: **Power Failure**

Power ID: Select Power DC 1, Power DC2 or Any you want to monitor. When the power you selected is shut down or broken, the system will short Relay Out and light the DO LED.

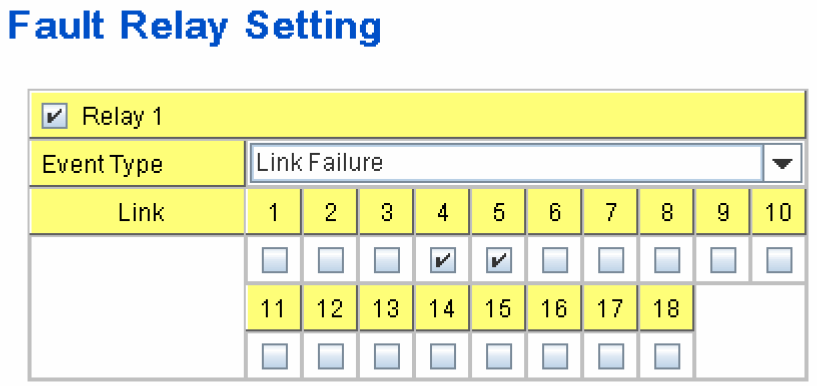


☑ Relay 1	
Event Type	Power Failure
Power ID	Power 1

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 DO LED.



Fault Relay Setting

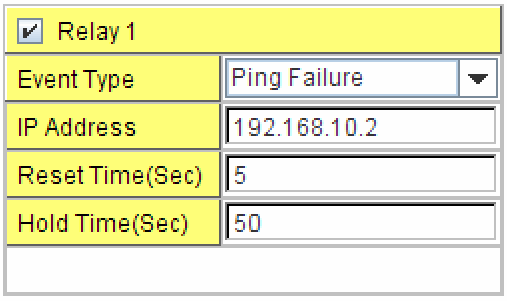
☑ Relay 1										
Event Type	Link Failure									
Link	1	2	3	4	5	6	7	8	9	10
	□	□	□	☑	☑	□	□	□	□	□
	11	12	13	14	15	16	17	18		
	□	□	□	□	□	□	□	□		

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



☑ Relay 1

Event Type	Ping Failure
IP Address	192.168.10.2
Reset Time(Sec)	5
Hold Time(Sec)	50

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.

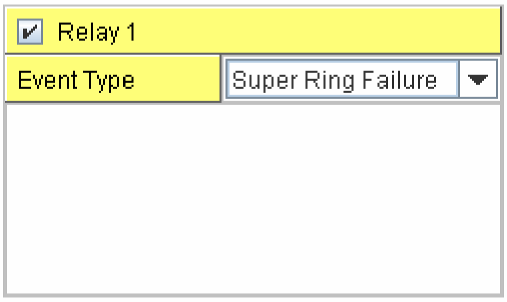
After the Reset Time timeout, the system will turn the Relay Output to close state. After the Hold Time timer is timeout, the switch system will start ping the target device.

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 DO LED.



☑ Relay 1

Event Type	Super Ring Failure

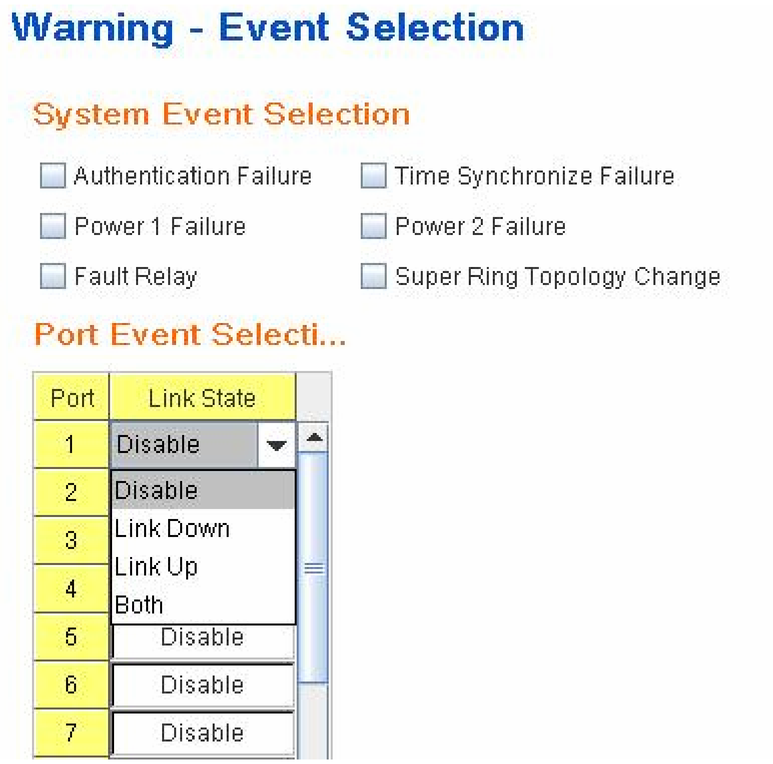
Once you finish configuring the settings, click on **Apply** to apply your configuration.

4.10.2 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…..
Authentication Failure	An incorrect password, SNMP Community String is entered.

Time Synchronize Failure	Accessing to NTP Server is failure.
Power 1 Failure	Selected Power ID is failure.
Power 2 Failure	Selected Power ID 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.
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	Either of Link Up or Link Down



Warning - Event Selection

System Event Selection

□ Authentication Failure □ Time Synchronize Failure
□ Power 1 Failure □ Power 2 Failure
□ Fault Relay □ Super Ring Topology Change

Port Event Selecti...

Port	Link State
1	Disable
2	
3	
4	
5	Disable
6	Disable
7	Disable

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

4.10.3 SysLog Configuration

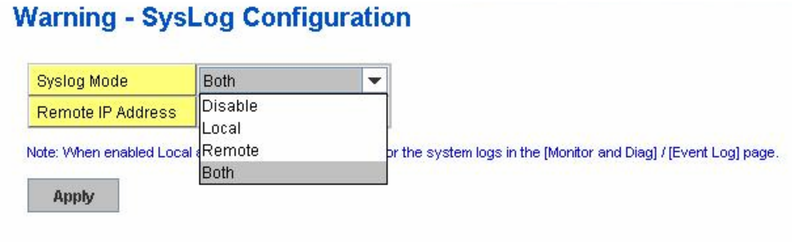
System Log is useful to provide system administrator locally or remotely monitor switch events history. There are 2 System Log modes provided by JetNet Managed Switch, local mode and remote mode.

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

Remote Mode: The remote mode is also known as Server mode in JetNet 4500 series. In this mode, you should assign the IP address of the System Log server. JetNet Managed

Switch 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.



Warning - SysLog Configuration

Syslog Mode	Both
Remote IP Address	

Note: When enabled Local or the system logs in the [Monitor and Diag] / [Event Log] page.

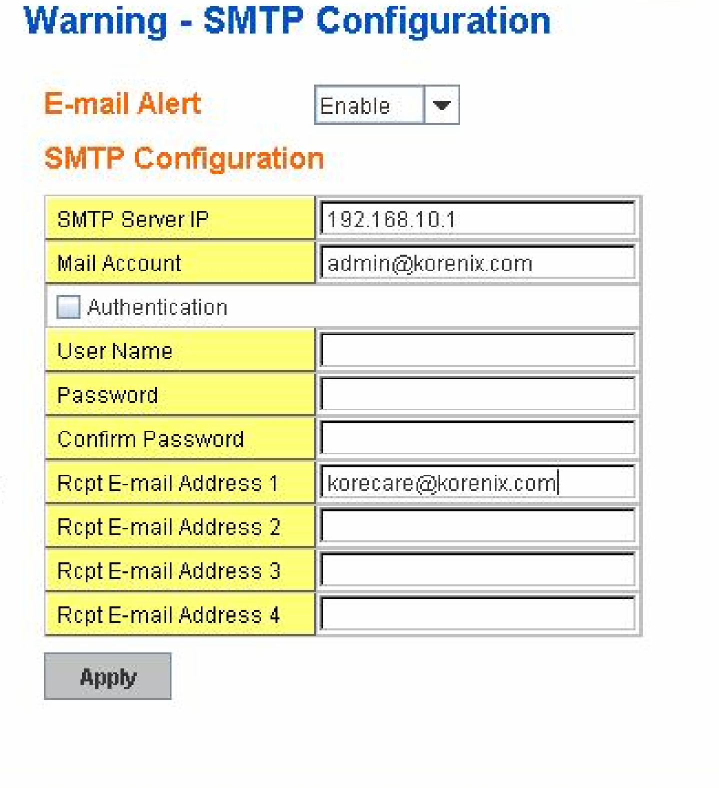
Once you finish configuring the settings, click on **Apply** to apply your configuration.

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

4.10.4 SMTP Configuration

JetNet Managed SwitchG 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.



Warning - SMTP Configuration

E-mail Alert: Enable

SMTP Configuration

SMTP Server IP	192.168.10.1
Mail Account	admin@korenix.com
□ Authentication	
User Name	
Password	
Confirm Password	
Rcpt E-mail Address 1	korecare@korenix.com
Rcpt E-mail Address 2	
Rcpt E-mail Address 3	
Rcpt E-mail Address 4	

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.

4.10.5 CLI Commands

Command Lines of the Warning configuration

Feature	Command Line
Relay Output	

Relay Output	Switch(config)# relay 1
	  di DI state (Not support in JetNet 5012G/5018G)
	  dry dry output
	  ping ping failure
	  port port link failure
	  power power failure
	  ring super ring failure
	
	Note: Select Relay 1 or 2 first, then select the event types.

DI State	Switch(config)# relay 1 di
	  <1-2> DI number
	Switch(config)# relay 1 di 1
	  high high is abnormal
	  low low is abnormal
	Switch(config)# relay 1 di 1 high

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 <1-2> power id any Anyone power failure asserts relay Switch(config)# relay 1 power 1
Super Ring Failure	Switch(config)# relay 1 ring
Disable Relay	Switch(config)# no relay <1-2> 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, Switch# show relay 2 Relay Output Type : Super Ring
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 power Switch power failure 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 [IFLIST] Interface list, ex: fa1,fa3-5,gi17-18 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
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:

4.11 Monitor and Diag

JetNet Managed Switch 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:

4.11.1 MAC Address Table

4.11.2 Port Statistics

4.11.3 Port Mirror

4.11.4 Event Log

4.11.5 Topology Discovery (LLDP)

4.11.6 Ping

4.11.7 CLI Commands of the Monitor and Diag

4.11.1 MAC Address Table

JetNet Managed Switch 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

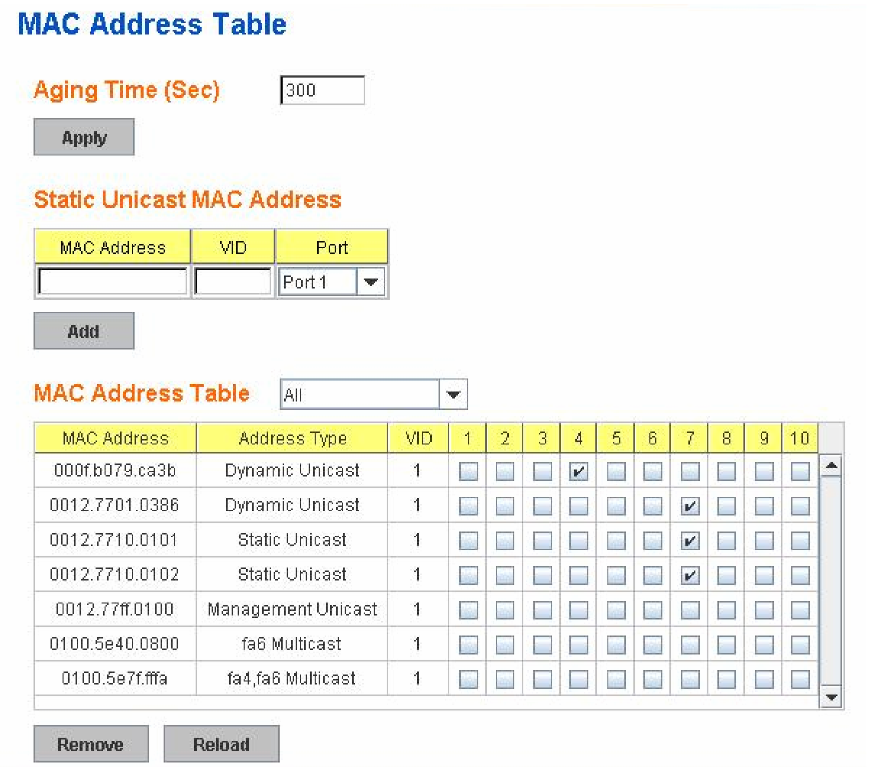
In some applications, users may need to type in the static Unicast MAC address to its MAC address table. In this page, you can type MAC Address (format: xxxx.xxxx.xxxx), select its VID and Port ID, and then click on **Add** to add it to MAC Address table.

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.



MAC Address Table

Aging Time (Sec): 300

Static Unicast MAC Address

MAC Address	VID	Port
		Port 1

MAC Address Table: All

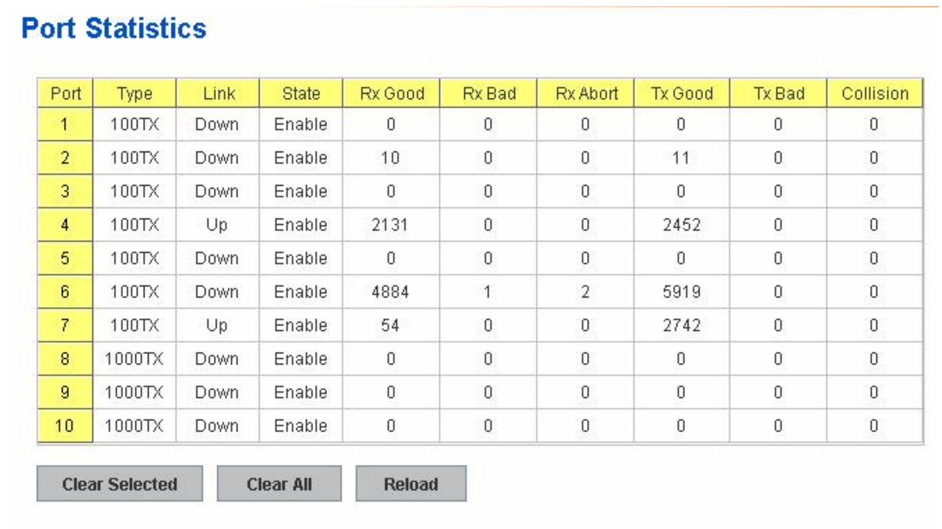
MAC Address	Address Type	VID	1	2	3	4	5	6	7	8	9	10
000f.b079.ca3b	Dynamic Unicast	1	□	□	□	☑	□	□	□	□	□	□
0012.7701.0386	Dynamic Unicast	1	□	□	□	□	□	□	☑	□	□	□
0012.7710.0101	Static Unicast	1	□	□	□	□	□	□	☑	□	□	□
0012.7710.0102	Static Unicast	1	□	□	□	□	□	□	☑	□	□	□
0012.77ff.0100	Management Unicast	1	□	□	□	□	□	□	□	□	□	□
0100.5e40.0800	fa6 Multicast	1	□	□	□	□	□	□	□	□	□	□
0100.5e7f.fffa	fa4,fa6 Multicast	1	□	□	□	□	□	□	□	□	□	□

4.11.2 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.



Port Statistics

Port	Type	Link	State	Rx Good	Rx Bad	Rx Abort	Tx Good	Tx Bad	Collision
1	100TX	Down	Enable	0	0	0	0	0	0
2	100TX	Down	Enable	10	0	0	11	0	0
3	100TX	Down	Enable	0	0	0	0	0	0
4	100TX	Up	Enable	2131	0	0	2452	0	0
5	100TX	Down	Enable	0	0	0	0	0	0
6	100TX	Down	Enable	4884	1	2	5919	0	0
7	100TX	Up	Enable	54	0	0	2742	0	0
8	1000TX	Down	Enable	0	0	0	0	0	0
9	1000TX	Down	Enable	0	0	0	0	0	0
10	1000TX	Down	Enable	0	0	0	0	0	0

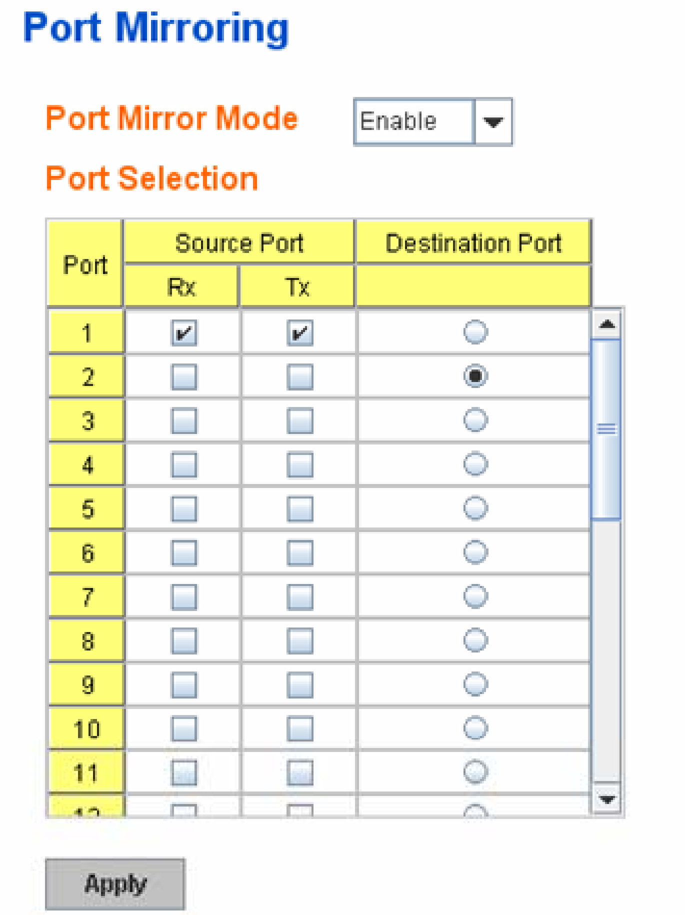
4.11.3 Port Mirroring

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 single port or any combination of ports, you can monitor them in Rx only, TX only or both RX and TX. Click on checkbox of the RX, Tx 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 of the destination ports can be selected. A network administrator would typically connect a LAN analyzer or Netxray device to this port.



Port Mirroring

Port Mirror Mode: Enable

Port Selection

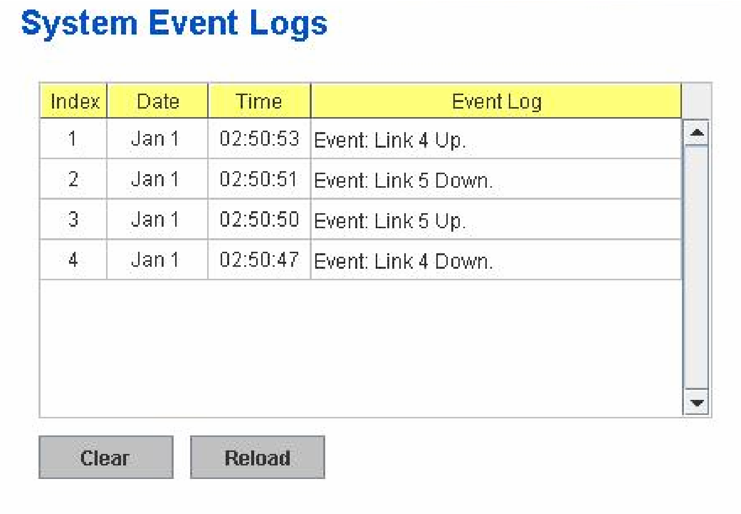
Port	Source Port		Destination Port
	Rx	Tx	
1	☑	☑	○
2	□	□	●
3	□	□	○
4	□	□	○
5	□	□	○
6	□	□	○
7	□	□	○
8	□	□	○
9	□	□	○
10	□	□	○
11	□	□	○
12	□	□	○

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

4.11.4 Event Log

In the 4.10.3, we have introduced System Log feature. When System Log Local mode is selected, JetNet Managed Switch 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.



System Event Logs

Index	Date	Time	Event Log
1	Jan 1	02:50:53	Event: Link 4 Up.
2	Jan 1	02:50:51	Event: Link 5 Down.
3	Jan 1	02:50:50	Event: Link 5 Up.
4	Jan 1	02:50:47	Event: Link 4 Down.

4.11.5 Topology Discovery (LLDP)

The Managed Switch supports 802.1AB Link Layer Discovery Protocol, thus the LLDP aware Switch can be discovered by the Network Management System which support LLDP discovery. With LLDP supported, the 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.

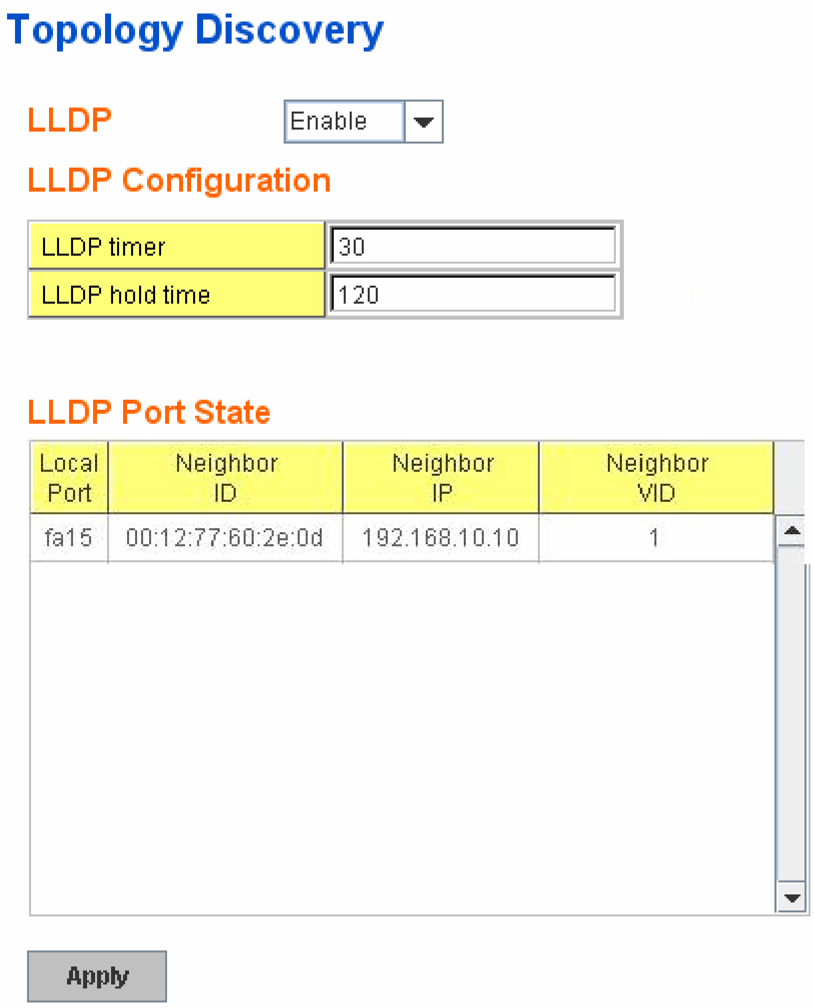
LLDP: Enable/Disable the LLDP topology discovery information.

LLDP Configuration: To configure the related timer of LLDP.

LLDP timer: The LLDPDP interval, the LLDP information is send per LLDP timer. The default value is 30 seconds.

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

LLDP Port State: Display the neighbor information learnt from the connected interface.



Topology Discovery

LLDP: Enable

LLDP Configuration

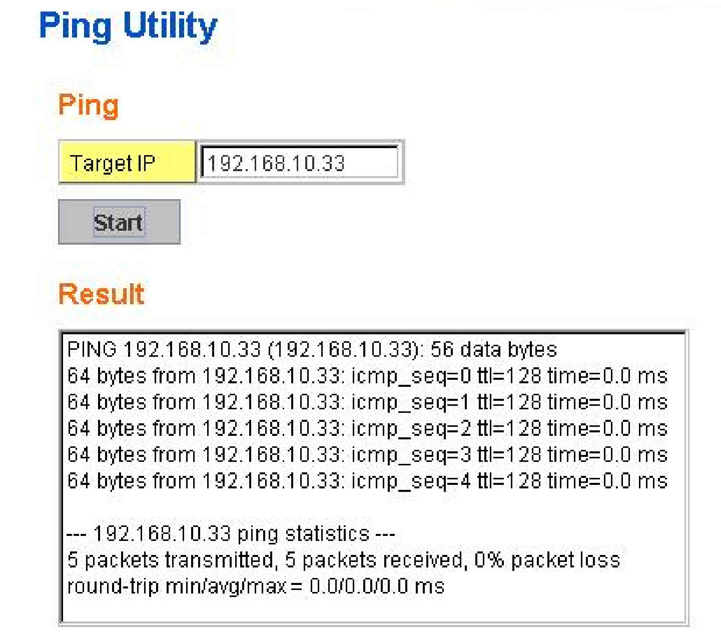
LLDP timer	30
LLDP hold time	120

LLDP Port State

Local Port	Neighbor ID	Neighbor IP	Neighbor VID
fa15	00:12:77:60:2e:0d	192.168.10.10	1

4.11.6 Ping Utility

This page provides **Ping Utility** 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.



Ping Utility

Ping

Target IP	192.168.10.33

Result

```
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
```

4.11.7 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.

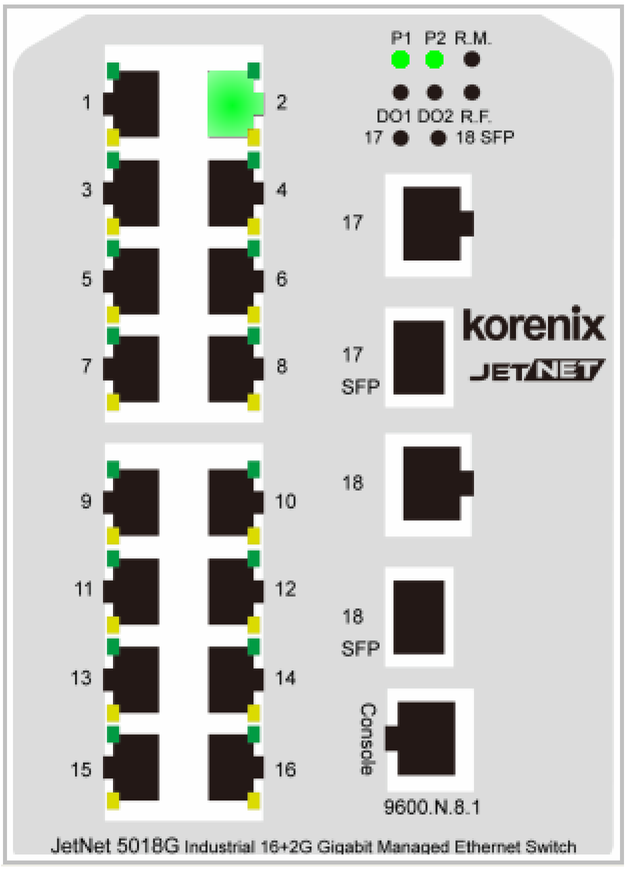
Port Statistics	
Port Statistics	Switch# show rmon statistics fa4 (select interface) Interface fastethernet4 is enable connected, which has Inbound: Good Octets: 178792, Bad Octets: 0 Unicast: 598, Broadcast: 1764, Multicast: 160 Pause: 0, Undersize: 0, Fragments: 0 Oversize: 0, Jabbers: 0, Disacrds: 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 both Mirror destination fa6 both set ok
Display	Switch# show mirror Mirror Status : Enabled Ingress Monitor Destination Port : fa6 Egress Monitor Destination Port : fa6 Ingress Source Ports :fa1,fa2, Egress Source Ports :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.
Topology Discovery (LLDP)	
Enable LLDP	Switch(config)# lldp holdtime Specify the holdtime of LLDP in seconds run Enable LLDP timer Set the transmission frequency of LLDP in seconds Switch(config)# lldp run LLDP is enabled!
Change LLDP timer	Switch(config)# lldp holdtime <10-255> Valid range is 10~255 Switch(config)# lldp timer <5-254> Valid range is 5~254

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

4.12 Device Front Panel

Device Front Panel command allows you to see LED status of the switch. You can see LED and link status of the Power, DO, R.M. and Font Ports.

Feature	On / Link UP	Off / Link Down	Other
Power 1 (P1)	Green	Black	
Power 2 (P2)	Green	Black	
Digital Output 1(DO1)	Red	Black	
Digital Output 2(DO2)	Red	Black	
Ring Master(R.M.)	Green	Black	
Ring Fail(R.F.)	Red	Black	
Fast Ethernet	Green	Black	(Port 1-16)
Gigabit Ethernet	Green	Black	(Port 17,18)
SFP	Green	Black	Gray: Plugged but not link up yet.

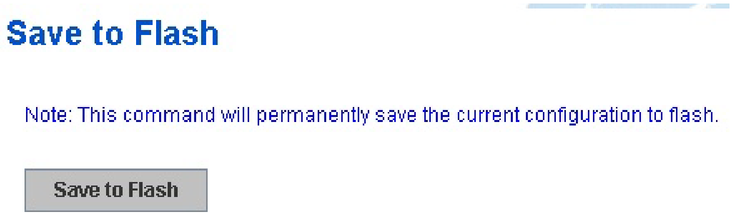


Example of the JetNet 5018G front panel.

Note: No CLI command for this feature.

4.13 Save to Flash

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.



Save to Flash

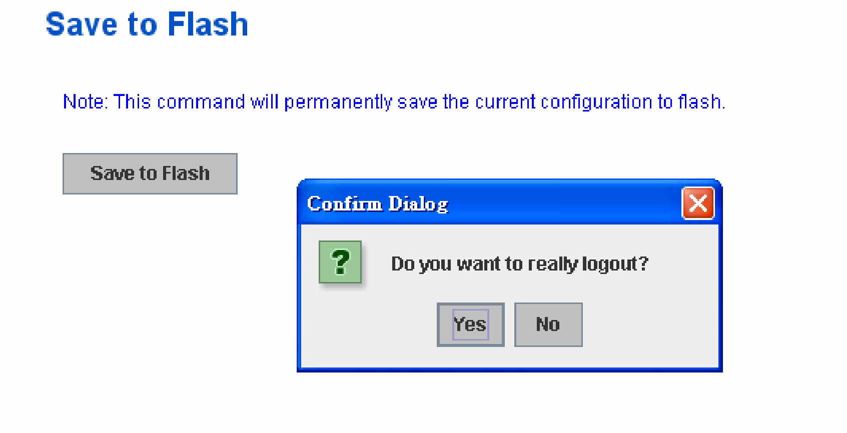
Note: This command will permanently save the current configuration to flash.

Command Lines:

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

4.14 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.



Save to Flash

Note: This command will permanently save the current configuration to flash.

Confirm Dialog

Do you want to really logout?

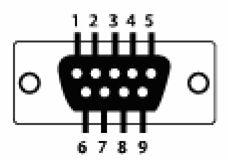
Command Lines:

Feature	Command Line
Logout	SWITCH> exit SWITCH# exit

5 Appendix

5.1 Pin Assignment of the RS-232 Console Cable

The total cable length is 150cm.



RJ45 Pin	DB9 Pin
1	7
2	9
3	4
4	5
5	1
6	3
7	2
8	8

5.2 Korenix SFP family

Korenix certificated many types of SFP transceiver. These certificated SFP transceivers can be identified by JetNet Managed Switch 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	Spec
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℃
SFP Gigabit BIDI/WDM	
SFPGLX10B13	1000Base-LX BIDI single-mode transceiver, 10km, TX:1310nm, RX: 1550nm, -10~70°C
SFPGLX10B13-W	1000Base-LX BIDI single-mode transceiver 10km, TX:1310nm, RX: 1550nm, -40~85°

SFPGLX10B15 1000Base-LX BIDI single-mode transceiver 10km, TX:1550nm, RX: 1310nm, -10~70°C

SFPGLX10B15-W 1000Base-LX BIDI single-mode transceiver 10km, TX:1550nm, RX: 1310nm, -40~85°C

SFPGLX20B13 1000Base-LX BIDI single-mode transceiver 20km, TX:1310nm, RX: 1550nm, -10~70°C

SFPGLX20B13-W 1000Base-LX BIDI single-mode transceiver 20km, TX:1310nm, RX: 1550nm, -40~85°C

SFPGLX20B15 1000Base-LX BIDI single-mode transceiver 20km, TX:1550nm, RX: 1310nm, -10~70°C

SFPGLX20B15-W 1000Base-LX BIDI single-mode transceiver 20km, TX:1550nm, RX: 1310nm, -40~85°C

SFPGLX40B13 1000Base-LX BIDI single-mode transceiver 40km, TX:1310nm, RX: 1550nm, -10~70°C

SFPGLX40B13-W 1000Base-LX BIDI single-mode transceiver 40km, TX:1310nm, RX: 1550nm, -40~85°C

SFPGLX40B15 1000Base-LX BIDI single-mode transceiver 40km, TX:1550nm, RX: 1310nm, -10~70°C

SFPGLX40B15-W 1000Base-LX BIDI single-mode transceiver 40km, TX:1550nm, RX: 1310nm, -40~85°C

SFPGLX60B13 1000Base-LX BIDI single-mode transceiver 60km, TX:1310nm, RX: 1550nm, -10~70°C

SFPGLX60B13-W 1000Base-LX BIDI single-mode transceiver 60km, TX:1310nm, RX: 1550nm, -40~85°C

SFPGLX60B15 1000Base-LX BIDI single-mode transceiver 60km, TX:1550nm, RX: 1310nm, -10~70°C

5.3 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 similar to 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 5012G is **1.3.6.1.4.1.24062.2.2.12**

The path of the JetNet 5018G is **1.3.6.1.4.1.24062.2.2.7**

Compile the private MIB file and you can see all the MIB tables in MIB browser.

5.4 Revision History

Edition	Date	Modifications
V1.1	Dec. 24, 2009	Add 3018G model and its related description and specification. 3018G is the unmanaged gigabit switch. Follow the hardware installation to install switch, there is no software configuration available. Correct the curve mechanical to vertical. Add SFP BIDI
V1.0	Oct. 27, 2009	CLI command correction continue and changed the version to V1.0.
V0.2	Oct. 25, 2009	CLI Command correction.
V0.1	Oct. 23, 2009	The first version.

5.5 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

Korenix Technologies Co., Ltd.

Business service : sales@korenix.com

Customer service: koreCARE@korenix.com