5 10/100TX with X-Ring Web Management Industrial Switch

User Manual

Rev.1.00

8-August-2006

Notice

This manual contents are based on the below table listing software kernel version, hardware version, and firmware version. If user's switch functions have any different from the manual contents description, please contact the local sale dealer for more information.

Firmware Version	V2.01
Kernel Version	V3.08
Hardware Version	A5.00

FCC Warning

This Equipment has been tested and found to comply with the limits for a Class-A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CE Mark Warning

This is a Class-A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Content

Introduction

The 5 10/100TX with X-Ring Web Management Industrial Switch is a cost-effective solution and meets the high reliability requirements demanded by industrial applications. The 5 10/100TX with X-Ring Web management industrial switch can be easily managed through the Web GUI. It also provides the X-Ring function that can prevent the network connection failure.

Features

- Conform to IEEE 802.3 10Base-T, 802.3u 100Base-TX/100Base-FX
- 5-port 10/100TX industrial switch
- RJ-45 port support auto MDI/MDI-X function
- Store-and-Forward switching architecture
- Wide-range redundant power design
- DIN rail and wall mount design
- Easy configuration design
- Web management
- Support IEEE 802.1p class of service and provide port base, Tag base and Type of service priority method
- Per port supports 4 priority queues
- Support Port based VLAN / 802.1 Q Tag VLAN
- Support IGMP with Query mode for multi media application
- Support DHCP client
- Supports ingress packet filter and egress rate limit.
- Support Relay alarm output for system events
- Support Power polarity reverse protect
- Support Port mirror for TX only, TX and RX packet
- IEEE 802.3x flow control support
  - Flow control with full-duplex

- Back pressure with half-duplex

- Support Super-Ring function
- Support SNTP
- Support TFTP firmware update, system configuration restore and backup
- 1Mbits Embedded memory
- 2K MAC address table

Package Contents

Please refer to the package content list below to verify them against the checklist.

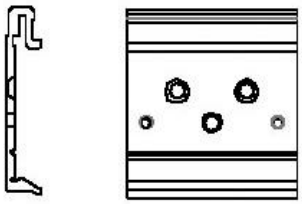
- 5 10/100TX with Super-Ring Web management industrial switch
- One DIN-Rail (attached to the switch)
- One wall mount plate and six screws
- User manual

5 10/100TX with X-Ring Web Management Industrial switch

User Manual

Wall Mount Plate(Option)

Screws



DIN-Rail

Compare the contents of your industrial switch with the standard checklist above. If any item is damaged or missing, please contact the local dealer for exchanging.

Hardware Description

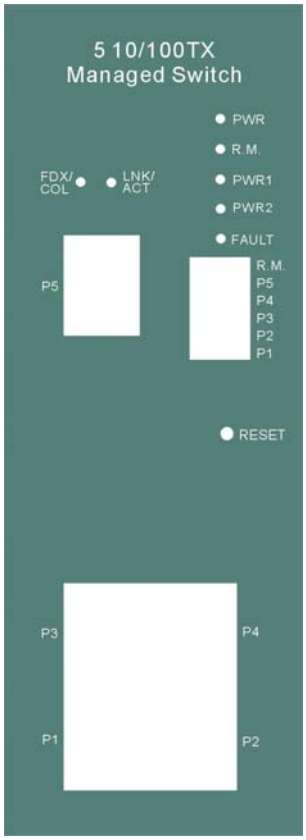
In this paragraph, we will describe the Industrial switch's hardware spec, port, cabling information, and wiring installation.

Physical Dimension

5 10/100TX with X-Ring Web management industrial switch dimension (W x H x D) is **54mm x 135mm x 105mm**

Front Panel

The front panel of the 5 10/100TX with X-Ring Web management industrial switch is showed as following figure.



Front Panel of the industrial switch

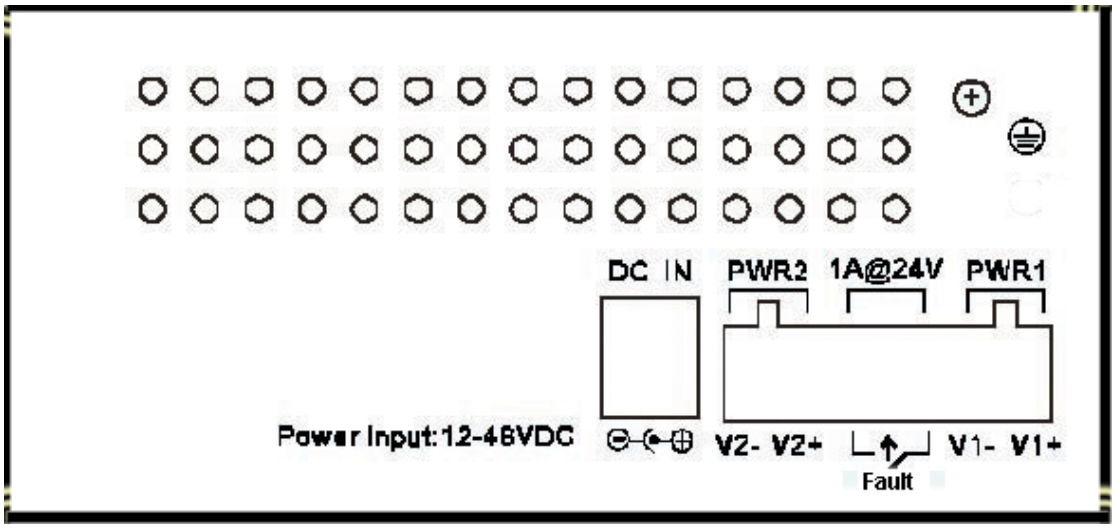
Reset Button

The reset button provides user a quick and easy way to restart and set the configuration back to default value.

- **Restart:** Press the button for 2 seconds and release.
- **Set to factory default value:** Press the button for 5 seconds and release. The switch will set all configurations back to default setting.

Bottom View

The bottom panel of the 5 10/100TX with X-Ring Web management industrial switch consists one terminal block connector within two DC power inputs and one DC IN power jack.



Bottom Panel of the industrial switch

DIP-switch

The switch provides the 6 DIP-switch for configuring the relay alarm operation mode and the master ring operation mode. The default value of Dipswitch is **OFF**.

DIP Switch No	Status	Description
1	OFF	Disable port 1 Alarm
	ON	Enable port Alarm. If the port's link fails, and then the fault LED will light up.
2	OFF	Disable port Alarm
	ON	Enable port Alarm. If the port's link fails, and then the fault LED will light up.
3	OFF	Disable port Alarm
	ON	Enable port Alarm. If the port's link fails, and then the fault LED will light up.
4	OFF	Disable port Alarm
	ON	Enable port Alarm. If the port's link fails, and then the fault LED will light up.
5	OFF	Disable port Alarm
	ON	Enable port Alarm. If the port's link fails, and then the fault LED will light up.
6	OFF	Disable the master ring function.
	ON	Enable the switch as the ring master in the Super-Ring group.

[NOTE] When port alarm function is enabled, the fault LED will on and Alarm relay will activity when port failure occurs.

LED Indicators

There are 7 diagnostic LEDs located on the front panel of the industrial switch. They provide real-time information of system and optional status. The following table provides description of the LED status and their meanings for the switch.

LED	Status	Meaning
Power	Green	The switch unit is power on
	Off	The switch unit is no power input
R.M. (Ring Master)	Green	The industrial switch is the master of Super-Ring group
	Off	The industrial switch is not a ring master in Super-Ring group
Power 1	Green	Power on
	Off	No power inputs
Power 2	Green	Power on
	Off	No power inputs
Fault	Yellow	Power failure or UTP port failure
	Off	No Power failure or UTP port failure occurs
LNK/ACT (port 5)	Green	The port is linking
	Blinks	The port is transmitting or receiving packets from the TX device

	Off	No device attached
FDX/COL (port 5)	Yellow	The port is operating in full-duplex mode
	Blinks	Collision of Packets occurs in the port
	Off	The port in half-duplex mode or no device attached

Ports

- **RJ-45 ports**

There are 5x 10/100Mbps auto-sensing ports for 10Base-T or 100Base-TX devices connection. The UTP ports will auto-sense for 10Base-T or 100Base-TX connections. Auto MDI/MDIX means that you can connect to another switch or workstation without changing straight through or crossover cabling. See the below figures for straight through and crossover cable schematic.

RJ-45 Pin Assignments

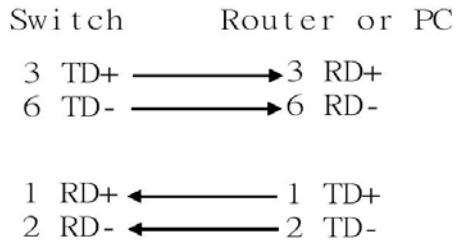
Pin Number	Assignment
1	Tx+
2	Tx-
3	Rx+
6	Rx-

[NOTE] "+" and "-" signs represent the polarity of the wires that make up each wire pair.

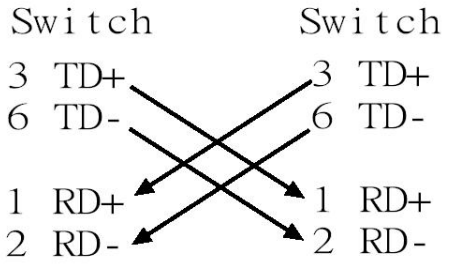
All ports on this industrial switch support automatic MDI/MDI-X operation,

user can use straight-through cables (See Figure below) for all network connections to PCs or servers, or to other switches or hubs. In straight-through cable, pins 1, 2, 3, and 6, at one end of the cable, are connected straight through to pins 1, 2, 3 and 6 at the other end of the cable. The table below shows the 10BASE-T/100BASE-TX MDI and MDI-X port pin outs.

Pin MDI-X	Signal Name	MDI Signal Name
1	Receive Data plus (RD+)	Transmit Data plus (TD+)
2	Receive Data minus (RD-)	Transmit Data minus (TD-)
3	Transmit Data plus (TD+)	Receive Data plus (RD+)
6	Transmit Data minus (TD-)	Receive Data minus (RD-)



Straight Through Cable Schematic



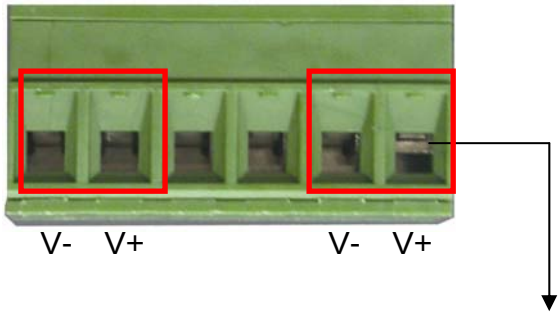
Cross Over Cable Schematic

Cabling

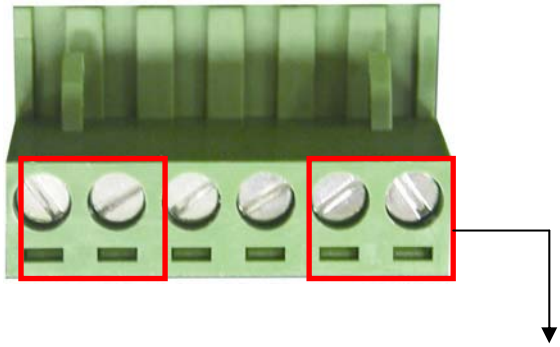
Use four twisted-pair, Category 5 cabling for RJ-45 port connection. The cable between the converter and the link partner (switch, hub, workstation, etc.) must be less than 100 meters (328 ft.) long.

Wiring the Power Inputs

Please follow below steps to insert the power wire.



1. Insert the positive and negative wires into the V+ and V- connector on the terminal block connector



2. To tighten the wire-clamp screws for preventing the DC wires to loose

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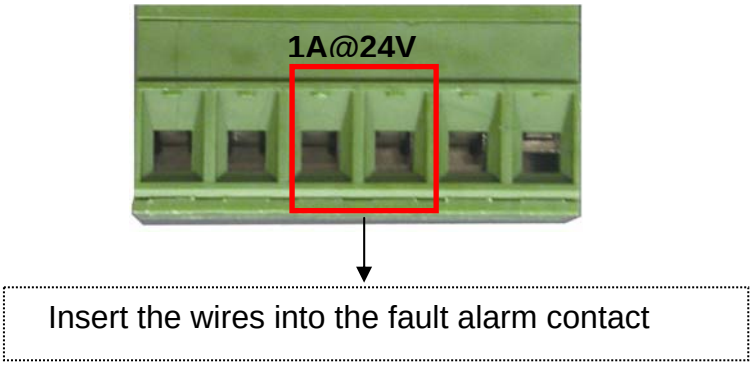
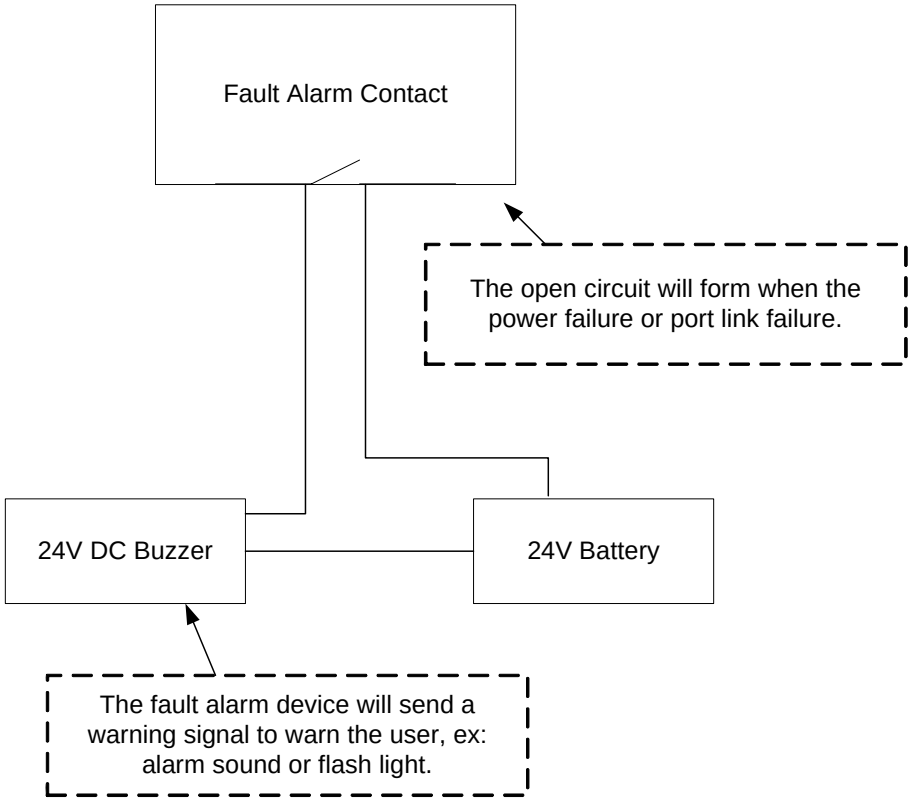
[NOTE] The wire range of terminal block is from 12~ 24 AWG.

Wiring the Fault Alarm Contact

The fault alarm contact locates in the middle of terminal block connector as below figure shows. Inserting the wires and set the DIPswitch at "**ON**" status. When power is failure or port link failure, it will detect and form an open circuit. The following figure shows an application example for the fault alarm contact.



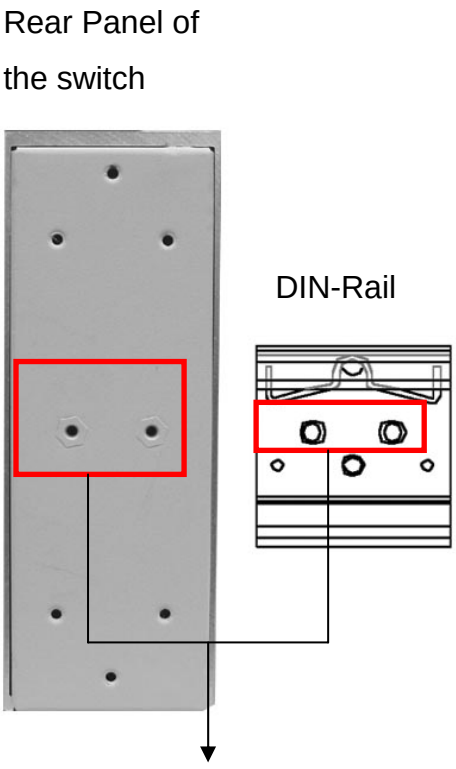
[NOTE] The wire range of terminal block is from 12~ +24 AWG.



Mounting Installation

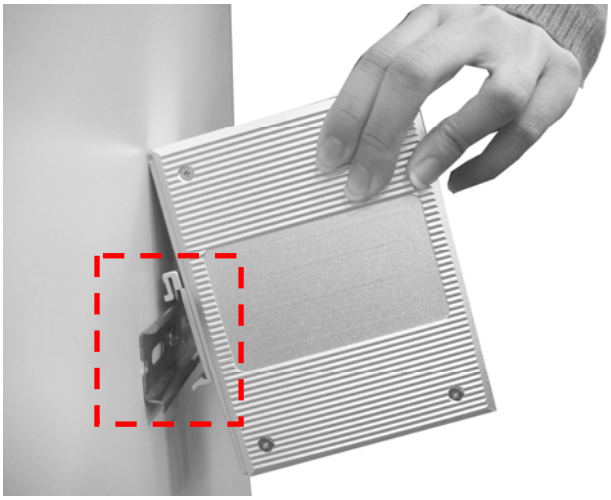
DIN-Rail Mounting

The DIN-Rail is screwed on the industrial switch when out of factory. If the DIN-Rail is not screwed on the industrial switch, please see the following figure to screw the DIN-Rail on the switch. Follow the below steps to hang the industrial switch.

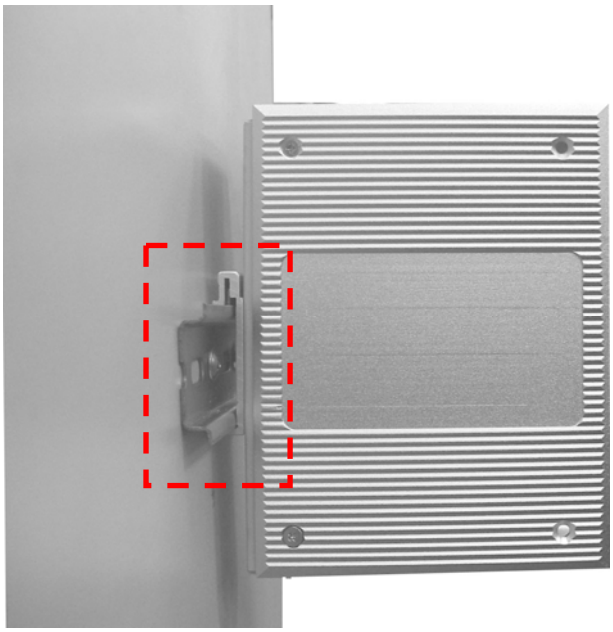


- Use the screws to screw on the DIN-Rail on the industrial switch
- To remove the DIN-Rail, reverse the step 1.

1. First, insert the top of DIN-Rail into the track.



2. Then, lightly push the DIN-Rail into the track.

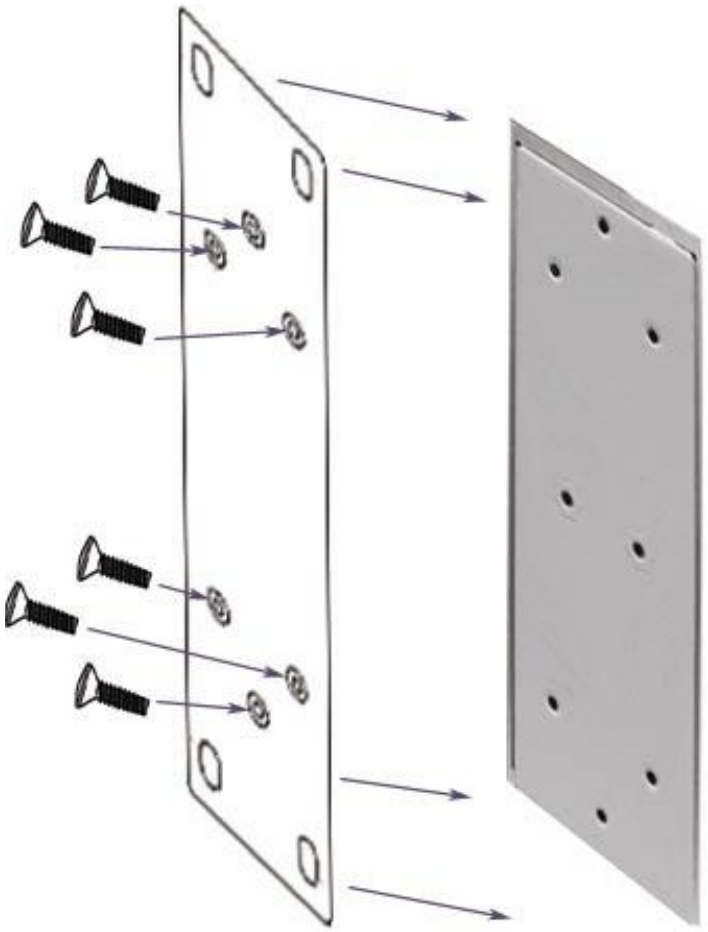


3. Check the DIN-Rail is tightly on the track.
4. To remove the industrial switch from the track, reverse steps above.

Wall Mount Plate Mounting(Option)

Follow the below steps to mount the industrial switch with wall mount plate.

1. Remove the DIN-Rail from the industrial switch; loose the screws to remove the DIN-Rail
2. Place the wall mount plate on the rear panel of the industrial switch
3. Use the screws to screw the wall mount plate on the industrial switch
4. Use the hook holes at the corners of the wall mount plate to hang the industrial switch on the wall
5. To remove the wall mount plate, reverse steps above



Screwing the wall mount plate on the Industrial media converter

Hardware Installation

In this paragraph, it will describe how to install the 5 10/100TX with X-Ring Web management industrial switch and the installation points for attention.

1. Unpacked the Industrial switch.
2. Check the DIN-Rail is tightly screwed on the Industrial switch. If the DIN-Rail is not screwed on the Industrial switch. Please refer to **DIN-Rail Mounting** section for DIN-Rail installation. To wall mount the Industrial switch, and then please refer to **Wall Mount Plate Mounting** section for wall mount plate installation.
3. To hang the Industrial switch on the DIN-Rail track or wall, please refer to the **Mounting Installation** section.
4. Power on the Industrial switch. How to wire the power; please refer to the **Wiring the Power Inputs** section. The power LED on the Industrial switch will light up. Please refer to the **LED Indicators** section for meaning of LED lights.
5. Prepare the twisted-pair, straight through Category 5 cable for Ethernet connection.
6. Connect one side of Category 5 cables into the Industrial switch Ethernet port (RJ-45 port) and another side of category 5 cables to the network devices' Ethernet port (RJ-45 port), ex: switch, PC or Server. The UTP port (RJ-45) LED on the Industrial switch will light up when the cable connected with the network device. Please refer to the **LED Indicators** section for LED light meaning.

[NOTE] Be sure the connected network devices support MDI/MDI-X. If it does not support then use the crossover category-5 cable.

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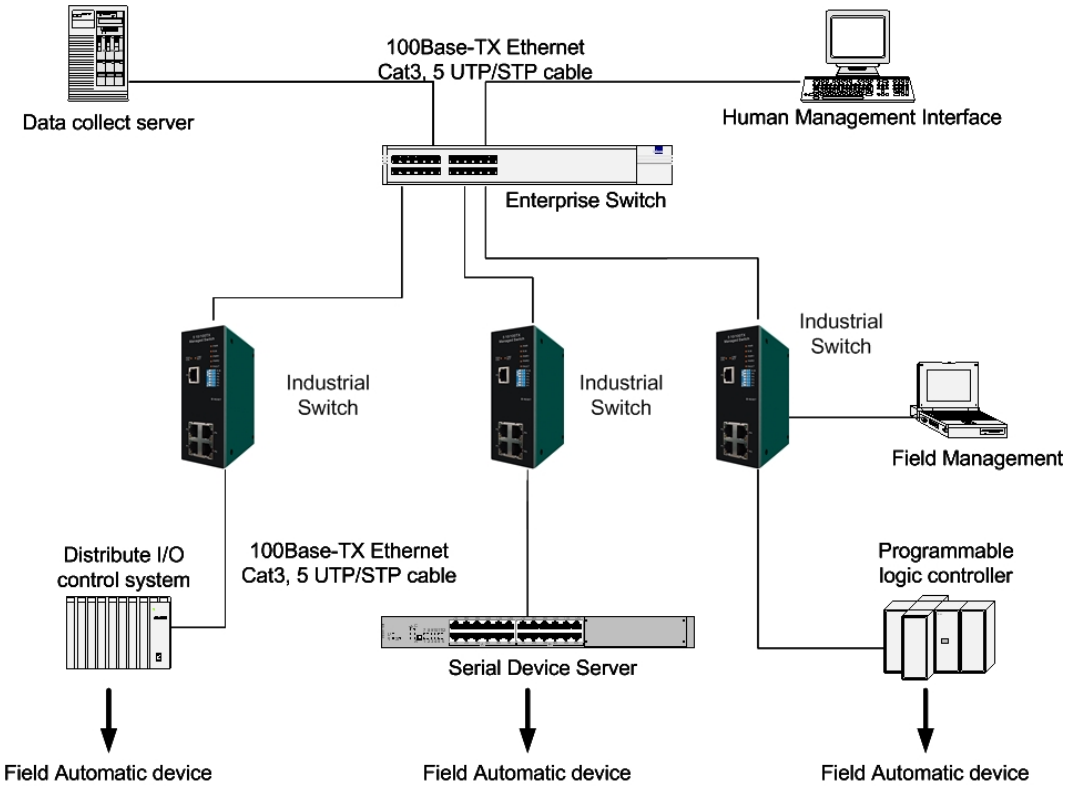
7. When all connections are all set and LED lights all show in normal, the installation is complete.

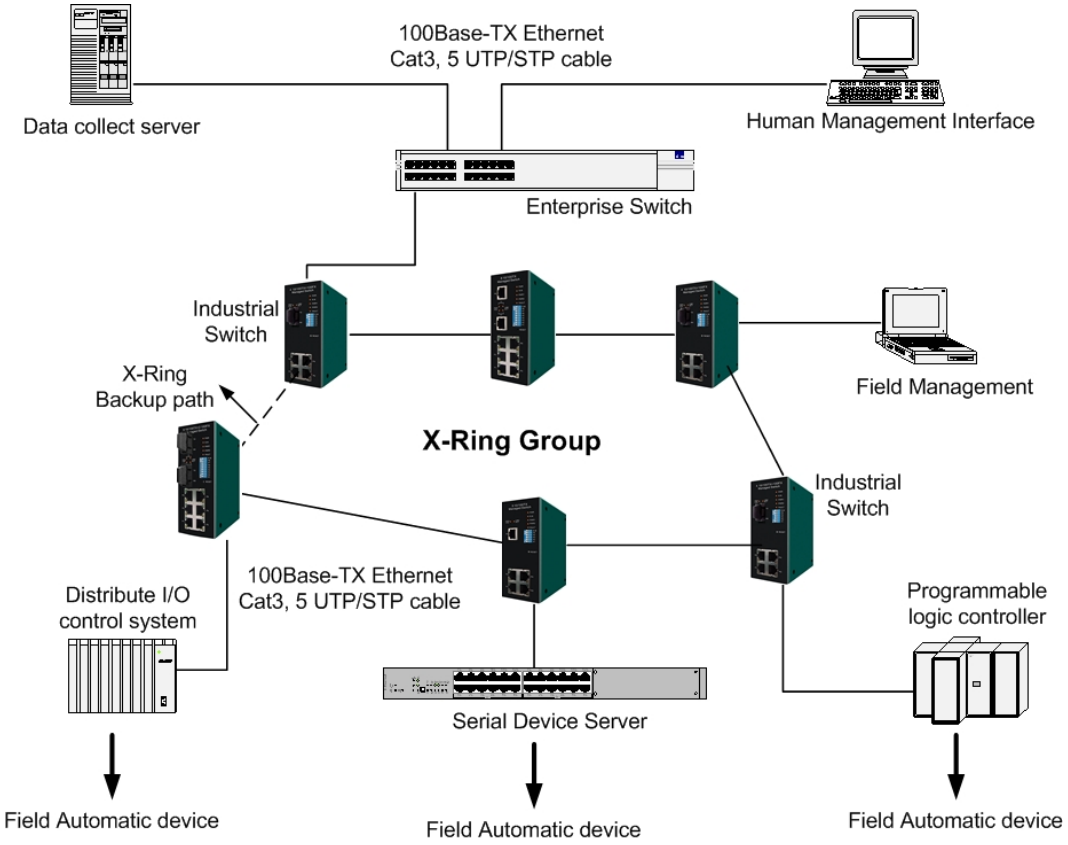
Network Application

This chapter provides some sample applications to help user to have more actual idea of industrial switch function application. The following figure is a sample application of the industrial switch.



X-Ring Application

The industrial switch supports the X-Ring protocol that can help the network system to recovery from network connection failure within 300ms or less, and make the network system more reliable. The X-Ring algorithm is like as spanning tree protocol (STP) algorithm but it has faster recovery time than STP. The following figure is a sample X-Ring application.


100Base-TX Ethernet
Cat3, 5 UTP/STP cable
Data collect server
Human Management Interface
Enterprise Switch
Industrial
Switch
X-Ring
Backup path
Field Management
X-Ring Group
Industrial
Switch
100Base-TX Ethernet
Cat3, 5 UTP/STP cable
Distribute I/O
control system
Programmable
logic controller
Serial Device Server
Field Automatic device
Field Automatic device
Field Automatic device

Web-Based Management

This section introduces the configuration and functions of the Web-Based management.

About Web-based Management

On CPU board of the switch there is an embedded HTML web site residing in flash memory, which offers advanced management features and allow users to manage the switch from anywhere on the network through a standard browser such as Microsoft Internet Explorer.

The Web-Based Management supports Internet Explorer 5.0. And, it is applied for Java Applets for reducing network bandwidth consumption, enhance access speed and present an easy viewing screen.

[NOTE] By default, IE5.0 or later version does not allow Java Applets to activate sockets. In fact, the user has to explicitly modify the browser setting to enable Java Applets to operate network ports.

Preparing for Web Management

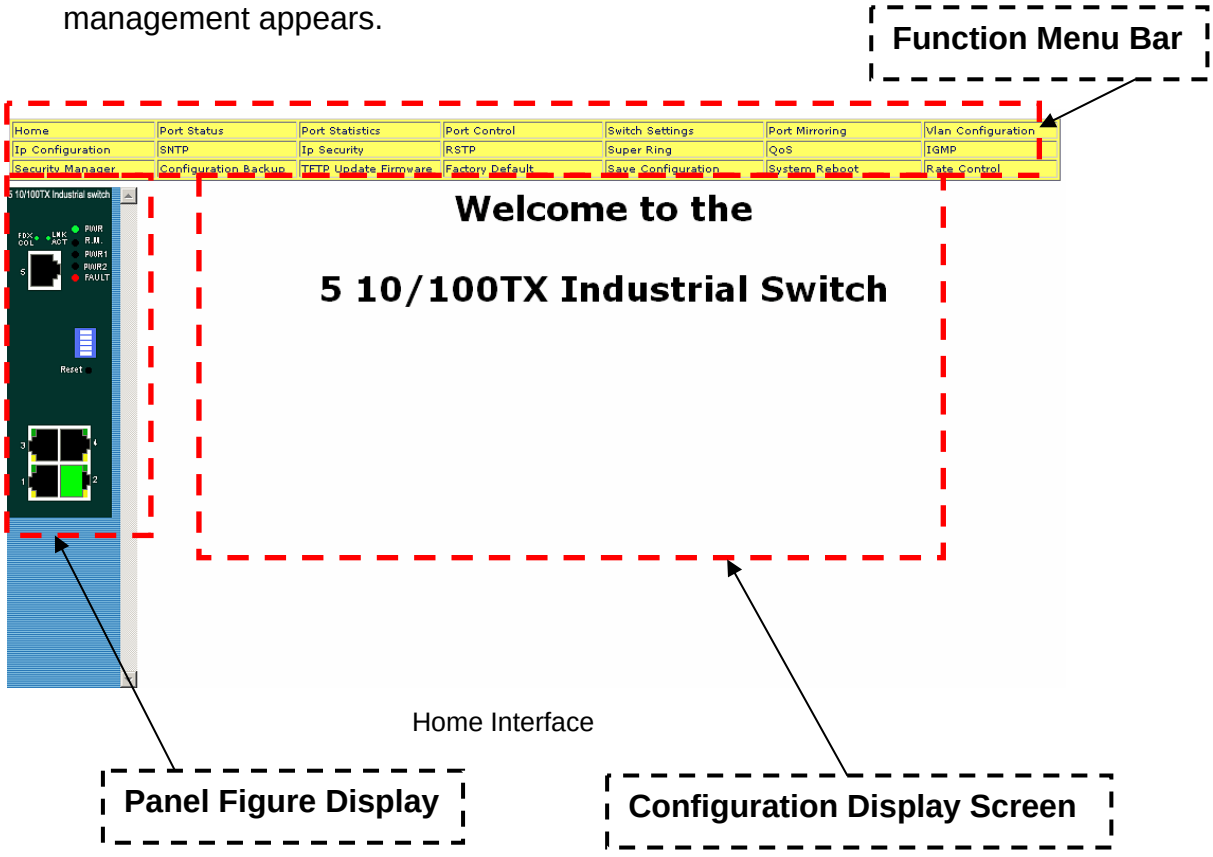
Before to use web management, install the industrial switch on the network and make sure that any one of PC on the local network can connect with the industrial switch through the web browser. The industrial switch default value of IP, subnet mask, username and password is listed below:

- IP Address: **192.168.16.1**
- Subnet Mask: **255.255.255.0**
- Default Gateway: **192.168.16.254**

- User Name: **root**
- Password: **root**

System Login

1. Launch the Internet Explorer on the PC.
2. Key in “http:// “+” the IP address of the switch”, and then Press “**Enter**”.
3. The login screen will appear right after.
4. Key in the user name and password. The default user name and password as “**root”**.
5. Press “**Enter**” or”**OK**”, and then the home screen of the Web-based management appears.

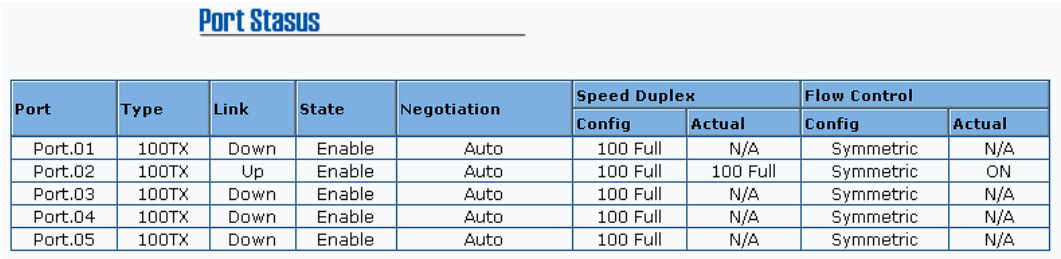


Home Interface

Port status

View status of each port

- **Port:** The port number
- **Type:** The speed mode, ex: 100TX = 100Mbps
- **Link:** Down means “No Link”. UP is for “Link”.
- **State:** Display port statuses “disable” or “enable”. Unlink will be treated as “off ”
- **Negotiation:** Display the auto negotiation mode: auto/force. “Config” means the value that user configured. “Actual” means the current value of the port.
- **Speed Duplex:** Display port connection speed. “Config” means the value that user configured. “Actual” means the current value of the port.
- **Flow Control:** Display the flow control status is “Symmetric” or “Asymmetric” in full mode. “Disable” means the flow control function is not enabling. “Config” means the value that user configured. “Actual” means the current value of the port.

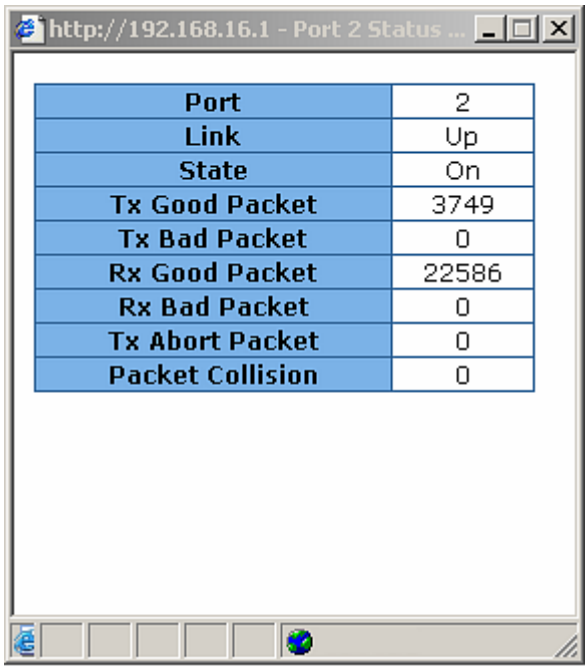


Port	Type	Link	State	Negotiation	Speed Duplex		Flow Control	
					Config	Actual	Config	Actual
Port.01	100TX	Down	Enable	Auto	100 Full	N/A	Symmetric	N/A
Port.02	100TX	Up	Enable	Auto	100 Full	100 Full	Symmetric	ON
Port.03	100TX	Down	Enable	Auto	100 Full	N/A	Symmetric	N/A
Port.04	100TX	Down	Enable	Auto	100 Full	N/A	Symmetric	N/A
Port.05	100TX	Down	Enable	Auto	100 Full	N/A	Symmetric	N/A

Port Status interface

Single Port Information

Click the port on the Panel figure on the web interface directly. Then, the single port information window will show up and display the port current information.



Port	2
Link	Up
State	On
Tx Good Packet	3749
Tx Bad Packet	0
Rx Good Packet	22586
Rx Bad Packet	0
Tx Abort Packet	0
Packet Collision	0

Port information interface

Port Statistics

The following information provides the current port statistic information. Click Clear button to clean all counts.

Port Statistics

Port	Type	Link	State	Tx Good Packet	Tx Bad Packet	Rx Good Packet	Rx Bad Packet	Tx Abort Packet	Packet Collision
Port.01	100TX	Down	Enable	0	0	0	0	0	0
Port.02	100TX	Up	Enable	10	0	9	0	0	0
Port.03	100TX	Down	Enable	0	0	0	0	0	0
Port.04	100TX	Down	Enable	0	0	0	0	0	0
Port.05	100TX	Down	Enable	0	0	0	0	0	0

Clear Help

Port Statistics Interface

Port Control

Change the port status

1. Select the port by scroll the **Port** column
2. **State:** To disable or enable control of his port
3. **Negotiation:** Set auto negotiation mode is Auto, Nway (specify the speed/duplex on this port and enable auto-negotiation), or Force
4. **Speed:** Set the transmit speed of the port
5. **Duplex:** Set full-duplex or half-duplex mode of the port
6. **Flow control:** Set flow control function is **Symmetric** or **Asymmetric** in Full Duplex mode(The default value is **Disable)**
7. And then, click Apply button to apply all configuration
8. Select the port, the port current configure will display in below column

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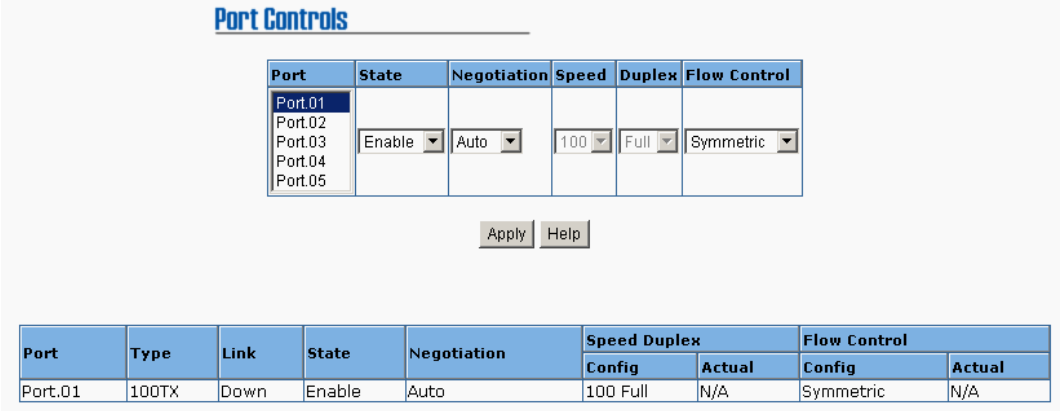
[NOTE] Remember to execute the “Save Configuration” action, otherwise the new configuration will lose when the switch power off.



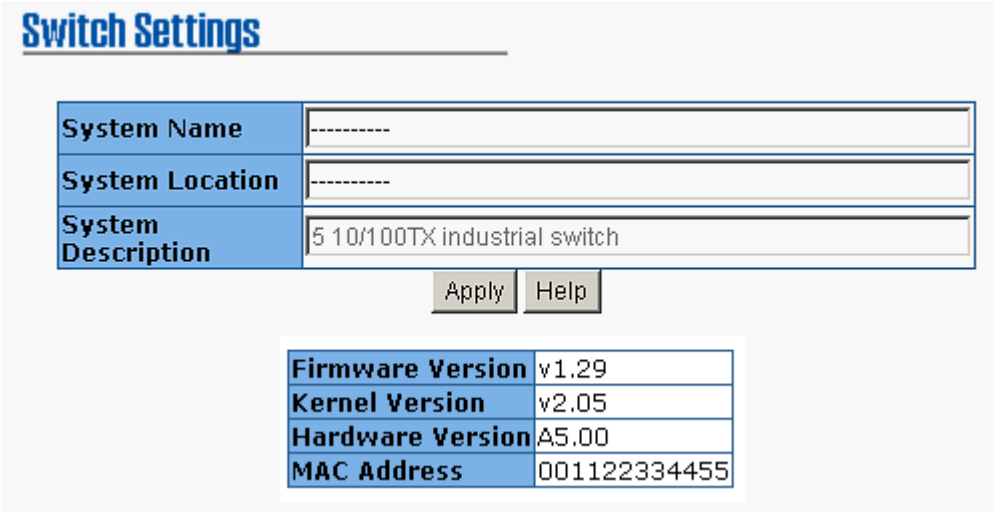
Port Control interface

Switch Settings

Assign the system name, location and view the system information

- **System Name:** Assign the name of switch. The maximum length is 64 bytes

- **System Location:** Assign the switch physical location. The maximum length is 64 bytes
- **System Description:** Display the description of switch. Read only cannot be modified
- **Firmware Version:** Display the switch's firmware version
- **Kernel Version:** Display the kernel software version
- **Hardware version:** Display the switch hardware version
- **MAC Address:** Display the unique hardware address assigned by manufacturer (default)



Switch settings interface

[NOTE] Remember to execute the "Save Configuration" action, otherwise the new configuration will lose when the switch power off.

Port Mirroring

The Port mirroring is a method for monitor traffic in switched networks. Traffic through ports can be monitored by one specific port. That is, traffic goes in or out monitored ports will be duplicated into mirror port.

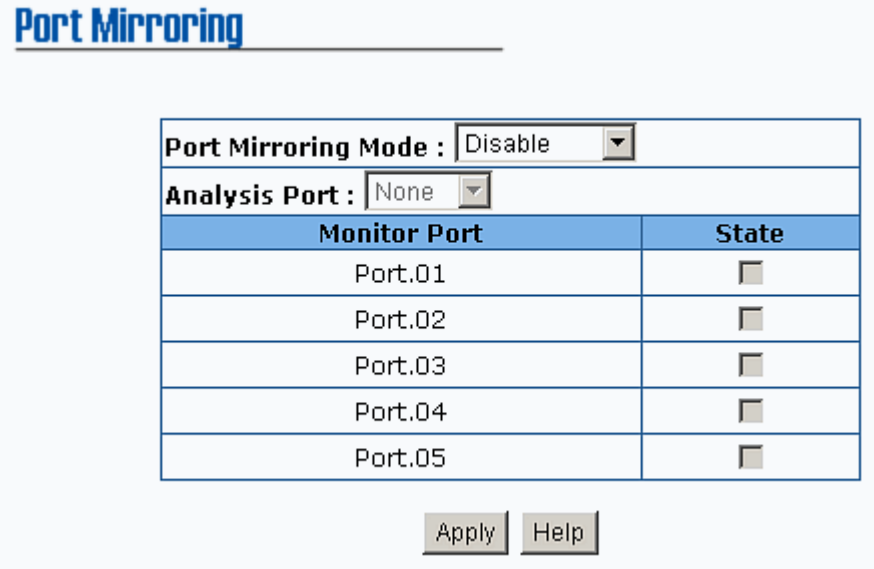
1. **Port Mirroring Mode:** Set mirror mode -- Disable, TX, and Both. The default value is "Disable".
2. **Analysis Port:** It means mirror port can be used to see all monitor port

traffic(User can connect mirror port to LAN analyzer or Netxray)

3. **Monitor Port:** The ports that want to monitor. All monitor port traffic will be copied to mirror port. User can select maximum 4 monitor ports in the switch. User can choose which port wants to monitor in only one mirror mode.

[NOTE]

1. Select the monitor mode to disable the mirroring function.
2. Remember to execute the “Save Configuration” action, otherwise the new configuration will lose when the switch power off.

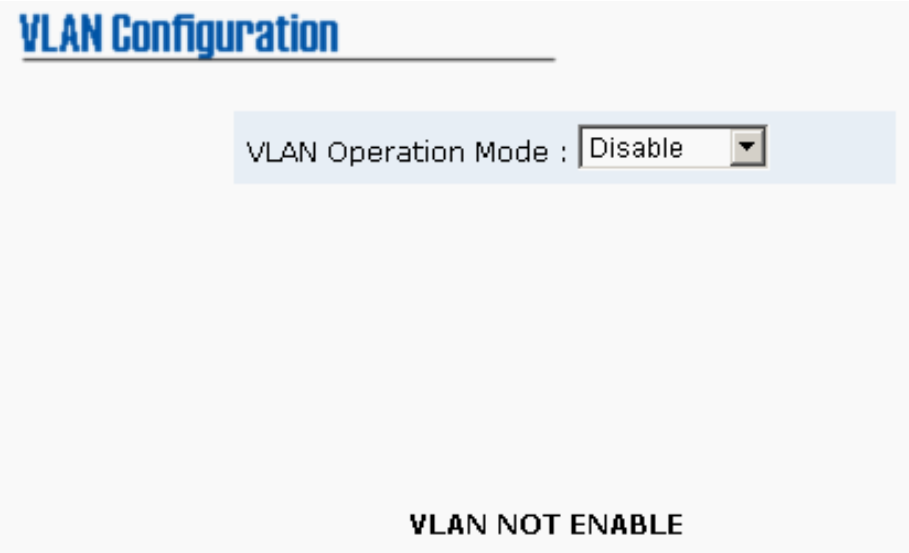


Prot Mirroring interface

VLAN configuration

A Virtual LAN (VLAN) is a logical network grouping that limits the broadcast domain, which would, allow you to isolate network traffic so only the members of the VLAN will receive traffic from the same members of VLAN. Basically, creating a VLAN from a switch is logically equivalent of reconnecting a group of network devices to another Layer 2 switch. However, all the network devices are still plugged into the same switch physically.

The industrial switch supports port-based and 802.1Q (tagged-based) VLAN. In the default configuration, VLAN operation mode default is "**disable**".

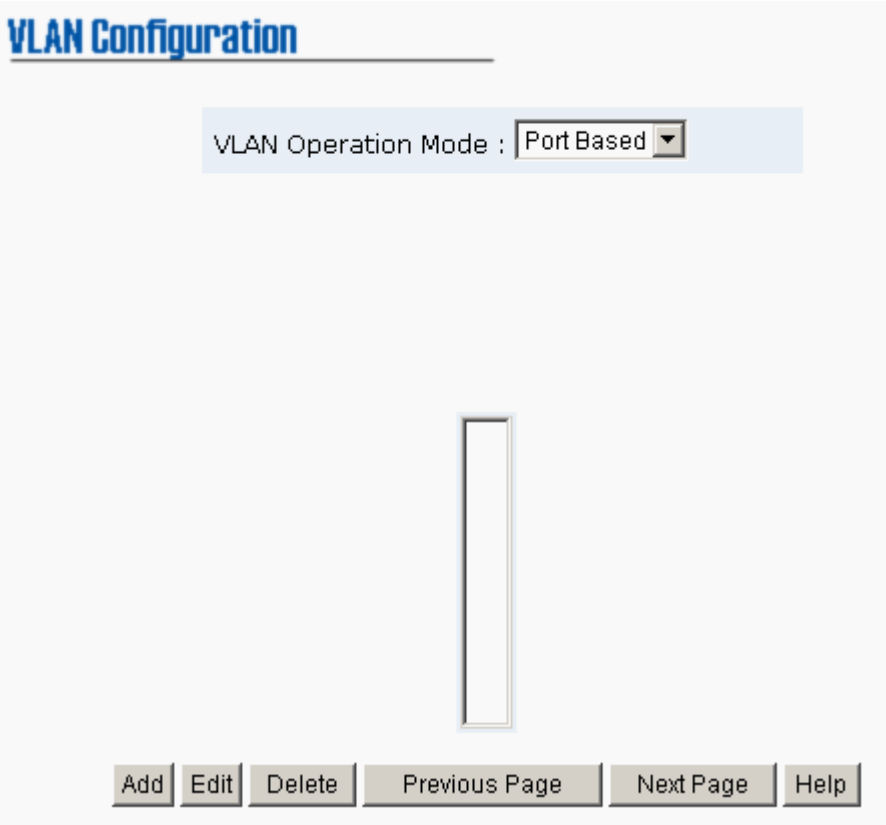


VLAN Configuration interface

Port-based VLAN

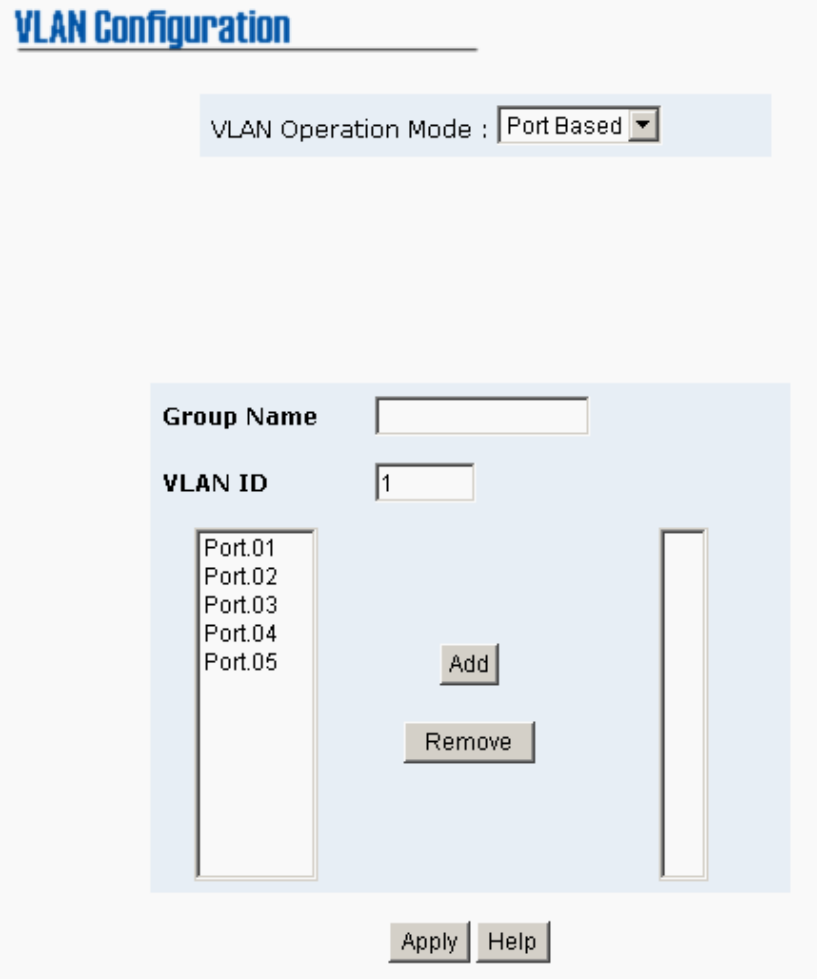
Packets can go among only members of the same VLAN group. Note all unselected ports are treated as belonging to another single VLAN.

In order for an end station to send packets to different VLAN groups, it itself has to be either capable of tagging packets it sends with VLAN tags or attached to a VLAN-aware bridge that is capable of classifying and tagging the packet with different VLAN ID based on not only default PVID but also other information about the packet, such as the protocol.



VLAN – PortBase interface

1. Click Add to add a new VLAN group. The maximum VLAN group is up to 64 VLAN groups
2. Key in the Group name, VLAN ID and select the members of VLAN group
3. And then, click Apply



VLAN—PortBase Add interface

4. The VLAN group will list after applying
5. Click Next Page to view another VLAN groups
6. Use Delete button to delete unwanted VLAN
7. Use Edit button to modify existing VLAN group

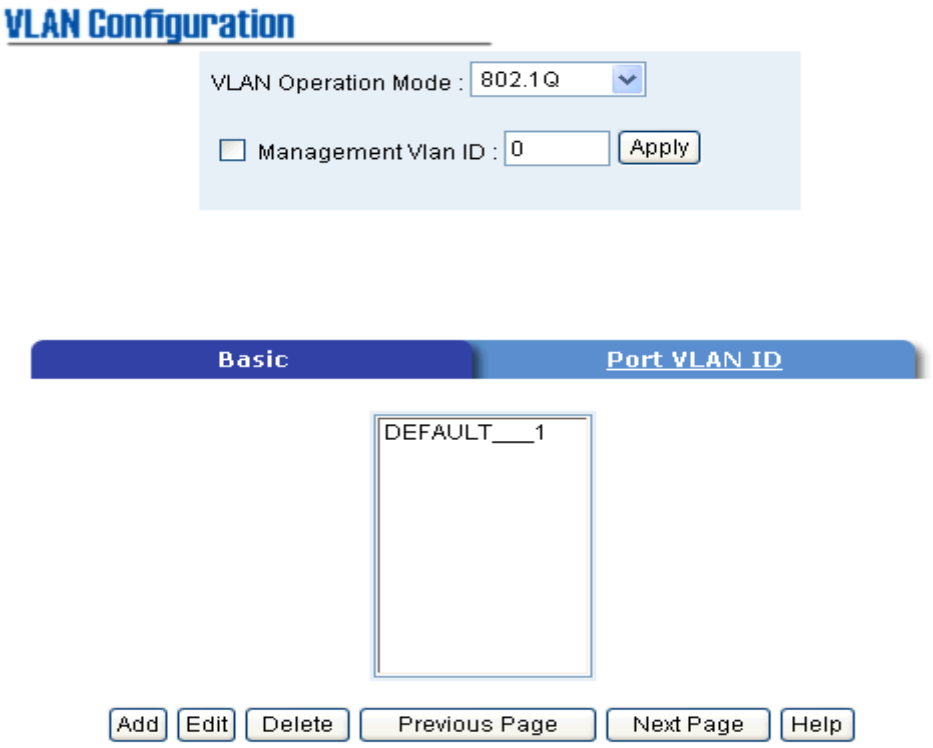
[NOTE] Remember to execute the “Save Configuration” action, otherwise the new configuration will lose when the switch power off.

802.1Q VLAN

Tagged-based VLAN is an IEEE 802.1Q specification standard which it

allows to create a VLAN across devices from different switch venders. IEEE 802.1Q VLAN uses a technique to insert a “tag” into the Ethernet frames. Tag contains a VLAN Identifier (VID) that indicates the VLAN numbers.

When the 802.1Q VLAN is enabling, the all ports on the switch belong to default VLAN which it VID is 1. The default VLAN can’t be deleting and the maximum VLAN group is up to 64 VLAN groups.



802.1q VLAN interface

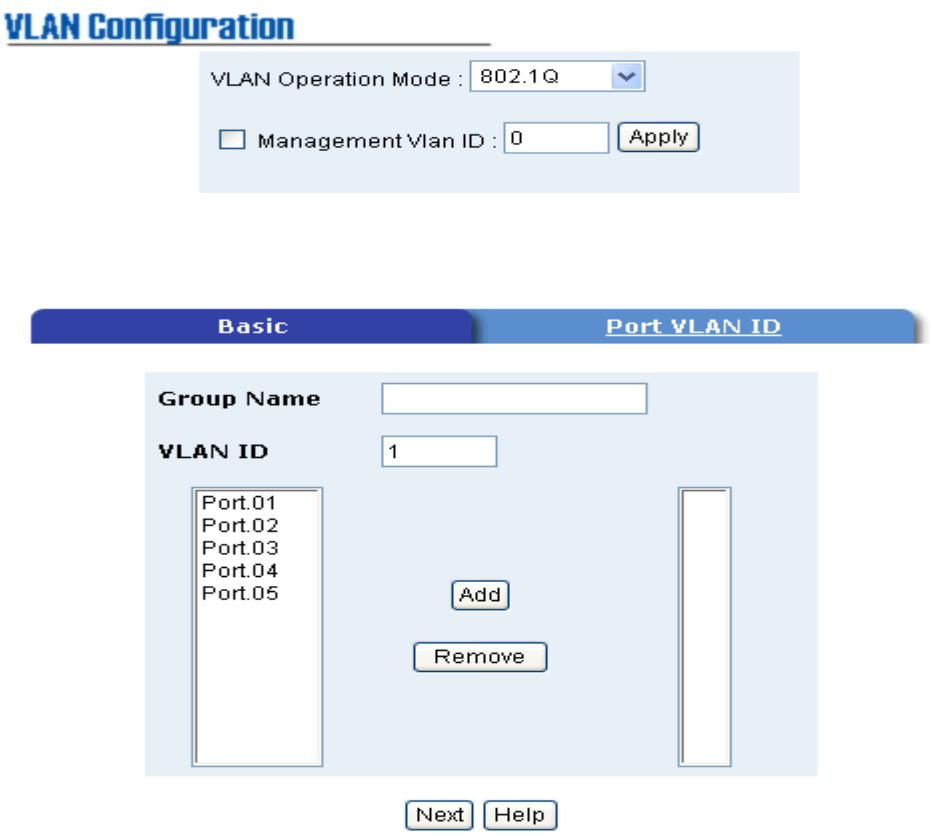
- **Basic**

1. Click Add button

2. **Management VLAN ID:** it is used for Remote Management Security. In fact, it can remote management that includes telnet, SNMP, and Web browse the switch, only when the port of VLAN group ID is equal to the Management VLAN ID. Fill the specific VLAN ID number in Management VLAN ID column and mark the check box, and then click Apply button to active the function. For example: the management

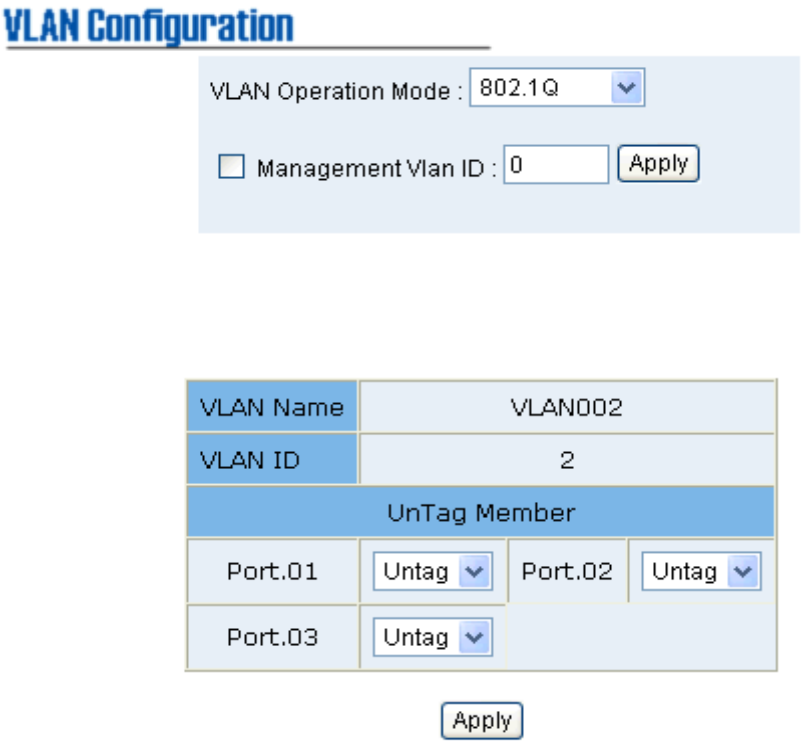
VLAN ID is 101, the VLAN group ID 101 includes the port 1, 2, and 4. Therefore, only port 1, 2, and 4 can remote management the switch. And, if the port is in two different VLAN groups and one of VLAN group ID is equal to the assigned Management VLAN ID, it still has the right to remote management the switch.

3. **Group Name:** assign a name for the new VLAN
4. **VLAN ID:** fill in a VLAN ID (2-4094). The default is 1
5. From the Available ports box, select ports to add to the VLAN group and click Add button



802.1q VLAN –Add interface

6. Click Next to bring up the configuration interface as below:

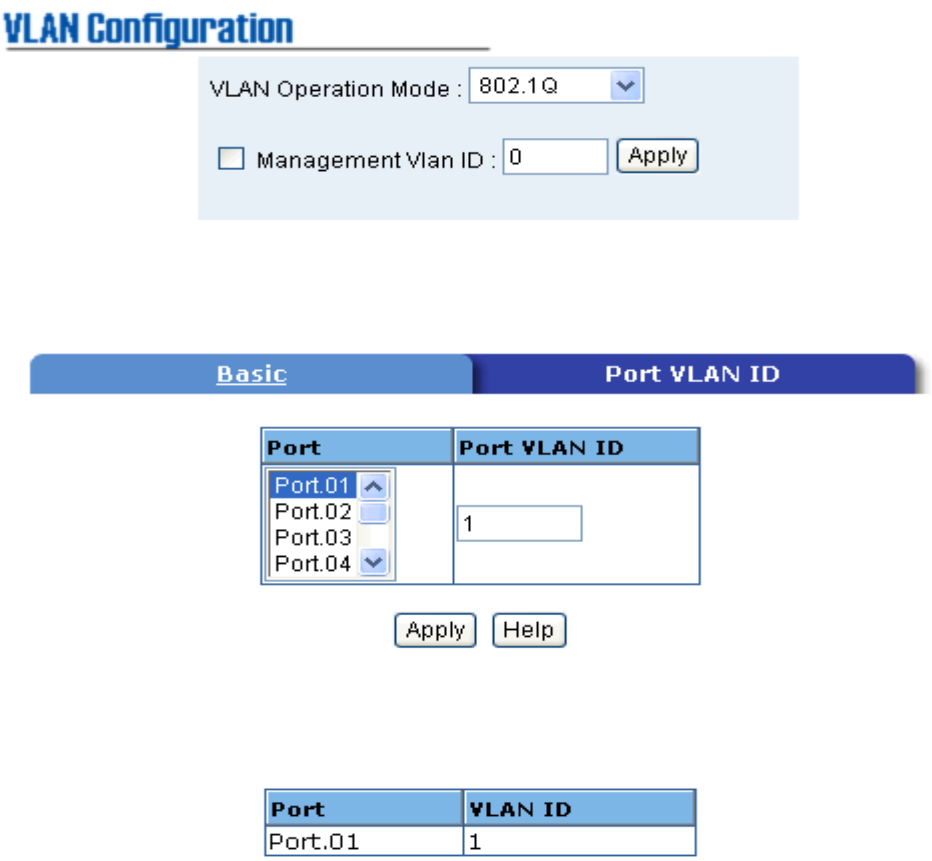


7. Set the outgoing frames are VLAN-Tagged frames or untagged and then click Apply

   - **Tag:** outgoing frames with VLAN-Tagged
   - **Untag:** outgoing frames without VLAN-Tagged

- **Port VID:** Configure port VID settings

1. **Port VLAN ID:** enter the port VLAN ID
2. And then, click Apply
3. To reset back to default value, click Default button



802.1q VLAN – Port VLAN ID interface

[NOTE] Remember to execute the “Save Configuration” action, otherwise the new configuration will lose when the switch power off.

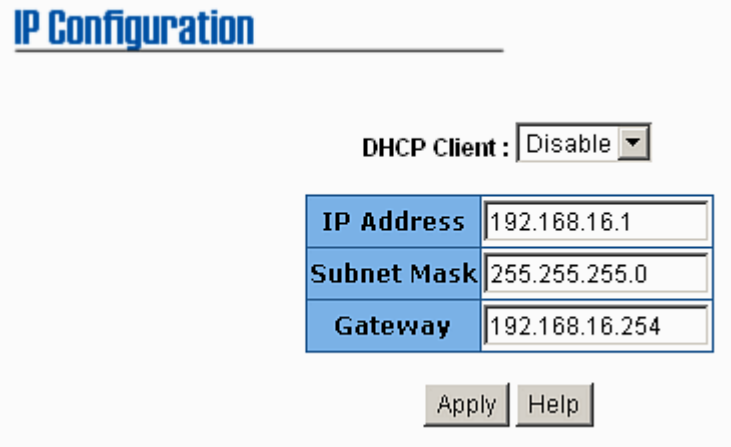
IP Address

Configure the IP Settings and DHCP client function

- **DHCP Client:** To enable or disable the DHCP client function. When DHCP client function is enabling, the industrial switch will be assigned the IP address from the network DHCP server. The default IP address will be replace by the DHCP server assigned IP address. After click “Apply” button, a popup dialog show up which It is to inform the user that when the DHCP client is enabling, the current IP will lose and user should find the new IP on the DHCP server. To cancel the enabling DHCP client function, click “cancel”.
- **IP Address:** Assign the IP address that the network is using. If DHCP

client function is enabling and then user does not need to assign the IP address. And, the network DHCP server will assign the IP address for the industrial switch and display in this column. The default IP is 192.168.16.1.

- **Subnet Mask:** Assign the subnet mask of the IP address. If DHCP client function is enabling and then user does not need to assign the subnet mask.
- **Gateway:** Assign the network gateway for the industrial switch. The default gateway is 192.168.16.254.
- And then, click Apply button to apply the configuration



IP configuration interface

SNTP Configuration

User can configure the SNTP (Simple Network Time Protocol) settings. The SNTP allows you to synchronize switch clocks in the Internet

1. **SNTP Client:** To enable or disable SNTP function to get the time from the SNTP server
2. **Daylight Saving Time:** To enable or disable daylight saving time function. When daylight saving time is enabling, user need to configure the daylight saving time period
3. **UTC Timezone:** Set the switch location time zone. The following table lists the different location time zone for reference. User also can drag

down the list to find the time zone.

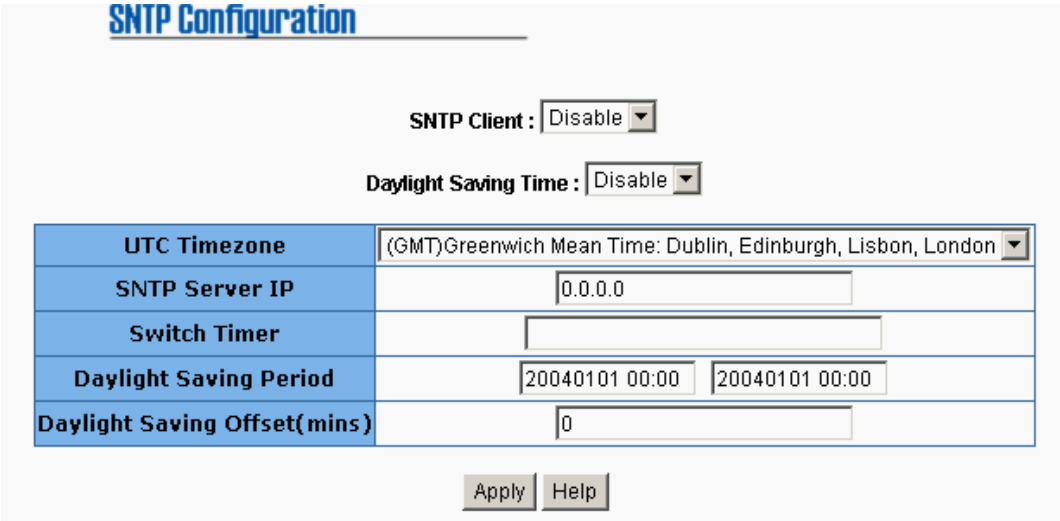
Local Time Zone	Conversion from UTC	Time at 12:00 UTC
November Time Zone	- 1 hour	11am
Oscar Time Zone	-2 hours	10 am
ADT - Atlantic Daylight	-3 hours	9 am
AST - Atlantic Standard EDT - Eastern Daylight	-4 hours	8 am
EST - Eastern Standard CDT - Central Daylight	-5 hours	7 am
CST - Central Standard MDT - Mountain Daylight	-6 hours	6 am
MST - Mountain Standard PDT - Pacific Daylight	-7 hours	5 am
PST - Pacific Standard ADT - Alaskan Daylight	-8 hours	4 am
ALA - Alaskan Standard	-9 hours	3 am
HAW - Hawaiian Standard	-10 hours	2 am

Nome, Alaska	-11 hours	1 am
CET - Central European FWT - French Winter MET - Middle European MEWT - Middle European Winter SWT - Swedish Winter	+1 hour	1 pm
EET - Eastern European, USSR Zone 1	+2 hours	2 pm
BT - Baghdad, USSR Zone 2	+3 hours	3 pm
ZP4 - USSR Zone 3	+4 hours	4 pm
ZP5 - USSR Zone 4	+5 hours	5 pm
ZP6 - USSR Zone 5	+6 hours	6 pm
WAST - West Australian Standard	+7 hours	7 pm
CCT - China Coast, USSR Zone 7	+8 hours	8 pm
JST - Japan Standard, USSR Zone 8	+9 hours	9 pm
EAST - East Australian Standard GST Guam Standard, USSR Zone 9	+10 hours	10 pm
IDLE - International Date Line NZST - New	+12 hours	Midnight

Zealand Standard NZT - New Zealand		

4. **SNTP Sever IP:** Set the SNTP server IP address
5. **Switch Timer:** Display the switch current time
6. **Daylight Saving Period:** Configuring the daylight saving time period
7. **Daylight Saving Offset (mins):** Configuring the offset value
8. And then, click Apply button to active the configuration

[NOTE] Remember to execute the "Save Configuration" action, otherwise the new configuration will lose when the switch power off.



SNTP Configuration

IP Security

IP security function allows user to assign 10 specific IP addresses that have permission to access the switch through the web browser for the securing switch management.

1. **Enable the IP Security:** Mark the check box to enable the IP security function
2. **Security IP 1 ~ 10:** Assign up to 10 specific IP address. Only the

assigned 10 IP address can remote access and manage the switch through the Web browser

3. And then, click Apply button to apply the configuration

[NOTE] Remember to execute the “Save Configuration” action, otherwise the new configuration will lose when the switch power off.

IP Security Interface

RSTP Configuration

The Rapid Spanning Tree Protocol (RSTP) is an evolution of the Spanning Tree Protocol and provides for faster spanning tree convergence after a topology change. The system also supports STP and the system will auto detect the connected device that is running STP or RSTP protocol.

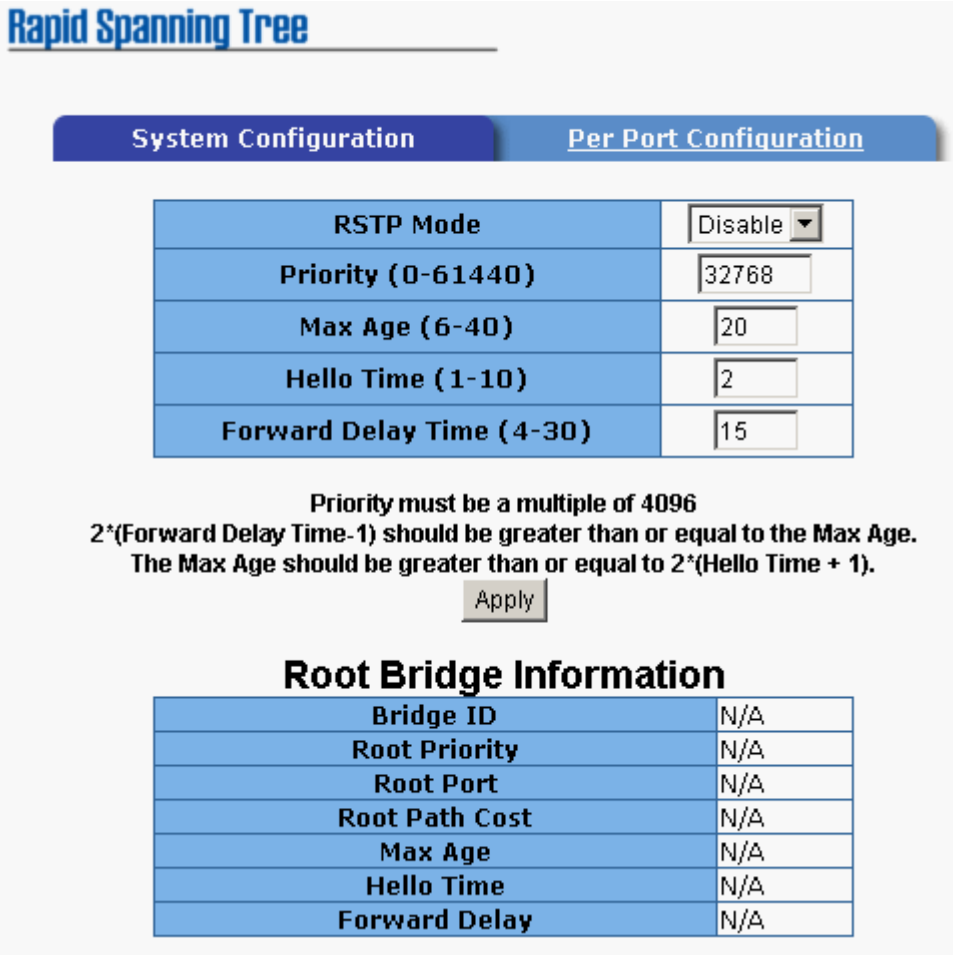
System Configuration

Modify RSTP state parameters

- **RSTP mode:** Enable or disable RSTP function before configure the related parameters. (The default value is enable)
- **Priority (0-61440):** a value used to identify the root bridge. The bridge with the lowest value has the highest priority and is selected as the root. If the value changes, user must reboot the switch. The priority value must be multiple of 4096 according to the protocol standard rule.
- **Max Age (6-40):** the number of seconds a bridge waits without receiving Spanning-tree Protocol configuration messages before attempting a reconfiguration. Enter a value between 6 through 40.
- **Hello Time (1-10):** the time that controls switch sends out the BPDU packet to check RSTP current status. Enter a value between 1 through 10.
- **Forward Delay Time (4-30):** the number of seconds which a port waits before changing from its Rapid Spanning-Tree Protocol learning and listening states to the forwarding state. Enter a value between 4 through 30.
- And then, click Apply button to apply the configuration

[NOTE]

1. Must follow the rule to configure the MAX Age, Hello Time, and Forward Delay Time.
   2 x (Forward Delay Time value –1) > = Max Age value >= 2 x (Hello Time value +1)
2. Remember to execute the “Save Configuration” action, otherwise the new configuration will lose when the switch power off.



RSTP– System Configuration Interface

Per Port Configuration

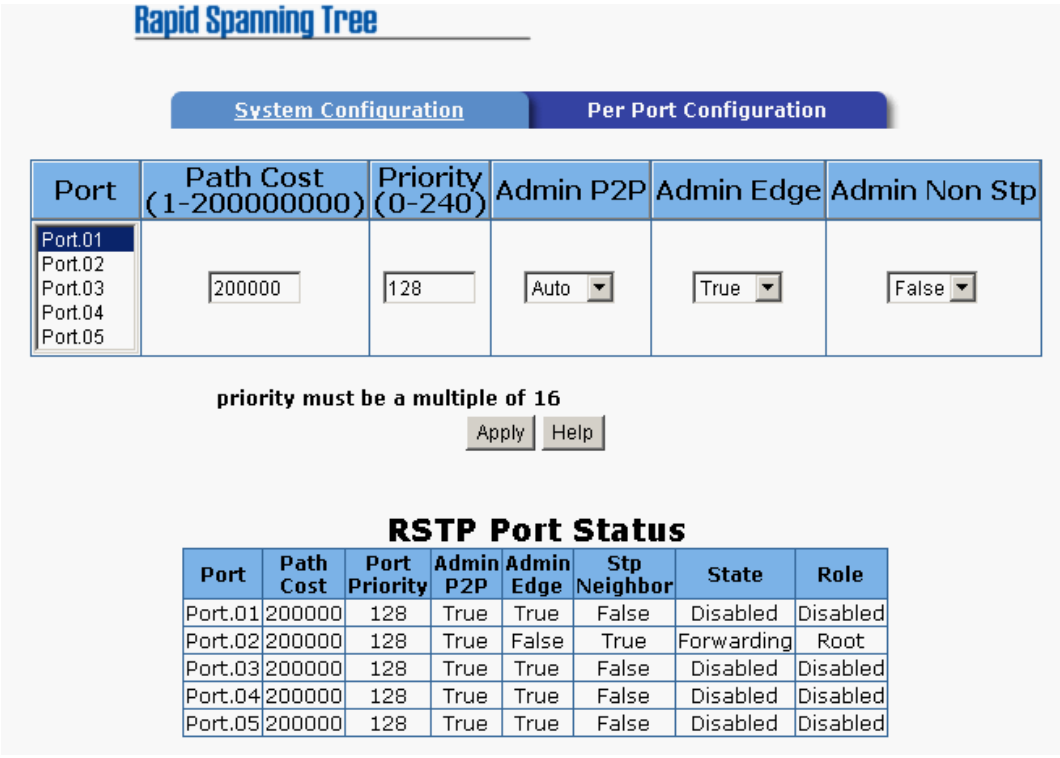
Configure path cost and priority of every port

1. Select the port in Port column
2. **Path Cost:** The cost of the path to the other bridge from this transmitting bridge at the specified port. Enter a number 1 through 200000000
3. **Priority:** Deciding which port should be blocked by priority in LAN. Enter a number 0 through 240. The value of priority must be the multiple of 16
4. **Admin P2P:** Some of the rapid state transactions that are possible within RSTP which are dependent upon whether the port concerned can only be connected to exactly one other bridge (i.e. it is served by a

point-to-point LAN segment), or can be connected to two or more bridges (i.e. it is served by a shared medium LAN segment). This function allows the P2P status of the link to be manipulated administratively. True is P2P enabling. False is P2P disabling

5. **Admin Edge:** The port directly connected to end stations cannot create bridging loop in the network. To configure the port as an edge port, set the port to "**True**" status
6. **Admin Non Stp:** The port includes the STP mathematic calculation. **True** is not including STP mathematic calculation. **False** is including the STP mathematic calculation
7. And then, click Apply button

[NOTE] Remember to execute the "Save Configuration" action, otherwise the new configuration will lose when the switch power off.



RSTP – Per Port Configuration interface

X-Ring

Super-Ring provides a faster redundant recovery than Spanning Tree topology. The action is similar with STP or RSTP, but the algorithms not the same.

In the X-Ring topology, every switch should enable Super-Ring function and assign two member ports in the ring. Only one switch in the X-Ring group would be set as a backup switch that one of two member ports would be blocking, called backup port, and another port is called working port. Other switches are called working switches and their two member ports are called working ports. When the network connection failure, the backup port will automatically become a working port to recovery the failure.

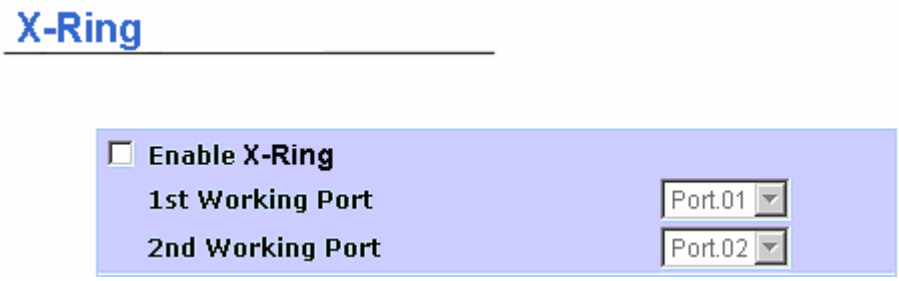
The switch supports one Dipswitch for configuring the switch as the ring master or slave mode. The ring master has the rights to negotiate and place command to other switches in the X-Ring group. If there are 2 or more switches are in master mode, then software will select the switch with lowest MAC address number as the ring master. The X-Ring master ring mode will be enabling by the DIP Switch. When the switch is set to the master ring mode, the Super-Ring configuration interface will display the switch as the master ring message. Also, you can identify the switch as the ring master from the R.M. LED panel of the LED panel on the switch.

The system also supports the coupling ring that can connect 2 or more X-Ring group for the redundant backup function and dual homing function that prevent connection lose between Super-Ring group and upper level/core switch.

- **Enable Super-Ring:** To enable the Super-Ring function. Marking the check box to enable the Super-Ring function
- **1st & 2nd Working Ports:** Assign two ports as the member ports. One port will be working port and one port will be the backup port. The system will automatically decide which port is working port and which

port is backup port

- **Enable Coupling Ring:** To enable the coupling ring function. Marking the check box to enable the coupling ring function
- **Coupling port:** Assign the member port
- **Control port:** Set the switch as the master switch in the coupling ring.
- **Enable Dual Homing:** Set up one of port on the switch to be the Dual Homing port. In an Super-Ring group, maximum Dual Homing port is one. Dual Homing only work when the Super-Ring function enable
- And then, click Apply to apply the configuration



X-Ring Interface

[NOTE]

1. When the X-Ring function enable, user must disable the RSTP. The X-Ring function and RSTP function cannot exist at the same time.
2. Remember to execute the “Save Configuration” action, otherwise the new configuration will lose when the switch power off.

QoS Configuration

Configure Qos setting of the every port

- **Oos Policy:** select the Qos policy rule
  - **Using the 8,4,2,1 weight fair queue scheme:** The switch will follow 8:4:2:1 rate to process priority queue from Hi to lowest queue. For example: the system will process 8 high queue packets, 4 middle queue packets, 2 low queue packets, and the one lowest queue packets at the same time
  - **Use the strict priority scheme:** Always higher queue will be

process first, except higher queue is empty

- **Priority Type:** Every port has 5 priority type selections
  - **Port-base:** The port priority will follow the **default port priority** that have assigned – High, middle, low, or lowest
  - **COS only:** The port priority will only follow the **COS priority** that have assigned
  - **TOS only:** The port priority will only follow the **TOS priority** that have assigned
  - **COS first:** The port priority will follow the COS priority first, and then other priority rule
  - **TOS first:** The port priority will follow the TOS priority first, and the other priority rule
- **COS priority:** Set the COS priority level 0~7
- **TOS priority:** The system provides 0~63 TOS priority level. Each level has 4 types of priority – high, mid, low, and lowest. The default value is "Lowest" priority for each level. When the IP packet is received, the system will check the TOS level value in the IP packet has received. For example: user set the TOS level 25 is high. The port 1 is following the TOS priority policy only. When the packet received by port 1, the system will check the TOS value of the received IP packet. If the TOS value of received IP packet is 25(priority = high), and then the packet priority will have highest priority

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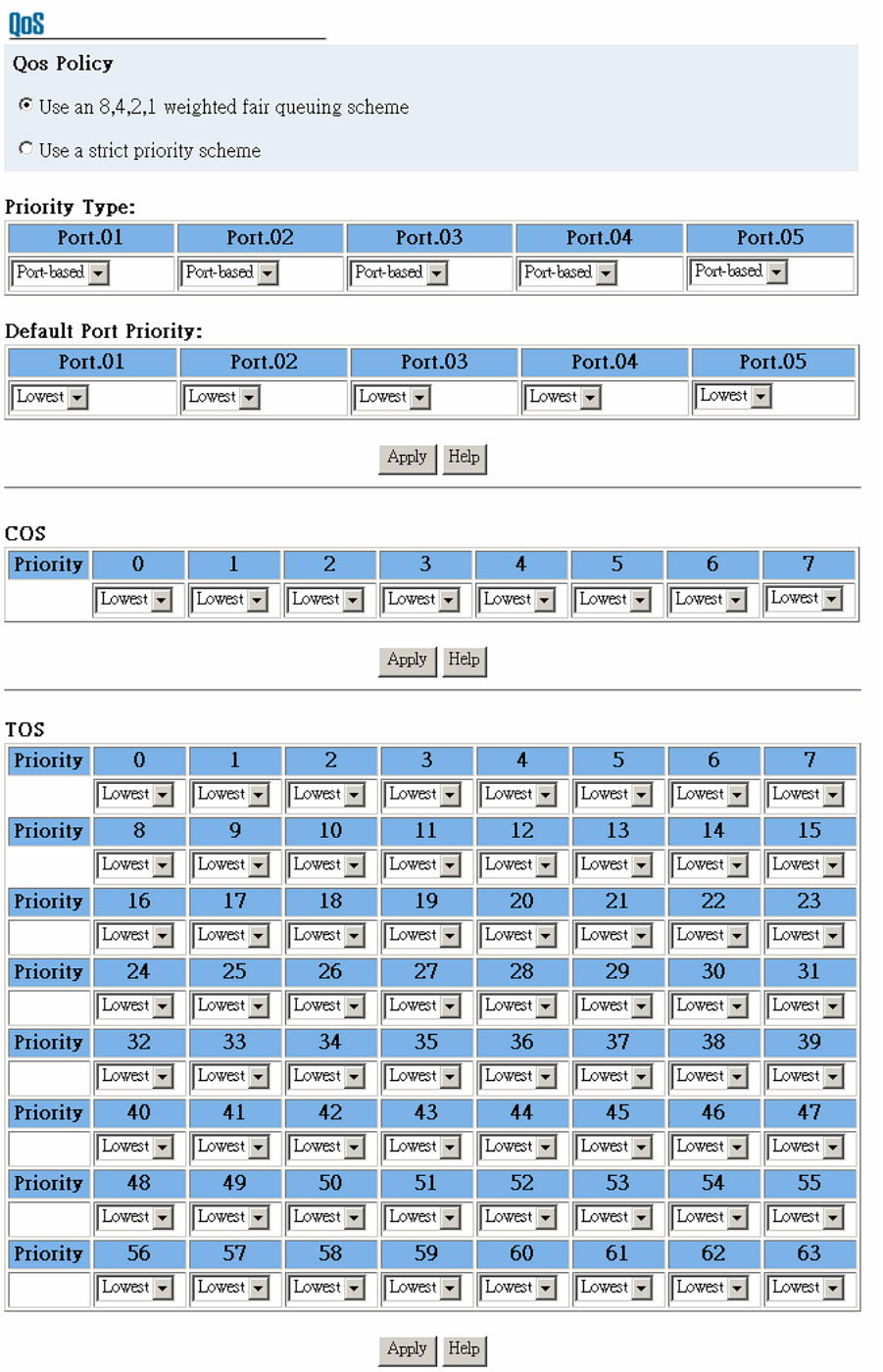
[NOTE] QoS and Rate control cannot be existed at the same time.



QoS configuration Interface

IGMP

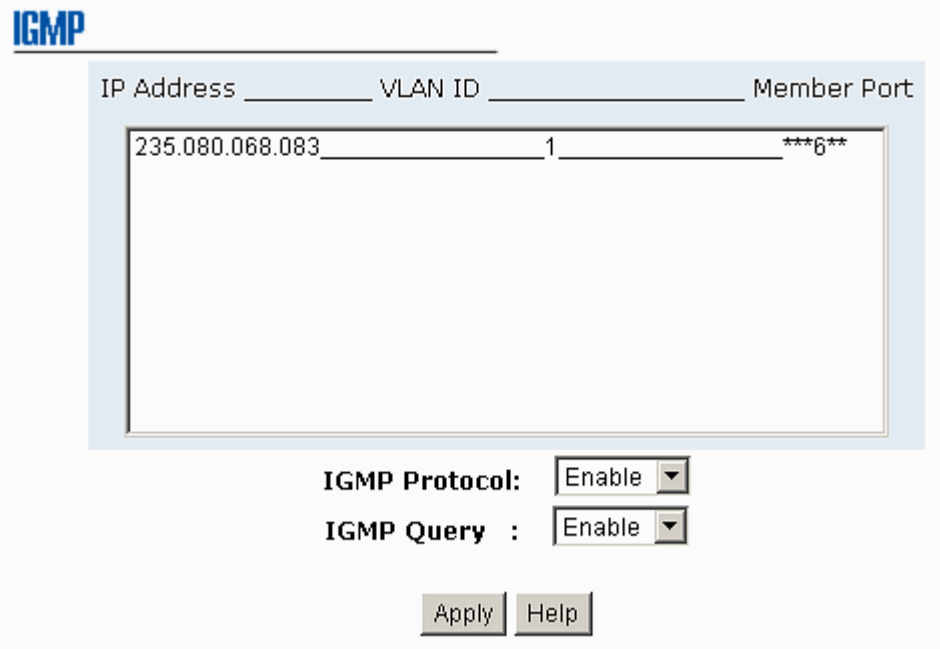
The Internet Group Management Protocol (IGMP) is an internal protocol of the Internet Protocol (IP) suite. IP manages multicast traffic by using switches, routers, and hosts that support IGMP. Enabling IGMP allows the ports to detect IGMP queries and report packets and manage IP multicast traffic through the switch. IGMP have three fundamental types of message

as follows:

Message	Description
Query	A message sent from the querier (IGMP router or switch) asking for a response from each host belonging 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 being a member of a specific multicast group.

User can enable **IGMP protocol** and **IGMP Query** function in here. The IGMP snooping information which difference multicast group VID and member port, and IP multicast addresses range from 224.0.0.0 through 239.255.255.255 will list as figure below:

[NOTE] Remember to execute the “Save Configuration” action, otherwise the new configuration will lose when the switch power off.



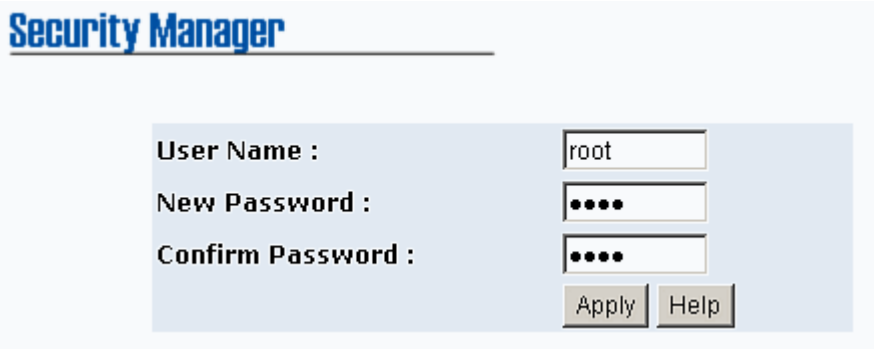
IGMP Snooping interface

Security Manager

Change web management login user name and password for the management security issue

1. **User name:** key in the new user name(The default is “admin”)
2. **Password:** key in the new password(The default is “admin”)
3. **Confirm password:** reenter the new password
4. And then, click Apply

[NOTE] Remember to execute the “Save Configuration” action, otherwise the new configuration will lose when the switch power off.



Security Manager interface

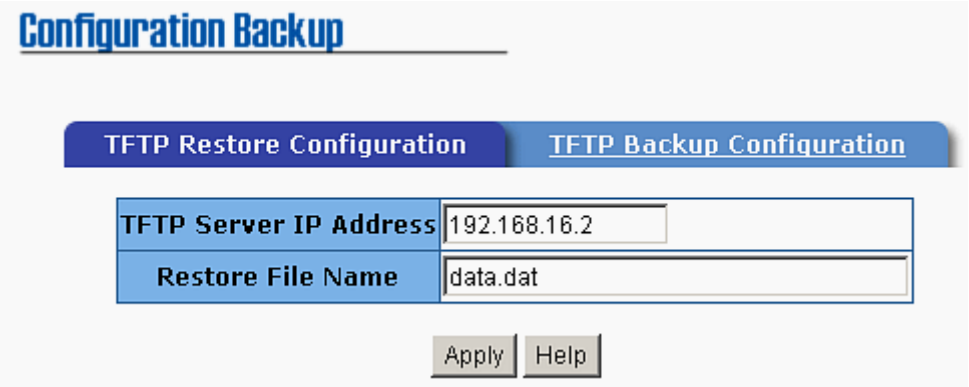
Configuration Backup

Restore the backup configuration into the industrial switch and backup the configuration to TFTP server

TFTP Restore Configuration

Restore flash ROM value from TFTP server, but the backup image has to be stored on TFTP server

1. **TFTP Server IP Address:** Key in the TFTP server IP
2. **Restore File Name:** Key in the restore file name
3. And then, click Apply

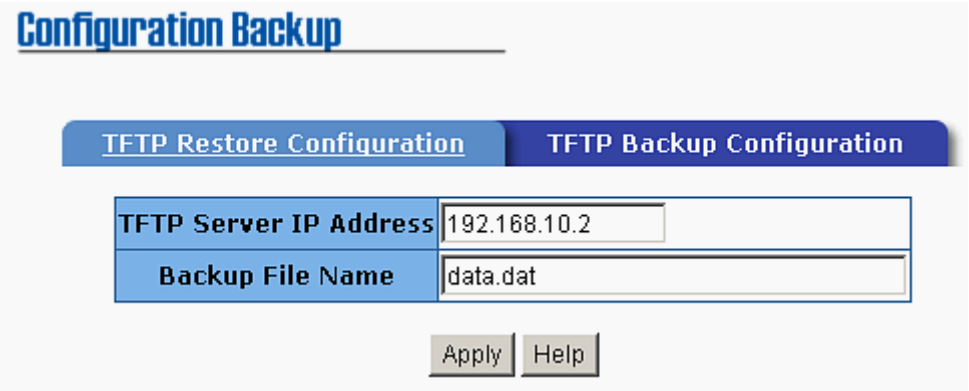


TFTP Restore Configuration interface

TFTP Backup Configuration

Save current flash ROM value from the industrial switch to the TFTP server

1. **TFTP Server IP Address:** Key in the TFTP server IP
2. **Backup File Name:** Key in the file image name
3. And then, click Apply

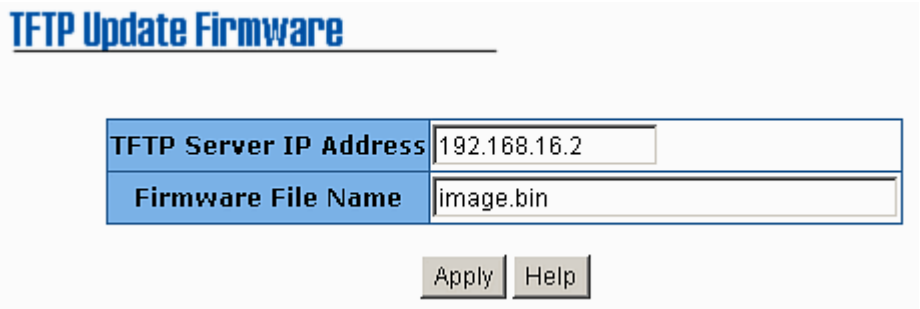


TFTP Backup Configuration interface

TFTP Update Firmware

To update the switch firmware. Make sure that the TFTP server is ready and the firmware image is on the TFTP server

1. **TFTP Server IP Address:** Key in your TFTP server IP
2. **Firmware File Name:** Key in the name of firmware image
3. And then, click Apply

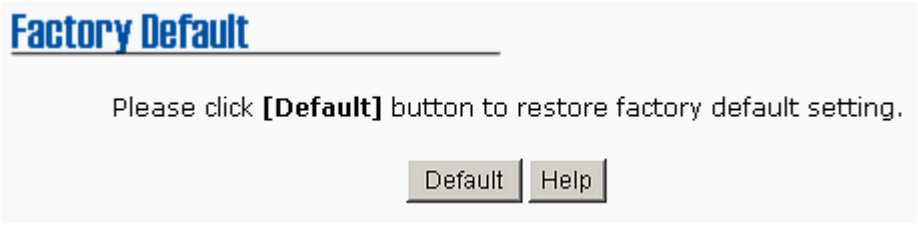


TFTP Update Firmware interface

Factory Default

Reset Switch to the default configuration. Except the IP address, subnet mask, default gateway, username, and password will remain as user configured

- Click Default button to reset switch to default setting



Factory Default interface

System Reboot

Reboot the switch in software reset

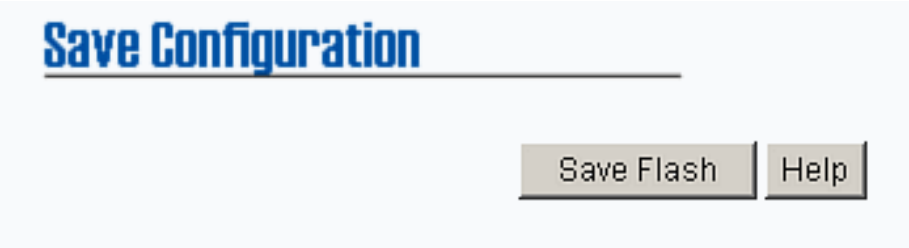
- Click Reboot button to reboot the switch

System Reboot interface

Save Configuration

Save the industrial switch configuration to the flash memory. Power off the industrial switch without the saving, all changed configuration will lost

- Click the Save Flash button the save the configuration.



Save Configuration Interface

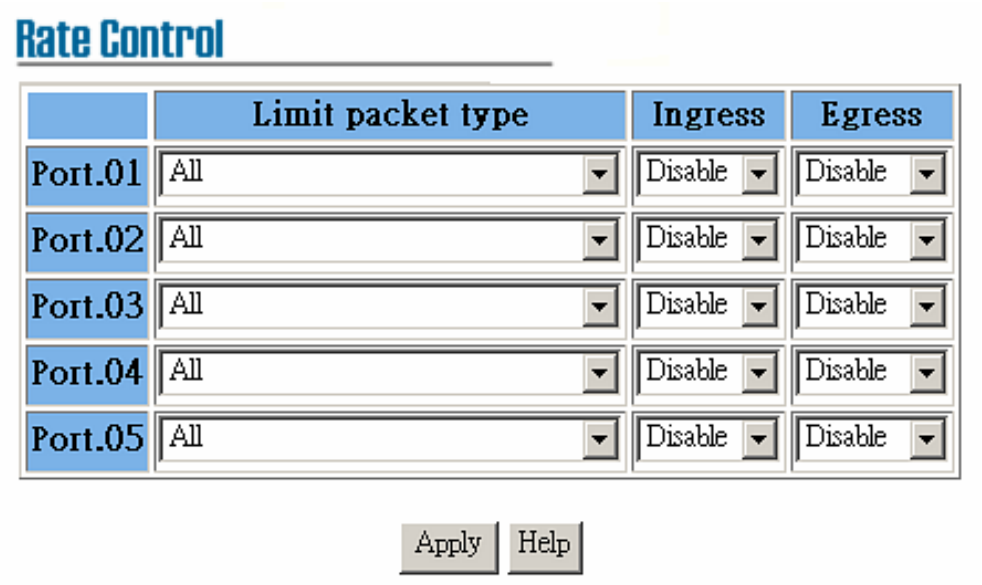
Rate Control

Set up every port's bandwidth rate and packet limitation type

- **Limit Packet type:** Select the packet type that wants to filter. The packet types have all type packet, broadcast/multicast/unknown unicast packet, broadcast/multicast packet, and broadcast packet only. The broadcast/multicast/unknown unicast packet, broadcast/multicast packet, and broadcast packet only are only for ingress packet. The egress rate only supports all type packet.
- The port1 ~ port 5 supports port ingress and egress rate control. For example, assume port 1 is 10Mbps, users can set it's effective egress rate is 1Mbps, ingress rate is 500Kbps. The switch performs the ingress rate by packet counter to meet the specified rate
  - **Ingress:** Select the port effective ingress rate. The valid range value is 1MB, 2MB, 4MB, 8MB, 16MB, 32MB and 64MB. The default value is "disable"
  - **Egress:** Select the port effective ingress rate. The valid range value is 128kbps, 256Kbps, 512Kbps, 1MB, 2MB, 4MB, and 8MB. The default value is "disable"
- And then, click Apply button to apply the configuration

[NOTE]

1. Remember to execute the "Save Configuration" action, otherwise the new configuration will lose when the switch power off.
2. Qos and Rate control cannot be existed at the same.



Rate Control Interface

Troubles shooting

- Verify power cord/adapter (DC 12-48V) is correct. Please do not use the power adapter with DC output excess 48V, it will cause the industrial switch to be burned
- Select the proper UTP cable to connect all the devices. Please check cable is unshielded twisted-pair (UTP) or shield twisted-pair (STP) cable for RJ-45 connections: 100Ω Category 3, 4 or 5 cable for 10Mbps connections or 100Ω Category 5 cable for 100Mbps connections. Also be sure that the length of any twisted-pair connection does not excess 100 meters (328 feet)
- **Diagnosing LED Indicators:** the switch can be easily monitored through panel indicators to assist in identifying problems, which describes common problems user may encounter and where user can find possible solutions
- If the power indicator does not light up when the power cord is plugged in, user may have a problem with power cord. Than check for loose power connections, power losses or surges at power outlet. If user still cannot resolve the problem, contact the local dealer for assistance
- If the Industrial switch LED indicators are normal and the connected cables are correct but the packets still cannot transmit. Please check the system Ethernet devices configuration or status

Technical Specification

The 5 10/100TX with Super-Ring managed industrial switch technical specification as follow:

Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE802.3x Flow Control and Back-pressure IEEE802.1d spanning tree / IEEE802.1w rapid spanning tree IEEE802.1p class of service IEEE802.1Q VLAN Tag
Protocol	CSMA/CD
Management	Provides Web interface management and one default button for system default setting
Technology	Store and forward switching architecture
Transfer Rate	14,880 pps for Ethernet port and 148,800 pps for Fast Ethernet port
Transfer packet size	64bytes to 1522 bytes (with VLAN tag)
MAC address	2K MAC address table
Memory Buffer	1Mbits
Back-plane	1.0 Gbps

Packet throughput ability	1.49Mpps @64bytes (8TX)
LED	Per port: Link/Activity (Green), Full duplex/Collision (Yellow) Per unit: Power (Green), Power 1 (Green), Power 2 (Green), Fault (Yellow), Master (Green)
Network Cable	**10Base-T:** 2-pair UTP/STP Cat. 3, 4, 5 cable EIA/TIA-568 100-ohm (100m) **100Base-TX:** 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m)
Power Supply	Provide 2 set of wide range DC power input with polarity reserve protect function and input by terminal block The power input range from 12 to 48V DC and also provides one DC jack for AC/DC power adapter
Power consumption	3 Watts
Packet filter	4 selection rules for different type of packet combination: ■ All of packet ■ Broadcast/ multicast/ unknown unicast packet ■ Broadcast/ multicast packet ■ Broadcast packet only
Class of service	IEEE802.1p class of service support, per port provides 4 priority queues.
Quality of service	port based Tag based IPv4 Type of service

Super-Ring	2 ports for Super-Ring to provide redundant backup feature and the recovery time below 300ms. It also supports coupling ring function. Ring and coupling port configure by web interface and ringmaster by hardware Dipswitch.
VLAN	Port based VLAN and IEEE802.1Q Tag VLAN. Both of port based and Tag based VLAN group up to 64 VLANs.
Spanning tree	IEEE802.1d spanning tree and IEEE802.1w rapid spanning tree.
IGMP	IGMP v1 and Query mode. Up to 256 groups.
SNTP	Simple Network time protocol
Management IP security	IP address security to prevent unauthorized intruder.
Port mirror	TX packet only or both TX and RX packet.
Install	Provide DIN rail kit and wall mount ear for wall mount or DIN-type cabinet install.
Alarm	Provides one relay output for port breakdown, power fail and provide Dipswitch to mask link down port. Alarm Relay current carry ability: 1A @ DC24V
Firmware update	TFTP firmware update TFTP configuration backup and restore.

DHCP client	Provide DHCP client function to obtain IP address from DHCP serve.
Bandwidth control	■ Ingress packets filter and egress packet limit ■ The egress rate control supports all of packet type and the limit rates are 128kbps, 256Kbps, 512Kbps, 1MB, 2MB, 4MB, and 8MB ■ Ingress filter packet type combination rules are Broadcast/Multicast/Unknown Unicast packet, Broadcast/Multicast packet, Broadcast packet only and all of packet. The packet filter rate can be set follow as:1Mbps、2Mbps、4Mbps、8Mbps、16Mbps、32Mbps、64Mbps
Operation Temp.	0℃ to 60℃ (32℉ to 140℉)
Operation Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40℃ to 85℃
Case Dimension	IP-30, 54 mm (W) x 135 mm (H) x 105mm (D)
EMI	FCC Class A, CE EN6100-4-2, CE EN6100-4-3, CE EN-6100-4-4, CE EN6100-4-5, CE EN6100-4-6
Safety	UL, cUL, CE/EN60950
Stability testing	IEC60068-2-32 (Free fall), IEC60068-2-27 (Shock), IEC60068-2-6 (Vibration)