# LMX-0500 Series

## 5-Port Industrial Managed Ethernet Switch, with 5*10/100Tx, 12~48VDC Power Input

# User Manual

Version 1.1

www.antaira.com

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## 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. It may cause harmful interference to radio communications if the equipment is not installed and used in accordance with the instructions. 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.

**Caution**: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

## 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.

## Industrial Ethernet Switches

Industrial Grade Managed Ethernet Switches

User Manual
Version 1.1 (March 2018)

This manual supports the following models:

- LMX-0500
- LMX-0500-T

This document is the current official release manual. Please check our website (www.antaira.com) for any updated manual or contact us by e-mail (support@antaira.com).

## Table of Contents

# 1. Introduction

All Antaira industrial managed switches come with a pre-installed “user friendly” web console interface, which allows users to easily configure and manage the units, whether one is using a serial console and command line interface(CLI) commands like Telnet, SSH, HTTP (Web GUI) or simple network management protocols (SNMP).

## 1.1 Product Overview

**Antaira’s LMX-0500 series** is a 5-Port Industrial Managed Ethernet Switch which embedded with 5*10/100Tx fast Ethernet ports. This series is a full manageable Industrial Ethernet Switch pre-loaded with standard Layer 2 network management software, and supports a user friendly Web Console interface for easy configuration.

LMX-0500 series is IP30 rated and DIN-rail mountable design and provides wide operating temperature range models in STD: -10°C to 70°C, and EOT: -40°C to 75°C, and it also provided high EFT and ESD protection for any industrial networking application in factory automation, ITS, Power/Utility, Water Wastewater Treatment plants, any outdoor or harsh environment.

## 1.2 Product Software Features

- Network Redundancy
  - STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switch (ERPS) for network redundancy
- Network Management
  - Web UI based management, SNMP v1/v2, Serial Console
  - Qos, traffic classification QoS, Cos, bandwidth control for Ingress and Egress, broadcast storm control, Diffserv
  - IEEE802.1q VLAN, port-based VLAN support
  - IGMP snooping v1/v2, IGMP filtering / throttling, IGMP query up to 256 group
  - Supports RMON, MIB II, port mirroring, event syslog, DNS, NTP/SNTP, SSH/SSL, TFTP.
- Port Configuration
  - Status, statistics, mirroring, rate limiting, event syslog
- Event Handling
  - Event notification by Email: Cold/Warm Start, Power Failure, Authentication, SNMP trap and Fault Alarm Relay Output

- Software Upgrade via TFTP and HTTP
- Configuration Backup – USB Port

## 1.3 Product Hardware Features

- System Interface and Performance
  - All RJ-45 ports support Auto MDI/MDI-X Function
  - Embedded 5*10/100Tx Fast Ethernet ports
  - Store-and-forward switching architecture
  - 8K MAC address table
  - Power line EFT protection: 2,000VDC; Ethernet ESD protection: 6,000VDC
- Power Input
  - DC 12~48V redundant with a 6-pin removal terminal block
  - One user programmable alarm relay contact
- Operating Temperature
  - Standard operating temperature models: -10°C to 70°C
  - Extended operating temperature models: -40°C to 75°C
- Case/Installation
  - IP-30 protection metal housing
  - Installation in pollution degree to environment
  - DIN-Rail and wall mount design

## 1.4 Package Contents

- 1– LMX-0500 series: 5-Port industrial managed Ethernet switch, with 5*10/100Tx
- 1-Product CD
- 2-Wall mounting brackets and screws
- 1-RJ45 to DB9 Serial Console cable
- 1-DC cable –18 AWG & DC jack 5.5x2.1mm

## 1.5 Safety Precaution

**Attention:** If the DC voltage is supplied by an external circuit, please use a protection device on the power supply input. The industrial Ethernet switch’s hardware specs, ports, cabling information, and wiring installation will be described within this user manual.

# 2. Hardware Description

## 2.1 Physical Dimensions

*Figure 2.1*, below, shows the physical dimensions of Antaira's LMX-0500 series: 5-Port industrial managed Ethernet switch with 5*10/100Tx; 12~48VDC power input.

(W x D x H) is **46mm x 99mm x 142mm**

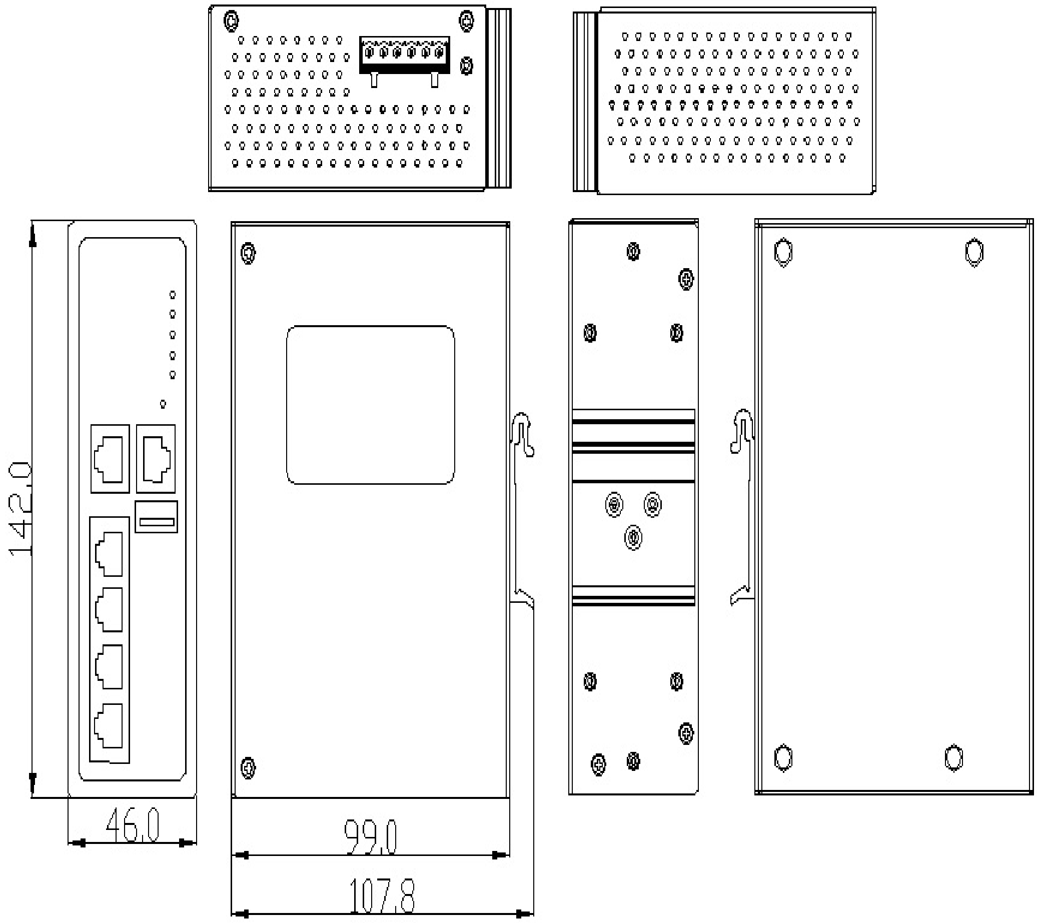


*Figure2.1*

*LMX-0500 Series Physical Dimensions*

## 2.2 Front Panel

The front panel of the LMX-0500 series industrial managed Ethernet switches is shown below in *Figure 2.2*.

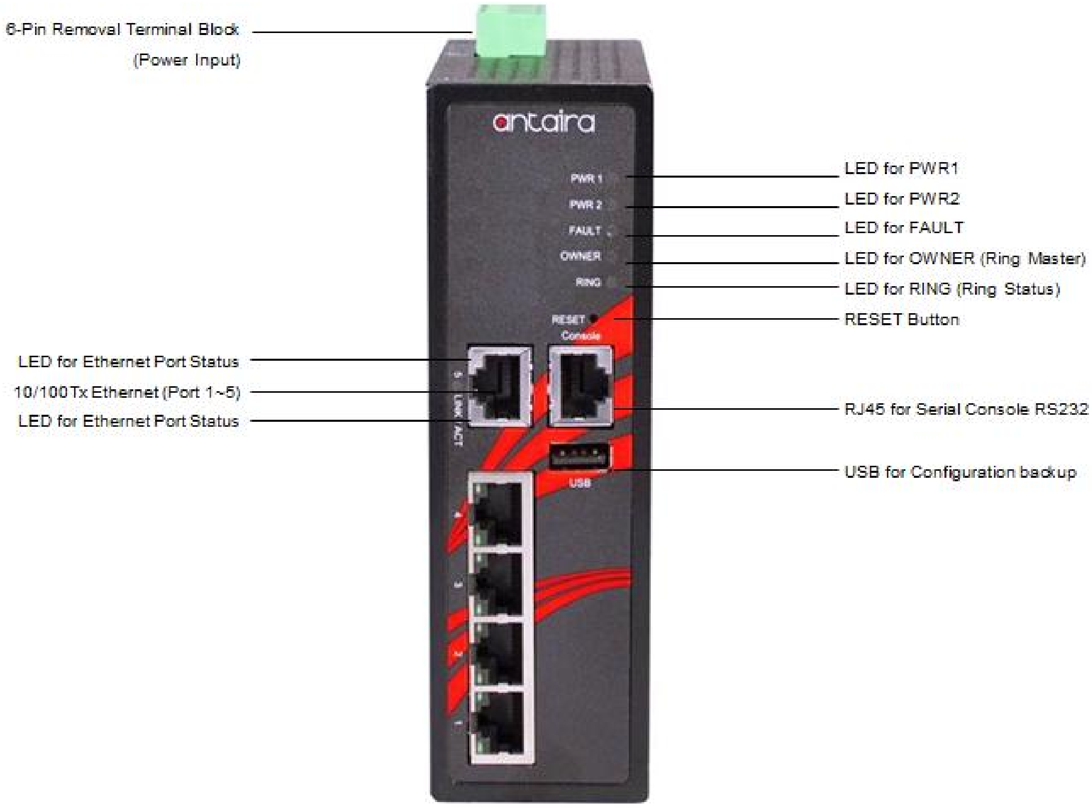

6-Pin Removal Terminal Block
(Power Input)
antaira
PWR 1
PWR 2
FAULT
OWNER
RING
RESET
Console
USB
LNK ACT
LED for PWR1
LED for PWR2
LED for FAULT
LED for OWNER (Ring Master)
LED for RING (Ring Status)
RESET Button
LED for Ethernet Port Status
10/100Tx Ethernet (Port 1~5)
LED for Ethernet Port Status
RJ45 for Serial Console RS232
USB for Configuration backup

*Figure 2.2 - The Front Panel of LMX-0500 Series*

## 2.3 Top View

*Figure 2.3*, below, shows the top panel of the LMX-0500 series switch that is equipped with one 6-pin removal terminal block connector for dual DC power inputs (12~48VDC).

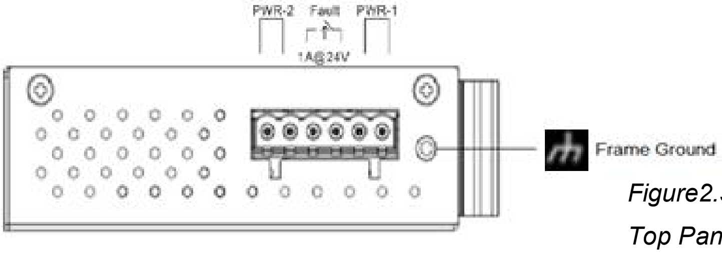


*Figure2.3*

*Top Panel View of LMX-0500 Series*

## 2.4 LED Indicators

There are LED light indicators located on the front panel of the industrial Ethernet switch that display the power status and network status. Each LED indicator has a different color and has its own specific meaning, see below in *Table 2.1*.

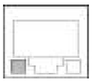
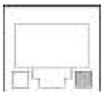
| LED | Color | Description | |
|---|---|---|---|
| P1 | Green | On | Powerinput1is active |
| | | Off | Powerinput1isinactive |
| P2 | Green | On | Powerinput2is active |
| | | Off | Powerinput2isinactive |
| Fault | Green | On | System is ready |
| | | Off | System is booting |
| | Red | On | Fault Alarm |
| | | Off | System is in normal state |
| Owner | Green | On | ERPS Owner Mode (Ring Master) is ready |
| | | Off | ERPS Owner Mode is not active |
| Ring | Green | On | Ring Network is active |
| | | Off | Ring Network is not active |
| LAN Port 1~ 5<br>(Left LED) | Green<br> | On | Connected to network, 100Mbps |
| | | Flashing | Networking is active |
| | | Off | Not connected to network |
| LAN Port 1~ 5<br>(Right LED) | Green<br> | On | Networking is active, 10Mbps |
| | | Flashing | Networking is active |
| | | Off | Not connected to network |

*Table 2.1*

*LED Indicators for LMX-0500 Series*

## 2.5 Ethernet Ports

- **RJ-45 Ports**

**RJ-45 Ports (Auto MDI/MDIX)**: The RJ-45 ports are auto-sensing for 10Base-T, 100Base-TX connections. Auto MDI/MDIX means that the switch can connect to another switch or workstation without changing the straight-through or crossover cabling. See the figures as below for straight-through and crossover cabling schematics.

- **RJ-45 Pin Assignments** (Table 2.2)

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

*Table 2.2*
*RJ45 Pin Assignments*

***Note*** *"+" and "-" signs represent the polarity of the wires that make up each wire pair.*

All ports on this industrial Ethernet switch support automatic MDI/MDI-X operation. Users can use straight-through cables (see figure below) for all network connections to PCs, servers, other switches or hubs. With 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 (*Table 2.3*) 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-) |

*Table 2.3 - Ethernet Signal Pin Outs*

The following figures show the cabling schematics for straight-through and crossover.

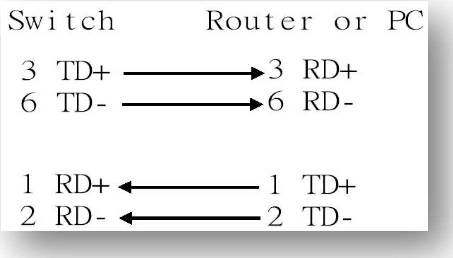


Figure 2.4
Straight-Through Cable Schematic

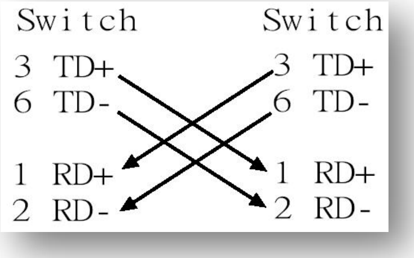


Figure 2.5
Crossover Cable Schematic

## 2.6 Cabling

- Twisted-pair segments can be connected with an unshielded twisted pair (UTP) or shielded twisted pair (STP) cable. The cable must comply with the IEEE 802.3u 100Base TX standard (e.g. Category 5, 5e, or 6). The cable between the equipment and the link partner (switch, hub, workstation, etc.) must be less than 100 meters (328 ft.) long.

## 2.7 Wiring the Power Inputs

Please follow below steps to insert the power wire.

1. Insert the positive and negative wires into the PWR1 (V1+, V1-) and PWR2 (V2+, V2-) contacts on the terminal block connector as shown below in *Figure 2.6*.

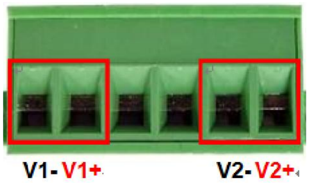


*Figure 2.6 - Power Terminal Block*

2. Tighten the wire-clamp screws to prevent the wires from loosening, as shown below in *Figure 2.7*.

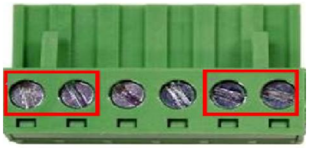


*Figure 2.7 - Power Terminal Block*

| **Note** | |
|---|---|
| | • *Only use copper conductors, **60/75°C**, tighten to **5lbs.*** |
| | • *The wire gauge for the terminal block should range between **18~20 AWG**.* |

## 2.8 Wiring the Fault Alarm Contact

The fault alarm contact is in the middle of the terminal block connector as the picture shows below in *Figure 2.8*. By inserting the wires, it will detect the fault status including power failure or port link failure (managed industrial switch only) and forma normally open circuit. An application example for the fault alarm contact is shown below in *Figure 2.8*.

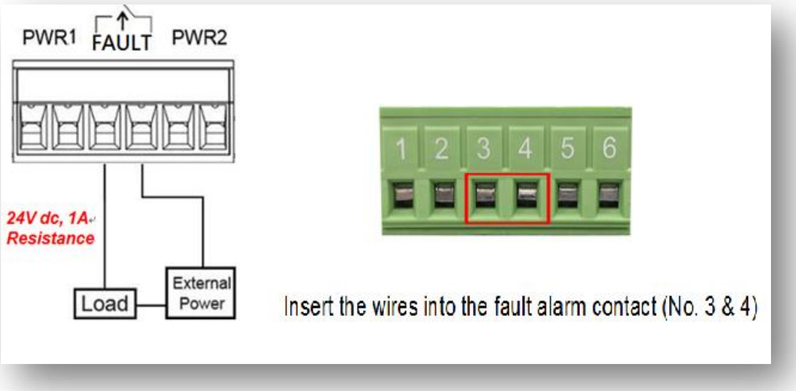


*Figure 2.8 - Wiring the Fault Alarm Contact*

| | | |
|---|---|---|
| ***Note*** | • | *The wire gauge for the terminal block should range between **12 ~ 24AWG*** |

# 3. Mounting Installation

## 3.1 DIN-Rail Mounting

The DIN-Rail is pre-installed on the industrial Ethernet switch from the factory. If the DIN-Rail is not on the industrial Ethernet switch, please see Figure 3.1 to learn how to install the DIN-Rail on the switch.

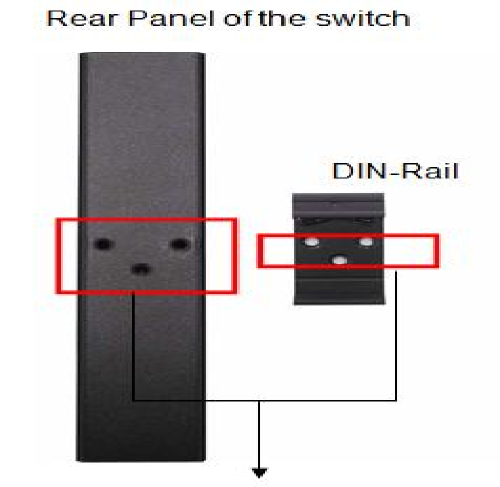


*Figure 3.1*

*The Rear Side of the Switch and DIN-Rail Bracket*

Follow the steps below to learn how to hang the industrial Ethernet switch.

1. Use the screws to install the DIN-Rail bracket on the rear side of the industrial Ethernet switch.
2. To remove the DIN-Rail bracket, do the opposite from step 1.
3. After the DIN-Rail bracket is installed on the rear side of the switch, insert the top of the DIN-Rail on to the track as shown below in *Figure 3.2*.
4. Lightly pull down the bracket on to the rail as shown below in *Figure 3.3*.
5. Check if the bracket is mounted tightly on the rail.
6. To remove the industrial Ethernet switch from the rail, do the opposite from the above steps.

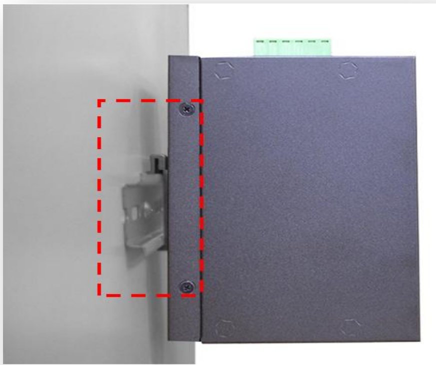


*Figure 3.2*

*Insert the Switch on the DIN-Rail*

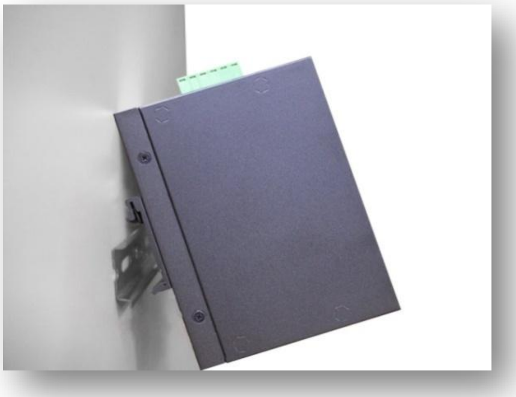


*Figure 3.3*

*Stable the Switch on DIN-Rail*

## 3.2 Wall Mounting

Follow the steps below to mount the industrial Ethernet switch using the wall mounting bracket as shown below in *Figure 3.4*.

1. Remove the DIN-Rail bracket from the industrial Ethernet switch by loosening the screws.
2. Place the wall mounting brackets on the top and bottom of the industrial Ethernet switch.
3. Use the screws to screw the wall mounting bracket on the industrial Ethernet switch.
4. Use the hook holes at the corners of the wall mounting bracket to hang the industrial Ethernet switch on the wall.
5. To remove the wall mount bracket, do the opposite from the steps above.

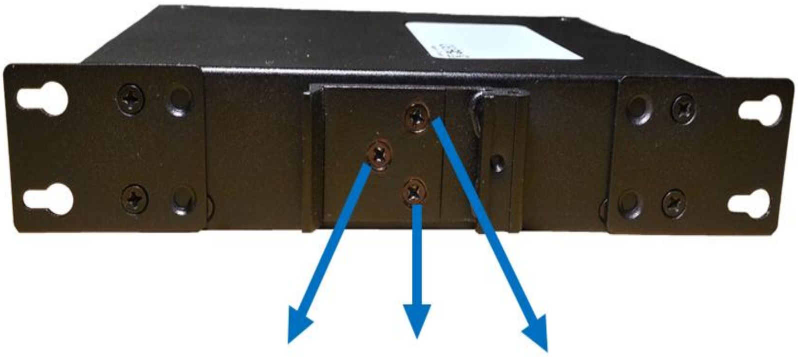


*Figure 3.4*
*Remove DIN-Rail Bracket from the Switch*

Below, in *Figure 3.5* are the dimensions of the wall mounting bracket.

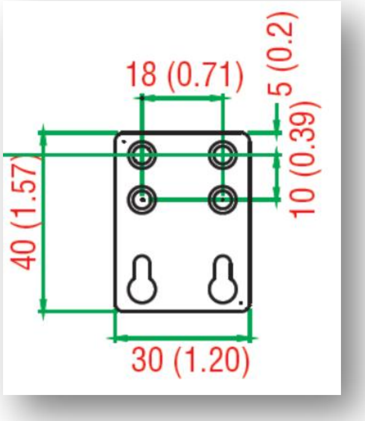


*Figure 3.5*
*Wall Mounting Bracket Dimensions*

# 4. Hardware Installation

## 4.1 Installation Steps

This section will explain how to install Antaira's LMX-0500 series: 5-Port industrial managed Ethernet switch with 5*10/100Tx RJ45 ports; 12~48VDC power input.

**Installation Steps**

1. Unpack the industrial Ethernet switch from the original packing box.
2. Check if the DIN-Rail bracket is screwed on the industrial Ethernet switch.
    - If the DIN-Rail is not screwed on the industrial Ethernet switch, please refer to the **DIN-Rail Mounting** section for DIN-Rail installation.
    - If you want to wall mount the industrial Ethernet switch, please refer to the **Wall Mounting** section for wall mounting installation.
3. To hang the industrial Ethernet switch on a DIN-Rail or wall, please refer to the **Mounting Installation** section.
4. Power on the industrial Ethernet switch and then the power LED light will turn on.
    - If you need help on how to wire power, please refer to the **Wiring the Power Inputs** section.
    - Please refer to the **LED Indicators** section for LED light indication.
5. Prepare the twisted-pair, straight-through category 5 cable for Ethernet connection.
6. Insert one side of the RJ-45 cable into switch's Ethernet port and on the other side into the networking device's Ethernet port, e.g. switch PC or server. The Ethernet port's (RJ-45) LED on the industrial Ethernet switch will turn on when the cable is connected to the networking device.
    - Please refer to the **LED Indicators** section for LED light indication.
7. When all connections are set and the LED lights all show normal, the installation is complete.

# 5. Web Management

## 5.1 Web Console Configuration

This section introduces the configuration by web browser.

### 5.1.1 About Web-Based Management

All of Antaira's industrial managed switches are embedded with HTML web console interfaces that have a flash memory on the CPU board. It is a "user friendly" design with advanced management features that allow users to manage the switch from anywhere on the network through any Internet browser, such as Internet Explorer (version 9.0 or above is recommended), Firefox, Chrome and many others.

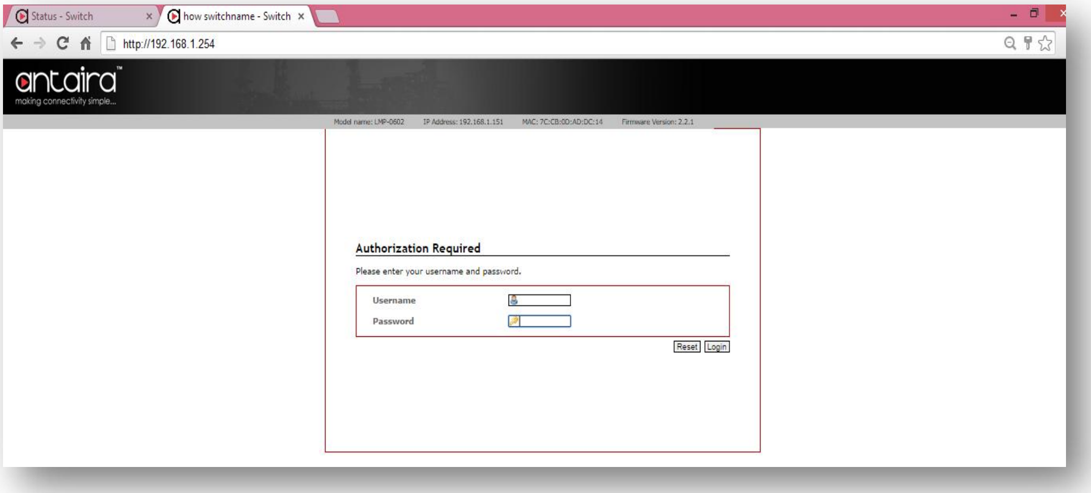
### Preparing for Web Console Configuration

Antaira's industrial managed switches come with a factory default value as below:

- Default IP Address: **192.168.1.254**
- Default User Name: **admin**
- Default Password: **admin**

### System Login

1. Launch any Internet browser
2. Type in factory default IP address: http://192.168.1.254 of the switch.  Press "**Enter**".



Model name: LMP-0602 IP Address: 192.168.1.151 MAC: 7C:CB:0D:AD:DC:14 Firmware Version: 2.2.1

Authorization Required

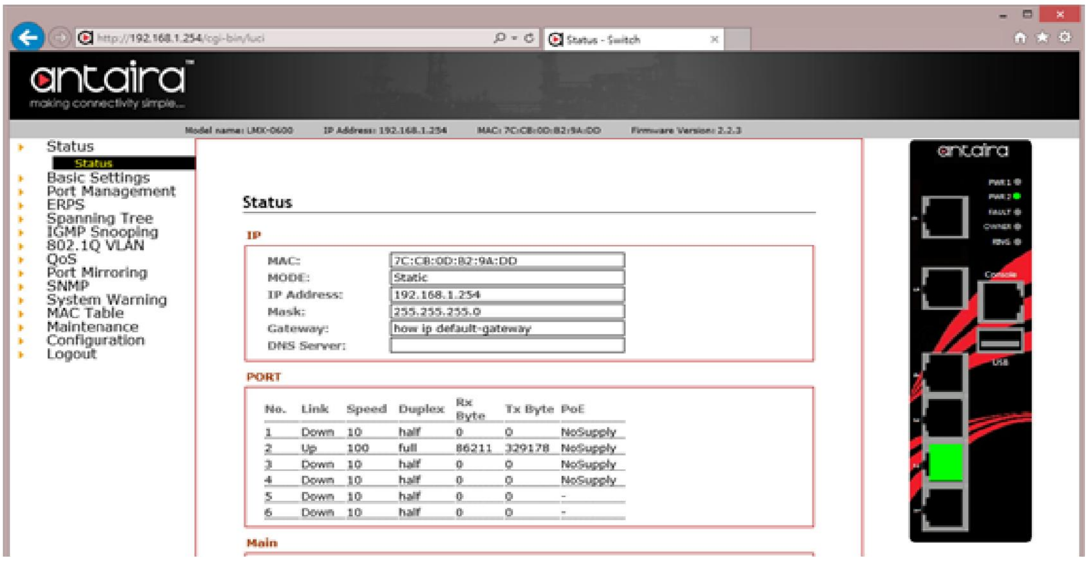
Please enter your username and password.

Username

Password

*Figure 5.1 - Web Console "Login"*

3. The login screen appears.
4. Key in the default username: **admin** and password **admin**.
5. Click “Login” button, then the main (status) page of the Web Console will appear as below *Figure 5.2*. The online image of the switch will display the real-time ports connection status.



Model name: LMX-0600 IP Address: 192.168.1.254 MAC: 7C:CB:0D:B2:9A:DD Firmware Version: 2.2.3

Status

IP

MAC: 7C:CB:0D:B2:9A:DD
MODE: Static
IP Address: 192.168.1.254
Mask: 255.255.255.0
Gateway: how ip default-gateway
DNS Server:

PORT

| No. | Link | Speed | Duplex | Rx Byte | Tx Byte | PoE |
|---|---|---|---|---|---|---|
| 1 | Down | 10 | half | 0 | 0 | NoSupply |
| 2 | Up | 100 | full | 86211 | 329178 | NoSupply |
| 3 | Down | 10 | half | 0 | 0 | NoSupply |
| 4 | Down | 10 | half | 0 | 0 | NoSupply |
| 5 | Down | 10 | half | 0 | 0 | - |
| 6 | Down | 10 | half | 0 | 0 | - |

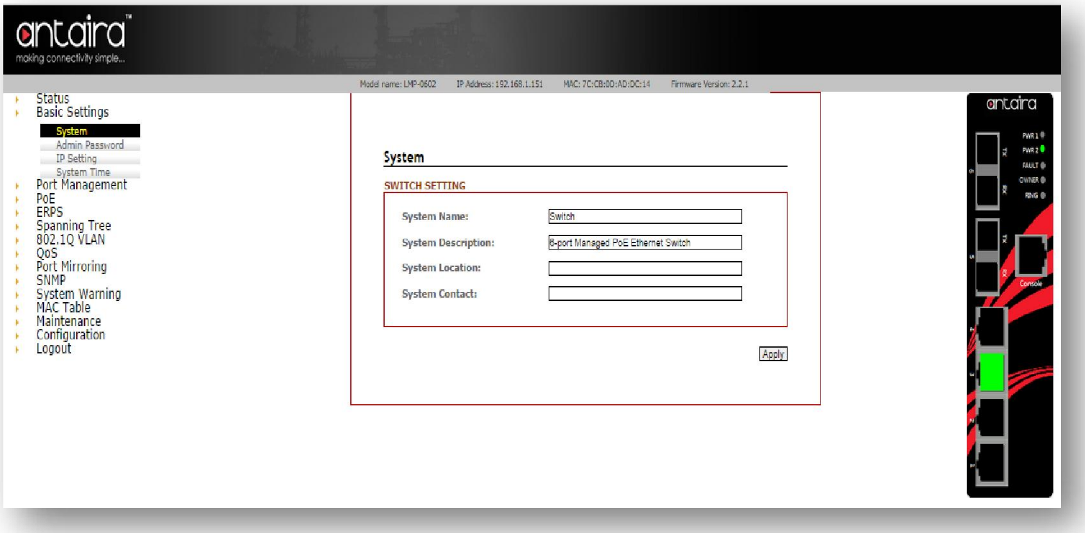
Main

*Figure 5.2 - Web Console Main (Status) Page*

# 5.2 Basic Setting

## 5.2.1 System Information

Below, *Figure 5.3*, shows the switch system setting information.



Model name: LMP-0602 IP Address: 192.168.1.151 MAC: 7C:CB:0D:AD:DC:14 Firmware Version: 2.2.1

System

SWITCH SETTING

System Name: Switch
System Description: 8-port Managed PoE Ethernet Switch
System Location:
System Contact:

*Figure 5.3 – Switch Settings (Status) Page*

| Terms | Value Description |
|---|---|
| **System Name** | Factory Default: Switch<br>*Users can assign any name label to identify this managed node. By convention, a domain name is a text string drawn from the alphabet (A-Z, a-z), digits (0-9), minus sign (-). No space characters are permitted as part of a name. The first character must be an alpha character. And the first or last character must not be a minus sign. The allowed string length is 0 to 255. |
| **System Description** | Factory Default: 5-Port Managed PoE Ethernet Switch<br>* Users can assign any new name label to describe this PoE Managed Switch. |
| **System Location** | Factory Default: blank<br>*Users can use this field to insert The physical location of this switch (e.g., telephone closet, 3rd floor). The maximum allowed string length is 0 to 255, and the allowed content is the ASCII characters from 32 to 126. |
| **System Contact** | Factory Default: blank<br>*Users can insert this field with the administrator of this switch together with information on how to contact this person. The maximum allowed string length is 0 to 255, and the allowed content is the ASCII characters from 32 to 126. |
| Apply | Click “Apply” button to save changes. |

*Figure 5.4 – Switch Settings Description*

## 5.2.2 Admin &Password

Below, describes how to configure the system user name and password for the web console login.

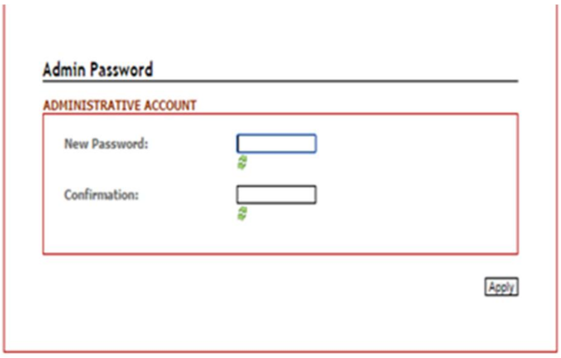


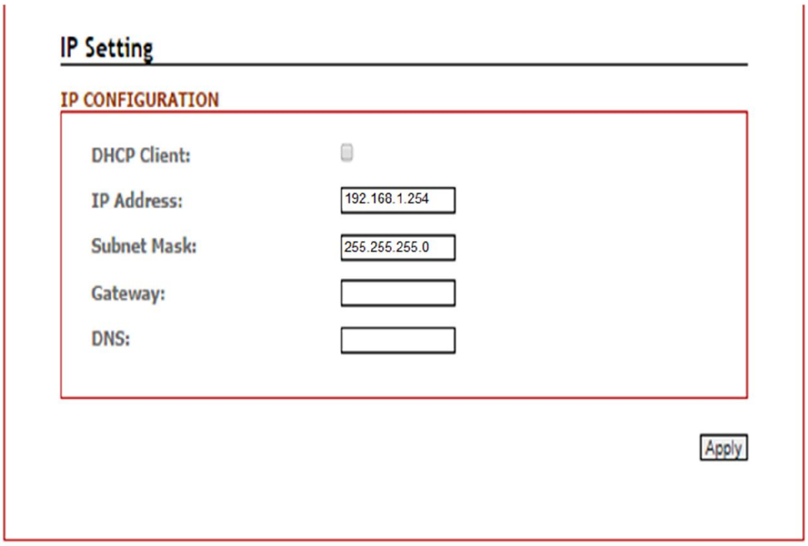
*Figure 5.5 – Administrative Account*

| Terms | Value Description |
|---|---|
| **New Password** | Users can assign a New Password, and the maximum allow string length is 0 to 31 characters. |
| **Confirmation** | Re-type the new password. |
| Apply | Click “Apply” to save changes. |

*Figure 5.6 – Admin & Password Description*

### 5.2.3 IP Setting

Configure the managed switch’s IP setting information.



IP Setting

IP CONFIGURATION

DHCP Client: □

IP Address: 192.168.1.254

Subnet Mask: 255.255.255.0

Gateway:

DNS:

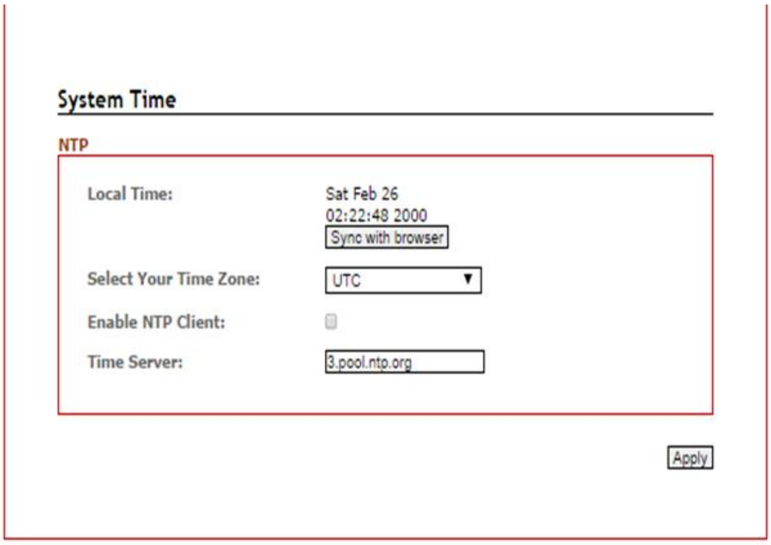
*Figure 5.7 – IP Setting information*

| Terms | Value Description |
|---|---|
| **DHCP Client** | Enable the DHCP client by checking this box.<br>If DHCP fails and the configured IP address is zero, DHCP will retry. If DHCP fails and the configured IP address is non-zero, DHCP will stop and the configured IP settings will be used. The DHCP client will announce the configured System Name as hostname to provide DNS lookup. |
| **IP Address** | The unit default IP is 192.168.1.254.<br>Assign the IP address that the network is using.  If DHCP client function is enabling, user does not require assigning the IP address.  The network DHCP server will assign the IP address for the switch and it will be display in this column. |

| | |
|---|---|
| **Subnet Mask** | Assign the subnet mask of the IP address. If DHCP client function is enabling, user does not require to assign the subnet mask |
| **Gateway** | Assign the network gateway for the switch. If DHCP client function is enabling, user does not require to assign the Gateway. |
| **DNS** | Assign the DNS IP address |
| Apply | Click “Apply” button to save changes. |

*Figure 5.8 – IP Setting Information Description*

## 5.2.4 System Time



System Time

NTP

Local Time: Sat Feb 26 02:22:48 2000

Select Your Time Zone: UTC

Enable NTP Client: □

Time Server: 3.pool.ntp.org

*Figure 5.9 – System Time Settings*

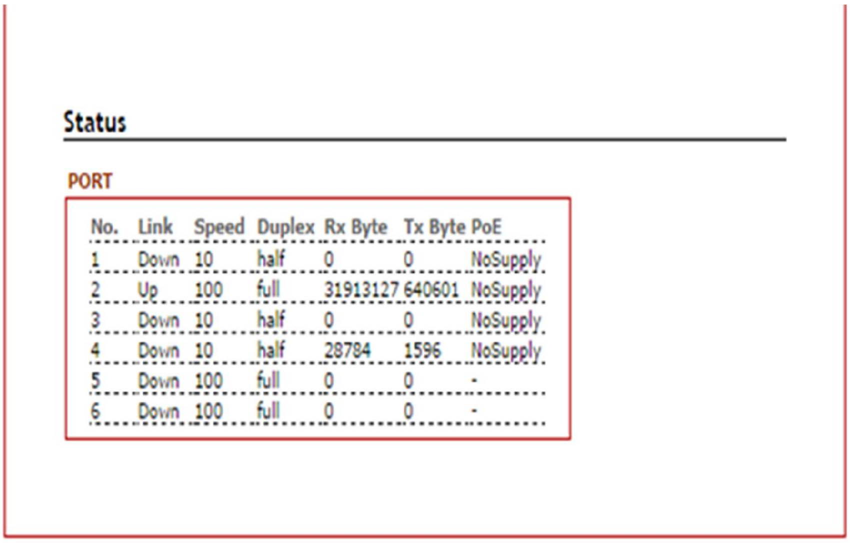
| **Terms** | **Value Description** |
|---|---|
| **Local Time** | Users can define the switch’s local time, or click “Sync with browser” button to have local time setup automatically. |
| **Select Your Time Zone** | Users can use dropdown box to setup the switch location time zone |
| **Enable NTP Client** | Enable or disable NTP function to get the time from the SNTP server. |
| **Time Server** | User can define the Time Server info |
| Apply | Click “Apply” button to save changes. |

*Figure 5.10 – System Time Settings Description*

# 5.3Port Management

## 5.3.1 Port Status

The following information provides the current port status.



Status

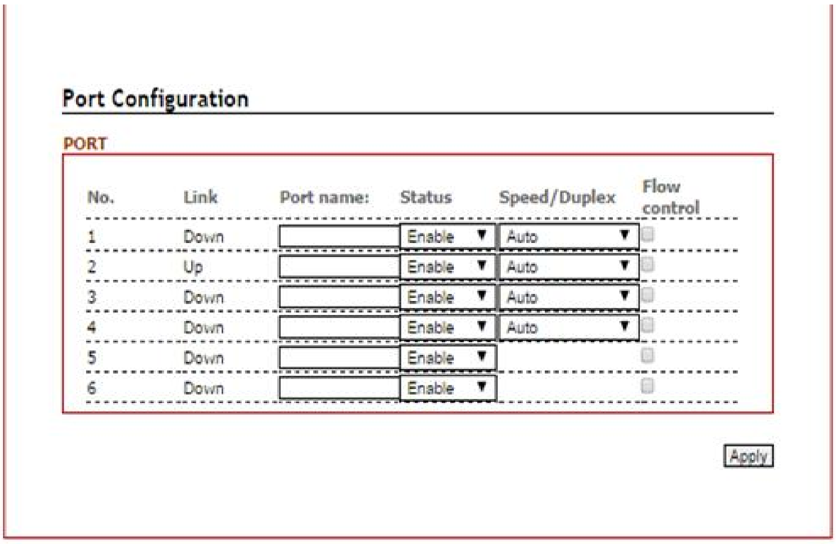
PORT

| No. | Link | Speed | Duplex | Rx Byte | Tx Byte | PoE |
|---|---|---|---|---|---|---|
| 1 | Down | 10 | half | 0 | 0 | NoSupply |
| 2 | Up | 100 | full | 31913127 | 640601 | NoSupply |
| 3 | Down | 10 | half | 0 | 0 | NoSupply |
| 4 | Down | 10 | half | 28784 | 1596 | NoSupply |
| 5 | Down | 100 | full | 0 | 0 | - |
| 6 | Down | 100 | full | 0 | 0 | - |

*Figure 5.11 – Port Status Interface*

## 5.3.2 Port Configuration

Users can assign or insert a “value/label” for each port under each “Port Name” box; enable or disable each port function; state the speed/duplex of each port; and enable or disable the flow control of the port.



Port Configuration

PORT

| No. | Link | Port name: | Status | Speed/Duplex | Flow control |
|---|---|---|---|---|---|
| 1 | Down |  | Enable ▼ | Auto ▼ | □ |
| 2 | Up |  | Enable ▼ | Auto ▼ | □ |
| 3 | Down |  | Enable ▼ | Auto ▼ | □ |
| 4 | Down |  | Enable ▼ | Auto ▼ | □ |
| 5 | Down |  | Enable ▼ |  | □ |
| 6 | Down |  | Enable ▼ |  | □ |

*Figure 5.12 – Port Configuration Interface*

| **Terms** | **Value Description** |
|---|---|
| **Port No.** | It shows each port status: Up for link active, and Down for link inactive. |
| **Port Name** | User can create or insert a value or label for each port's identification |
| **Status** | Enable or disable a port |
| **Speed/Duplex** | User can set the bandwidth of each port as Auto-negotiation, 100 full,100 half,10 full,10 half mode. |
| **Flow Control** | Support symmetric and asymmetric mode to avoid packet loss when congestion occurred. |
| Apply | Click "Apply" button to save changes. |
| Reset | Click to undo any changes made locally and revert to previously saved values. |

*Figure 5.13 – Port Configuration Description*

# 5.5 ERPS

In any industrial automation application, designing the redundant ring network paths can protect networks from unexpected failovers is extremely important in mission-critical networks that need to provide uninterrupted services. In practice, several loop protection methods are implemented to ensure that network functions normally without loops and recovers as soon as possible when a point of failure occurs. The most popular ones are RSTP (802.1w) and MSTP (802.1s). For industrial applications, the ERPS (G.8032) are highly recommended since they can achieve faster recovery time than any STP protocol.

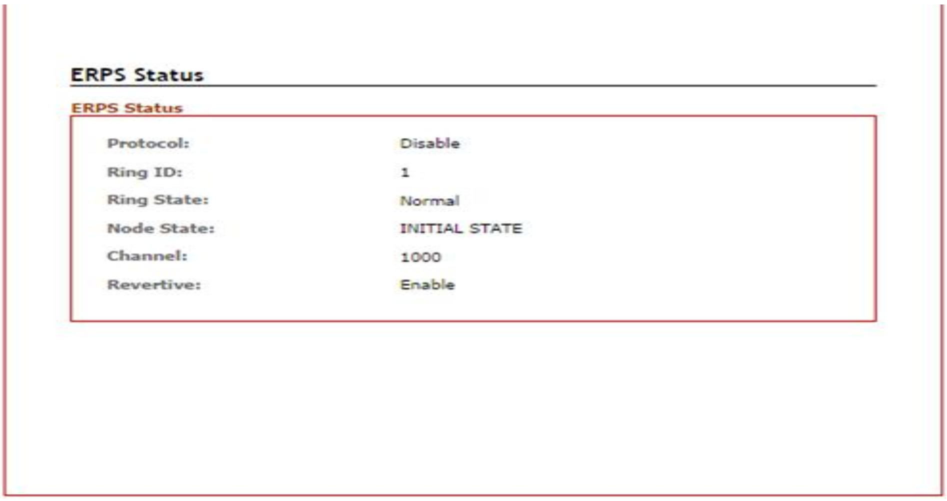
Due to different manufacturers who provide their own proprietary redundant ring protocol, and users facing inconvenient situations with compatible issues when they are planning to design or upgrade their ring network for future proof, Antaira is proud to introduce and implement Ethernet Ring Protection Switching (ERPS) protocol as a standard ring solution for network redundancy with all new industrial managed Ethernet switches. In order to provide users with the flexibility and compatibility when there are any existing switches that contains the standard ERPS protocol.

**Ethernet Ring Protection Switching (ERPS)**, defined in ITU-T G8032, implements a protection switching mechanism for Ethernet traffic in a ring topology. By performing the ERPS function, potential loops in a network can be avoided by blocking traffic to flow to the ring protection link (RPL) to protect the entire Ethernet ring.

In a network with ring topology that runs ERPS, only one switch is assigned as an “owner” that is responsible for blocking traffic in RPL so as to avoid loops. The switch adjacent to the RPL owner is called the RPL “neighbor” node that is responsible for blocking its end of the RPL under normal condition. Other participating switches adjacent to the RPL owner or neighbor in a ring are members or RPL next-neighbor nodes to this topology and normally forward receive traffic.
ERPS, like STP, provides a loop-free network by using polling packets to detect faults. When a fault occurs, ERPS heals itself by sending traffic over a protected reverse path less than 50ms and recover quickly to forward traffic. Because of this fault detection mechanism, the network broadcast storm problem could be avoided as well.

## 5.5.1 ERPS Status

Below, *Figure 5.18,* shows the network redundancy ring status with the Ethernet Ring Protection Switch (ERPS) protocol.



ERPS Status

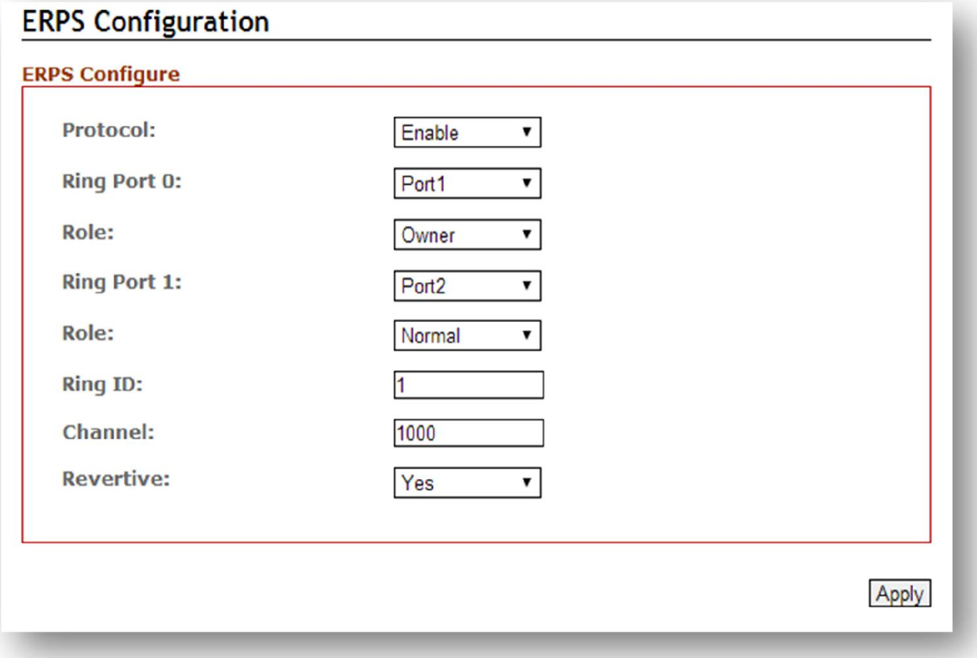
ERPS Status

Protocol: Disable
Ring ID: 1
Ring State: Normal
Node State: INITIAL STATE
Channel: 1000
Revertive: Enable

*Figure 5.14 – Redundant Ring Network – ERPS Status*

## 5.5.2 ERPS Configuration

Below, *Figure 5.19*, shows the ERPS configuration interface.



ERPS Configuration

ERPS Configure

Protocol: Enable
Ring Port 0: Port1
Role: Owner
Ring Port 1: Port2
Role: Normal
Ring ID: 1
Channel: 1000
Revertive: Yes

*Figure 5.15 – ERPS Configuration Interface*

| **Terms** | **Value Description** |
|---|---|
| **Protocol** | "Enable" or "Disable" ERPS protocol |
| **Ring Port 0** | ERPS ring port 0, it could be map to real switch port 1 – port 6.<br>Do not set the same as Ring port 1. |
| **Ring Port 1** | ERPS ring port 1, it could be map to real switch port 1 – port 6.<br>Do not set the same as Ring port 0. |
| **Role** | Set the ERPS role as Owner, Neighbor or Normal.<br>***[Owner]*** *In charge of blocking one side of RPL link. It will prevent the packet flow from its blocked port.*<br>***[Neighbor]*** *In charge of blocking one side of RPL link. It will prevent the packet flow from its blocked port.*<br>***[Normal]*** *Besides Owner and Neighbor node, the rest of nodes are defined as Normal node.*<br>*All node roles have the ability to block the port if the link attach to the port is failed and disconnected.* |
| **Ring ID** | ERPS ring ID, ranges from 1 to 239. Ring ID distinguishes different Ring topology. |
| **Channel** | ERPS Channel ID, ranges from 1 to 4094. It's a channel to send PDUs of ERPS. |
| **Revertive** | Set to Revertive (yes) or Non-revertive (no). The revertive mode works only under the scenario A at the RPL Owner node.<br>***[Revertive]*** *While the revertive mode is set, the RPL link will be blocked in 5 minutes after recovery form link failure situation. Otherwise, it will remain unchanged of the blocking state. That is, the failed link port will block permanently until the next event happen.*<br>***[Non-Revertive]*** *The failed ring link the port attached to it will remain blocked even the situation is eliminated.* |
| Apply | Click "Apply" button to save changes. |

*Figure 5.16 – ERPS Configuration Terms & Description*

### 5.5.3 Before Configuring ERPS

Before configuring ERPS, the rapid spanning tree protocol (RSTP), or multiple spanning tree protocol is required to disabled, due to only one protocol is exclusive running within a switch. Below are the steps to disable RSTP, or MSTP.

**Step 1:** Login the switch with a web browser.

**Step 2:** Open the "RSTP Configuration" page under the "Spanning Tree" manual as below figure 5.17.

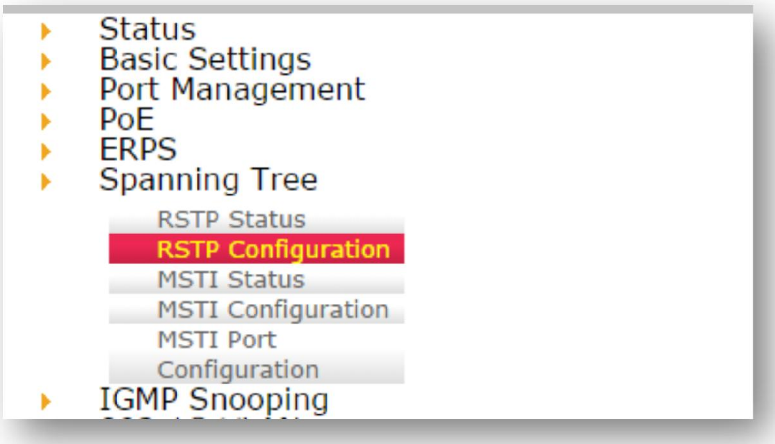
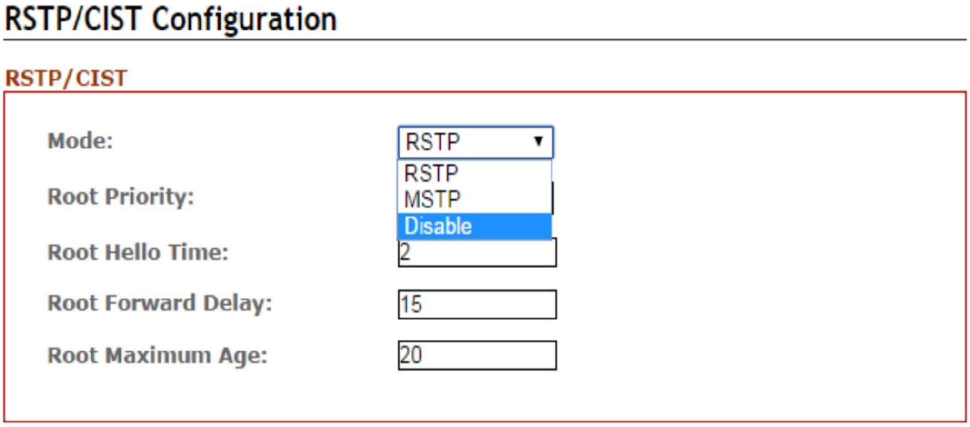


*Figure 5.17 – Spanning Tree Manual*

**Step 3:** When the RSTP/CIST Configuration page shows up, set "Mode" to "Disable" as the figure 5.18.



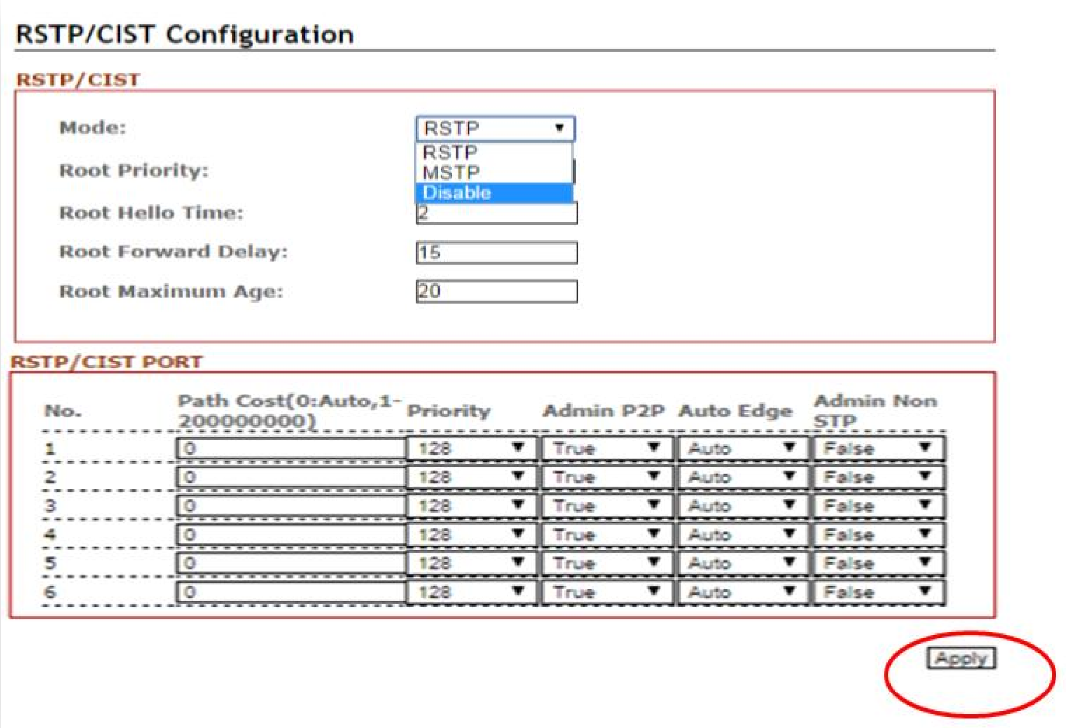
RSTP/CIST Configuration

RSTP/CIST

| | |
|---|---|
| Mode: | RSTP ▾ (RSTP / MSTP / Disable) |
| Root Priority: | |
| Root Hello Time: | 2 |
| Root Forward Delay: | 15 |
| Root Maximum Age: | 20 |

*Figure 5.18 – RSTP/CIST Configuration interface*

**Step 4:** Press the Apply button in the lower right corner as below figure 5.19.



RSTP/CIST Configuration

RSTP/CIST

Mode: RSTP

Root Priority:

Root Hello Time: 2

Root Forward Delay: 15

Root Maximum Age: 20

RSTP/CIST PORT

| No. | Path Cost(0:Auto,1-200000000) | Priority | Admin P2P | Auto Edge | Admin Non STP |
|---|---|---|---|---|---|
| 1 | 0 | 128 | True | Auto | False |
| 2 | 0 | 128 | True | Auto | False |
| 3 | 0 | 128 | True | Auto | False |
| 4 | 0 | 128 | True | Auto | False |
| 5 | 0 | 128 | True | Auto | False |
| 6 | 0 | 128 | True | Auto | False |

*Figure 5.23 – RSTP/CIST Configuration interface*

Ethernet Ring Protection Switch (ERPS) is an Ethernet ring protection protocol which is used to prevent forming the loop in LAN, thus, the Broadcast Storm problem could be avoided. The loop avoidance mechanism ensures the traffic flows on all but the RPL ring link. In order to achieve the loop-avoidance mechanism, ITU-T G.8032 defines three roles in ERPS, which are “RPL Owner Node”, “RPL Neighbor Node”, and “Normal Node”.

Below are two scenarios describing how to configure the ERPS in Antaira Industrial Managed Ethernet Switches. Users can reference it to configure the managed switch as RPL-configured architecture as figure 5.24 or Non-configure architecture as figure 5.25.

### 5.5.3.1 Scenario A – RPL configured Architecture

Under this scenario A, there are three major roles are required to be configured within the ERPS configuration.

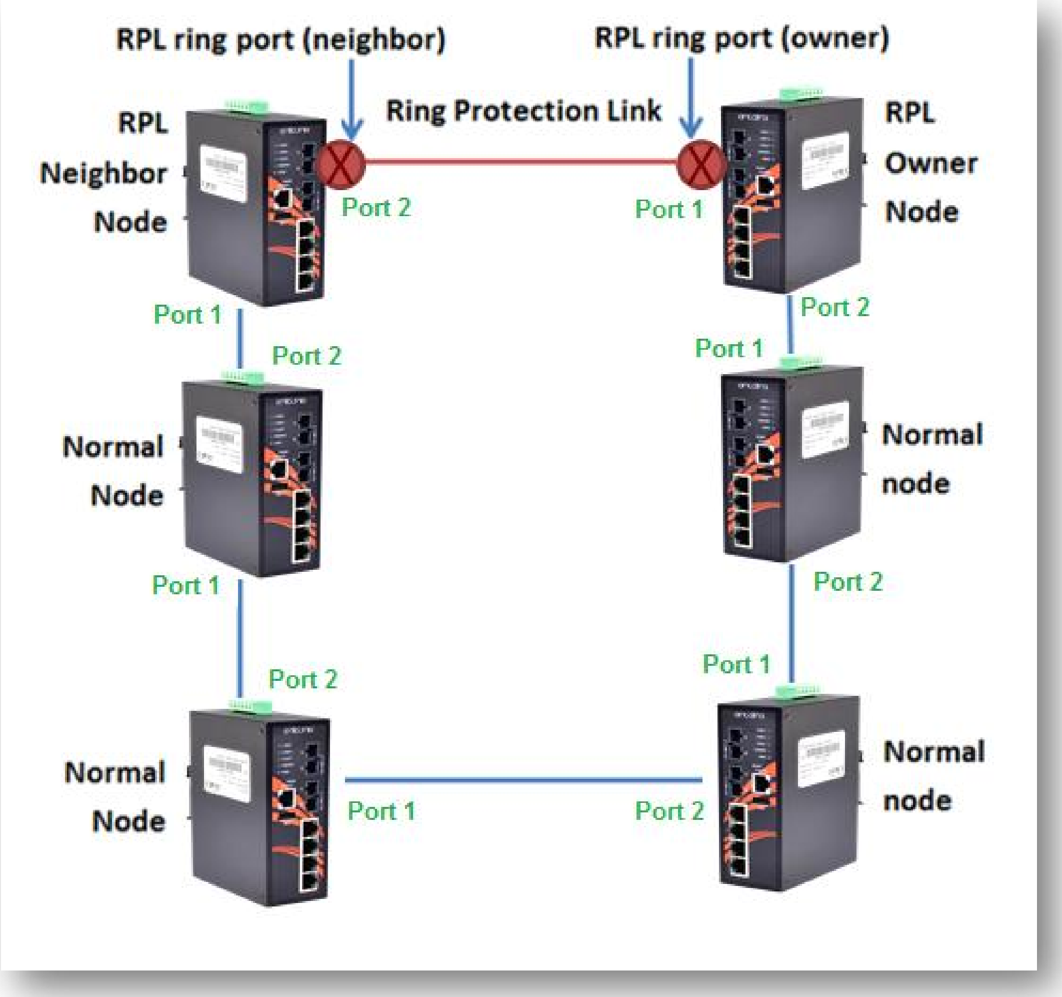


*Figure 5.20 – RPL-configured Architecture*

**Caution**: ***Before enabling any ERPS protocols on any of the Ring Nodes, please DO NOT connect all switches to form a loop (ring) network yet. There should have at least one ring port leave unplugged until all nodes in the topology are ready.***

**[RPL Owner Node]**

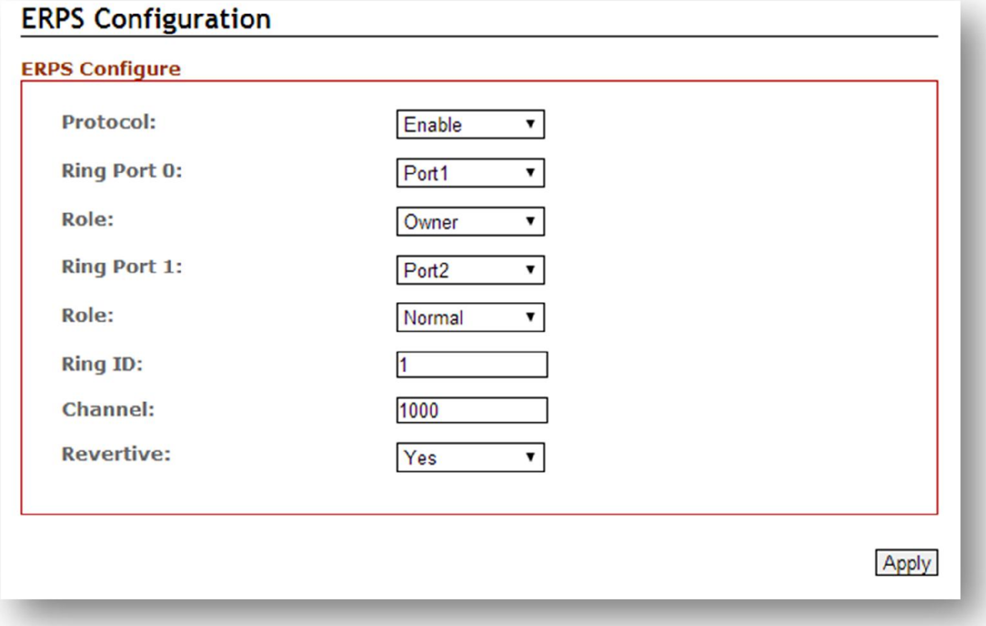
There is only one RPL Owner Node could be set in a ring network. In order to set up the RPL Owner Node, choose a switch and enable "Protocol" under the ERPS Configuration interface, and follow below steps and use below figure 5.25 as example:

Step 1: Choose a specific port from the dropdown box next to "ring port 0", and set it as "Owner" node by clicking the dropdown box next to "Role" below "ring port 0". At this point, "**Port 1**" was chosen as example.

Step 2: Choose a specific port from the dropdown box next to "ring port 1", then set it as "**Normal**" from the dropdown box next to "Role" (which locates below "ring port 1"). At this point, "**Port 2**" was chosen as example.

**Note:** The port number of "Ring Port 0" and "Ring Port 1" cannot be duplicated.

After the configurations, press the "Apply" button on the right bottom corner to save the setting.



ERPS Configuration

ERPS Configure

Protocol: Enable
Ring Port 0: Port1
Role: Owner
Ring Port 1: Port2
Role: Normal
Ring ID: 1
Channel: 1000
Revertive: Yes

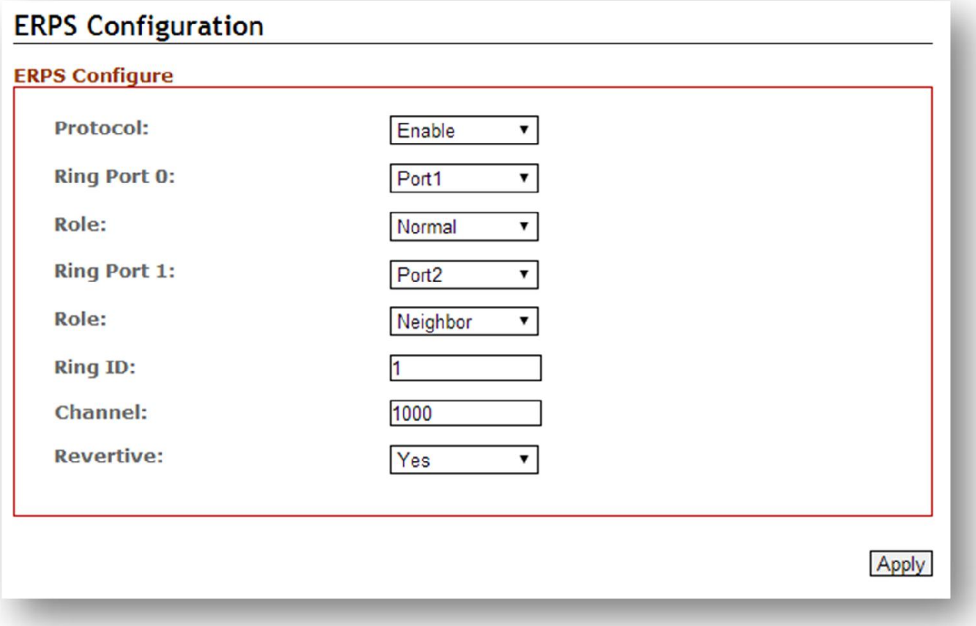
*Figure 5.21 – RPL Owner Node Setup Example*

Please be aware, when the revertive mode is set to "**Yes**", the ring will recover same as above figure 5.20 after the ring state form ABNORMAL to NORMAL in 5 minutes. Otherwise, the blocked port will remain blocked permanently unless users reconfigure it.

**[RPL Neighbor Node]**

Users should choose a second managed switch that is adjacent to the first managed switch and set it up as the RPL neighbor node. For configuration, users should login to the second managed switch's ERPS configuration interface and choose a specific port number under "Ring Port 0" and set it as the "Normal" node by clicking the dropdown box of "Role"; then, set another specific port number under "Ring Port 1" as the "Neighbor" node as shown below in *Figure 5.22*. So the link between neighbor port and owner port forms the ring protection link (RPL). After the configurations, press the "Apply" button on the bottom right corner to save the settings.

**Note:** The port number of "Ring Port 0" and "Ring Port 1" cannot be duplicated.



ERPS Configuration

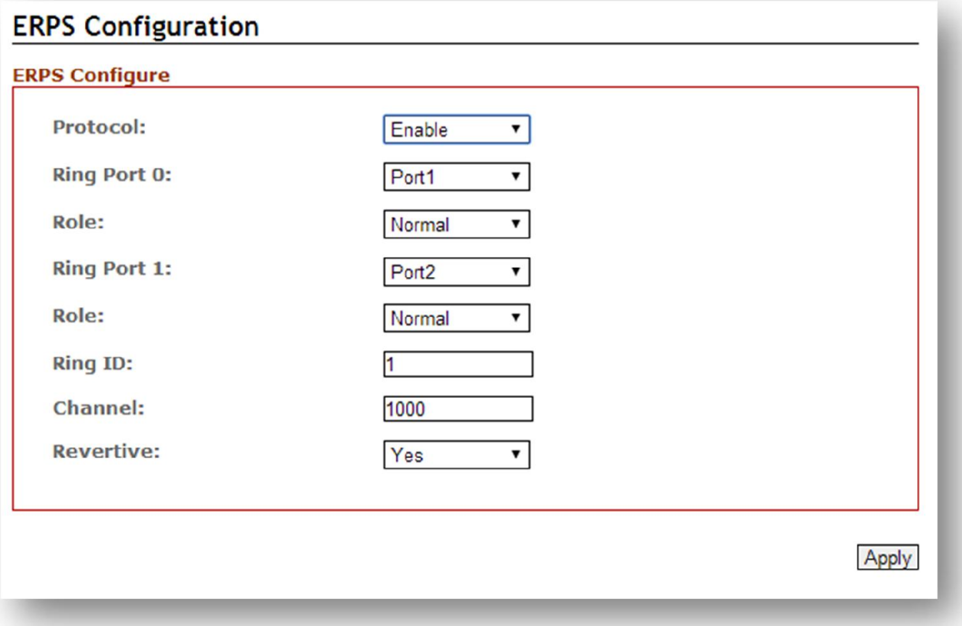
ERPS Configure

Protocol: Enable
Ring Port 0: Port1
Role: Normal
Ring Port 1: Port2
Role: Neighbor
Ring ID: 1
Channel: 1000
Revertive: Yes

*Figure 5.22 – RPL Neighbor Node Setup Example*

**[Normal Node]**

Then user should setup the rest of the managed switches' "Role" of both "Ring Port 0 and 1" as "Normal Node" as shown above in *Figure 5.23*. Please be sure no duplicate port number has been chosen within a managed switch's ERPS ring setting, the incorrect configurations may lead to unexpected errors.


ERPS Configuration

ERPS Configure

Protocol: Enable
Ring Port 0: Port1
Role: Normal
Ring Port 1: Port2
Role: Normal
Ring ID: 1
Channel: 1000
Revertive: Yes

*Figure 5.23 – RPL Normal Node Setup Example*

### 5.5.3.2 Scenario B – Non-configured Architecture

In some situations, users can choose not to configure the RPL owner and neighbor node; the ERPS could still work well under the mechanism by blocking one of the ring ports in the ERPS ring topology.

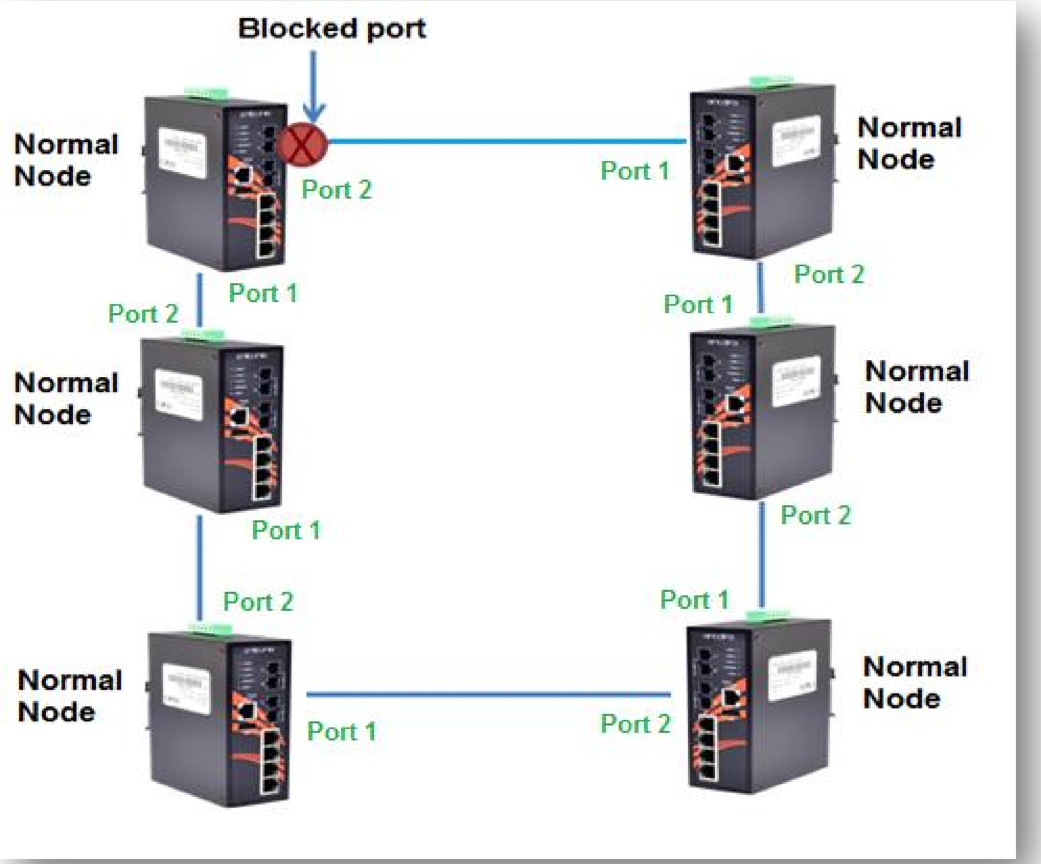


*Figure 5.24 – Non-Configured Architecture*

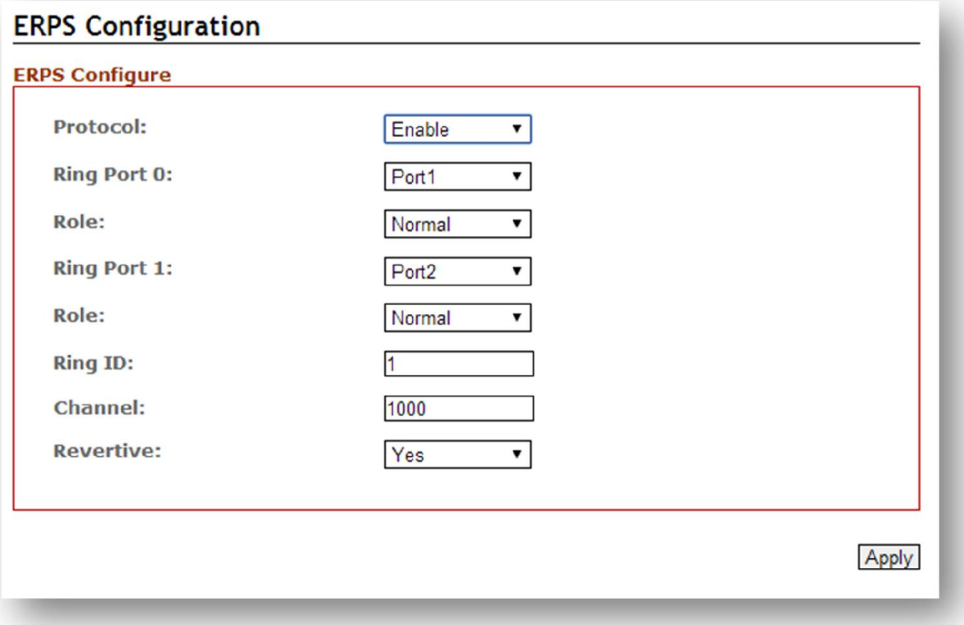
**Caution**: ***Before enabling any ERPS protocols on any of the Ring Nodes, please DO NOT connect all switches to form a loop (ring) network yet. There should have at least one ring port leave unplugged until all nodes in the topology are ready.***

As above *Figure 5.24*, the ERPS is blocked at one of the ring node ports. The blocked port is chosen by an election mechanism that is decided by the MAC address. Due to the MAC address is unique; the ERPS will just choose the biggest MAC as the blocking node.

However, the user is still required to enable the RRPS protocol, and assign a dedicated port number for each uplink port under "Ring Port 0 and 1" but there is no requirement to setting the role. *Figure 5.25*, below, shows the configurations as a reference.

After the configurations, press the "Apply" button on the bottom right corner to save the settings.

**Note:** The port number of "Ring Port 0" and "Ring Port 1" cannot be duplicated.



ERPS Configuration

ERPS Configure

| | |
|---|---|
| Protocol: | Enable |
| Ring Port 0: | Port1 |
| Role: | Normal |
| Ring Port 1: | Port2 |
| Role: | Normal |
| Ring ID: | 1 |
| Channel: | 1000 |
| Revertive: | Yes |

*Figure 5.25 – Non-configured Architecture setup*

## 5.6 Spanning Tree

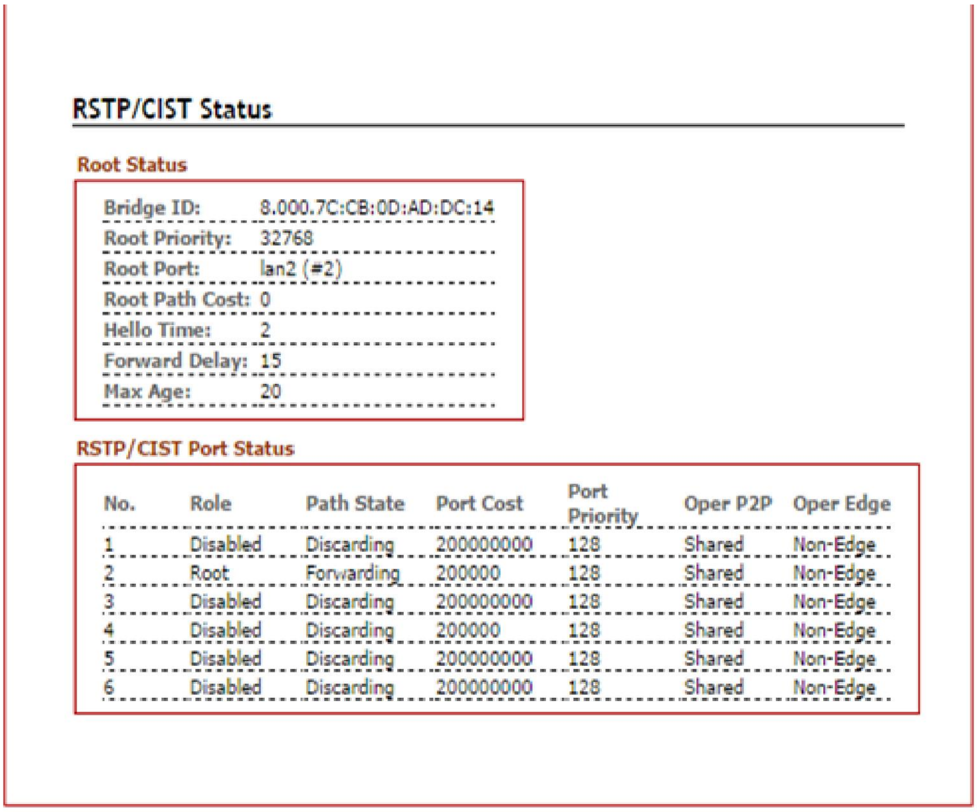
The Spanning Tree Protocol (STP), defined in the IEEE Standard 802.1d, can be created within a mesh network of connected layer-2 switches.

The Rapid Spanning Tree Protocol (RSTP), defined in the IEEE 802.1w. RSTP is an enhanced solution of STP. It shares most of its basic operation characteristics, and essentially creates a cascading effect away from the root bridge where each designated bridge proposes to its neighbors to determine if it can make a rapid transition.

Another extension of RSTP is the Multiple Spanning Tree protocol (MSTP), defined in the IEEE802.1s. It allows different VLANs to travel along separate instances of spanning tree. Unlike STP and RSTP, MSTP eliminates the needs for having different STP for each VLAN. Therefore, in a large networking environment that employs many VLANs, MSTP can be more useful than legacy STP.

## 5.6.1 RSTP Status

*Figure 5.26* shows the RSTP algorithm results.



RSTP/CIST Status

Root Status

| | |
|---|---|
| Bridge ID: | 8.000.7C:CB:0D:AD:DC:14 |
| Root Priority: | 32768 |
| Root Port: | lan2 (#2) |
| Root Path Cost: | 0 |
| Hello Time: | 2 |
| Forward Delay: | 15 |
| Max Age: | 20 |

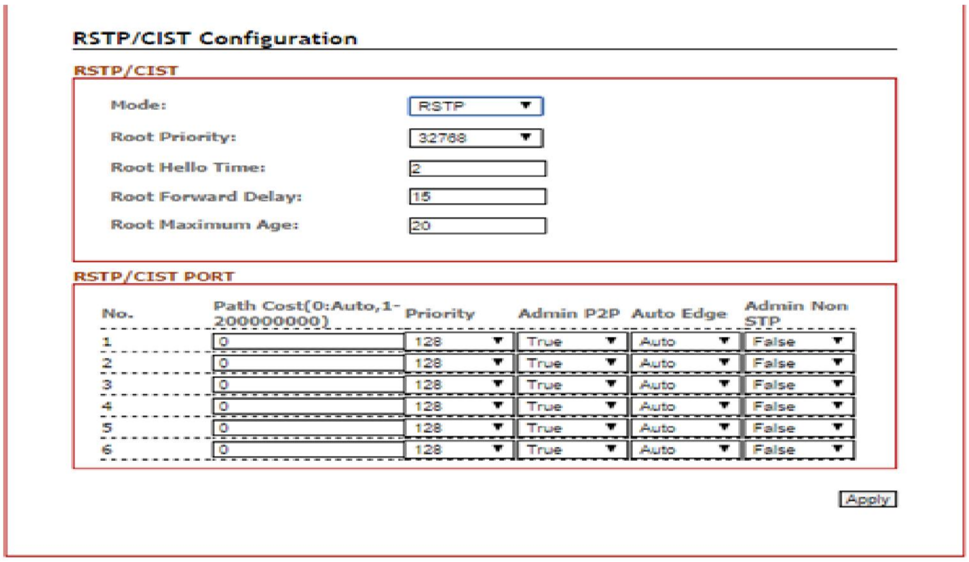
RSTP/CIST Port Status

| No. | Role | Path State | Port Cost | Port Priority | Oper P2P | Oper Edge |
|---|---|---|---|---|---|---|
| 1 | Disabled | Discarding | 200000000 | 128 | Shared | Non-Edge |
| 2 | Root | Forwarding | 200000 | 128 | Shared | Non-Edge |
| 3 | Disabled | Discarding | 200000000 | 128 | Shared | Non-Edge |
| 4 | Disabled | Discarding | 200000 | 128 | Shared | Non-Edge |
| 5 | Disabled | Discarding | 200000000 | 128 | Shared | Non-Edge |
| 6 | Disabled | Discarding | 200000000 | 128 | Shared | Non-Edge |

*Figure 5.26 – RSTP Information Interface*

## 5.6.2 RSTP Configuration

Users can enable/disable the RSTP function, and set the parameters for each port.



RSTP/CIST Configuration

RSTP/CIST

| | |
|---|---|
| Mode: | RSTP ▼ |
| Root Priority: | 32768 ▼ |
| Root Hello Time: | 2 |
| Root Forward Delay: | 15 |
| Root Maximum Age: | 20 |

RSTP/CIST PORT

| No. | Path Cost(0:Auto,1-200000000) | Priority | Admin P2P | Auto Edge | Admin Non STP |
|---|---|---|---|---|---|
| 1 | 0 | 128 ▼ | True ▼ | Auto ▼ | False ▼ |
| 2 | 0 | 128 ▼ | True ▼ | Auto ▼ | False ▼ |
| 3 | 0 | 128 ▼ | True ▼ | Auto ▼ | False ▼ |
| 4 | 0 | 128 ▼ | True ▼ | Auto ▼ | False ▼ |
| 5 | 0 | 128 ▼ | True ▼ | Auto ▼ | False ▼ |
| 6 | 0 | 128 ▼ | True ▼ | Auto ▼ | False ▼ |

*Figure 5.27 – RSTP Configuration Interface*

| Terms | Value Description |
|---|---|
| **Mode** | Users can select RSTP or MSTP function to be enabled or disabled before configuring the related parameters. |
| **Root 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 any change of the value, the switch is required to be reboot. The value must be multiple of 4096 according to the protocol standard rule. |
| **Root Hello Time (1~10)** | Enter a value between 1 through 10 for the time to control the switch to send out the BPDU packet for RSTP current status checking. |
| **Root Forward Delay (4~30)** | Enter a value between 4 through 30 asthe number of seconds for a port to wait before changing from its RSTP learning and listening states to the forwarding state. |
| **Root Maximum Age (6~40)** | Enter a value between 6 through 40 as the number of seconds a bridge waits without receiving STP configuration messages before attempting a reconfiguration. |
| **Path Cost (0~200000000)** | Enter a value from 1 through 200000000 to define the path cost for the other switch from this transmitting switch at the specified port. When path cost insert in 0, the switches will be setup as automatic data transmitting. |
| **Priority (0~240)** | Enter a number 0 through 240 to decide which port should be blocked by priority in LAN.<br>The value of priority must be the multiple of 16 |
| **Admin P2P** | Some of the rapid state transactions that are possible within RSTP are dependent upon whether the port concerned can only be connected to exactly one other switch (i.e. It is served by a point-to-point LAN segment), or it can be connected to two or more switches (i.e. It is served by a shared medium LAN segment).<br>This function allows the P2P status of the link to be manipulated administratively.<br>True means P2P enabling. False means P2P disabling. |
| **Auto Edge** | The port is directly connected to end stations, and it cannot create bridging loop in the network.To configure the port as an edge port, set the port to "**True**". |

| | |
|---|---|
| **Admin Non STP** | The port includes the STP mathematic calculation.<br>**True** is not including STP mathematic calculation.<br>**False** is including the STP mathematic calculation. |
| Apply | Click “Apply” button to save changes. |

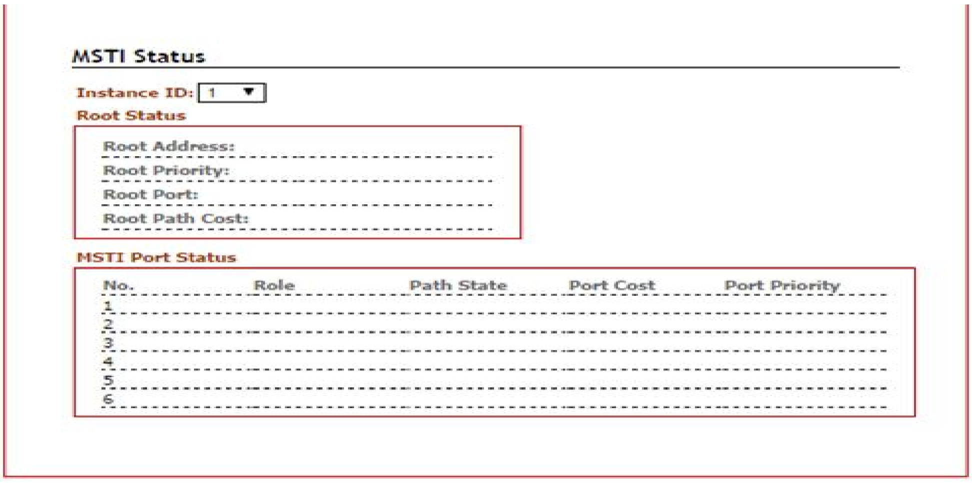
*Figure 5.28 – RSTP Configuration Terms & Value Description*

**MSTP (Multiple Spanning Tree Protocol)**

It is defined in IEEE 802.1s, it can map a group of VLAN’s into a single Multiple Spanning Tree instance (MSTI). In fact, the Spanning Tree Protocol is applied separately for a set of VLAN’s instead of the whole network. Different root switches and different STP parameters can be individually configured for each MSTI. So, one link can be active for one MSTI and the other link active for the second MSTI. This enables some degree of load-balancing and generally two MSTI’s are used in the network for easier implementation.

## 5.6.3 MSTI Status

Users can display the MSTI root status and port status by selecting the instance ID number from 1 to 15 by clicking on the dropdown box from the “MSTI Status” interface.



MSTI Status

Instance ID: 1 ▼

Root Status

Root Address:
Root Priority:
Root Port:
Root Path Cost:

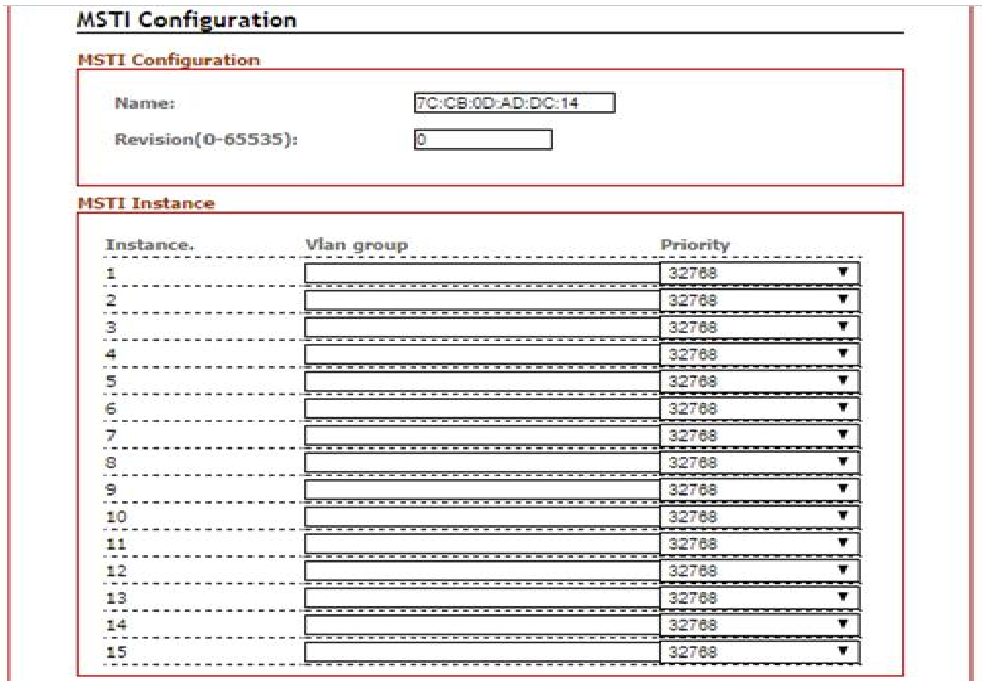
MSTI Port Status

| No. | Role | Path State | Port Cost | Port Priority |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |

*Figure 5.29 – MSTI Status Interface*

## 5.6.4 MSTI Configuration

Users can display the MSTI root status and port status by selecting the “Instance ID” number from 1 to 15 by clicking on the dropdown box from the “MSTI Status” interface.



MSTI Configuration

MSTI Configuration

Name: 7C:CB:0D:AD:DC:14

Revision(0-65535): 0

MSTI Instance

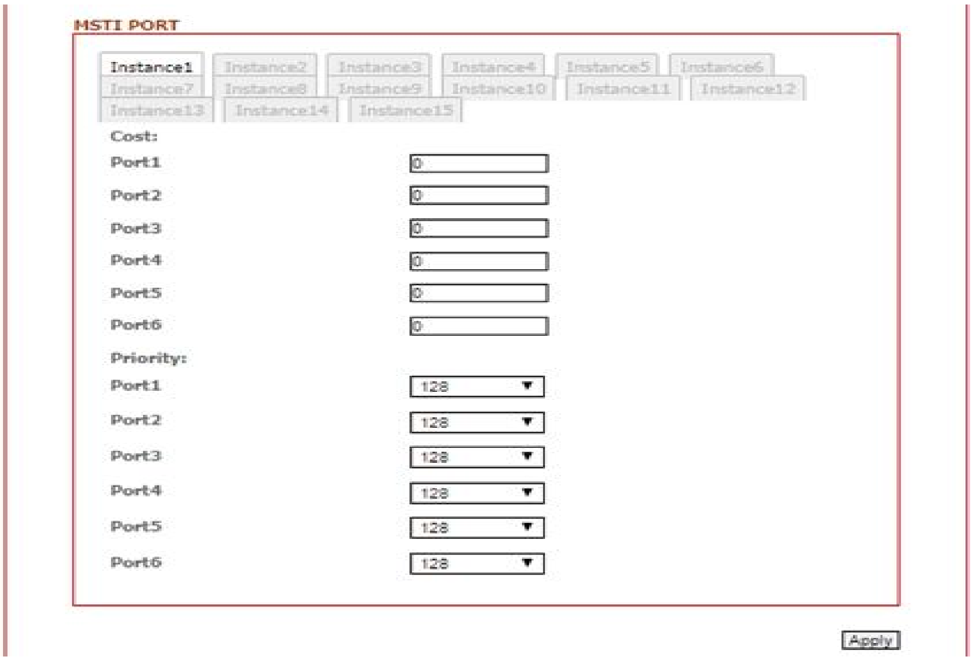
| Instance. | Vlan group | Priority |
|---|---|---|
| 1 | | 32768 |
| 2 | | 32768 |
| 3 | | 32768 |
| 4 | | 32768 |
| 5 | | 32768 |
| 6 | | 32768 |
| 7 | | 32768 |
| 8 | | 32768 |
| 9 | | 32768 |
| 10 | | 32768 |
| 11 | | 32768 |
| 12 | | 32768 |
| 13 | | 32768 |
| 14 | | 32768 |
| 15 | | 32768 |

*Figure 5.30 – MSTI Configuration Interface*

| Terms | Value Description |
|---|---|
| **MTSI Configuration** | |
| **Name** | Users can insert the unique MAC address of the bridge switch. |
| **Revision** | User can insert the value from 0~65535 |
| **MTSI Instance** | |
| **Instance No. & VLAN Group** | There are 1~15 instance number, user can insert which VLAN Group info into the belonging Instance number |
| **Priority (0~61440)** | A value used to identify the root bridge.<br>The bridge with the lowest value has the highest priority and is selected as the root.<br>The switch is required to reboot when there’s any value change.<br>The value must be multiple of 4096 according to the protocol standard rule. |

| | |
|---|---|
| Apply | Click “Apply” button to save changes. |

*Figure 5.31 – MSTI Configuration –Terms & Value Description*



Cost:
Port1 0
Port2 0
Port3 0
Port4 0
Port5 0
Port6 0
Priority:
Port1 128
Port2 128
Port3 128
Port4 128
Port5 128
Port6 128

*Figure 5.32 – MSTI Port Configuration Interface*

| **Terms** | **Value Description** |
|---|---|
| **Instance Tabs** | User can select Instance Tab #1~#15 to configure each MSTI port “Cost” & “Priority” value. |
| **Cost** | User can define the path cost value from 1 through 200000000 to the other bridge from this transmitting bridge at the specified port. |
| **Priority** | User can decide which port should be blocked by priority in LAN by select the value from 0 to 240 from the dropdown box. |
| Apply | Click “Apply” button to save changes. |

*Figure 5.33 – MSTI Port Configuration Terms & Value Description*

# 5.7. 802.1Q VLAN

A Virtual LAN (VLAN) is a logical network grouping that limits the broadcast domain, which allows user to isolate network traffic. 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.

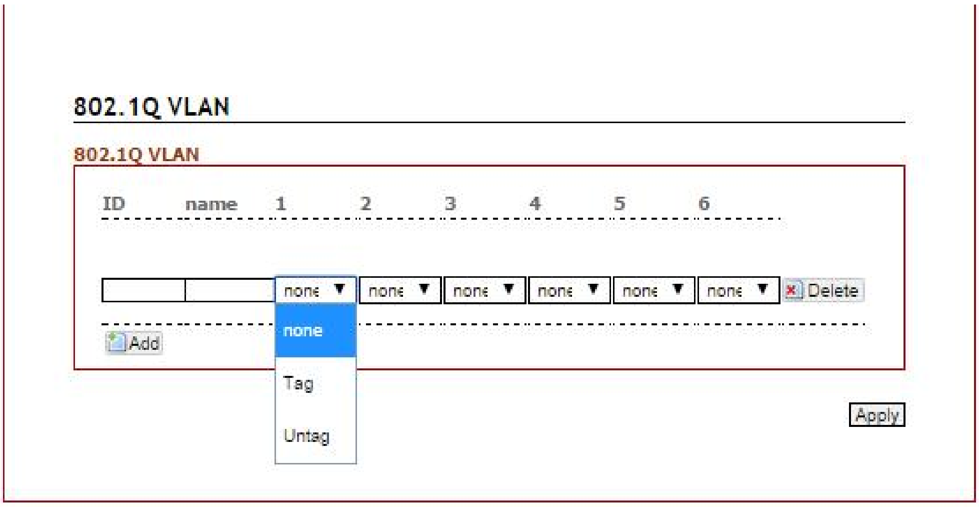
The switch supports port-based and 802.1Q (tagged-based) VLAN. The default configuration of VLAN operation mode is at "**802.1Q**".

## 5.7.1 802.1Q VLAN settings

Tagged-based VLAN is an IEEE 802.1Q specification standard, and it is possible 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.

Ports in a port-based VLAN are referred to as untagged ports and the frames received on the ports as untagged frames. The names derive from the fact that the frames received on a port do not contain any information that indicates VLAN membership, and that VLAN membership is determined solely by a port's PVID.

All of Antaira's industrial managed switches' have a default VLAN setting set to "none" for each port, so the users can login to the VLAN setting interface to create a VLAN Group name and choose "Tag" or "Untag" for each port.



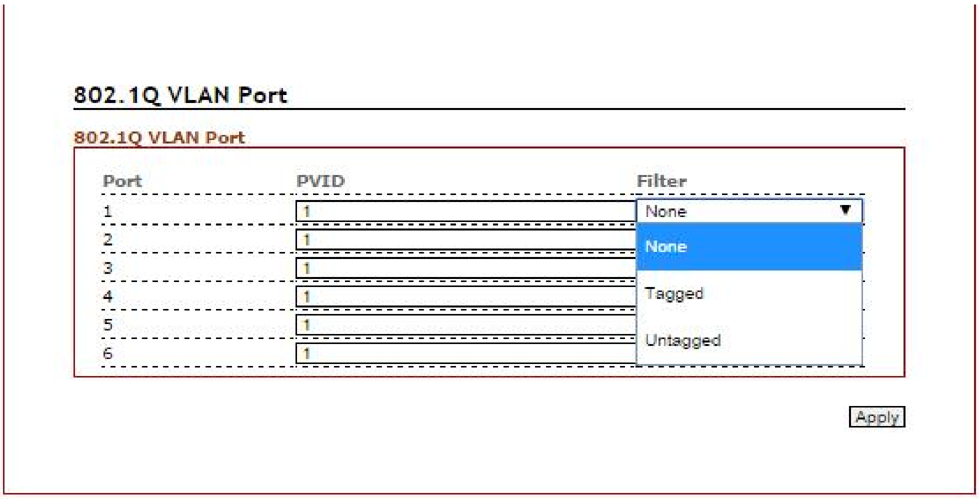
802.1Q VLAN

802.1Q VLAN

| ID | name | 1 | 2 | 3 | 4 | 5 | 6 | |
|---|---|---|---|---|---|---|---|---|
| | | none | none | none | none | none | none | Delete |

*Figure 5.34 – 802.1Q VLAN Settings Interface*

### 5.7.2 802.1Q VLAN Settings



802.1Q VLAN Port

802.1Q VLAN Port

| Port | PVID | Filter |
|---|---|---|
| 1 | 1 | None ▼ |
| 2 | 1 | |
| 3 | 1 | |
| 4 | 1 | |
| 5 | 1 | |
| 6 | 1 | |

*Figure 5.35 – 802.1Q VLAN Settings Interface*

| Terms | Value Description |
|---|---|
| **PVID** | User can assign a Port VLAN ID for each port |
| **Filter** | User can choose any port be "Tagged" or "Untagged".<br>Tagged VLAN: set the tagged PVIDs to carry different VLAN frames to other switch.<br>Untagged VLAN: set the port PVID for untagged devices that connect to the port. The range of PVID is 1 to 4094. |
| Apply | Click "Apply" button to save changes. |

*Figure 5.36 – 802.1Q VLAN settings Terms & Value Description*

## 5.8. IGMP Snooping

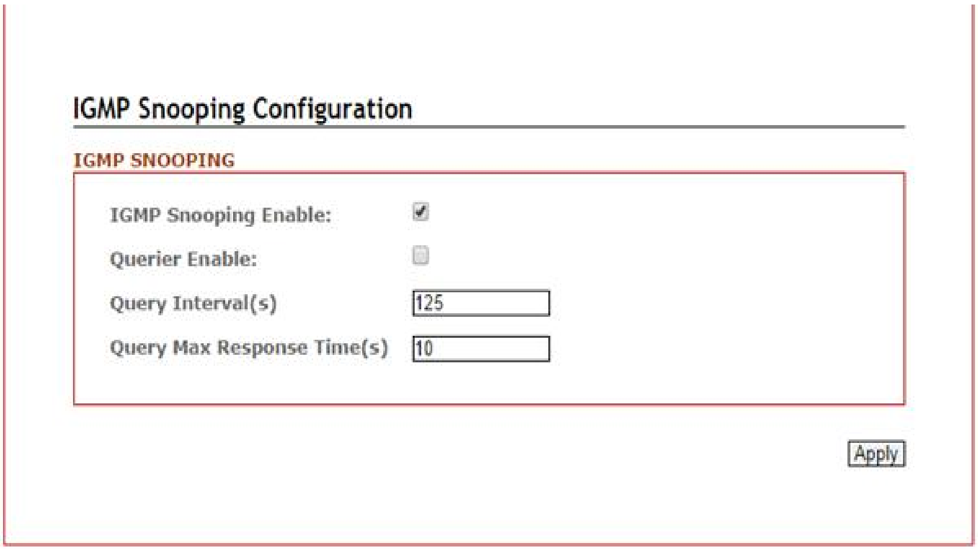
The Internet Group Management Protocol (IGMP) is a communications protocol used to manage the membership of Internet Protocol multicast groups. IGMP is used by IP hosts and adjacent multicast routers to establish multicast group memberships.

When IGMP snooping is enabled in a switch, it analyzes all the IGMP packets between hosts connected to the switch and multicast routers in the network. When a switch receives an IGMP report for a given multicast group from a host, the switch adds the host's port number to the multicast list for that group. When the switch hears an IGMP leave, it removes the host's port from the table entry.

IGMP snooping can reduce multicast traffic from streaming and other bandwidth intensive IP applications more effectively. A switch using IGMP snooping will only forward multicast traffic to the hosts in that traffic. This reduction of multicast traffic reduces the packet processing at the switch (at the cost of needing additional memory to handle the multicast tables) and also

decreases the workload at the end hosts since their network cards (or operating system) will not receive and filter all the multicast traffic generated in the network.
IGMP has 3 versions, IGMP v1, v2, and v3, and support query group up to 256 groups.

### 5.8.1 IGMP Settings


IGMP Snooping Configuration

IGMP SNOOPING

IGMP Snooping Enable: ☑
Querier Enable: □
Query Interval(s) 125
Query Max Response Time(s) 10

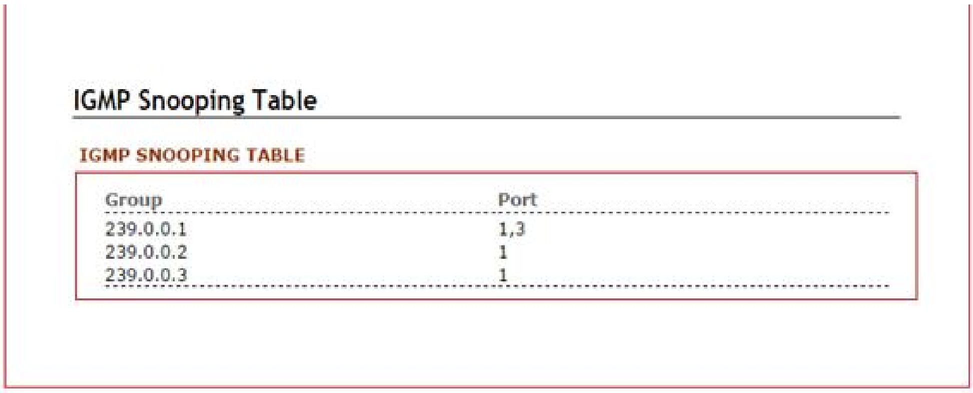
*Figure 5.37 – IGMP Snooping Settings Interface*

| Terms | Value Description |
|---|---|
| **IGMP Protocol** | Check the box to enable or disable IGMP Snooping |
| **Querier** | Switch will be IGMP querier or not. There should have the existing one and only one IGMP querier in an IGMP application – up to 256 Groups |
| **Query Interval** | The frequency at which the querier sends query messages |
| **Query Max Response Time** | The maximum response time advertised. |
| Apply | Click “Apply” button to save changes. |

*Figure 5.38 – IGMP Snooping Settings Terms & Value Description*

### 5.8.2 IGMP Snooping Status Table

Multicast filtering is the system by which end stations only receive multicast traffic if they register to join specific multicast groups. With multicast filtering, network devices only forward multicast traffic to the ports that are connected to registered end stations.



IGMP Snooping Table

IGMP SNOOPING TABLE

| Group | Port |
|---|---|
| 239.0.0.1 | 1,3 |
| 239.0.0.2 | 1 |
| 239.0.0.3 | 1 |

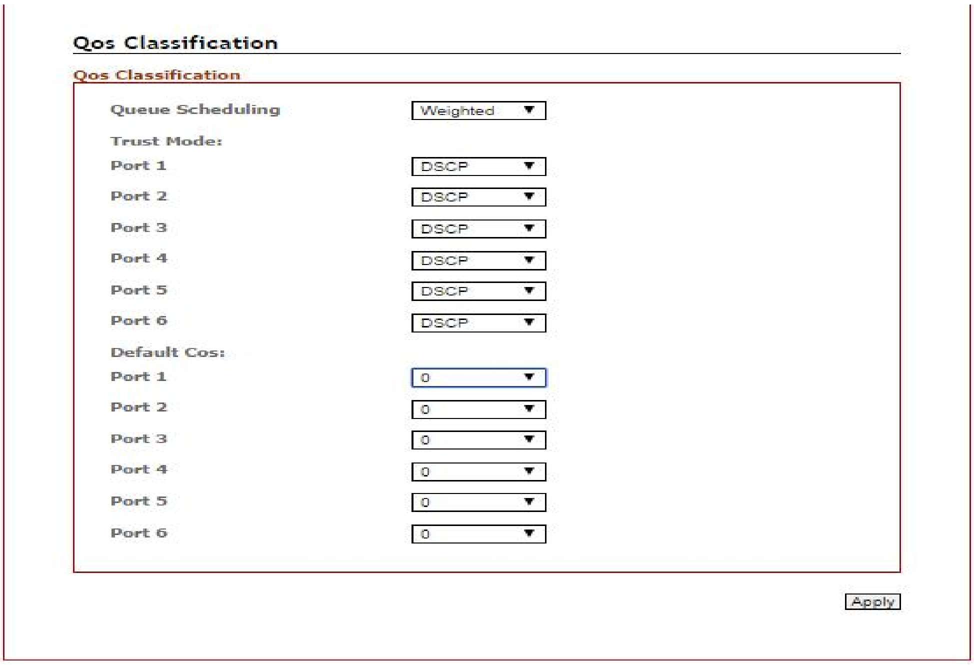
*Figure 5.39 – IGMP Snooping Status Table*

## 5.9 QoS (Traffic Prioritization)

Network traffic is always unpredictable and the only basic assurance that can be offered is the best effort traffic delivery. To overcome this challenge, Quality of Service (QoS) is applied throughout the network. This ensures that network traffic is prioritized according to specified criteria and receives preferential treatments.

Traffic Prioritization includes three modes: port base, 802.1p/COS, and TOS/DSCP. By traffic prioritization function, users can classify the traffic into four classes for differential network application. All of Antaira’s industrial managed switches support four priority queues.

## 5.9.1 QoS Classification



Qos Classification

Qos Classification

Queue Scheduling: Weighted

Trust Mode:

Port 1: DSCP
Port 2: DSCP
Port 3: DSCP
Port 4: DSCP
Port 5: DSCP
Port 6: DSCP

Default Cos:

Port 1: 0
Port 2: 0
Port 3: 0
Port 4: 0
Port 5: 0
Port 6: 0

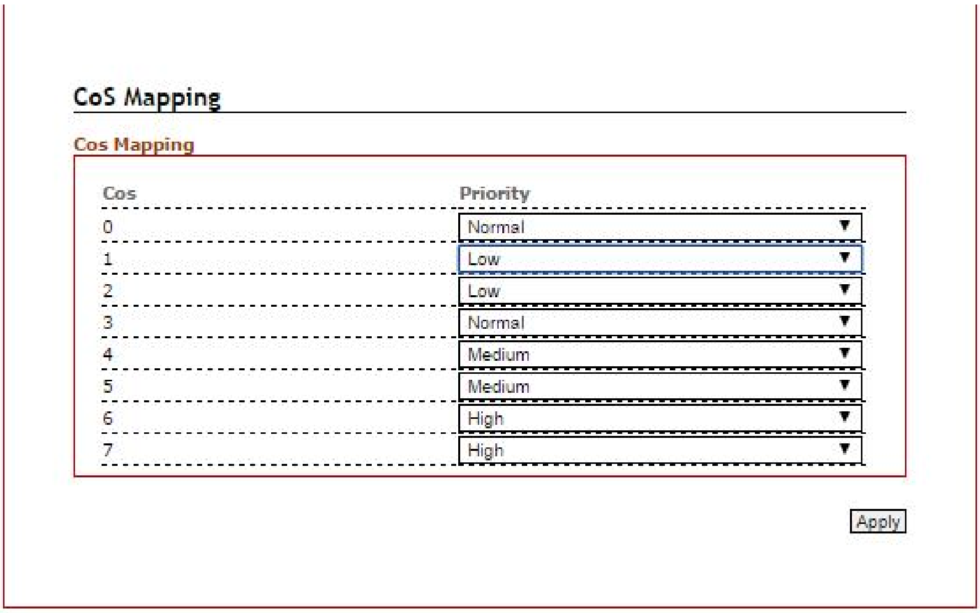
*Figure 5.40 – QoS Classification Interface*

| Terms | Value Description |
|---|---|
| **Queue Scheduling** | User can set it as “Weighted” or “Strict”<br>Weighted mode: An 8, 4, 2, 1 weighting is applied to each round robin priority queue.<br>Strict mode: It gives egress queues with higher priority to be transmitted first before lower priority queues are serviced. ” |
| **Trust mode** | User can select the trust mode with either DSCP or Cos. When select DSCP, only trusted DSCP (Differentiated Services Code Point) values are mapped to a specific QoS class and drop precedence level (DPL). Frames with untrusted DSCP values are treated as non-IP frames.<br>CoS: (Class Of Service) is well known as 802.1p. It describes that the output priority of a packet is determined by user priority field in 802.1Q VLAN tag. The priority value is supported 0to7COS value map to 4 priority queues: Highest, SecHigh, SecLow, and Lowest |
| **Default Cost** | User can set each port’s priority queue from 0 to 7 by clicking from dropdown box; of which 0 is the Highest, and |

| | |
|---|---|
| | 7 is the Lowest |
| Apply | Click “Apply” button to save changes. |

*Figure 5.41 – QoS Classification Terms & Value Description*

## 5.9.2 CoS Mapping



CoS Mapping

Cos Mapping

| Cos | Priority |
|---|---|
| 0 | Normal |
| 1 | Low |
| 2 | Low |
| 3 | Normal |
| 4 | Medium |
| 5 | Medium |
| 6 | High |
| 7 | High |

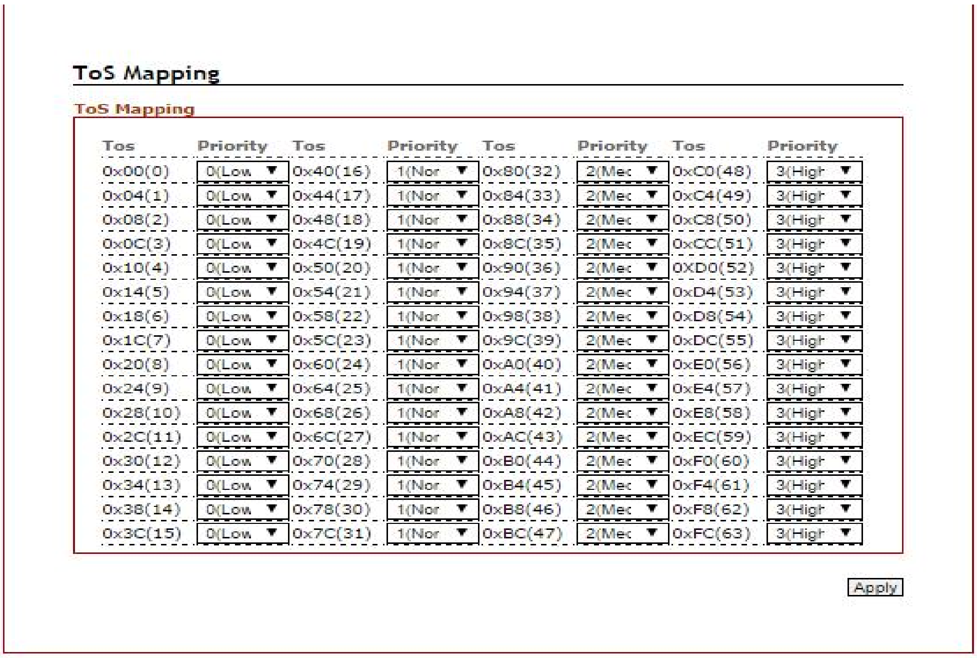
*Figure 5.42 – CoS Mapping Interface*

| Terms | Value Description |
|---|---|
| **Cos Value (0~7)** | User can assign each port a CoS value from 0 to 7. According to the IEEE 802.1p, user can define each CoS value in 4 priority queues: from Low to Normal, Medium, and High. |
| Apply | Click “Apply” button to save changes. |

*Figure 5.43 – QoS Mapping Terms & Value Description*

## 5.9.3 ToS Mapping

ToS is an acronym for Type of Service. It is implemented as the IPv4 ToS priority control. It is fully decoded to determine the priority from the 6-bit ToS field in the IP header. The most significant 6 bits of the ToS field are fully decoded into 64 possibilities, and the singular code that results is compared against the corresponding bit in the IPv4 ToS priority control bit (0~63).



ToS Mapping

ToS Mapping

| Tos | Priority | Tos | Priority | Tos | Priority | Tos | Priority |
|---|---|---|---|---|---|---|---|
| 0x00(0) | 0(Low ▼ | 0x40(16) | 1(Nor ▼ | 0x80(32) | 2(Mec ▼ | 0xC0(48) | 3(High ▼ |
| 0x04(1) | 0(Low ▼ | 0x44(17) | 1(Nor ▼ | 0x84(33) | 2(Mec ▼ | 0xC4(49) | 3(High ▼ |
| 0x08(2) | 0(Low ▼ | 0x48(18) | 1(Nor ▼ | 0x88(34) | 2(Mec ▼ | 0xC8(50) | 3(High ▼ |
| 0x0C(3) | 0(Low ▼ | 0x4C(19) | 1(Nor ▼ | 0x8C(35) | 2(Mec ▼ | 0xCC(51) | 3(High ▼ |
| 0x10(4) | 0(Low ▼ | 0x50(20) | 1(Nor ▼ | 0x90(36) | 2(Mec ▼ | 0XD0(52) | 3(High ▼ |
| 0x14(5) | 0(Low ▼ | 0x54(21) | 1(Nor ▼ | 0x94(37) | 2(Mec ▼ | 0xD4(53) | 3(High ▼ |
| 0x18(6) | 0(Low ▼ | 0x58(22) | 1(Nor ▼ | 0x98(38) | 2(Mec ▼ | 0xD8(54) | 3(High ▼ |
| 0x1C(7) | 0(Low ▼ | 0x5C(23) | 1(Nor ▼ | 0x9C(39) | 2(Mec ▼ | 0xDC(55) | 3(High ▼ |
| 0x20(8) | 0(Low ▼ | 0x60(24) | 1(Nor ▼ | 0xA0(40) | 2(Mec ▼ | 0xE0(56) | 3(High ▼ |
| 0x24(9) | 0(Low ▼ | 0x64(25) | 1(Nor ▼ | 0xA4(41) | 2(Mec ▼ | 0xE4(57) | 3(High ▼ |
| 0x28(10) | 0(Low ▼ | 0x68(26) | 1(Nor ▼ | 0xA8(42) | 2(Mec ▼ | 0xE8(58) | 3(High ▼ |
| 0x2C(11) | 0(Low ▼ | 0x6C(27) | 1(Nor ▼ | 0xAC(43) | 2(Mec ▼ | 0xEC(59) | 3(High ▼ |
| 0x30(12) | 0(Low ▼ | 0x70(28) | 1(Nor ▼ | 0xB0(44) | 2(Mec ▼ | 0xF0(60) | 3(High ▼ |
| 0x34(13) | 0(Low ▼ | 0x74(29) | 1(Nor ▼ | 0xB4(45) | 2(Mec ▼ | 0xF4(61) | 3(High ▼ |
| 0x38(14) | 0(Low ▼ | 0x78(30) | 1(Nor ▼ | 0xB8(46) | 2(Mec ▼ | 0xF8(62) | 3(High ▼ |
| 0x3C(15) | 0(Low ▼ | 0x7C(31) | 1(Nor ▼ | 0xBC(47) | 2(Mec ▼ | 0xFC(63) | 3(High ▼ |

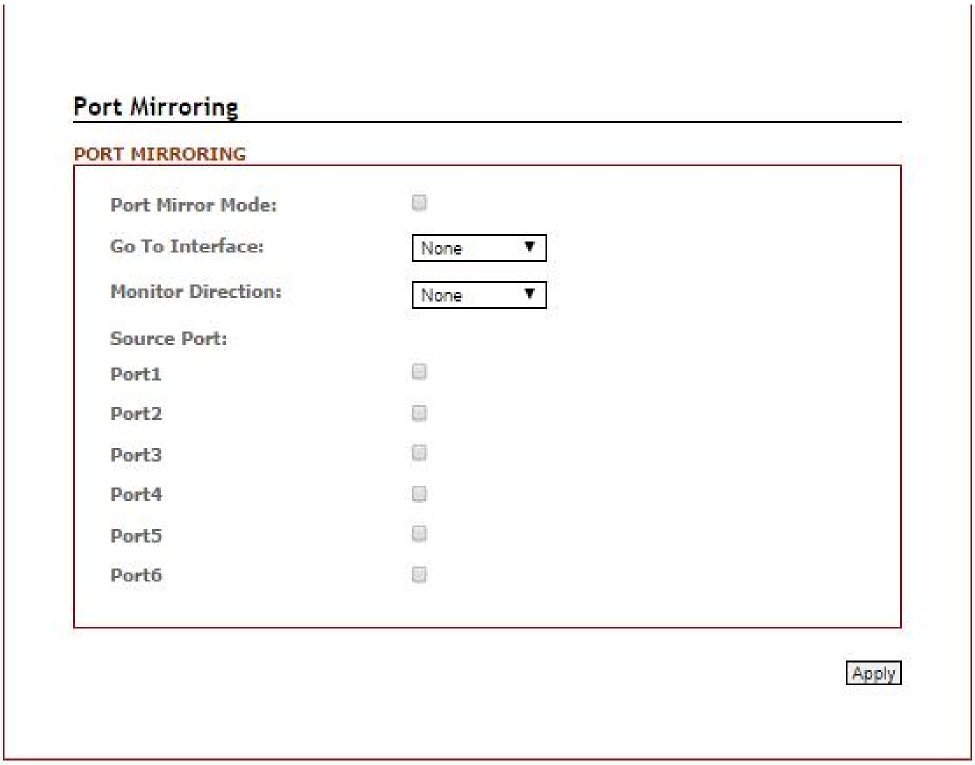
*Figure 5.44 – ToS Mapping Interface*

| Terms | Value Description |
|---|---|
| **ToS** | User can assign each ToS value with 4 priority queues form 0 (Low) to 1 (Normal), 2 (Medium), and 3 (High). |
| Apply | Click “Apply” button to save changes. |

*Figure 5.45 – ToS Mapping Terms & Value Description*

# 5.10 Port Mirroring

Enable or disable mirroring feature. When enabled, a copy of matched frames will be mirrored to the destination port specified in the port mirroring interface.



Port Mirroring

PORT MIRRORING

| | |
|---|---|
| Port Mirror Mode: | □ |
| Go To Interface: | None ▼ |
| Monitor Direction: | None ▼ |
| Source Port: | |
| Port1 | □ |
| Port2 | □ |
| Port3 | □ |
| Port4 | □ |
| Port5 | □ |
| Port6 | □ |

*Figure 5.46 – Port Mirroring Configuration Interface*

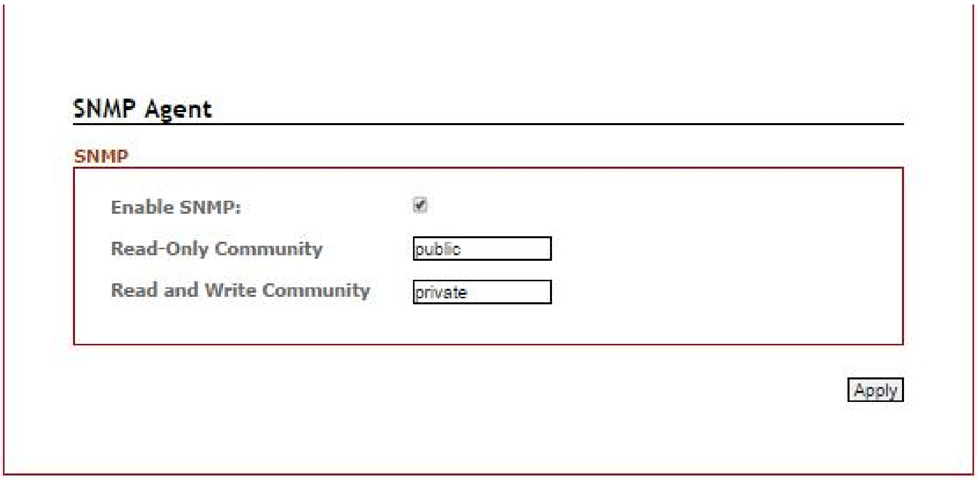
| Terms | Value Description |
|---|---|
| **Port Mirror Mode** | Enable Port Mirroring function by check the box |
| **Go To Interface** | User can use the dropdown box to choose the destination port as “Port to mirror on” feature |
| **Monitor Direction** | User can select the monitor direction from the dropdown box by “Tx”, “Rx”, or “Tx/Rx”. |
| **Source Port** | User can decide any particular port as the source port(s) will require port mirroring. |
| Apply | Click “Apply” button to save changes. |

*Figure 5.47 – Port Mirroring Terms & Value Description*

# 5.11 SNMP

Simple Network Management Protocol (SNMP) is the protocol developed to manage nodes (servers, workstations, routers, switches and hubs etc.) on an IP network. SNMP enables network administrators to manage network performance, find and solve network problems, and plan for network growth. Network management systems learn of problems by receiving traps or change notices from network devices implementing SNMP.

## 5.11.1 SNMP Agent



SNMP Agent

SNMP

Enable SNMP: ☑

Read-Only Community: public

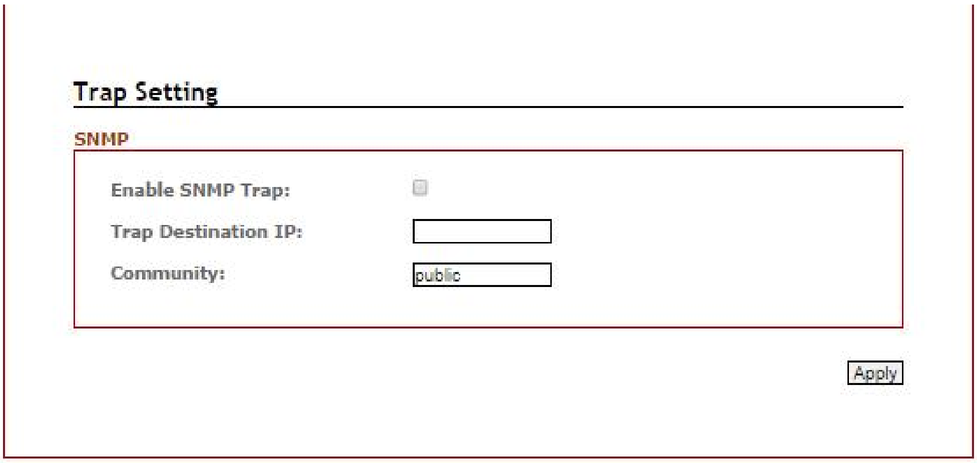
Read and Write Community: private

*Figure 5.48 – SNMP Agent Setup Interface*

| Terms | Value Description |
|---|---|
| **Enable SNMP** | Enable SNMP function by check the box |
| **Read-only Community** | User can release the SNMP to public for “read-only” |
| Apply | Click “Apply” button to save changes. |

*Figure 5.49 – SNMP Agent Interface Terms & Value Description*

## 5.11.2 SNMP Trap setting



Trap Setting

SNMP

Enable SNMP Trap: □

Trap Destination IP:

Community: public

*Figure 5.50 – SNMP Trap Setting*

| Terms | Value Description |
|---|---|
| **Enable SNMP Trap** | Enable SNMP Trap function by check the box |
| **Trap Destination IP** | User could insert the Server IP address as Trap Destination IP info |
| **Community** | User can release the SNMP to public for "read-only" |
| Apply | Click "Apply" button to save changes. |

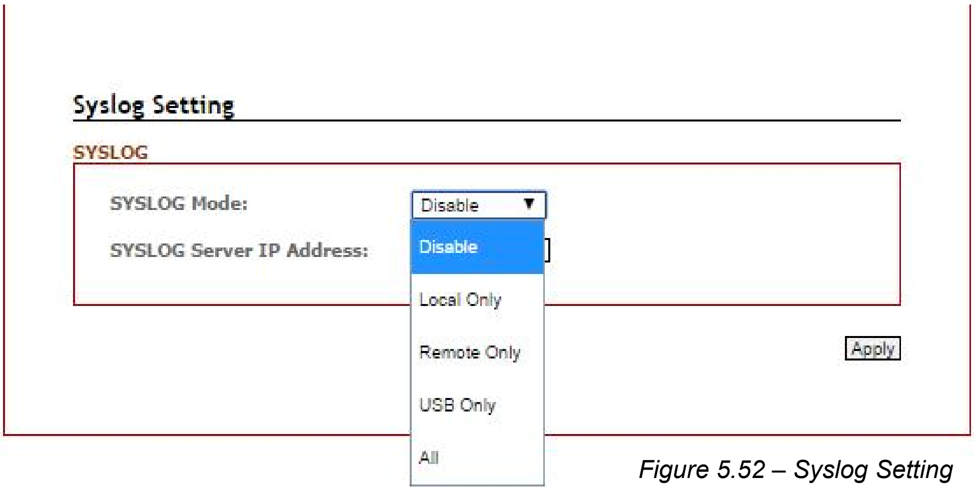
*Figure 5.51 – SNMP Trap Settings Terms & Value Description*

## 5.12 System Warning

System warning function is very important for managing a switch. Users can manage the switch by “Syslog”, “System Event Log”, and “Email Server” setup for Advanced Notice in any event type, “Event Type Selection”, and “Fault Alarm” setting. By setting up all these system warning features, users will receive the in advanced warning message through email, whenever any event occurs. It definitely increases the flexibility and capability for the user to monitor the remote site network and device statuses.

### 5.12.1 Syslog Setting

The SYSLOG is a protocol to transmit event notification messages across networks.



Syslog Setting

SYSLOG

SYSLOG Mode: Disable

SYSLOG Server IP Address:

*Figure 5.52 – Syslog Setting*

| Terms | Value Description |
|---|---|
| **SYSLOG Mode** | **Disable:** disable SYSLOG.<br>**Local Only:** log to local system.<br>**Remote Only:** log to a remote SYSLOG server.<br>**USB Only:** log and store SYSLOG data and warning file to USB storage device through built-in USB Port; and the file name is “message”<br>**All:** log to all local server / USB port, and remote SYSLOG server at the same time.<br>Notice that there is one log in local server or USB port. If USB presented, it will log to USB storage. Otherwise it logs to local server. |
| **SYSLOG Server IP Address** | Insert remote SYSLOG server IP address |

| | |
|---|---|
| Apply | Click “Apply” button to save changes. |

*Figure 5.53 – SYSLOG Setting Terms & Value Description*

## 5.12.2System Event Log

Users can view and display the system event log by clicking the “Apply” button on the right bottom corner of the interface. Then, the system event logs will display within the SYSLOG LIST window. The SYSLOG LIST will contain up to 5 pages of system event log information.
Users also can click the “Refresh” button to have the most updated system event logs information to display.

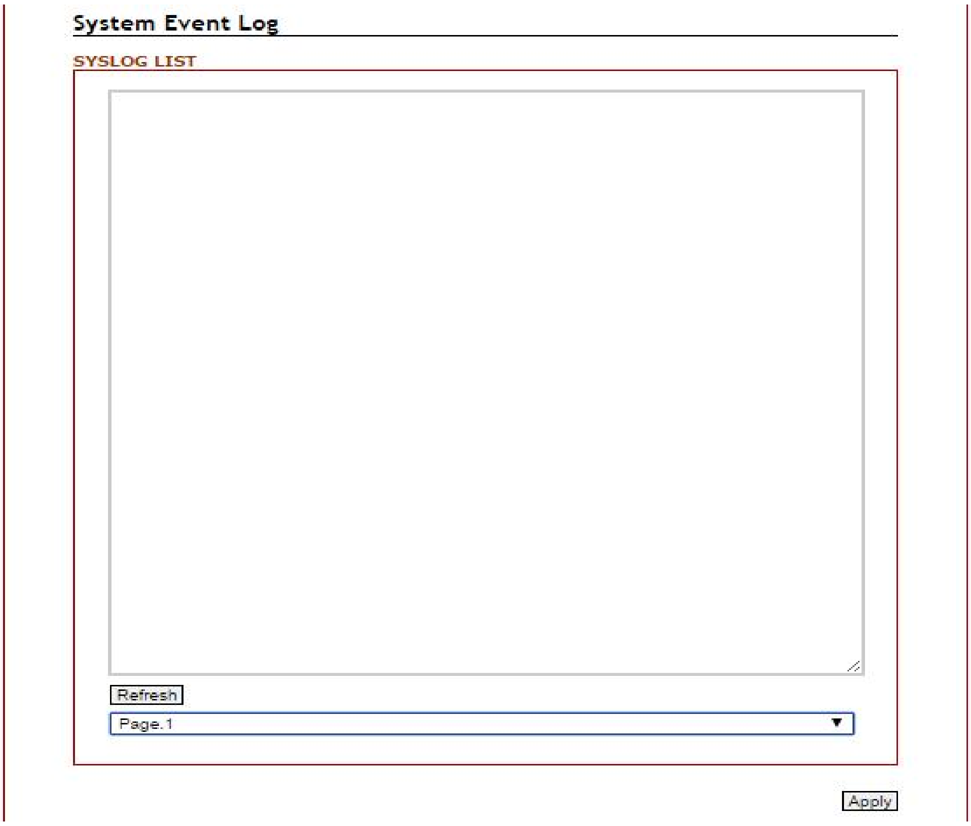
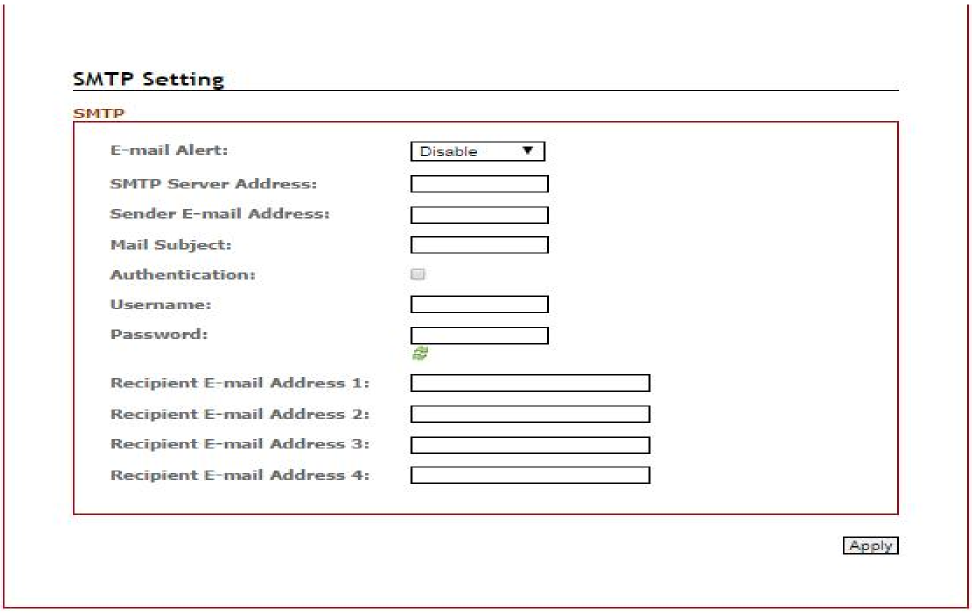


*Figure 5.54 – System Event Logs Interface*

### 5.12.3 SMTP Setting

The Simple Mail Transfer Protocol (SMTP) is for e-mail transmission across the Internet.



SMTP Setting

SMTP

E-mail Alert: Disable ▼

SMTP Server Address:

Sender E-mail Address:

Mail Subject:

Authentication: □

Username:

Password:

Recipient E-mail Address 1:

Recipient E-mail Address 2:

Recipient E-mail Address 3:

Recipient E-mail Address 4:

Apply

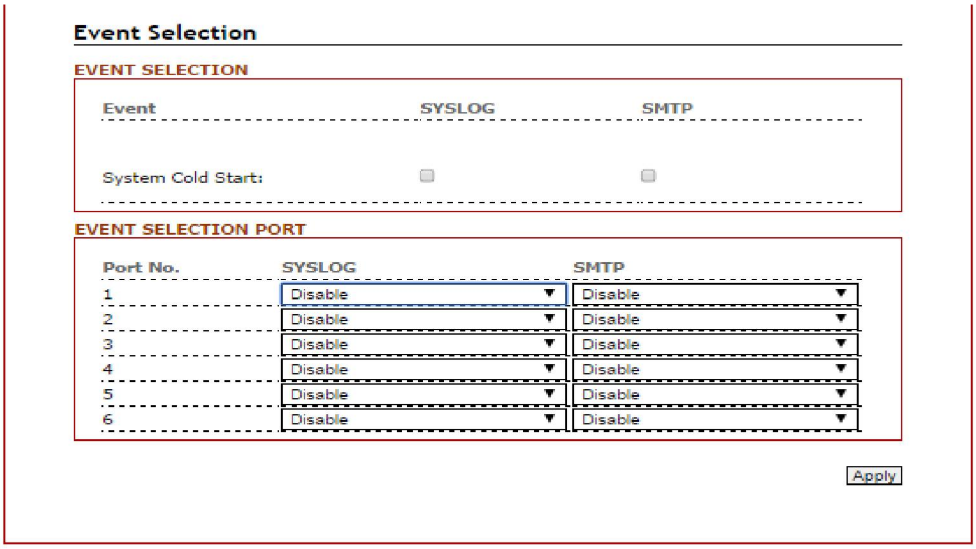
*Figure 5.55 – SMTP Setting Interface*

| Terms | Value Description |
|---|---|
| **E-mail Alert** | Enable/Disable transmission system warning events by e-mail. |
| **SMTP Server Address** | Setting up the mail server IP address |
| **Sender E-mail Address** | Set up the email account to send the alert. |
| **Mail Subject** | The subject of the mail |
| **Authentication** | Check the box to enable the Authentication function<br>**Username:** the authentication username.<br>**Password:** the authentication password. |
| **Recipient E-mail Address(es)** | User can setup up to 4 recipient E-mail addresses to receive any system warning message. |
| Apply | Click “Apply” button to save changes. |

*Figure 5.56 – SMTP Setting Terms & Value Description*

### 5.12.4 Event Selection

Users can select any event type through the “Event Selection” interface, such as “System Cold Start”, any ports’ “Link Up”, “Link Down”, “Link Up & Link Down” and send the system warning massage to either SYSLOG or SMTP, or both at the same time. After the event selection, users can click the “Apply” button to save changes.



Event Selection

EVENT SELECTION

| Event | SYSLOG | SMTP |
|---|---|---|
| System Cold Start: | □ | □ |

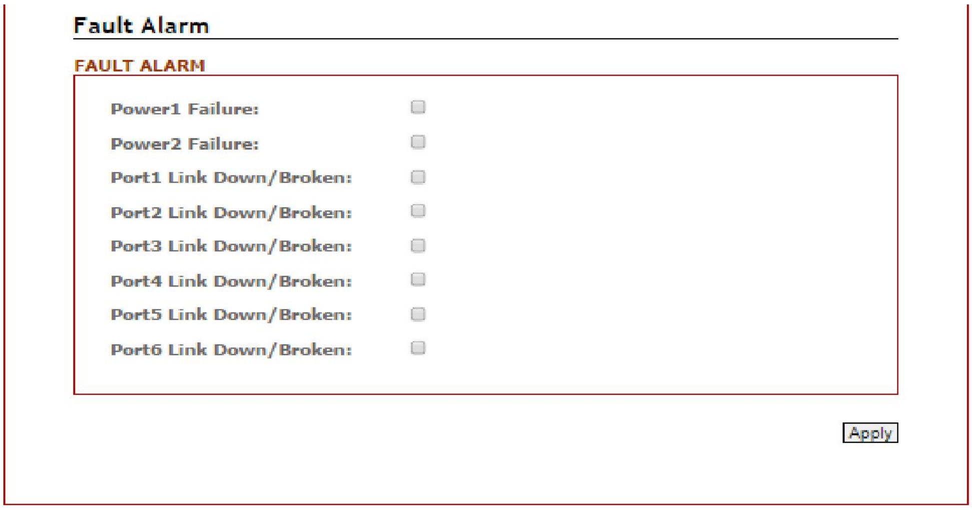
EVENT SELECTION PORT

| Port No. | SYSLOG | SMTP |
|---|---|---|
| 1 | Disable | Disable |
| 2 | Disable | Disable |
| 3 | Disable | Disable |
| 4 | Disable | Disable |
| 5 | Disable | Disable |
| 6 | Disable | Disable |

*Figure 5.57 – Event Selection Setting Interface*

### 5.12.5 Fault Alarm

When any selected fault event has occurred, the fault LED of the switch’s front panel will light up and the electric relay will signal at the same time. Users can check the checkbox of any “Fault Alarm” type, such as power failure, port link down or broken through the “Fault Alarm” setting interface to trigger this function.



Fault Alarm

FAULT ALARM

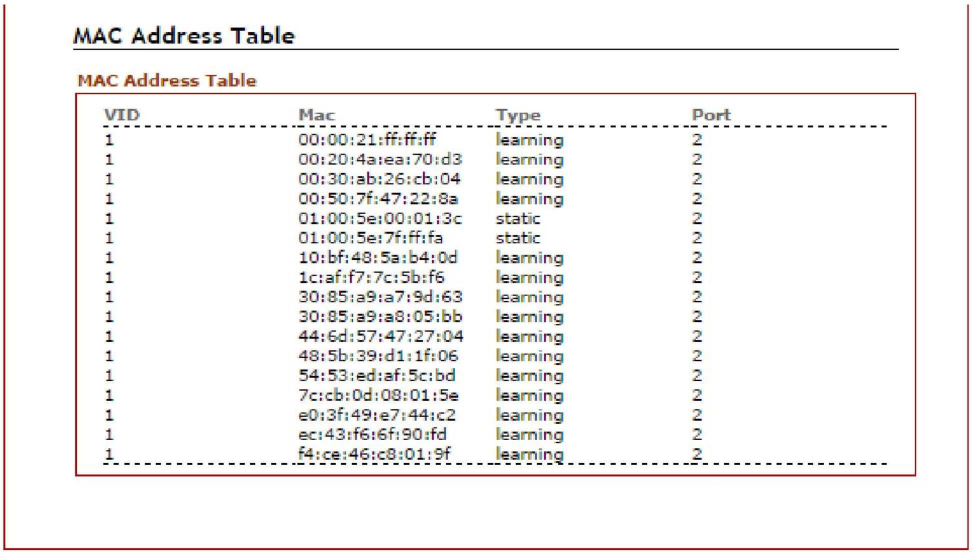
| | |
|---|---|
| Power1 Failure: | □ |
| Power2 Failure: | □ |
| Port1 Link Down/Broken: | □ |
| Port2 Link Down/Broken: | □ |
| Port3 Link Down/Broken: | □ |
| Port4 Link Down/Broken: | □ |
| Port5 Link Down/Broken: | □ |
| Port6 Link Down/Broken: | □ |

*Figure 5.58 – Event Selection Setting Interface*

# 5.13 MAC Table

The MAC address table is the filtering database that supports queries by the forwarding process, as to whether a frame received by a given port with a given destination MAC address is to be forwarded through a given potential transmission port.

## 5.13.1 MAC Address Table



MAC Address Table

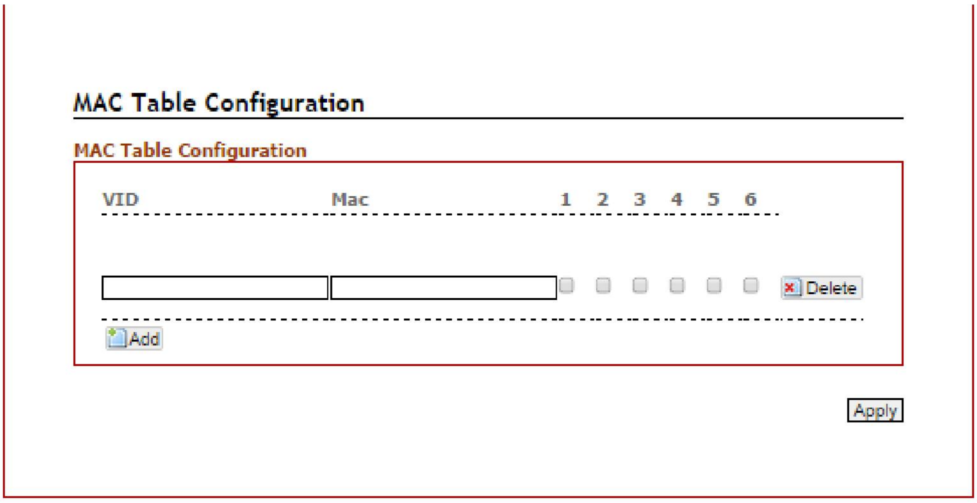
MAC Address Table

| VID | Mac | Type | Port |
|---|---|---|---|
| 1 | 00:00:21:ff:ff:ff | learning | 2 |
| 1 | 00:20:4a:ea:70:d3 | learning | 2 |
| 1 | 00:30:ab:26:cb:04 | learning | 2 |
| 1 | 00:50:7f:47:22:8a | learning | 2 |
| 1 | 01:00:5e:00:01:3c | static | 2 |
| 1 | 01:00:5e:7f:ff:fa | static | 2 |
| 1 | 10:bf:48:5a:b4:0d | learning | 2 |
| 1 | 1c:af:f7:7c:5b:f6 | learning | 2 |
| 1 | 30:85:a9:a7:9d:63 | learning | 2 |
| 1 | 30:85:a9:a8:05:bb | learning | 2 |
| 1 | 44:6d:57:47:27:04 | learning | 2 |
| 1 | 48:5b:39:d1:1f:06 | learning | 2 |
| 1 | 54:53:ed:af:5c:bd | learning | 2 |
| 1 | 7c:cb:0d:08:01:5e | learning | 2 |
| 1 | e0:3f:49:e7:44:c2 | learning | 2 |
| 1 | ec:43:f6:6f:90:fd | learning | 2 |
| 1 | f4:ce:46:c8:01:9f | learning | 2 |

*Figure 5.59 – MAC Address Table Interface*

## 5.13.2 MAC Table Configuration

Users can check the checked box of each port and insert the port’s VID and MAC address of the device that is connected to that port, then click the “Add” button to continue adding other ports’ information. Click the “Apply” button to save all the settings.



MAC Table Configuration

MAC Table Configuration

| VID | Mac | 1 | 2 | 3 | 4 | 5 | 6 | |
|---|---|---|---|---|---|---|---|---|
| | | □ | □ | □ | □ | □ | □ | Delete |

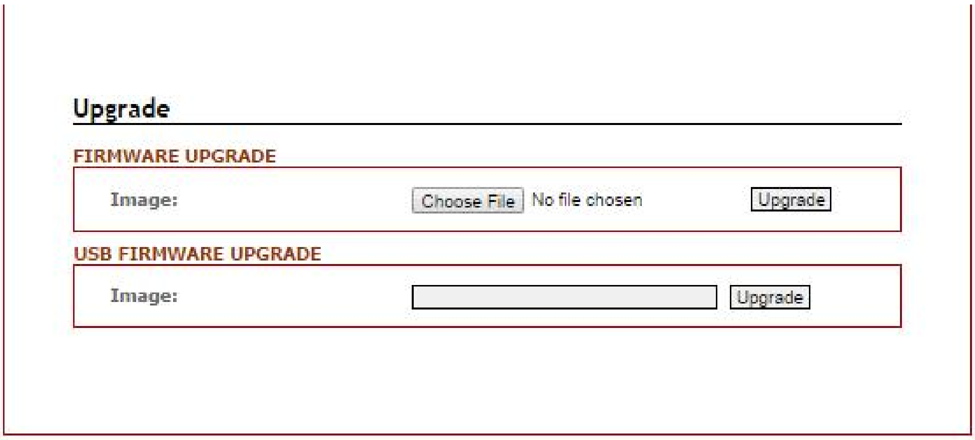
*Figure 5.60 – MAC Table Setting Interface*

## 5.14 Maintenance

Under the maintenance section, users can execute updated firmware upgrade, system reboot, and reset the system to factory default.

### 5.14.1 Upgrade

Antaira is continuously developing new functions and features for specific application requirements for the industrial managed switches. Users can download the latest firmware from Antaira's website and store it within their local PC, server, or USB drive.



Upgrade

FIRMWARE UPGRADE

Image: Choose File No file chosen Upgrade

USB FIRMWARE UPGRADE

Image: Upgrade

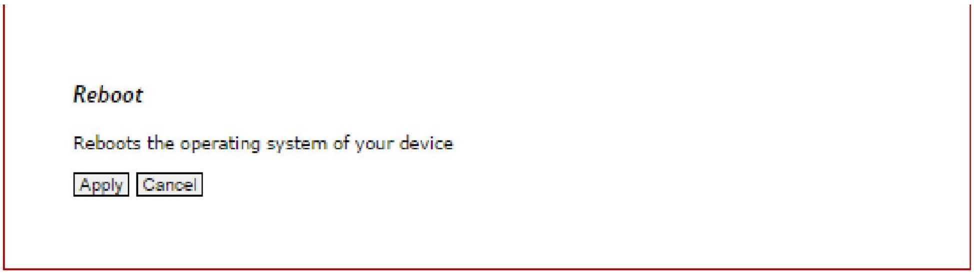
*Figure 5.61 – Firmware Upgrade Interface*

| Terms | Value Description |
|---|---|
| **FIRMWARE UPGRADE** | User can click the "Choose File" button to select the latest firmware from the local PC, or Server; then click the "Upgrade" button to have the switch be updated. |
| **USB FIRMWARE UPGRADE** | Fill in the folder and filename and click the button of Upgrade. If the folder or filename does not exist, system will return error. If it succeeds, system will reboot. Ex: file1, / folder /file2. |

*Figure 5.62 – Firmware Upgrade setting Terms & Value Description*

## 5.14.2 Reboot

Users can click the “Apply” button under the “Reboot” interface to reboot the switch.



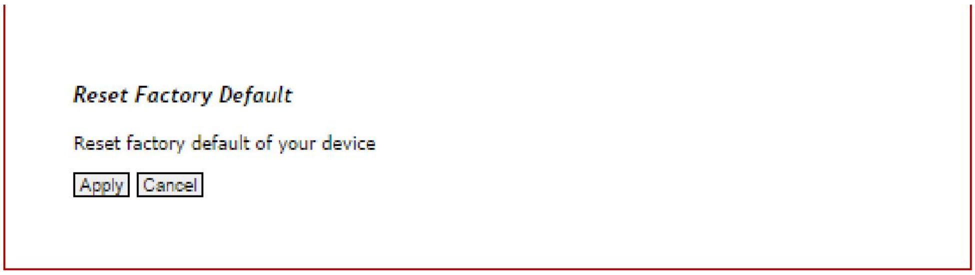
Reboot

Reboots the operating system of your device

*Figure 5.63 – Switch Reboot Interface*

## 5.14.3 Default

Users can reset the switch to “Factory Default” by click the “Apply” button under the default interface.



Reset Factory Default

Reset factory default of your device

*Figure 5.64 – Reset Factory Default Interface*

# 5.15 Configuration

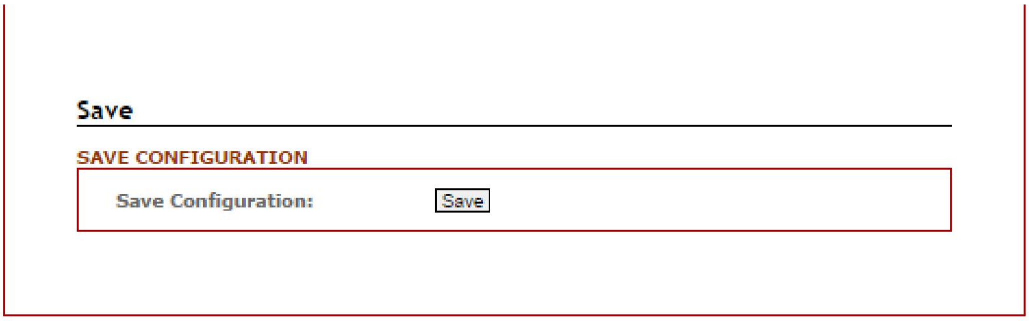
Under the “Configuration” section, users can save all the settings that have been configured, backed up and stored to a local PC, Server, or a USB storage device through the built-in USB port.

Users can use the USB port feature to execute the “Auto Load” function to boot the switch’s configuration that has been saved within the USB storage device, or users can utilize this function to “Auto Load” the configuration to other switches, and those switches would require the same configuration settings.

Users can keep the USB storage device plugged in with the switch to enable the USB “Auto Backup” function to allow the switch’s configuration settings to backup to the USB storage device whenever users makes and save configuration settings.

## 5.15.1 Save

Users can click the “Save” button under the “SAVE CONFIGURATION” interface, once all the settings had been configured.



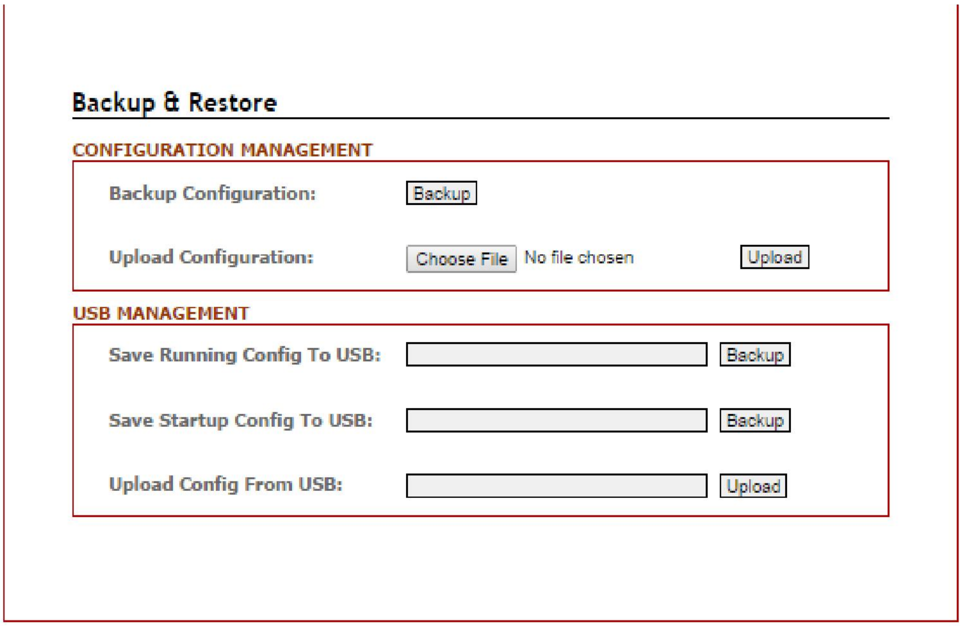
Save

SAVE CONFIGURATION

Save Configuration:

*Figure 5.65 – Save Setting Interface*

## 5.15.2 Backup & Store



Backup & Restore

CONFIGURATION MANAGEMENT

Backup Configuration:

Upload Configuration: No file chosen

USB MANAGEMENT

Save Running Config To USB:

Save Startup Config To USB:

Upload Config From USB:

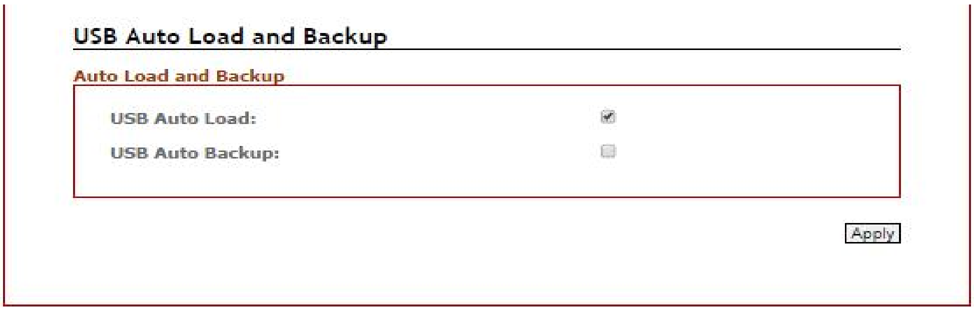
*Figure 5.66 – Backup & Restore Setting Interface*

| Terms | Value Description |
|---|---|
| **CONFIGURATION MANAGEMNET** | |
| **Backup Configuration** | By click the “Backup” button, it allows user to backup the switch configuration setting to local PC, or server. |
| **Upload Configuration** | User can click the “Choose File” button to select the saved configuration file from local PC, or server, then click the “Upload” the settings to the switch. |

| **USB Management** | |
|---|---|
| **Save Running Config to USB** | Fill in the folder and filename and click the button of Backup. If the folder or filename does not exist, system will generate it automatically. Ex: file1, / folder /file2. |
| **Save Startup Config to USB** | Fill in the folder and filename and click the button of Backup. Because startup file didn't exist in default, it will be error to save in default. If the folder or filename does not exist, system will generate it automatically. Ex: file1, / folder /file2. |
| **Upload Config from USB** | Fill in the folder and filename and click the button of Upload. If the folder or filename does not exist, system will return error. If it succeeds, system will reboot. Ex: file1, / folder /file2. |

*Figure 5.67 – Backup & Restore Setting Terms & Value Description*

### 5.15.3 Auto Load & Backup



USB Auto Load and Backup

Auto Load and Backup

USB Auto Load: ☑

USB Auto Backup: □

*Figure 5.68 – USB Auto Load and Backup Setting Interface*

| **Terms** | **Value Description** |
|---|---|
| **USB Auto Load** | Select USB Auto Load, it can auto load startup file from USB to Switch. And the file name is "switch-[MAC ADDRESS].cfg", if the file didn't exist, it will find "switch-config.cfg". If all of them didn't exist, it does not work. |
| **USB Auto Backup** | Select USB Auto Backup, it can auto Backup running-config file from Switch to USB. And the file name is "startup-config". |

*Figure 5.69 – USB Auto Load and Backup Setting Terms & Value Description*

## 5.16 Logout

Users can logout of the web console interface by pointing at and clicking 'logout' from the menu.

# 6. Command Line Interface Management

## 6.1 About CLI Management

Besides WEB-based management, LMX-0500 series also supports CLI management. Users can use console or telnet to management switch by CLI.

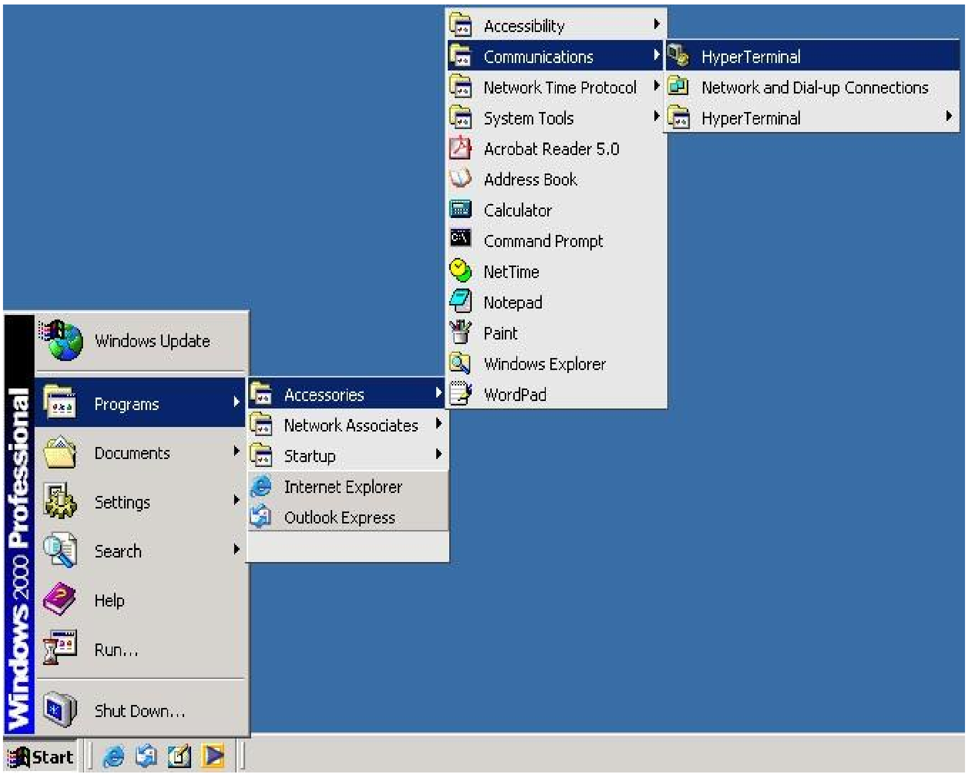
**CLI Management by RS-232 Serial Console (115200, 8, none, 1, none)**

Before configuring by an RS-232 serial console, use an RJ45 to DB9-F cable to connect the switches' RS-232 Console port to the PC's COM port.

Follow the steps below to access the console via RS-232 serial cable.

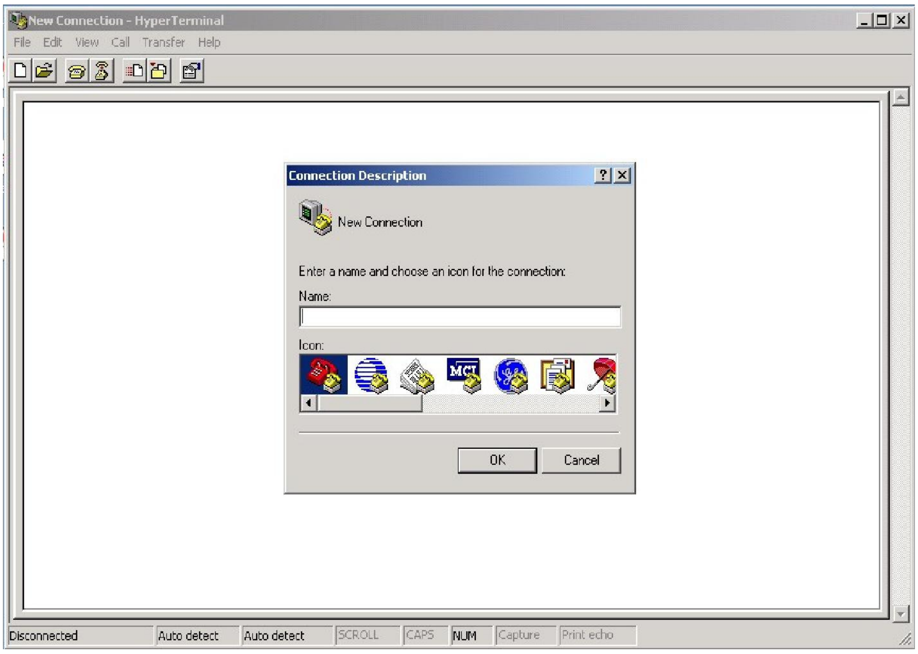
Step 1:

From the Windows desktop, click on Start -> Programs -> Accessories -> Communications -> Hyper Terminal.



Step 2:

Input a name for the new connection.



New Connection - HyperTerminal

Connection Description

New Connection

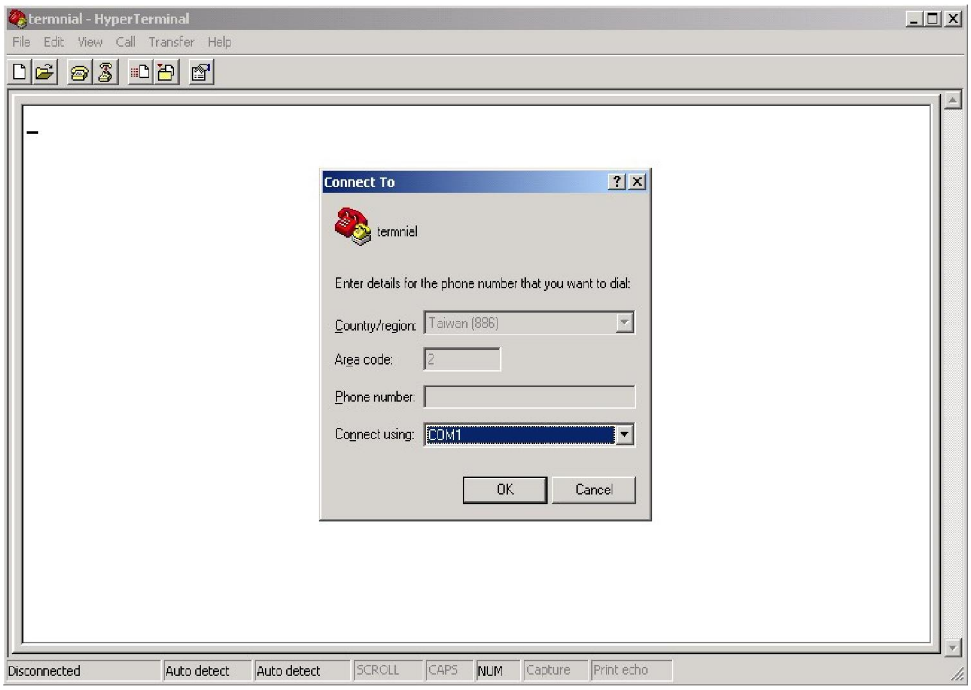
Enter a name and choose an icon for the connection:

Name:

Icon:

Step 3:

Select to use COM port number



termnial - HyperTerminal

Connect To

termnial

Enter details for the phone number that you want to dial:

Country/region: Taiwan (886)

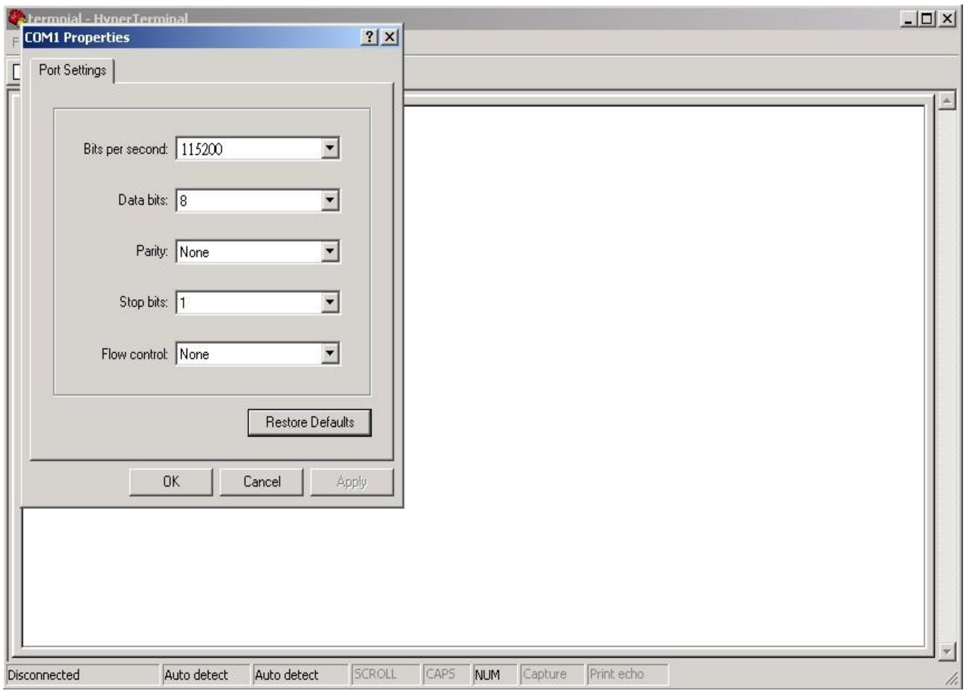
Area code: 2

Phone number:

Connect using: COM1

Step 4:

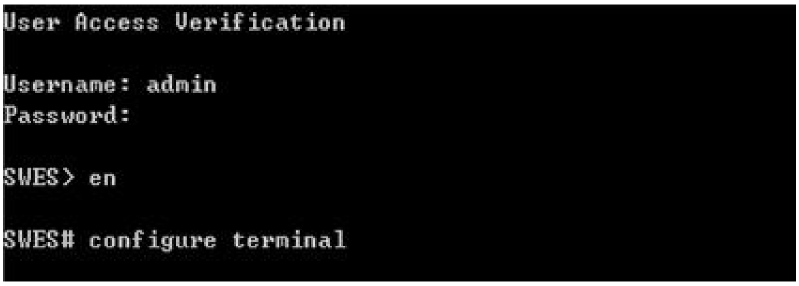
The COM port property settings are as follows: 115200 for "Bits per second", 8 for "Data bits", None for Parity, 1 for "Stop bits" and none for "Flow control".



Bits per second: 115200
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None

Step 5:

The Console login screen will appear. Use the keyboard to enter the Username and Password, then press "**Enter**".



```
User Access Verification

Username: admin
Password:

SWES> en

SWES# configure terminal
```

**CLI Management by Telnet**

Users can use “**TELNET**” to configure the switches.

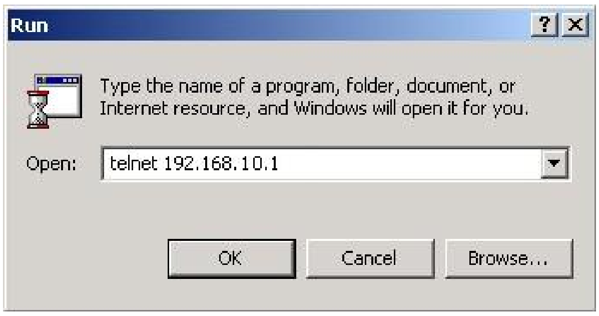
The default value is as below:

- IP Address: **192.168.1.254**
- Subnet Mask: **255.255.255.0**
- Default Gateway: none
- User Name: **admin**
- Password: **admin**

Follow the steps below to access the console via Telnet.

Step 1:

Telnet to the IP address of the switch from the Windows “**Run**“ command as below.

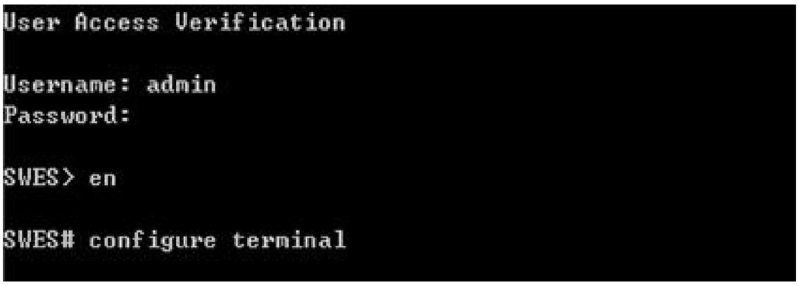


Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.

Open: telnet 192.168.10.1

Step 2:

The Login screen will appear. Use the keyboard to enter the Username and Password, and then press “**Enter**”



```
User Access Verification

Username: admin
Password:

SWES> en

SWES# configure terminal
```

## Commander Groups

| Group | Command | Mode |
|---|---|---|
| System | hostname [Switch] | configure |
| | system location [none] | configure |
| | system contact [none] | configure |
| | no system location | configure |
| | no system contact | configure |
| | show system uptime | configure |
| | show system mac | configure |
| | show system version firmware | configure |
| | show system version loader | configure |
| | show environment power 1 | configure |
| | show environment power 2 | configure |
| | show environment temperature | configure |
| | admin username admin | configure |
| | admin password admin | configure |
| IP | boot host dhcp | configure |
| | ip address [ip_addr] [ip_mask] | configure |
| | ip default-gateway [ip_router] | configure |
| | ip name-server [ip_addr_string] | configure |
| | no boot host dhcp | configure |
| | no ip default-gateway | configure |
| | no ip name-server | configure |
| | show boot host dhcp | configure |
| | show ip address | configure |
| | show ip default-gateway | configure |
| | show ip name-server | configure |
| | show ip mode | configure |
| Time | ntp time update | configure |
| | ntp client enable | |
| | ntp client timeserver [ip_addr_string] | configure |
| | clock set [hh:mm:ss] [day] [month] [year] | configure |
| | clock timezone [area] [city] | configure |
| | ntp sync schedule enable | configure |

| | | |
|---|---|---|
| | ntp sync minute [time] | configure |
| | ntp sync hour [time] | configure |
| | ntp sync day [time] | configure |
| | ntp sync month [time] | configure |
| | ntp sync weekly [time] | configure |
| | no ntp client enable | Configure |
| | no ntp client timeserver | configure |
| | no clock timezone | configure |
| | no ntp sync schedule enable | configure |
| | no ntp sync minute | configure |
| | no ntp sync hour | configure |
| | no ntp sync day | configure |
| | no ntp sync month | configure |
| | no ntp sync weekly | configure |
| | show ntp client enable | configure |
| | show ntp client timeserver | configure |
| | show clock timezone | configure |
| | show ntp sync schedule enable | configure |
| | show ntp sync minute | configure |
| | show ntp sync hour | configure |
| | show ntp sync day | configure |
| | show ntp sync month | configure |
| | show ntp sync weekly | configure |
| **Port** | speed [auto \| 10 \| 100 \| 1000] | interface |
| | duplex [auto \| full \| half] | interface |
| | flowcontrol <receive> [on \| off \| desired] | interface |
| | name [string] | interface |
| | shutdown | interface |
| | no speed | interface |
| | no duplex | interface |
| | no flowcontrol | interface |
| | no name | interface |
| | no shutdown | interface |
| | show speed | interface |
| | show duplex | interface |

| | | |
|---|---|---|
| | show flowcontrol | interface |
| | show administrate | interface |
| | show name | interface |
| | show link status | interface |
| | show link state | interface |
| | show link speed | interface |
| | show duplex | interface |
| | show link rx | interface |
| | show link tx | interface |
| | show link summary | interface |
| | show interface transceiver | interface |
| **VLAN** | name [vlan_name] | vlan |
| | member [member_portlist] [<untag_portlist>] | vlan |
| | vlan-mode [port \| tag \| qinq] | configure |
| | vlan-group [group_num] [group_portlist] | configure |
| | switchport pvid [vlan_id] | interface |
| | switchport filter [tagged \| untagged] | interface |
| | switchport provider | interface |
| | switchport ethertype [ether_type] | interface |
| | no name | vlan |
| | no member | vlan |
| | no vlan-mode | configure |
| | no vlan-group | configure |
| | no switchport pvid | interface |
| | no switchport filter | interface |
| | no switchport provider | interface |
| | no switchport ethertype | interface |
| | show name | vlan |
| | show member | vlan |
| | show vlan-mode | configure |
| | show vlan-group | configure |
| | show switchport pvid | interface |
| | show switchport filter | interface |
| | show switchport provider | interface |
| | show switchport ethertype | interface |

| | | |
|---|---|---|
| **ERPS** | enable | g8032 |
| | disable | g8032 |
| | rpl [port0 \| port1] [owner \| neighbor] | g8032 |
| | aps-channel [channel ID] | g8032 |
| | revertive | g8032 |
| | clear | g8032 |
| | port0 interface [interface name] | g8032 |
| | port1 interface [interface name] | g8032 |
| | fs | g8032 |
| | ms | g8032 |
| | ring-id [erps ring ID] | g8032 |
| | timer hold-off [time] | g8032 |
| | timer guard [time] | g8032 |
| | timer wtr [time] | g8032 |
| | no rpl [port0 \| port1] | g8032 |
| | no aps-channel | g8032 |
| | no revertive | g8032 |
| | no port0 | g8032 |
| | no port1 | g8032 |
| | no ring-id | g8032 |
| | no timer hold-off | g8032 |
| | no timer guard | g8032 |
| | no timer wtr | g8032 |
| | show ethernet ring g8032 status | g8032 |
| | show ethernet ring g8032 brief | g8032 |
| | show ethernet ring g8032 port status | g8032 |
| **STP** | spanning-tree enable | configure |
| | spanning-tree mode [rstp \| mst] | configure |
| | spanning-tree priority [priority_value] | configure |
| | spanning-tree forward-time [ forward time] | configure |
| | spanning-tree hello-time [hello_time] | configure |
| | spanning-tree max-age [max_age] | configure |
| | spanning-tree cost [link_cost_value] | interface |
| | spanning-tree port-priority [port_priority] | interface |
| | spanning-tree link-type [point-to-point \| point-to-multiple] | interface |

| | | |
|---|---|---|
| **STP** | spanning-tree auto-edge off | interface |
| | spanning-tree admin-edge on | interface |
| | spanning-tree stp disable | interface |
| | no spanning-tree enable | configure |
| | no spanning-tree mode | configure |
| | no spanning-tree priority | configure |
| | no spanning-tree forward-time | configure |
| | no spanning-tree hello-time | configure |
| | no spanning-tree max-age | configure |
| | no spanning-tree mst [instance_ID] priority | configure |
| | no spanning-tree cost | interface |
| | no spanning-tree port-priority | interface |
| | no spanning-tree link-type | interface |
| | no spanning-tree auto-edge | interface |
| | no spanning-tree admin-edge | interface |
| | no spanning-tree admin-edge | interface |
| | no spanning-tree stp | interface |
| | show spanning-tree mode | configure |
| | show spanning-tree priority | configure |
| | show spanning-tree forward-time | configure |
| | show spanning-tree hello-time | configure |
| | show spanning-tree max-age | configure |
| | show spanning-tree cost | interface |
| | show spanning-tree port-priority | interface |
| | show spanning-tree link-type | interface |
| | show spanning-tree auto-edge | interface |
| | show spanning-tree admin-edge | interface |
| | show spanning-tree stp | interface |
| | spanning-tree mst [instance_ID] priority [priority] | configure |
| | spanning-tree mst name [NAME] | configure |
| | spanning-tree mst revision [REVISION] | configure |
| | spanning-tree mst instance [instance_ID] vlan [vlan_grp] | configure |
| | spanning-tree mst [instance_ID] priority [priority_number] | configure |
| | spanning-tree mst [instance_ID] cost [cost_value] | interface |
| | spanning-tree mst [instance_ID] port-priority [priority] | interface |

| | | |
|---|---|---|
| **STP** | no spanning-tree mst name | configure |
| | no spanning-tree mst revision | configure |
| | no spanning-tree mst instance [instance_ID] vlan | configure |
| | no spanning-tree mst [instance_ID] cost | interface |
| | no spanning-tree mst [instance_ID] port-priority | interface |
| | show spanning-tree mst name | configure |
| | show spanning-tree mst revision | configure |
| | show spanning-tree mst instance [instance_ID] vlan | configure |
| | show spanning-tree mst [instance_ID] priority | configure |
| | show spanning-tree mst [instance_ID] cost | interface |
| | show spanning-tree mst [instance_ID] port-priority | interface |
| **Event** | event smtp power1 enable | configure |
| | event smtp power2 enable | configure |
| | event smtp cold-start enable | configure |
| | event smtp warm-start enable | configure |
| | event smtp authentication-failure enable | configure |
| | event smtp erps-change enable | configure |
| | event smtp interface [INTERFACE_NAME] [up \| down] | configure |
| | no event smtp power1 | configure |
| | no event smtp power2 | configure |
| | no event smtp cold-start | configure |
| | no event smtp warm-start | configure |
| | no event smtp authentication-failure | configure |
| | no event smtp erps-change | configure |
| | no event smtp interface [INTERFACE_NAME] [up \| down] | configure |
| | show event smtp power1 | configure |
| | show event smtp power2 | configure |
| | show event smtp cold-start | configure |
| | show event smtp warm-start | configure |
| | show event smtp authentication-failure | configure |
| | show event smtp erps-change | configure |
| | show event smtp interface [INTERFACE_NAME] [up \| down] | configure |
| | event syslog power1 enable | configure |
| | event syslog power2 enable | configure |
| | event syslog cold-start enable | configure |

| | | |
|---|---|---|
| **Event** | event syslog warm-start enable | configure |
| | event syslog authentication-failure enable | configure |
| | event syslog erps-change enable | configure |
| | event syslog interface [INTERFACE_NAME] [up \| down] | configure |
| | no event syslog power1 | configure |
| | no event syslog power2 | configure |
| | no event syslog cold-start | configure |
| | no event syslog warm-start | configure |
| | no event syslog authentication-failure | configure |
| | no event syslog erps-change | configure |
| | no event syslog interface [INTERFACE_NAME] [up \| down] | configure |
| | show event syslog power1 | configure |
| | show event syslog power2 | configure |
| | show event syslog cold-start | configure |
| | show event syslog warm-start | configure |
| | show event syslog authentication-failure | configure |
| | show event syslog erps-change | configure |
| | show event syslog interface [INTERFACE_NAME] [up \| down] | configure |
| | event alarm power1 enable | configure |
| | event alarm power2 enable | configure |
| | event alarm interface [INTERFACE_NAME] [up \| down] | configure |
| | no event alarm power1 | configure |
| | no event alarm power2 | configure |
| | no event alarm interface [INTERFACE_NAME] [up \| down] | configure |
| | show event alarm power1 | configure |
| | show event alarm power2 | configure |
| | show event alarm interface [INTERFACE_NAME] [up \| down] | configure |
| | event apply | configure |
| **SYSLOG** | syslog server [IP_address] | configure |
| | syslog mode [both \| remote \| local] | configure |
| | no syslog server | configure |
| | no syslog mode | configure |
| | show syslog server | configure |
| | show syslog mode | configure |
| | show syslog log | configure |

| | | |
|---|---|---|
| **SMTP** | smtp enable | configure |
| | smtp sender [E-MAIL_ADDR] | configure |
| | smtp subject [subject_text] | configure |
| | smtp server address [GMAIL_SMPT_SERVER] | configure |
| | smtp server port [GMAIL_SMPT_SERVER] | configure |
| | smtp authentication enable | configure |
| | smtp authentication username [GMAIL_ACCOUNT] | configure |
| | smtp authentication password [GMAIL_PASS] | configure |
| | smtp receive [1 \| 2 \| 3 \| 4] [e-mail_address] | configure |
| | no smtp enable | configure |
| | no smtp sender | configure |
| | no smtp subject | configure |
| | no smtp server address | configure |
| | no smtp server port | configure |
| | no smtp authentication enable | configure |
| | no smtp authentication username | configure |
| | no smtp authentication password | configure |
| | no smtp receive [1 \| 2 \| 3 \| 4] | configure |
| | show smtp state | configure |
| | show smtp sender | configure |
| | show smtp subject | configure |
| | show smtp server address | configure |
| | show smtp server port | configure |
| | show smtp authentication enable | configure |
| | show smtp authentication username | configure |
| | show smtp receive [1 \| 2 \| 3 \| 4] | configure |
| **SNMP** | snmp server enable [<v1-v2c-only \| v3-only>] | configure |
| | snmp server community [ro \| rw] [community_name] | configure |
| | snmp server v3 level [admin\| user] [auth \| noauth \| priv] | configure |
| | snmp server v3 auth [admin \| user] [md5 \| sha] [PWD] | configure |
| | snmp server v3 encryption [admin \| user] [des \| aes] [PWD] | configure |
| | no snmp server enable | configure |
| | no snmp server community [ro \| rw] | configure |
| | no snmp server v3 level [admin\| user] | configure |
| | no snmp server v3 auth [admin \| user] | configure |

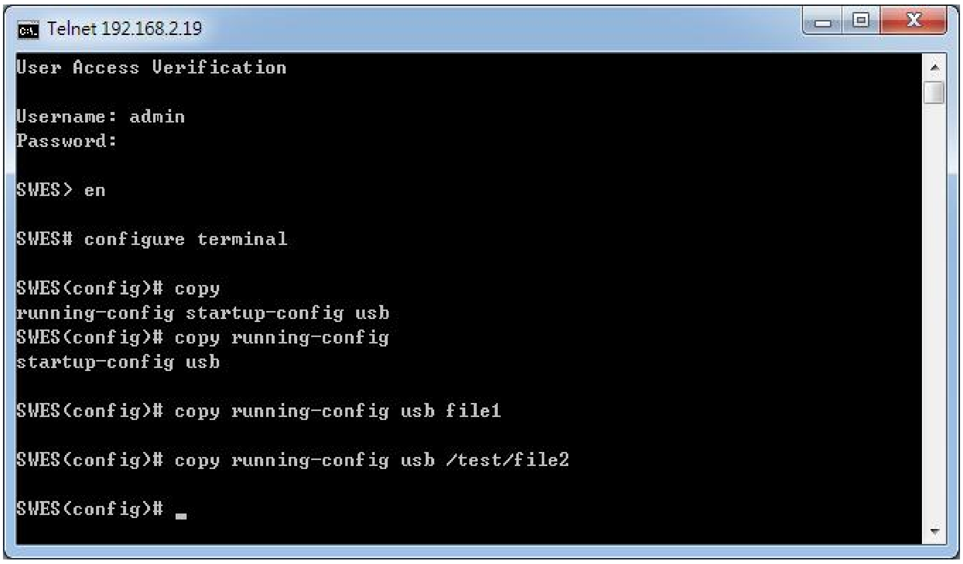
| | | |
|---|---|---|
| **SNMP** | no snmp server v3 encryption [admin \| user] | configure |
| | show snmp server enable | configure |
| | show snmp server community [ro \| rw] | configure |
| | show snmp server v3 level [admin\| user] | configure |
| | show snmp server v3 auth [admin \| user] | configure |
| | show snmp server v3 encryption [admin \| user] | configure |
| | snmp trap enable | configure |
| | snmp trap host [DESTINATION_IP] | configure |
| | snmp trap version [1 \| 2c \| 3] [traps \| inform] | configure |
| | snmp trap community [trap_community_name] | configure |
| | snmp trap inform retry [retry_time] | configure |
| | snmp trap inform timeout [retry_interval] | configure |
| | snmp trap v3 user [user_ID] | configure |
| | snmp trap v3 level [auth \| noauth \| priv] | configure |
| | snmp trap v3 engine-ID [engineID] | configure |
| | snmp trap v3 auth [md5 \| sha] [PASSWORD] | configure |
| | snmp trap v3 encryption [des \| aes] [PASSWORD] | configure |
| | no snmp trap enable | configure |
| | no snmp trap host | configure |
| | no snmp trap version | configure |
| | no snmp trap community | configure |
| | no snmp trap inform retry | configure |
| | no snmp trap inform timeout | configure |
| | no snmp trap v3 user | configure |
| | no snmp trap v3 level | configure |
| | no snmp trap v3 engine-ID | configure |
| | no snmp trap v3 auth | configure |
| | no snmp trap v3 encryption | configure |
| | show snmp trap enable | configure |
| | show snmp trap host | configure |
| | show snmp trap version | configure |
| | show snmp trap community | configure |
| | show snmp trap inform retry | configure |
| | show snmp trap inform timeout | configure |
| | show snmp trap v3 user | configure |

| | | |
|---|---|---|
| **SNMP** | show snmp trap v3 level | configure |
| | show snmp trap v3 engine-ID | configure |
| | show snmp trap v3 auth | configure |
| | show snmp trap v3 encryption | configure |
| **FILE** | copy running-config startup-config | configure |
| | copy startup-config running-config | configure |
| **PORT MIRROR** | monitor enable | configure |
| | monitor source [rx \| tx \| both] [port_list] | configure |
| | monitor destination [dest_port_number] | configure |
| | no monitor enable | configure |
| | no monitor source | configure |
| | no monitor destination | configure |
| | show monitor enable | configure |
| | show monitor source | configure |
| | show monitor destination | configure |
| **QoS** | qos queue-schedule [strict \| wrr] | configure |
| | qos map cos [priority_type] to tx-queue [queue] | configure |
| | qos map dscp [[priority_type] to tx-queue [[queue] | configure |
| | qos trust [cos \| dscp] | interface |
| | qos default cos [cos_default_value] | interface |
| | no qos queue-schedule | configure |
| | no qos map cos [priority_type] | configure |
| | no qos map dscp [priority_type] | configure |
| | no qos trust | interface |
| | no qos default cos | interface |
| | show qos queue-schedule | configure |
| | show qos map cos [priority_type] | configure |
| | show qos map dscp [priority_type] | configure |
| | show qos trust | interface |
| | show qos default cos | interface |
| **IGMP** | igmp snooping enable | configure |
| | igmp snooping query max-respond-time [second] | configure |
| | igmp snooping query interval [second] | configure |
| | igmp snooping last-member count [time] | configure |
| | igmp snooping last-member interval [second] | configure |

| | | |
|---|---|---|
| **IGMP** | igmp snooping querier enable | configure |
| | igmp snooping fast-leave enable | interface |
| | no igmp snooping enable | configure |
| | no igmp snooping query max-respond-time | configure |
| | no igmp snooping query interval | configure |
| | no igmp snooping last-member count | configure |
| | no igmp snooping last-member interval | configure |
| | no igmp snooping querier | configure |
| | no igmp snooping fast-leave | interface |
| | show igmp snooping mdb | configure |
| | show igmp snooping all | configure |
| | show igmp snooping fast-leave | interface |

## Save and Load Configuration File to/from USB

1. CLI: enable -> configure terminal ->copy running-config usb (path)

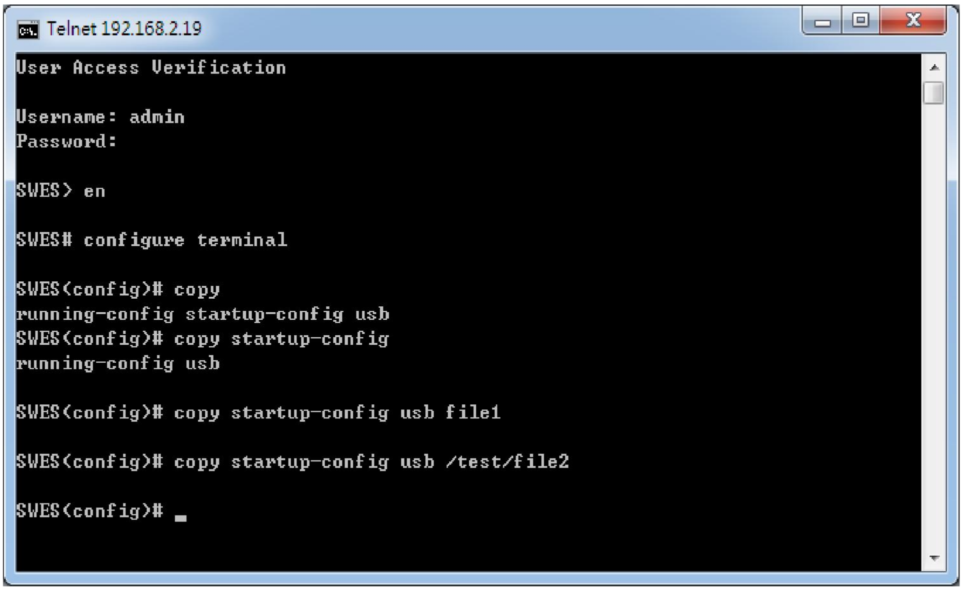


```
User Access Verification

Username: admin
Password:

SWES> en

SWES# configure terminal

SWES(config)# copy
running-config startup-config usb
SWES(config)# copy running-config
startup-config usb

SWES(config)# copy running-config usb file1

SWES(config)# copy running-config usb /test/file2

SWES(config)# _
```

Fill in the folder and filename behind the “copy running-config usb” command.

Ex: file1, / folder /file2.

2. CLI : enable -> configure terminal ->copy startup-config usb (path)

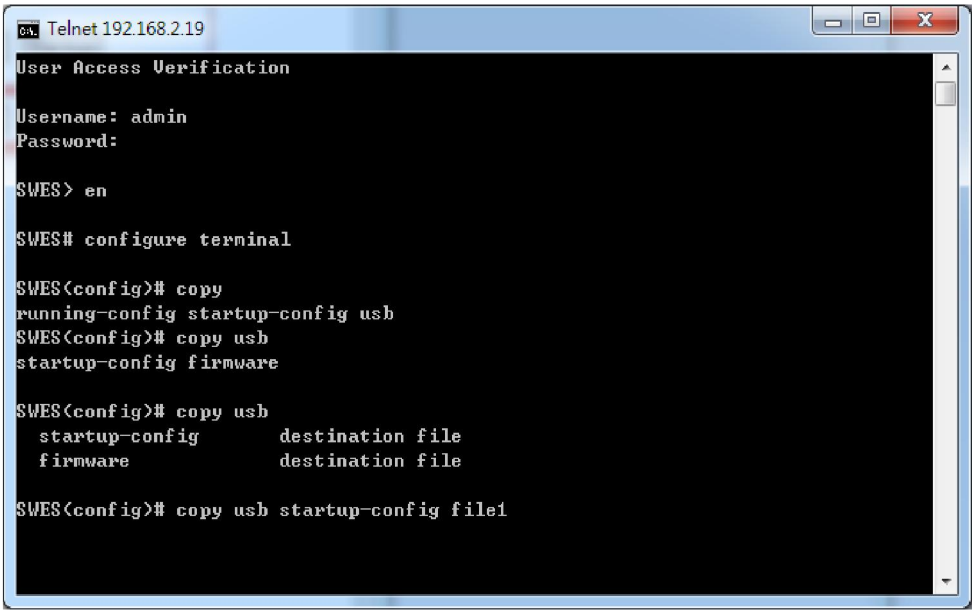


```
User Access Verification

Username: admin
Password:

SWES> en

SWES# configure terminal

SWES(config)# copy
running-config startup-config usb
SWES(config)# copy startup-config
running-config usb

SWES(config)# copy startup-config usb file1

SWES(config)# copy startup-config usb /test/file2

SWES(config)# _
```

Fill in the folder and filename behind the “copy startup-config usb” command.

Ex: file1, / folder /file2.

3. CLI :enable -> configure terminal ->copy usb startup-config (path)

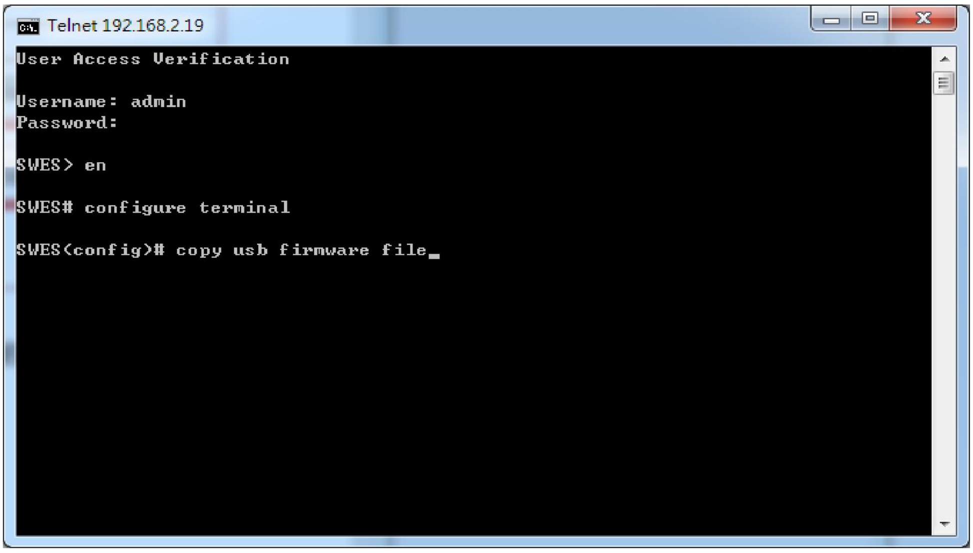


```
User Access Verification

Username: admin
Password:

SWES> en

SWES# configure terminal

SWES(config)# copy
running-config startup-config usb
SWES(config)# copy usb
startup-config firmware

SWES(config)# copy usb
  startup-config       destination file
  firmware             destination file

SWES(config)# copy usb startup-config file1
```

Fill in the folder and filename behind the “copy usb startup-config” command.

Ex: file1, / folder /file2.

4. CLI : enable -> configure terminal ->copy usb firmware (path)

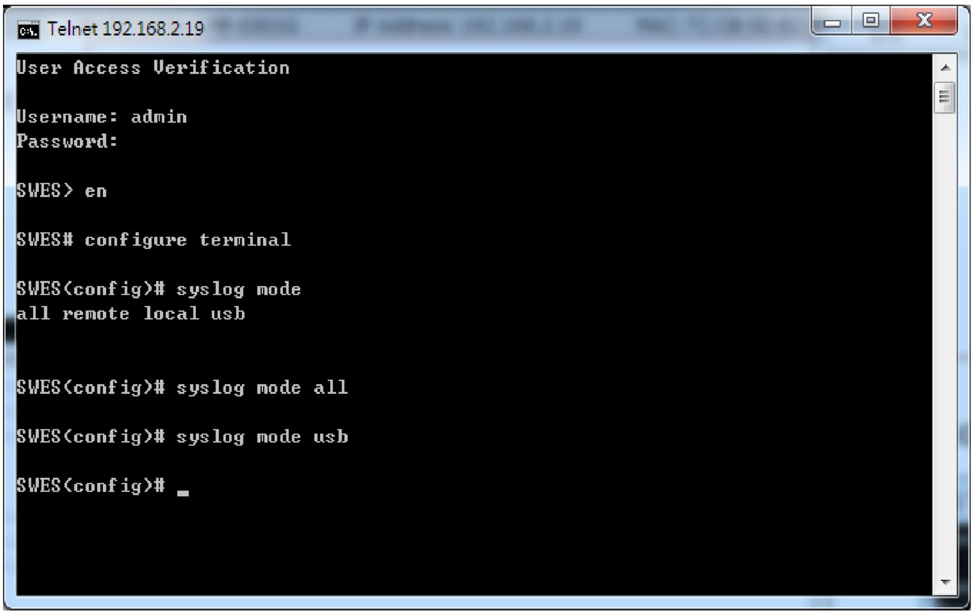


```
User Access Verification

Username: admin
Password:

SWES> en

SWES# configure terminal

SWES(config)# copy usb firmware file_
```

Fill in the folder and filename behind the “copy usb startup-config” command.

Ex: file1, / folder /file2.

5. CLI : enable -> configure terminal -> Syslog mode (usb or all)



```
User Access Verification

Username: admin
Password:

SWES> en

SWES# configure terminal

SWES(config)# syslog mode
all remote local usb


SWES(config)# syslog mode all

SWES(config)# syslog mode usb

SWES(config)# _
```

Select USB or ALL, it can auto save waning file to USB. And the file name is “message”.

6. CLI : enable -> configure terminal ->usb auto load enable
7. CLI : enable -> configure terminal ->usb auto load enable

# 7. Technical Specification

*Table 7.1* has the technical specifications for Antaira's LMX-0500 series: 5-Port industrial managed Ethernet switch with 5*10/100Tx; 12~48VDC power input.

| | | |
|---|---|---|
| **Standards** | IEEE 802.3 | 10Base-T 10Mbit/s Ethernet |
| | IEEE 802.3u | 100Base-Tx, 100Base-Fx, Fast Ethernet |
| | IEEE 802.3x | Flow Control for Full Duplex |
| | IEEE 802.1d | STP (Spanning Tree Protocol) |
| | IEEE 802.1w | RSTP (Rapid Spanning Tree Protocol) |
| | IEEE 802.1s | MTP (Multiple Spanning Tree Protocol) |
| | ITU-TG.8032 / Y.1344 | ERPS (Ethernet Ring Protection Switch) |
| | IEEE 802.1q | Virtual LANs (VLAN) |
| | IEEE 802.1x | Port based Network Control, Authentication |
| | IEEE 802.1ad | Stacked VLAN, Q-in-Q |
| | IEEE 802.1p | QoS/CoS Protocol for Traffic Prioritization |
| **Switch** | Protocol | CSMA/CD,IGMPv1/v2,SNMPv1/v2,TFTP,SNTP,SMTP,RARP, Syslog |
| | Data Process | Store and Forward |
| | Transfer Rate | 14,880 pps for 10Base-T Ethernet port<br>148,800 pps for 100Base-TX Fast Ethernet port |
| | Packet Buffer | 1Mbits |
| | MAC Table | 8K |
| | Jumbo Frame | - |
| | Flow Control | IEEE 802.3x for full duplex mode, back pressure for half duplex mode |
| | VLAN Groups | 0 ~ 4094 |
| | IGMP Groups | Up to 256 |
| **Port Interface** | Ethernet (RJ45) Port | 5*10/100BaseTx ; auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection |
| | RS232 Serial Console | 1*RS232 in RJ45 connector with console cable, 115.2Kbps, 8,N,1 |
| | Configuration Backup | 1*USB 2.0 |
| **Protection** | Overload Current | Present |
| | Power Reverse polarity | Present |
| | CPU Watch Dog | Present |
| | Network Cable | 10Base-T: 2-pair UTP/STP Cat. 3, 4, 5 cable; 100Base-TX: 2-pair UTP/STP Cat. 5 cable. EIA/TIA-568 100-ohm (100m) |
| **Mechanical Characteristics** | LED Indicator | Per Unit: Power 1 (Green), Power 2 (Green), Fault (Red); |
| | Housing | Metal IP30 protection |
| | Dimension | 46 x 142 x 99 mm (1.81 x 5.59 x 3.90 in.) |
| | Weight | Unit Weight: 1.3 lbs. Shipping Weight: 2.2 lbs. |
| | Mounting | DIN-Rail Mounting, wall-mounting (optional) |
| **Power** | Input Voltage | 12~48VDC Redundant Input |

| | | |
|---|---|---|
| **Requirement** | Power Connection | 1 removable 6-contact terminal block |
| | Power Consumption | 10 Watts |
| **Environmental Limits** | Operating Temperature | STD: -10° to 70° C (14° to 158° F); EOT: -40° to 75° C (-40° to 167° F) |
| | Storage Temperature | -40°C ~ 85°C (-40°F ~ 185°F) |
| | Ambient Relative Humidity | 5 to 95%, (non-condensing) |
| **Regulatory Approvals** | EMI | FCC Class A |
| | EMS | CE EN6100-4-2/3/4/5/6/8; CE EN6100-6-2; EN6100-6-4 |
| | Stability Testing | IEC60068-2-32 (Free fall)<br>IEC60068-2-27 (Shock)<br>IEC60068-2-6 (Vibration) |
| | Safety | UL 61010-1, UL 61010-2-201 |

*Table 7.1 - LMX-0500 Series Technical Specification*

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