Industrial

Lite-Managed Ethernet Switch

IES-2050-M12 User's Manual

Version 1.3

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Getting to Know Your Switch

1.1 About the IES-2050-M12 Lite-Managed Industrial Switch

The IES-2050-M12 switch is cost-effect and powerful industrial switch with many features. The switch can work under wide temperature and dusty environment and humid condition. The IES-2050-M12 switch can be managed by WEB and a useful Windows Utility we called Open-Vision. Open-Vision is powerful network management software. With its friendly and powerful interface, you can easily configure multiple switches at the same time, and monitor switches' status

1.2 Software Features

- World's fastest Redundant Ethernet Ring (Recovery time < 10ms over 250 units connection)
- Supports Ring Coupling, Dual Homing over O-Ring and standard STP/RSTP
- Support fast recovery mode
- Easy-to-configure: Web / Windows utility
- Windows utility (Open-Vision) for network management

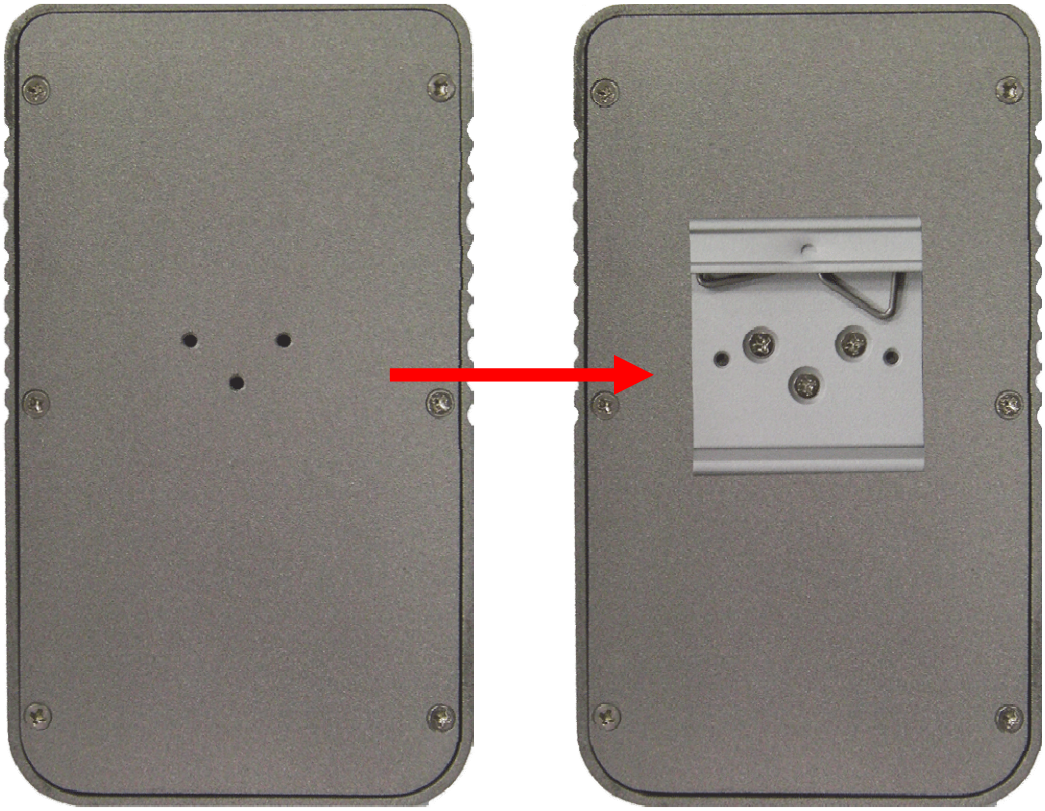
1.3 Hardware Features

- Wide Operating Temperature: -40 to 70 ^{o}C
- Storage Temperature: -40 to 85 ^{o}C
- Operating Humidity: 5% to 95%, non-condensing
- 10/100Base-T(X) Ethernet port

Hardware Installation

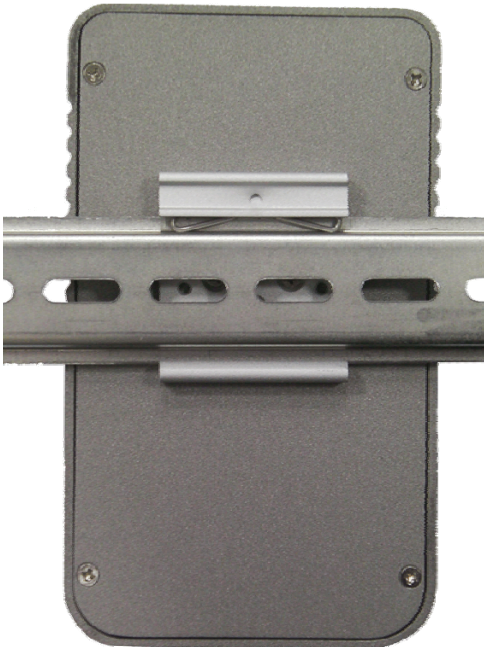
2.1 Installing IES-2050-M12 on DIN-Rail

Each IES-2050-M12 switch has a DIN-Rail kit on rear panel. The DIN-Rail kit helps switch to fix on the DIN-Rail. It is easy to install the switch on the DIN-Rail:



Step 1: Slant the switch and mount the metal spring to DIN-Rail.

Step 2: Push the switch toward the DIN-Rail until you heard a "click" sound.

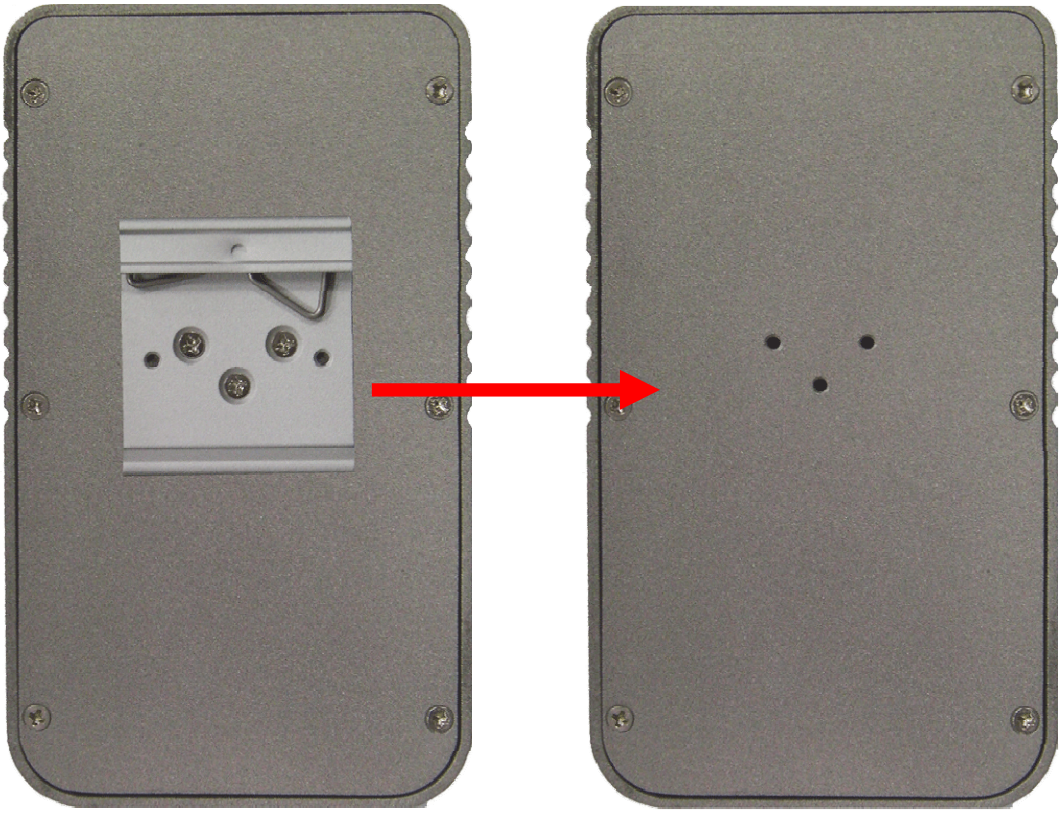


2.2 Wall Mounting Installation

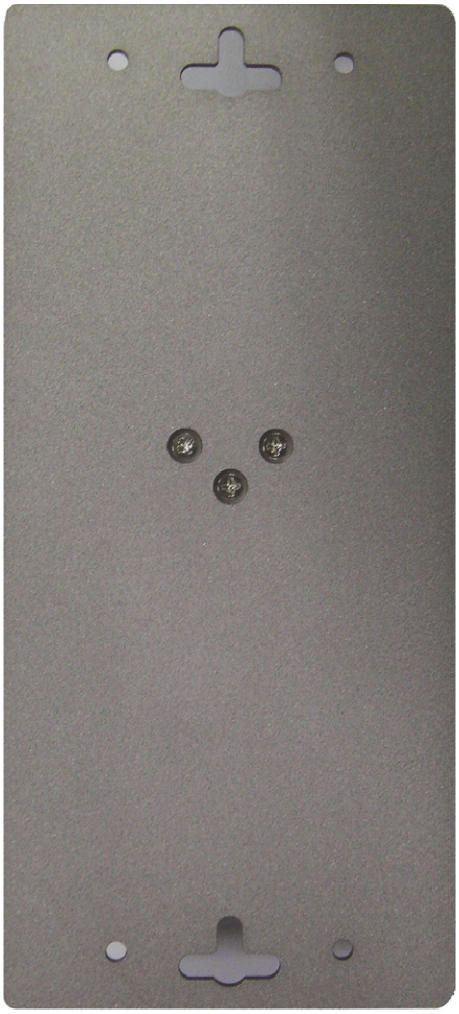
Each switch has another installation method for users to fix the switch. A wall mount panel can be found in the package. The following steps show how to mount the switch on the wall:

2.2.1 Mount IES-2050-M12 on wall

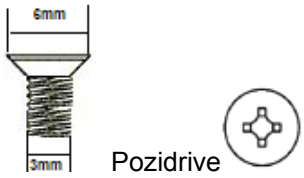
Step 1: Remove Din-Rail kit.



Step 2: Use 3 screws that can be found in the package to combine the wall mount panel. Just like the picture shows below:



The screws specification shows in the following two pictures. In order to prevent switch from any damage, the screws should not larger than the size that used in IES-2050-M12 switch.



Step 3: Mount the combined switch on the wall.

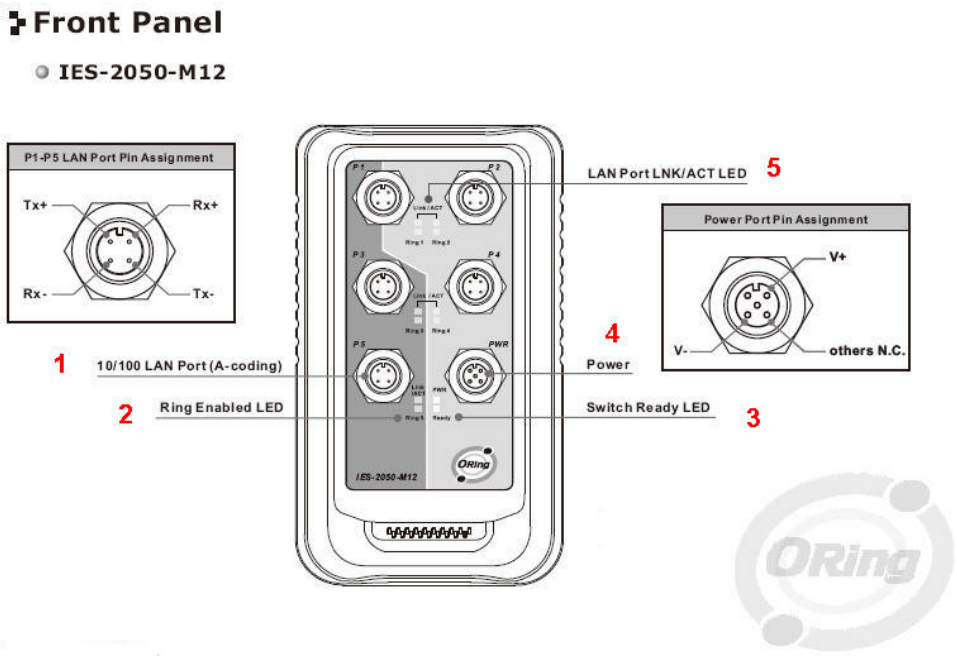
Hardware Overview

3.1 Front Panel

The following table describes the labels that stick on the IES-2050-M12.

Port	Description
10/100 M12 Connector Ethernet ports	10/100Base-T(X) M12 Connector Ethernet ports support auto-negotiation. Default Setting : Speed: auto Duplex: auto Flow control : disable

IES-2050-M12



1. 10/100Base-T(X) Ethernet ports.
2. LED for Ethernet ports in Ring mode.
3. Ready LED & R.M (Ring master) LED When Switch Ready the LED light on,When Ring Master enable the LED to glitter.
4. DC 12~48V power input.
5. LED for Ethernet ports link status.

Cables

4.1 Ethernet Cables

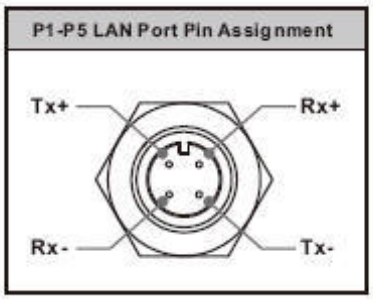
The IES-2050-M12 switch have standard Ethernet ports. According to the link type, the switch use CAT 3, 4, 5, 5e UTP cables to connect to any other network device (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

Cable Types and Specifications

Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328 ft)	RJ-45
100BASE-TX	Cat. 5 100-ohm UTP	UTP 100 m (328 ft)	RJ-45

4.1.1 100BASE-TX/10BASE-T Pin Assignments

With 100BASE-TX/10BASE-T cable, pins 1 and 3 are used for transmitting data, and pins 2 and 4 are used for receiving data.



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

WEB Management

5.1 Configuration by Web Browser

This section introduces the configuration by Web browser.

5.1.1 About Web-based Management

An embedded HTML web site resides in flash memory on the CPU board. It contains advanced management features and allows you to manage the switch from anywhere on the network through a standard web browser such as Microsoft Internet Explorer.

The Web-Based Management function supports Internet Explorer 5.0 or later. It is based on Java Applets with an aim to reduce network bandwidth consumption, enhance access speed and present an easy viewing screen.

Note: By default, IE5.0 or later version does not allow Java Applets to open sockets. You need to explicitly modify the browser setting in order to enable Java Applets to use network ports.

Preparing for Web Management

The default value is as below:

IP Address: **192.168.10.1**

Subnet Mask: **255.255.255.0**

Default Gateway: **192.168.10.254**

User Name: **admin**

Password: **admin**

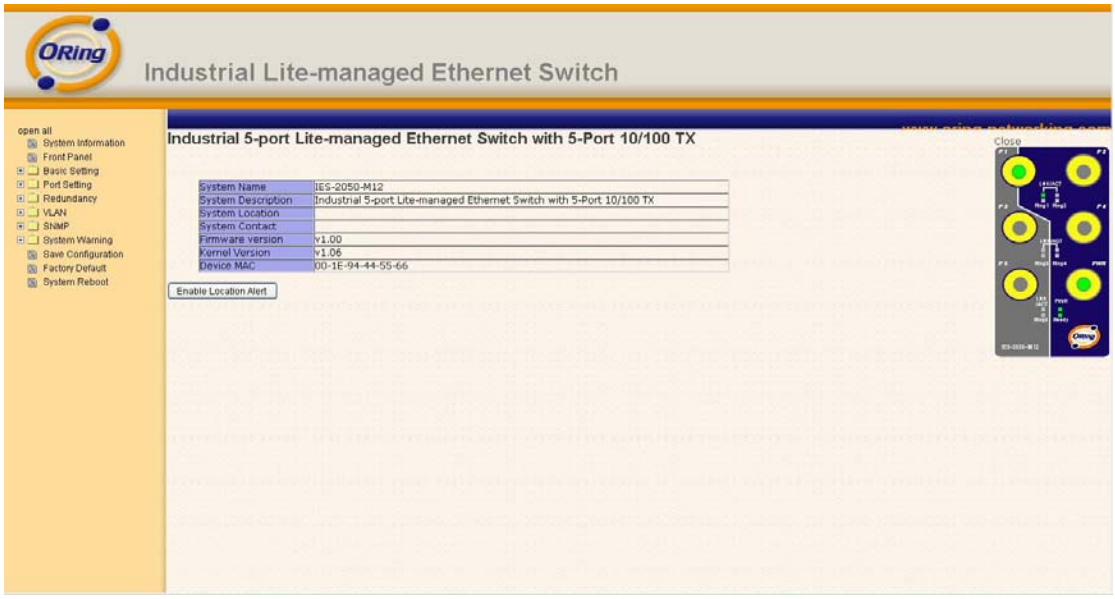
System Login

1. Launch the Internet Explorer.
2. Type http:// and the IP address of the switch. Press "**Enter**".

3. The login screen appears.
4. Key in the username and password. The default username and password is "**admin**".
5. Click "**Enter**" or "**OK**" button, then the main interface of the Web-based management appears.

Login screen

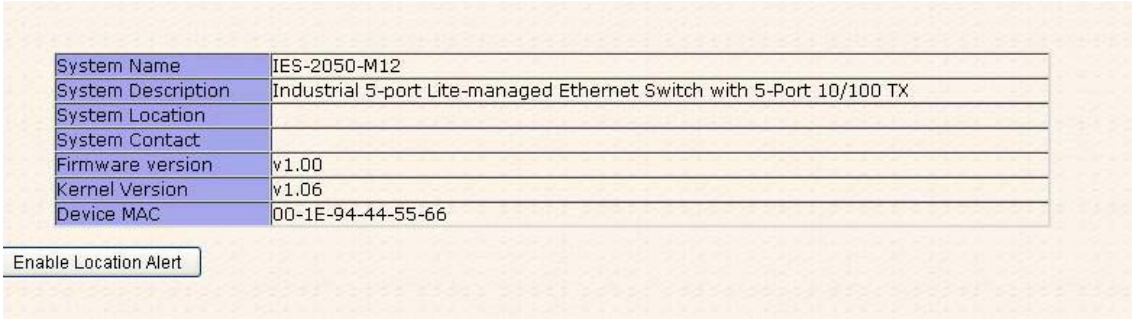
Main Interface



Main interface

5.1.2 Basic Setting

5.1.2.1 Switch setting



Switch setting interface

The following table describes the labels in this screen.

Label	Description
System Name	Assign the name of switch. The maximum length is 64 bytes
System Description	Display the description of switch.
System Location	Assign the switch physical location. The maximum length is 64 bytes
System Contact	Enter the name of contact person or organization
Firmware Version	Display the switch's firmware version
Kernel Version	Display the kernel software version
MAC Address	Display the unique hardware address assigned by manufacturer (default)

5.1.2.2 Admin Password

Change web management login username and password for the management security issue

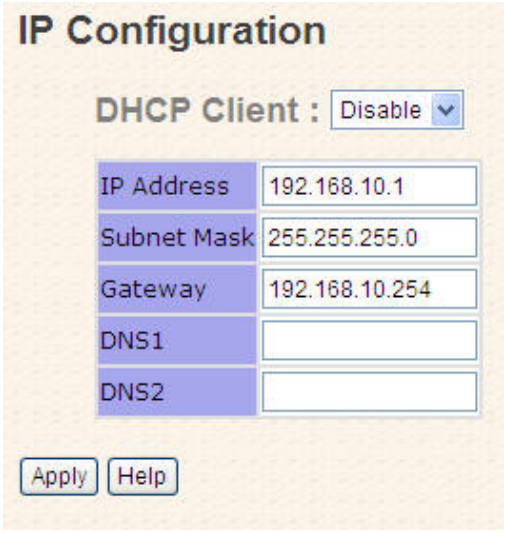
Admin Password interface

The following table describes the labels in this screen.

Label	Description
User name	Key in the new username (The default is "**admin**")
New Password	Key in the new password (The default is "**admin**")
Confirm password	Re-type the new password.
Apply	Click "**Apply**" to activate the configurations.

5.1.2.3 IP configuration

You can configure the IP Settings and DHCP client function through IP configuration.



IP Configuration interface

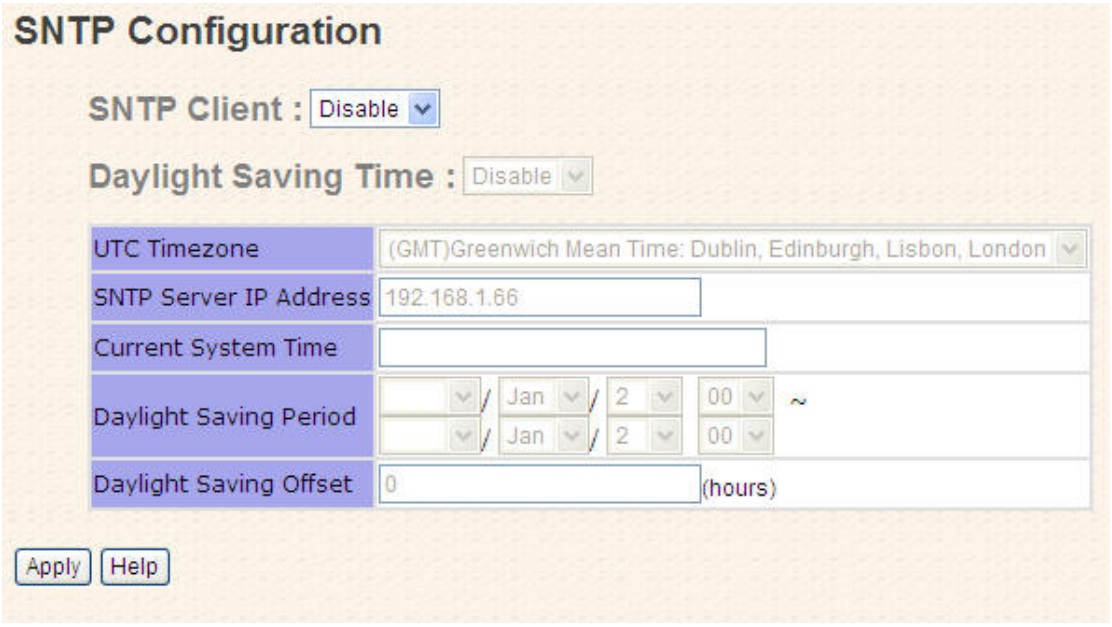
The following table describes the labels in this screen.

Label	Description
DHCP Client	To enable or disable the DHCP client function. When DHCP

	client function is enabling, the switch will assign the IP address from the network DHCP server. The default IP address will be replaced by the IP address which the DHCP server has assigned. After clicking "**Apply**" button, a popup dialog will show up to inform you when the DHCP client is enabling. The current IP will lose and you should find the new IP on the DHCP server.
IP Address	Assign the IP address that the network is using. If DHCP client function is enabling, you do not need to assign the IP address. The network DHCP server will assign the IP address for the switch and it will be displayed in this column. The default IP is 192.168.10.1
Subnet Mask	Assign the subnet mask for the IP address. If DHCP client function is enabling, you do not need to assign the subnet mask.
Gateway	Assign the network gateway for the switch. The default gateway is 192.168.10.254
DNS1	Assign the primary DNS IP address
DNS2	Assign the secondary DNS IP address
Apply	Click "**Apply**" to activate the configurations.

5.1.2.4 SNTP Configuration

The SNTP (Simple Network Time Protocol) settings allow you to synchronize switch clocks in the Internet.



SNTP Configuration interface

The following table describes the labels in this screen.

Label	Description
SNTP Client	Enable or disable SNTP function to get the time from the SNTP server.
Daylight Saving Time	Enable or disable daylight saving time function. When daylight saving time is enabling, you need to configure the daylight saving time period.
UTC Time zone	Set the switch location time zone. The following table lists the different location time zone for your reference.

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

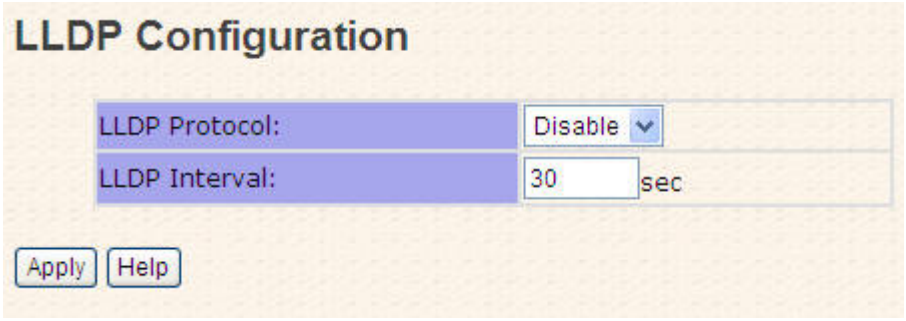
CET - Central European FWT - French Winter MET - Middle European MEWT - Middle European Winter SWT - Swedish Winter	+1 hour	1 pm
EET - Eastern European, USSR Zone 1	+2 hours	2 pm
BT - Baghdad, USSR Zone 2	+3 hours	3 pm
ZP4 - USSR Zone 3	+4 hours	4 pm
ZP5 - USSR Zone 4	+5 hours	5 pm
ZP6 - USSR Zone 5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

The following table describes the labels in this screen.

Label	Description
SNTP Sever IP Address	Set the SNTP server IP address.
Daylight Saving Period	Set up the Daylight Saving beginning time and Daylight Saving ending time. Both will be different each year.
Daylight Saving Offset	Set up the offset time.
Switch Timer	Display the switch current time.
Apply	Click "**Apply**" to activate the configurations.

5.1.2.5 LLDP

LLDP (Link Layer Discovery Protocol) function allows the switch to advertise its information to other nodes on the network and store the information it discovers.



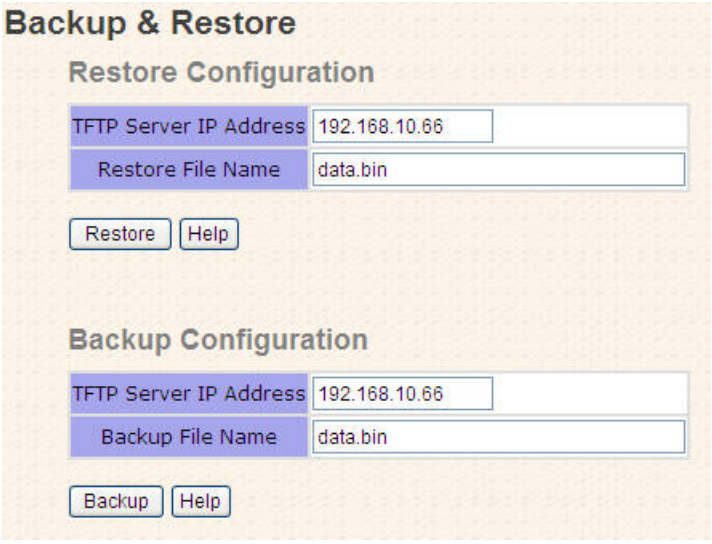
LLDP interface

The following table describes the labels in this screen.

Label	Description
LLDP Protocol	"**Enable**" or "**Disable**" LLDP function.
LLDP Interval	The interval of resend LLDP (by default at 30 seconds)
Apply	Click "**Apply**" to activate the configurations.
Help	Show help file.

5.1.2.6 Backup & Restore

You can save current EEPROM value of the switch to TFTP server, then go to the TFTP restore configuration page to restore the EEPROM value.



Backup & Restore interface

The following table describes the labels in this screen.

Label	Description
TFTP Server IP Address	Fill in the TFTP server IP
Restore File Name	Fill the file name.
Restore	Click "**restore**" to restore the configurations.
Restore File Name	Fill the file name.
Restore	Click "**restore**" to restore the configurations.
Backup	Click "**backup**" to backup the configurations.

5.1.2.7 Upgrade Firmware

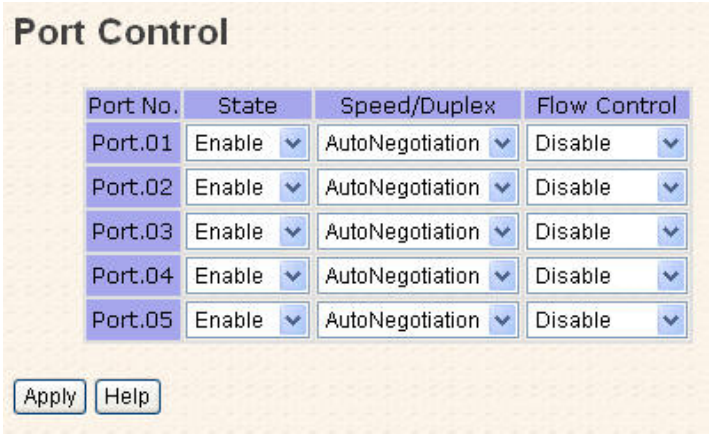
Upgrade Firmware allows you to update the switch firmware. Before updating, make sure you have your TFTP server ready and the firmware image is on the TFTP server.

Update Firmware interface

5.1.3 Port Configuration

5.1.3.1 Port Control

By this function, you can set the state, speed/duplex, flow control, and security of the port.



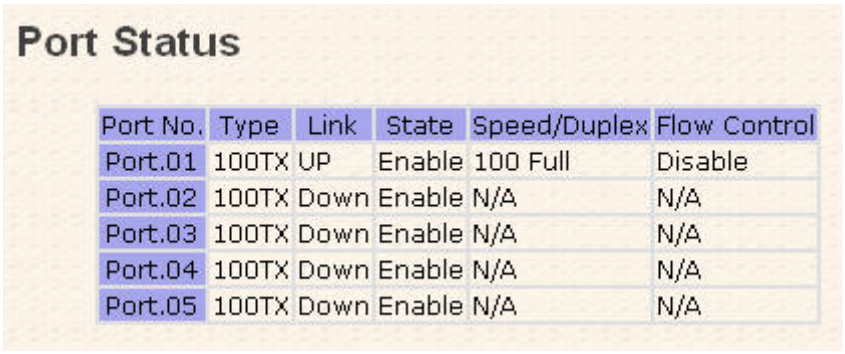
Port Control interface

The following table describes the labels in this screen.

Label	Description
Port NO.	Port number for setting.
State	Enable/Disable the port.
Speed/Duplex	You can set 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**" to activate the configurations.

5.1.3.2 Port Status

The following information provides the current port status.

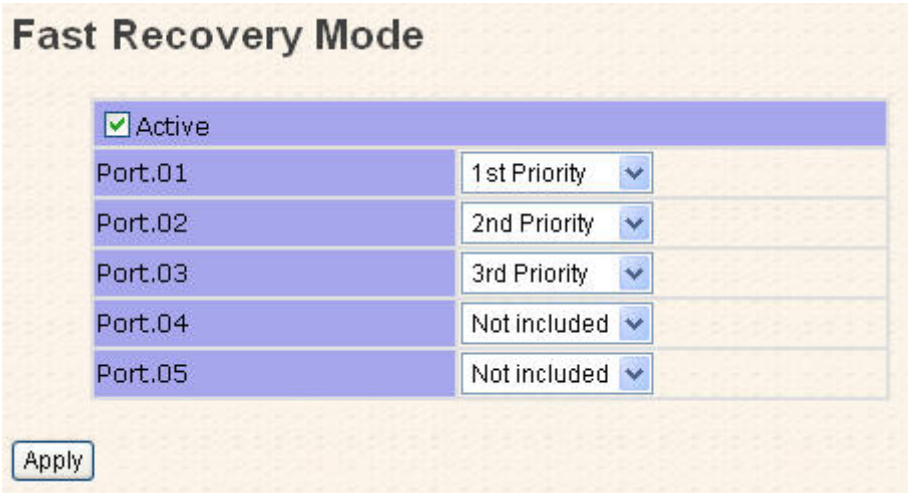


Port Status interface

5.1.4 Redundancy

5.1.4.1 Fast Recovery Mode

The Fast Recovery Mode can be set to connect multiple ports to one or more switches. The IES-2050-M12 with its fast recovery mode will provide redundant links. Fast Recovery mode supports 4 priorities, only the first priority will be the act port, the other ports configured with other priority will be the backup ports.



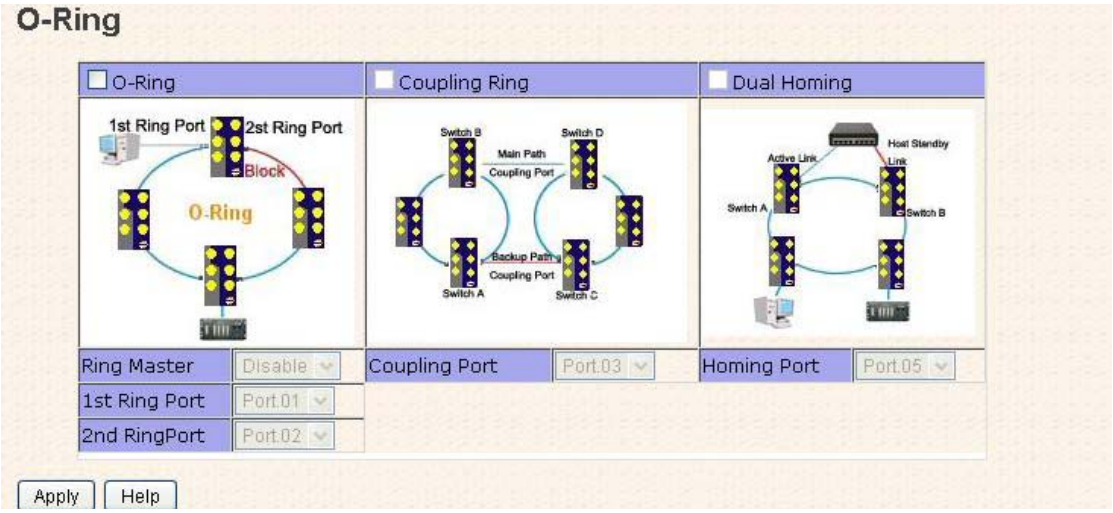
Fast Recovery Mode interface

The following table describes the labels in this screen.

Label	Description
Active	Activate the fast recovery mode.
port	Port can be configured as 5 priorities. Only the port with highest priority will be the active port. 1st Priority is the highest.
Apply	Click "**Apply**" to activate the configurations.

5.1.4.2 O-Ring

O-Ring is one of the most powerful Redundant Ring technology in the world. The recovery time of O-Ring is less than 10 ms over 250 units of connections. It can reduce unexpected malfunction caused by network topology change. O-Ring technology supports three Ring topologies for network redundancy: O-Ring, Coupling Ring and Dual Homing.



O-Ring interface

The following table describes the labels in this screen.

Label	Description
O-Ring	Mark to enable O-Ring.
Ring Master	There should be one and only one Ring Master in a ring. However if there are two or more switches which set Ring Master to enable, the switch with the lowest MAC address will be the actual Ring Master and others will be Backup Masters.
1st Ring Port	The primary port, when this switch is Ring Master.
2nd Ring Port	The backup port, when this switch is Ring Master.
Coupling Ring	Mark to enable Coupling Ring. Coupling Ring can be used to divide a big ring into two smaller rings to avoid effecting all switches when network topology change. It is a good application for connecting two O-Rings.
Coupling Port	Link to Coupling Port of the switch in another ring. Coupling Ring need four switch to build an active and a backup link. Set a port as coupling port. The coupled four ports of four switches will be run at active/backup mode.
Dual Homing	Mark to enable Dual Homing. By selecting Dual Homing mode, O-Ring will be connected to normal switches through two RSTP links (ex: backbone Switch). The two links work as active/backup mode, and connect each O-Ring to the normal switches in RSTP mode.
Apply	Click "**Apply**" to activate the configurations.

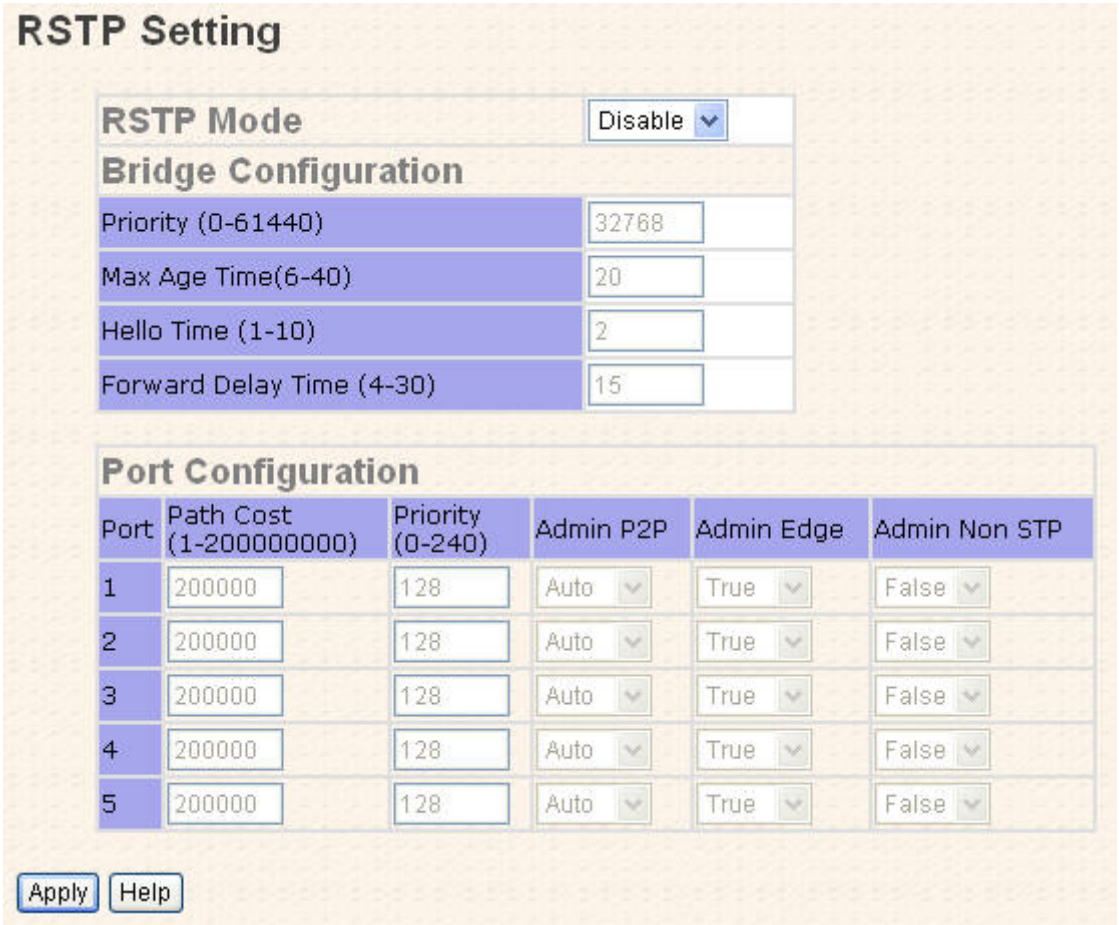
Note: We don't suggest you to set one switch as a Ring Master and a Coupling Ring at the same time due to heavy load.

5.1.4.3 RSTP

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

RSTP setting

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



RSTP Setting interface

The following table describes the labels in this screen.

Label	Description
RSTP mode	You must enable or disable RSTP function before configuring the related parameters.
Priority (0-61440)	A value used to identify the root bridge. The bridge with the lowest value has the highest priority and is selected as the root. If the value changes, you must reboot the switch. The value

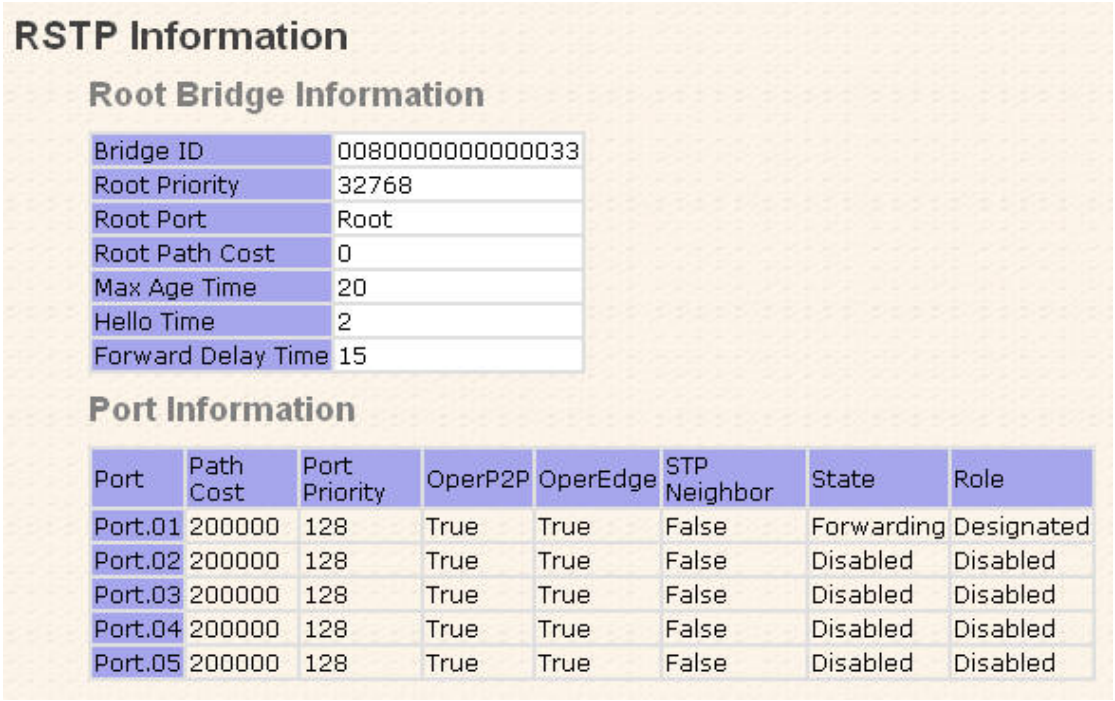
	must be multiple of 4096 according to the protocol standard rule.
Max Age (6-40)	The number of seconds a bridge waits without receiving Spanning-tree Protocol configuration messages before attempting a reconfiguration. Enter a value between 6 through 40.
Hello Time (1-10)	The time that controls switch sends out the BPDU packet to check RSTP current status. Enter a value between 1 through 10.
Forwarding Delay Time (4-30)	The number of seconds a port waits before changing from its Rapid Spanning-Tree Protocol learning and listening states to the forwarding state. Enter a value between 4 through 30.
Path Cost (1-200000000)	The cost of the path to the other bridge from this transmitting bridge at the specified port. Enter a number 1 through 200000000.
Priority (0-240)	Decide which port should be blocked by priority in LAN. Enter a number 0 through 240. The value of priority must be the multiple of 16
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 bridge (i.e. It is served by a point-to-point LAN segment), or it can be connected to two or more bridges (i.e. It is served by a shared medium LAN segment). This function allows the P2P status of the link to be manipulated administratively. True means P2P enabling. False means P2P disabling.
Admin 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. **True** is not including STP mathematic calculation. **False** is including the STP mathematic calculation.
Apply	Click "**Apply**" to activate the configurations.

NOTE: Follow the rule to configure the MAX Age, Hello Time, and Forward Delay Time:

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

RSTP Information

Show RSTP algorithm result at this table.



RSTP Information

Root Bridge Information

Bridge ID	0080000000000033
Root Priority	32768
Root Port	Root
Root Path Cost	0
Max Age Time	20
Hello Time	2
Forward Delay Time	15

Port Information

Port	Path Cost	Port Priority	OperP2P	OperEdge	STP Neighbor	State	Role
Port.01	200000	128	True	True	False	Forwarding	Designated
Port.02	200000	128	True	True	False	Disabled	Disabled
Port.03	200000	128	True	True	False	Disabled	Disabled
Port.04	200000	128	True	True	False	Disabled	Disabled
Port.05	200000	128	True	True	False	Disabled	Disabled

RSTP Information interface

5.1.5 SNMP Configuration

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.

5.1.5.1 SNMP – Agent Setting

You can set SNMP agent related information by Agent Setting Function.

SNMP - Agent Setting

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

Apply Help

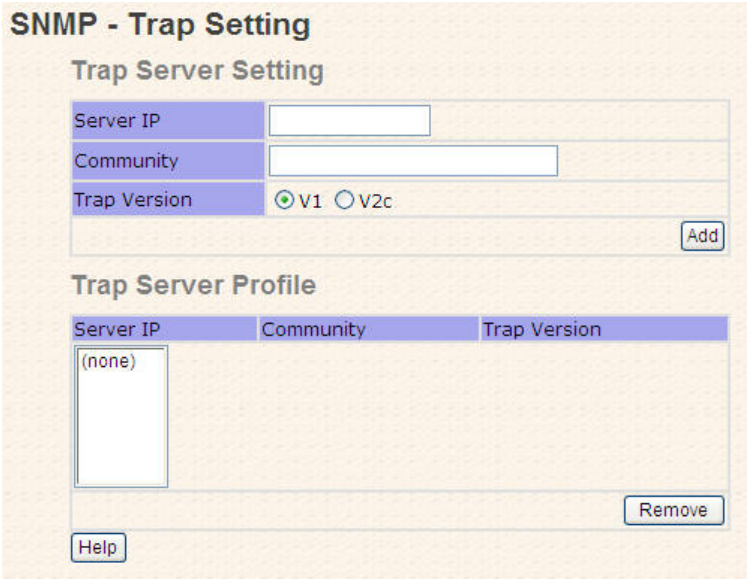
SNMP – Agent setting interface

The following table describes the labels in this screen.

Label	Description
SNMP – Agent Setting	SNMP Community should be set for SNMP. Four sets of "Community String/Privilege" are supported. Each Community String is maximum 32 characters. Keep empty to remove this Community string.

5.1.5.2 SNMP –Trap Setting

A trap manager is a management station that receives traps, the system alerts generated by the switch. If no trap manager is defined, no traps will issue. Create a trap manager by entering the IP address of the station and a community string. To define management stations as trap manager and enter SNMP community strings and selects the SNMP version.



SNMP –Trap Setting interface

The following table describes the labels in this screen.

Label	Description
Server IP	The server IP address to receive Trap
Community	Community for authentication
Trap Version	Trap Version supports V1 and V2c and V3
Add	Add trap server profile.
Remove	Remove trap server profile.
Help	Show help file.

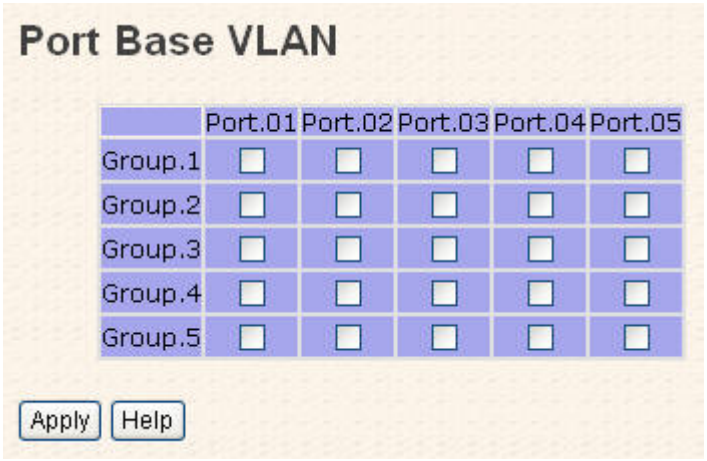
5.1.6 VLAN

A Virtual LAN (VLAN) is a logical network grouping that limits the broadcast domain, which allows you 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 VLAN only.

5.1.6.1 VLAN Configuration – Port Based

Traffic is forwarded to the member ports of the same vlan group. vlan port based startup, set in the same group of the port, can be a normal transmission packet, without restricting the types of packets.



VLAN Configuration – Port Based VLAN interface

The following table describes the labels in this screen.

Label	Description
Group	Mark the blank to assign the port into VLAN group.
Apply	Click "**Apply**" to activate the configurations.
Help	Show help file.

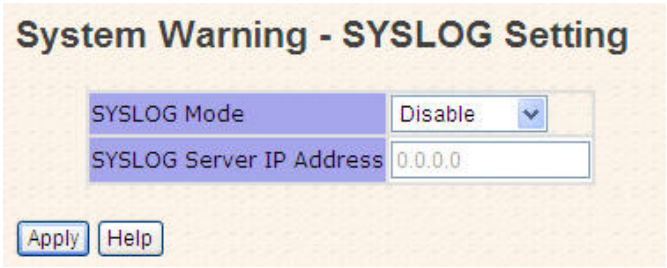
5.1.7 Warning

Warning function is very important for managing switch. You can manage switch by SYSLOG, E-MAIL, and Fault Relay. It helps you to monitor the switch status on remote site. When events occurred, the warning message will send to your appointed server, E-MAIL, or relay fault to switch panel.

5.1.7.1 Fault Alarm

System Warning – SYSLOG Setting

The SYSLOG is a protocol to transmit event notification messages across networks. Please refer to RFC 3164 - The BSD SYSLOG Protocol



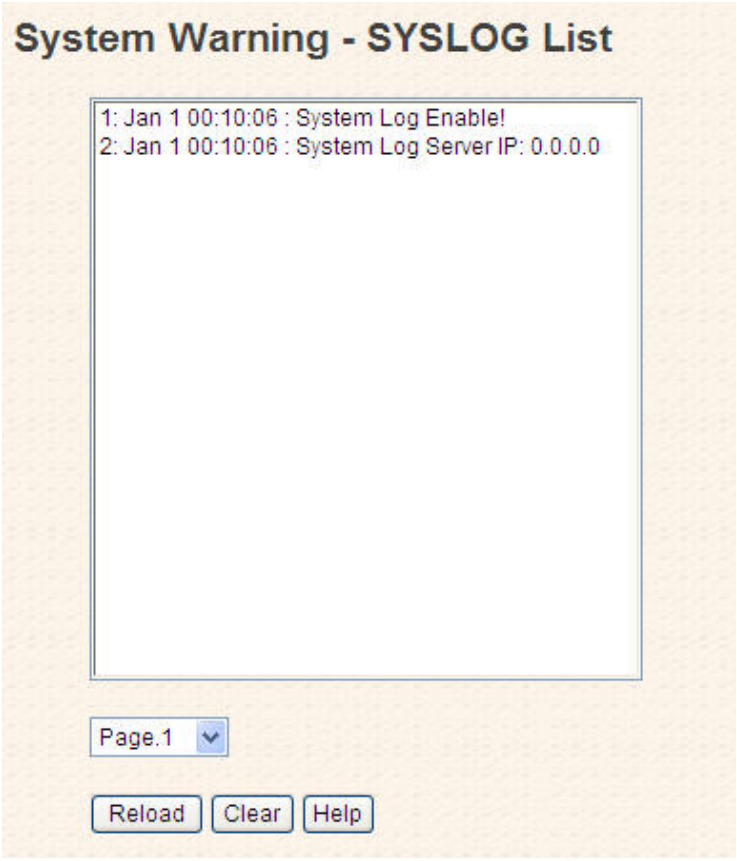
System Warning – SYSLOG Setting interface

The following table describes the labels in this screen.

Label	Description
SYSLOG Mode	■ **Disable:** disable SYSLOG. ■ **Client Only:** log to local system. ■ **Server Only:** log to a remote SYSLOG server. ■ **Both:** log to both of local and remote server.
SYSLOG Server IP Address	The remote SYSLOG Server IP address.
Apply	Click "**Apply**" to activate the configurations.
Help	Show help file.

System Event LOG

If system log client is enabled, the system event logs will show in this table.



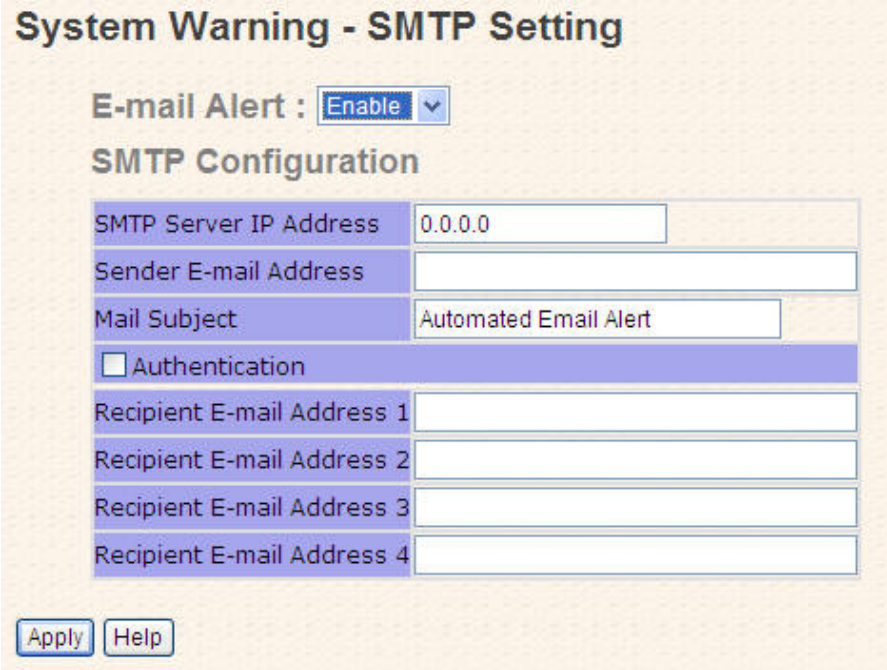
System event log interface

The following table describes the labels in this screen.

Label	Description
Page	Select LOG page.
Reload	To get the newest event logs and refresh this page.
Clear	Clear log.
Help	Show help file.

System Warning – SMTP Setting

The SMTP is Short for Simple Mail Transfer Protocol. It is a protocol for e-mail transmission across the Internet. Please refer to RFC 821 - Simple Mail Transfer Protocol.



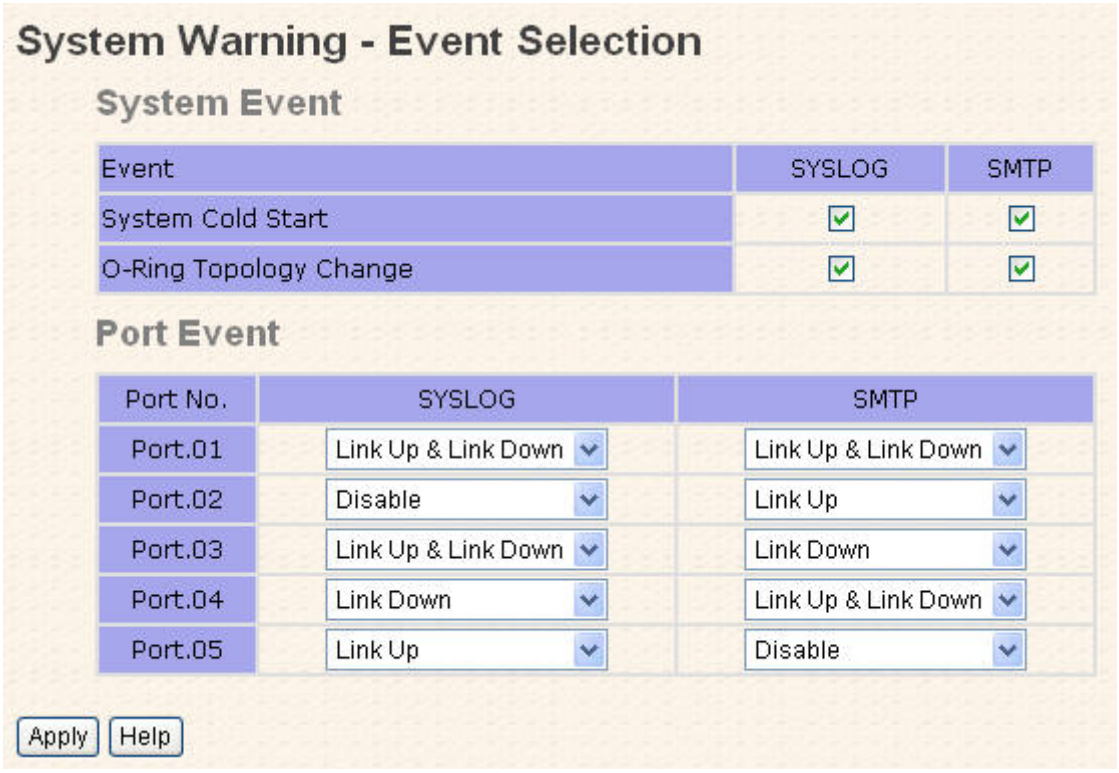
System Warning – SMTP Setting interface

The following table describes the labels in this screen.

Label	Description
E-mail Alarm	Enable/Disable transmission system warning events by e-mail.
Sender E-mail Address	The SMTP server IP address
Mail Subject	The Subject of the mail
Authentication	■ **Username:** the authentication username. ■ **Password:** the authentication password. ■ **Confirm Password:** re-enter password.
Recipient E-mail Address	The recipient's E-mail address. It supports up to 6 recipients per mail.
Apply	Click "**Apply**" to activate the configurations.
Help	Show help file.

System Warning – Event Selection

SYSLOG and SMTP are the two warning methods that supported by the system. Check the corresponding box to enable system event warning method you wish to choose. Please note that the checkbox can not be checked when SYSLOG or SMTP is disabled.



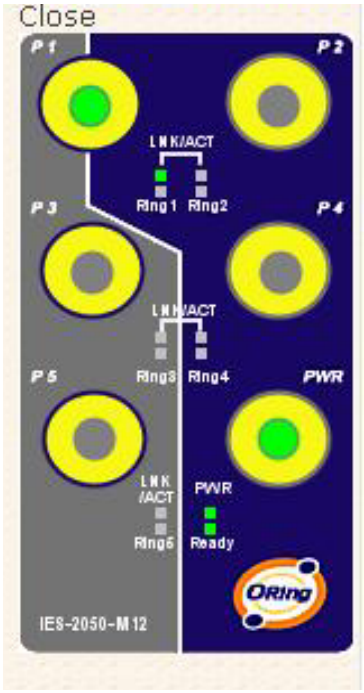
System Warning – Event Selection interface

The following table describes the labels in this screen.

Label	Description
System Event	
System Cold Start	Alert when system restart
O-Ring Topology Change	Alert when O-Ring topology change
Port Event	■ **Disable** ■ **Link Up** ■ **Link Down** ■ **Link Up & Link Down**
Apply	Click "**Apply**" to activate the configurations.
Help	Show help file.

5.1.8 Front Panel

Show IES-2050-M12 panel. Click "**Close**" to close panel on web.



Front panel interface

5.1.9 Save Configuration

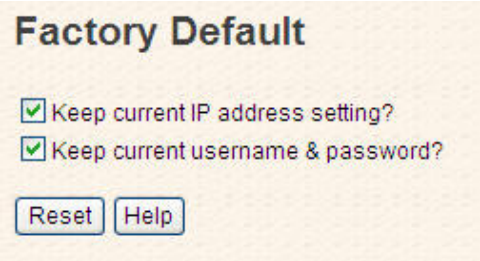
If any configuration changed, "**Save Configuration**" should be clicked to save current configuration data into the permanent flash memory. Otherwise, the current configuration will be lost when power off or system reset.

System Configuration interface

The following table describes the labels in this screen.

Label	Description
Save	Save all configurations.
Help	Show help file.

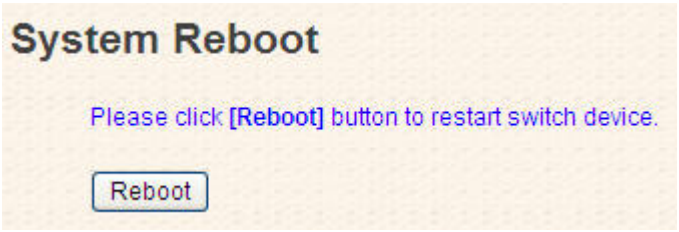
5.1.10 Factory Default



Factory Default interface

Reset switch to default configuration. Click Reset to reset all configurations to the default value. You can select "**Keep current IP address setting**" and "**Keep current username & password**" to prevent IP and username & password from default.

5.1.11 System Reboot



System Reboot interface

Technical Specifications

Technology	
Ethernet Standards	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE802.3x Flow Control and Back pressure IEEE802.1D Spanning tree protocol IEEE802.1w Rapid Spanning tree protocol IEEE802.1AB LLDP
MAC addresses	2048
Flow Control	IEEE 802.3x Flow Control and Back-pressure
VLAN	Port based
Processing	Store-and-Forward
Firmware upgrade	TFTP
Ring redundancy	STP RSTP O-Ring Open-Ring Fast recovery
Interface	
M12 Connector Ports	10/100Base-T(X), Auto MDI/MDI-X
Connector Type	M12 Waterproof (A-Coding)
LED Indicators	Power: Power indicator(Green) M12 Connector Ports: Link/Activity(Green/Blinking Green) R.M: Ring master(Amber) Ring: Ring port(Amber)
Power Requirements	
Power Input Voltage	PWR1: 12 ~ 48V DC
Connector Type	M12 Waterproof
Power Consumption	3 Watts Max
Environmental	
Wide Operating Temperature	-40 to 70°C
Storage Temperature	-40 to 85°C
Operating Humidity	5% to 95%, non-condensing

Mechanical	
Dimensions(W x D x H)	90 mm(W) x 40.5 mm(D) x 155 mm(H)
Casing	IP-67 protection
Regulatory Approvals	
Regulatory Approvals	FCC Part 15, CISPER (EN55022) class A
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS)
Shock	IEC 60068-2-27
Free Fall	IEC 60068-2-32
Vibration	IEC 60068-2-6
Warranty	5 years