Managed Ethernet Switch
User's Manual

Information Coding: UM00D908
Version: V1.1
Product version: all
Product Name: Managed Industrial Ethernet Switches on DIN Rail and Rack.
Applicable to: Technical Support

Attention:
This document will be updated on regular bases due to version upgrades or other requirements.
Unless otherwise agreed on, this document is only to be used as a guide and not for warranty purposes.

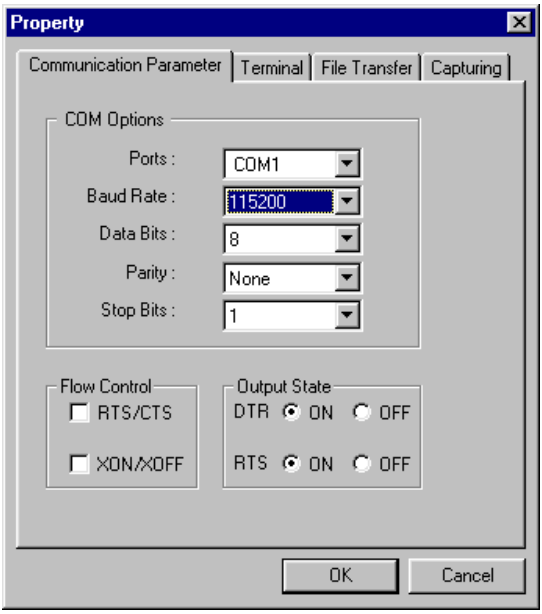
Table of Contents

Chapter 1 Getting Started

In this chapter we explain how to install a managed switch for the first time. There are three ways to access the managed switch's configuration settings: serial console, Telnet console, or web console.
If you do not know the switch's IP address, you can open the serial console by connecting the switch to a PC's COM port with a short serial cable. You can open the Telnet or web console over an Ethernet LAN or over the Internet.

1. Serial Console Configuration

First, please make sure the managed switches are connected via a serial cable through the PC's serial ports.
Next, open Hyper Terminal from the computer: **Start → programs → Accessories → Communication → HyperTerminal**.
Once you have opened Hyper Terminal, you need to create a new connection, select the communication port to the switch, and set the parameter as follows:
115200 for Baud Rate, 8 for Data Bits, None for Parity, and 1 for Stop Bits.



2. User Name and Password

When HyperTerminal finish setting, you can see the page display as below :

```
User Access Verification!

username:
username:
username: admin
password: *****
```

Enter User Name and Password, the default User Name and Password as “**admin**”, then press “**Enter**”, go into Console Program.

3. Console Menu

Console menu includes the following:

```
Switch> help
  default                 -- Restore factory default
  help                    -- Description of the interactive help system
  hostname                -- Set system hostname
  interface               -- Interface configuration
  ip                      -- IPv4 configuration commands
  show                    -- Show configuration and status
  reboot                  -- Restart system
  quit                    -- Exit Command line
```

The default IP address for managed switches is 192.168.19.16. You can set IP address as follows:

Switch>>ip address 192.168.0.1

When IP Address is set, you can access the Web page through this IP address.

Chapter 2 Web Management Function

The switch's web console is a convenient platform for modifying the configuration and accessing the built-in monitoring and network administration functions. You can open the switch's web console using a standard web browser, such as Internet Explorer.

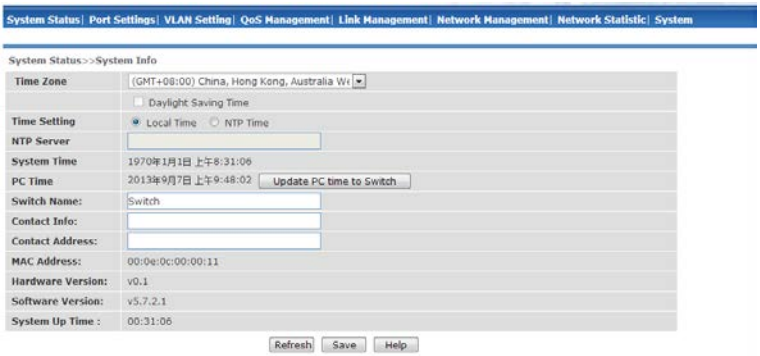
1. Login to the Webserver

Please open a browser and enter in the address bar the switch IP address, for example: **http://192.168.19.16** once you have done so, please press "**Enter**".
Once you have completed the above the following window will appear and you are to type in your User Name and Password.

Please note that the default IP address is "**admin**".

Input correct User Name and Password login to Webserver and we recommend you to change User Name and Password.

2. System Status

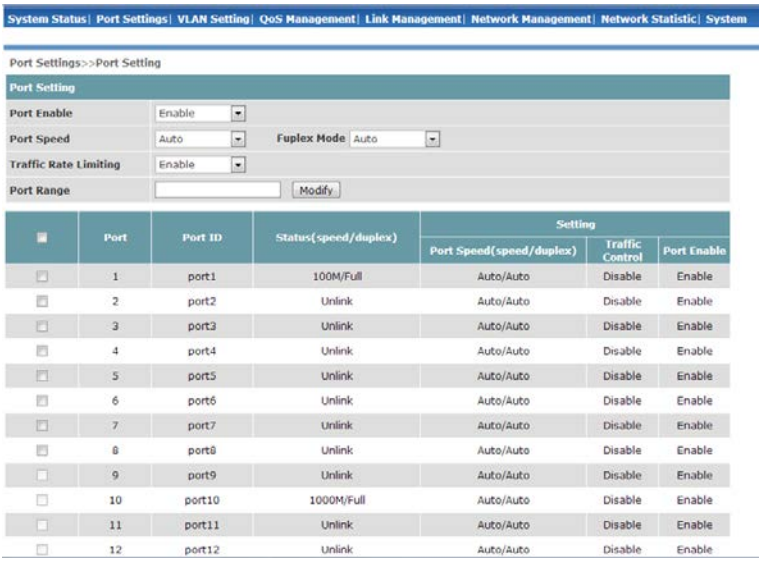


Setting	Description
Time Zone	Specifies the time zone, which is used to determine the local time offset from GMT (Greenwich Mean Time).
Time Setting	Use the local time or enables NTP time server functionality.
NTP Server	Set NTP server IP address.
System Time	Show the switch system time.
PC Time	Show the PC time .
Update PC Time to Switch	Click this button and the switch time will be set according to the PC time.
Switch Name	Give a different name for each switch.
Contact Info	Display contact info for technical support.
Contact Address	Describe the location of switches installed.
MAC Address	Show the switch's MAC address.
Hardware Version	Show the hardware version.
Software Version	Show the software version.
System Up Time	Indicates how long the switch remained up since the last start.

After finishing inputting info, click on "Save" to save info.

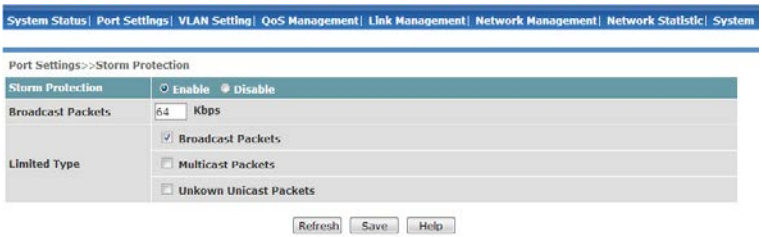
3. Port Setting

3.1 Port Setting



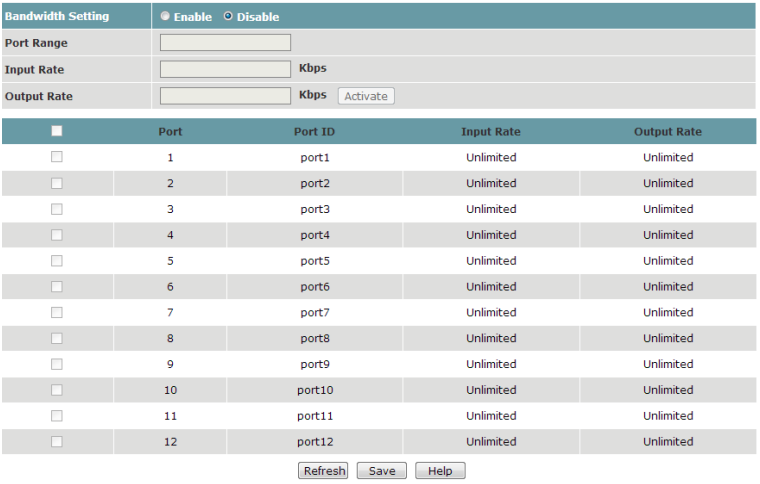
Setting	Description
Port Enable	Allows data transmission through the port or not.
Port Speed	Allows the port to use the IEEE 802.3u protocol to negotiate with connected devices. The port and connected devices will determine the best speed for that connection. Choose one of these fixed speed options if the connected Ethernet device has trouble auto-negotiating for line speed.
Duplex Mode	Set Auto, Full or Half.
Traffic Limiting	Enable or disable traffic control function.
Port Range	You can select from the following port.

3.2 Storm Protection



Setting	Description
Storm Protection	Enable / Disable protection function.
Broadcast Packets	Indicate the packet rate, the range 1-30Mbps.
Limited Type	Broadcast packet, multi-cast packet or Unknown unicast packet.

3.3 Bandwidth Setting



The switches provide Port Control Rate Limit, including Ingress and Egress Rate Limit.

4. VLAN Setting

A Virtual, commonly known as a VLAN, is used to create independent logical networks within a physical network. Several VLANs may co-exist within such a network. VLAN can effectively

reduce the scope of Broadcast, and it's convenient to manage network through logical network segment (for example, company's department) that cannot conduct data exchange and is separated. As a matter of fact, if you add a router between different virtual network segments, they can conduct data exchange through router.

Managed switches support IEEE802.1Q VLAN. There are three types of VLAN port settings:

- Access Port:

The port connects to a single device that is not tagged. The user must define the default port PVID that assigns which VLAN the device belongs to. Once the ingress packet of this Access Port egresses to another Trunk Port (the port needs all packets to carry tag information), the switch will insert this PVID into this packet so the next 802.1Q VLAN switch can recognize it.

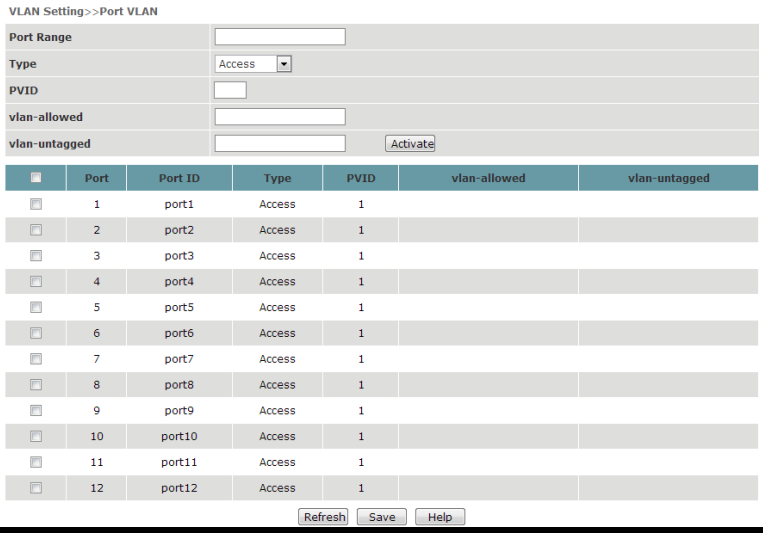
- Trunk Port:

The port connects to a LAN that consists of untagged devices, tagged devices and/or switches and hubs. In general, the traffic of the Trunk Port must have a Tag. Users can also assign a PVID to a Trunk Port. The untagged packet on the Trunk Port will be assigned the port default PVID as its VID.

- Hybrid Port:

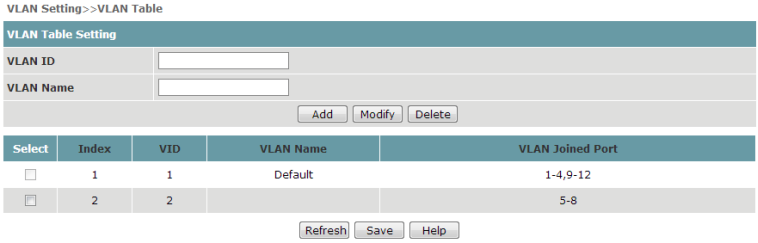
The port is similar to a Trunk port, except users can explicitly assign tags to be removed from egress packets.

4.1 Port VLAN



Setting	Description
Port Range	Select port to set.
Port Type	Three types of VLAN port Access, Trunk or Hybrid can be selected.
PVID	Assigns the VLAN ID, the range is 1~4094.
Vlan-allowed	The VLAN ID allowed to pass. Only valid if port type is trunk.
Vlan-untaged	Remove the tag for the port. Only valid if port type is trunk.

4.2 VLAN Table



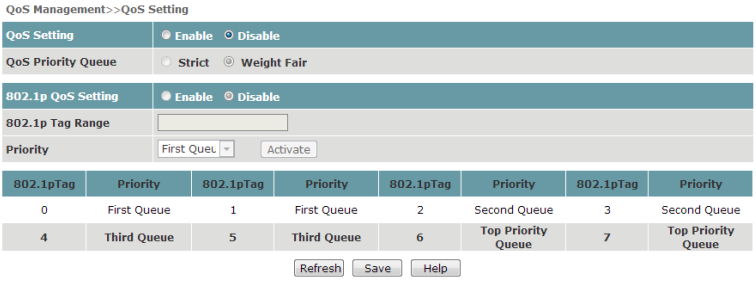
Setting	Description
VID	VLAN ID
VLAN Name	The name of VLAN

The table shows the VLAN groups that were created.

5. QoS

The switch's traffic prioritization capability provides Quality of Service (QoS) to your network by making data delivery more reliable. You can prioritize traffic on your network to ensure that high priority data is transmitted with minimum delay.
Traffic can be controlled by a set of rules to obtain the required Quality of Service for your network. The rules define different types of traffic and specify how each type should be treated as it passes through the switch. The switch can inspect IEEE 802.1p/1Q layer 2 CoS tags and improves the performance and determinism of industrial networks for mission critical applications.

5.1 QoS Setting



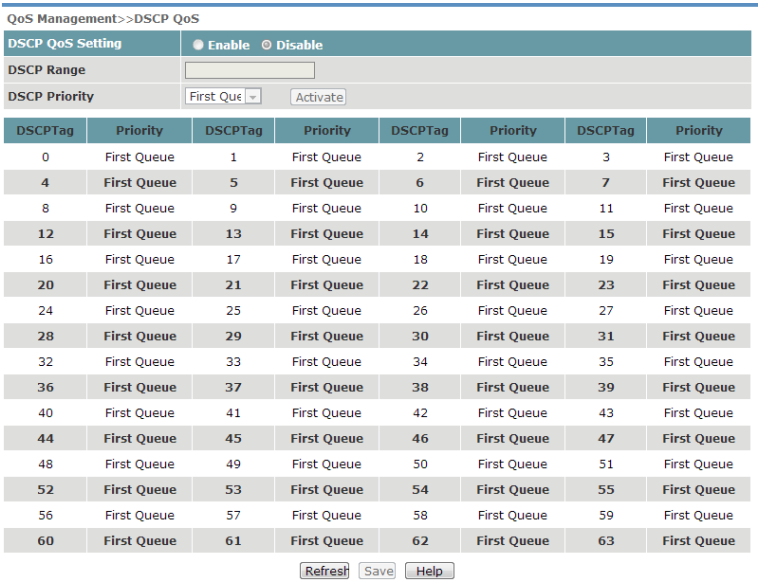
Setting	Description
QoS Setting	Enable / Disable QoS function.
QoS Priority Queue	The switches support two different queuing mechanisms: • **Weight Fair:** This method services all the traffic queues, giving priority to the higher priority queues. Under most circumstances, the Weight Fair method gives high priority precedence over low priority, but in the event that high priority traffic does not reach the link capacity, lower priority traffic is not blocked. • **Strict:** This method services high traffic queues first; low priority queues are delayed until no more high priority data needs to be

<table>
<tr><td></td><td>sent. The Strict method always gives precedence to high priority over low priority.

The switch has 4 priority queues.
In the weight fair scheme, an 8, 4, 2, 1 weighting is applied to the four priorities. This approach prevents the lower priority frames from being starved of opportunity for transmission with only a slight delay to the higher priority frames.

In the Strict-priority scheme, all top-priority frames egress a port until that priority's queue is empty, and then the next lower priority queue's frames egress. This approach can cause the lower priorities to be starved of opportunity for transmitting any frames but ensures that all high priority frames will egress the switch as soon as possible.</td></tr>
<tr><td>802.1p QoS Setting</td><td>Enable / Disable 802.1p QoS function.</td></tr>
<tr><td>802.1p Tag Range
Priority</td><td>About IEEE802.1p priority, there are 8 classified levels available. In IEEE802.1Q tags, there are 3 user priority levels. The switches parameters default settings are listed below:
<table>
<tr><th>Tag Value</th><th>Default</th><th>Tag Value</th><th>Default</th></tr>
<tr><td>0</td><td>Low</td><td>4</td><td>Middle</td></tr>
<tr><td>1</td><td>Low</td><td>5</td><td>Middle</td></tr>
<tr><td>2</td><td>Normal</td><td>6</td><td>High</td></tr>
<tr><td>3</td><td>Normal</td><td>7</td><td>High</td></tr>
</table>
</td></tr>
</table>

5.2 DSCP QoS



Setting	Description
DSCP QoS Setting	Enable / Disable DSCP QoS function
DSCP Range	Maps different TOS values to 4 different egress queues. The default setting is : 1 to 16: Low 17 to 32: Normal 33 to 48: Medium 49 to 64: High
DSCP Priority	

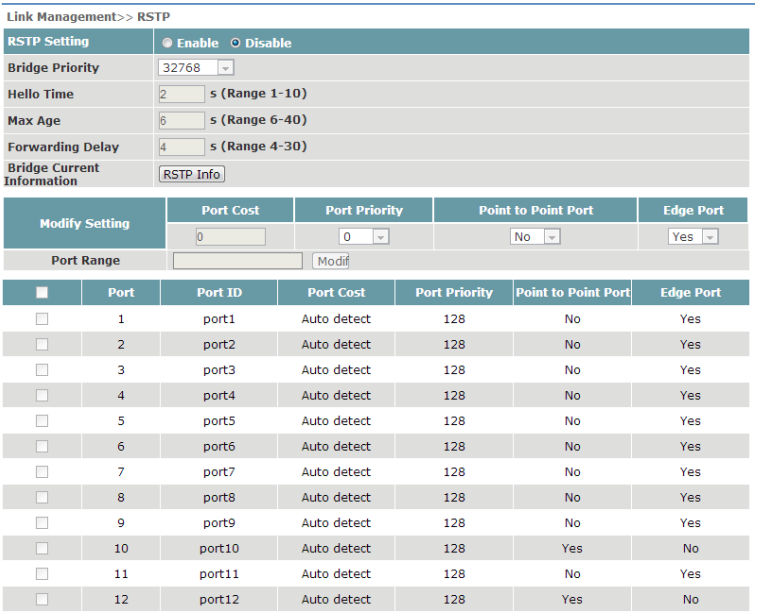
6. Link Management

6.1 RSTP

Spanning Tree Protocol (STP) was designed to help reduce link failures on a network, and provide an automatic means of avoiding loops. This is particularly important for networks that have a complicated architecture, since unintended loops in the network can cause broadcast storms. The switches' STP feature is disabled by default. To be completely effective, you must enable RSTP/STP on every the switch connected to your network.

Rapid Spanning Tree Protocol (RSTP) implements the Spanning Tree Algorithm and Protocol defined by IEEE 802.1D-2004. RSTP provides the following benefits:

- The topology of a bridged network will be determined much more quickly compared to STP.
- RSTP is backward compatible with STP, making it relatively easy to deploy.



Setting	Description
RSTP Setting	Enable / Disable RSTP function.
Bridge Priority	Increase this device's bridge priority by selecting a lower number. A device with a higher bridge priority has a greater chance of being established as the root of the Spanning Tree topology.
Hello Time	The root of the Spanning Tree topology periodically sends out a "hello" message to other devices on the network to check if the topology is healthy. The "hello time" is the amount of time the root waits between sending hello messages.
Max Age Time	If this device is not the root, and it has not received a hello message from the root in an amount of time equal to "Max. Age," then this device will reconfigure itself as a root. Once two or more devices on the network are recognized as a root, the devices will renegotiate to set up a new Spanning Tree topology.
Forwarding Delay	The amount of time this device waits before checking to see if it should change to a different state. The value range is 4~30s.
Bridge Information	Show the current bridge information.

Port Cost	Input a higher cost to indicate that this port is less suitable as a node for the Multiple Spanning Tree topology. Use the default value (0) to use port speed in the auto port cost.
Priority	Increase this port's priority as a node on the Multiple Spanning Tree topology by entering a lower number.
Point to Point Port	If the port is connected to only one bridge, the port is called point to point port.
Edge Port	Select to enable or disable the port as the edge port.

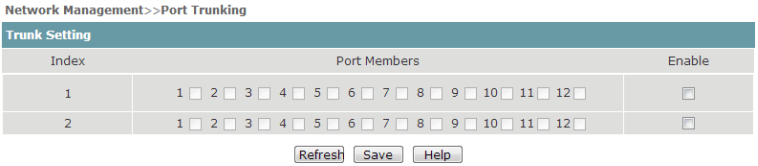
In RSTP info page, the RSTP information can be shown:

Port	Port ID	Port Cost	Port Priority	Point to Point Port	Edge Port
1	port1	Auto detect	128	No	Yes
2	port2	Auto detect	128	No	Yes
3	port3	Auto detect	128	No	Yes
4	port4	Auto detect	128	No	Yes
5	port5	Auto detect	128	No	Yes
6	port6	Auto detect	128	No	Yes
7	port7	Auto detect	128	No	Yes
8	port8	Auto detect	128	No	Yes

7. Network Management

7.1 Port Trunking

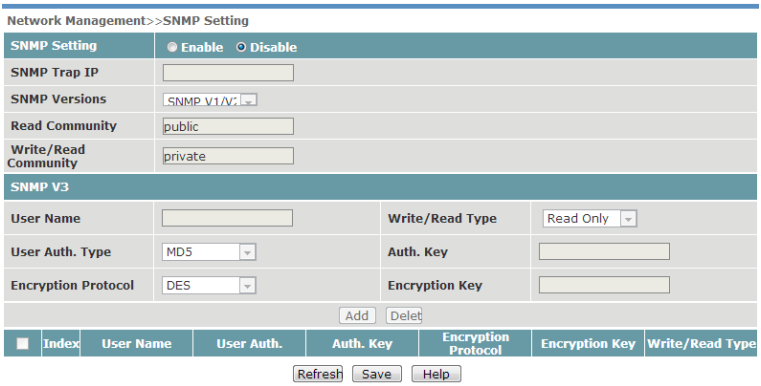
Trunking, sometimes called Link Aggregation, is a way to parallel Switch ports using a few cables to improve the bandwidth and generate link redundancy. Trunks are a very useful function in building redundancy network. Managed series of switches provide Trunking function, which allows two or more ports to be a group of Trunking as a single logical link in order to improve the bandwidth and link redundancy; when a physical connection cannot communicate or fails, other link in Trunking group will take over and maintain communications, in this case fast recovery mechanism is set up.



Setting	Description
Trunk Index	Totally 2 groups.
Port Members	Lists the ports in the current trunk group and the ports that are available to be added.
Enable	Enable / Disable the function.

7.2 SNMP Setting

The switch supports SNMP V1, V2c, and V3. SNMP V1 and SNMP V2c use a community string match for authentication, which means that SNMP servers access all objects with read-only or read/write permissions using the community strings *public* and *private* by default. SNMP V3 requires that you select an authentication level of MD5 or SHA, and is the most secure protocol. You can also enable data encryption to enhance data security.



SNMP V1/2 Setting is shown in the following table:

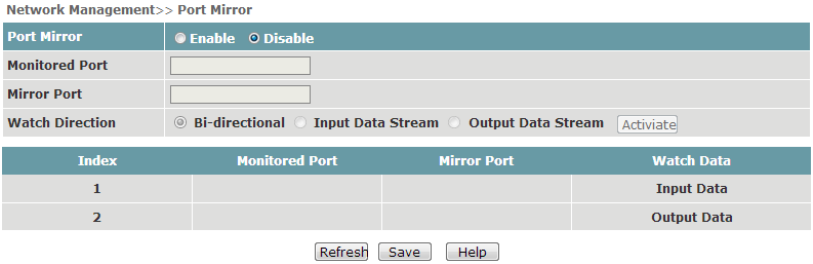
Setting	Description
SNMP Trap IP	Specifies the IP address or name of the primary trap server used by your network.
SNMP Version	SNMP version.
Read Community	Specifies the community string to authenticate the SNMP agent for read-only access. The SNMP agent will access all objects with read-only permissions using this community string.
Write/Read Community	Specifies the community string to authenticate the SNMP agent for read/write access. The SNMP server will access all objects with read/write permissions using this community string.

SNMP V3 Setting is shown in the following table:

Setting	Description
User Name	User Name.
Write/Read Type	The write/read type selection.
User Auth. Type	Provides authentication based on HMAC-MD5, or HMAC-SHA algorithms. 8-character passwords are the minimum requirement for authentication.
Auth. Key	The Encryption key.
Encryption Protocol	The encryption protocol could be DES, AES or 3DES.
Encryption Key	Encryption Key.

7.3 Port Mirror

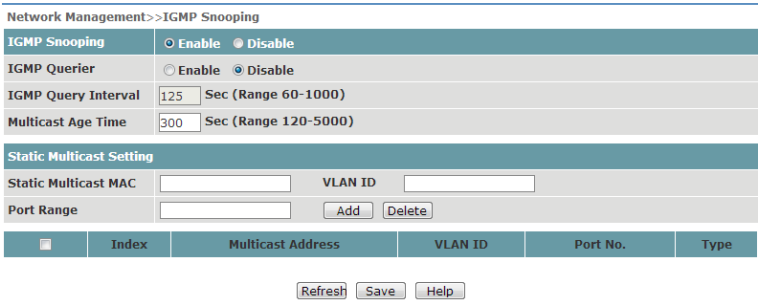
The Mirror Port function can be used to monitor data being transmitted through a specific port. This is done by setting up another port (the mirror port) to receive the same data being transmitted from, or both to and from, the port under observation. Using a mirror port allows the network administrator to sniff the observed port to keep tabs on network activity.



Setting	Description
Port Mirror	Enable / Disable the function.
Mirror Port	Select the number of the port that will be used to monitor the activity of the monitored port.
Monitored Port	Select the number of the ports whose network activity will be monitored.
Watch Direction	Select one of the following two watch direction options: **Input data stream:** Select this option to monitor only those data packets coming into the switch's port. **Output data stream:** Select this option to monitor only those data packets being sent out through the switch's port. **Bi-directional:** Select this option to monitor data packets both coming into, and being sent out through, the switch's port.

7.4 IGMP Snooping

IGMP Snooping provides the ability to prune multicast traffic so that it travels only to those end destinations that require that traffic, thereby reducing the amount of traffic on the Ethernet LAN.

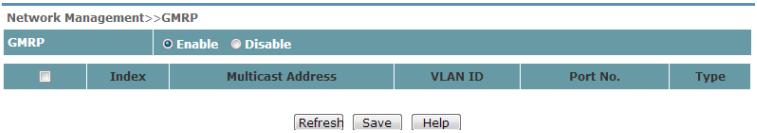


Setting	Description
IGMP snooping Setting	Enable / Disable the function.
IGMP Querier	Enable / Disable IGMP Querirer function.
Query Interval	Sets the query interval of the Querier function globally. Valid settings are from 20 to 600 seconds.
Multicast Age Time	The age time of the broadcast member.
Static Multicast MAC	Static Multicast MAC
VLAN ID	The ID of static multicast MAC
Port Range	The port range of static multicast MAC

7.5 GMRP

The switches support IEEE 802.1D-1998 GMRP (GARP Multicast Registration Protocol), which is different from IGMP (Internet Group Management Protocol). GMRP is a MAC-based multicast management protocol, whereas IGMP is IP-based. GMRP provides a mechanism that allows bridges and end stations to register or de-register Group membership information dynamically. GMRP functions similarly to GVRP, except that GMRP registers multicast addresses on ports. When a port receives a GMRP-join message, it will register the multicast address to its database if the multicast address is not registered, and all the multicast packets with that multicast address are able to be forwarded from this port. When a port receives a GMRP-leave message, it will de-register the multicast address from its database, and all the multicast packets

with this multicast address will not be able to be forwarded from this port.

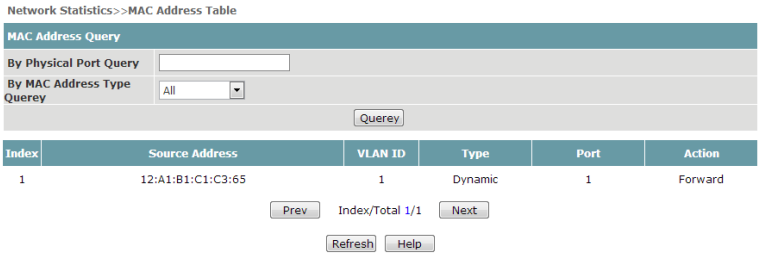


Setting	Description
GMRP Setting	Enable / Disable the function.
Multicast Address	This multicast address is learned by GMRP.
VLAN ID	VLAN ID is learned by GMRP.
Type	The type of learned by GMRP.

8. Network Statistic

8.1 Mac Address Table

MAC Address and related forwarding port will display in this table.



Setting	Description
By Port No.	Query by port no.
By MAC Address Type	Query by MAC address type

8.2 Traffic Statistics

Managed series of switches conduct each port monitoring, and send all network data packets and display them in Web page. The statics start Statistics Package as soon as switches power on, when switch soft reset and power down and reset, the data will zero.

When opening the page as below, the page will be refreshed ever 30 seconds .Please refer to the page below for detailed data display:

Network Statistic>>Traffic Statistics

Port	Output Packets				Input Packets			
Port No	Unicast	Multicast	Broadcast	Error	Unicast	Multicast	Broadcast	Error
1	2936	36	0	0	2807	547	745	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	471	640	0	0	7	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0

Refresh Help

9. System *Management*

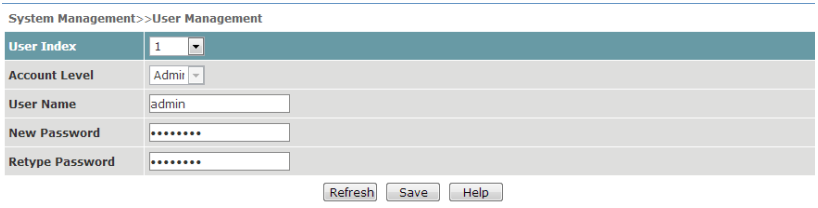
9.1 Device Address

This function will assign a managed IP Address for the switches. There are two options that can be used to set Ethernet managed switch: automatic assign (DHCP) and Fixed (Static) IP Address. Managed series of switches default fixed IP address when they leave the factor. Automatically assign (DHCP): Switches automatically obtain IP Address, Sub-net Mask, Gateway and DNS

Address from DHCP Server in network.

Setting	Description
DHCP/Fixed IP	Obtain an IP address automatically or assign a fixed IP
IP Address	Only IP Address is network
Subnet Mask	Space range sub-net logical address use
Default Gateway	Network Node, reach a entry port of network
DNS	Domain Name System, IP Address for Domain Server

9.2 User Management



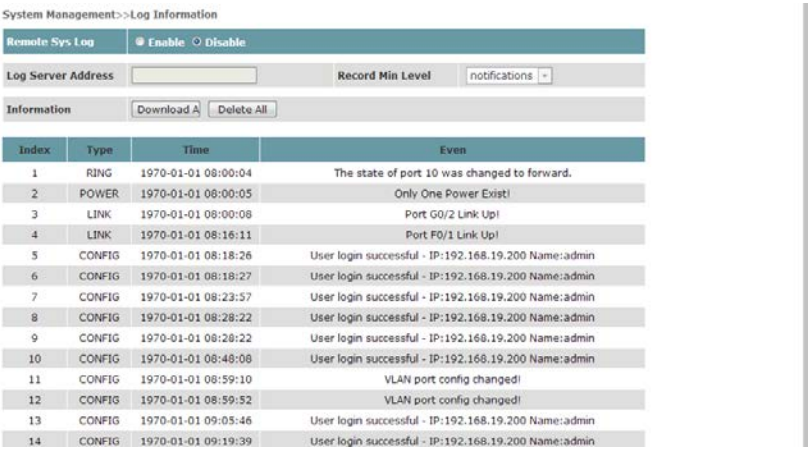
Setting	Description
User Index	Represent a group of users.

Account Level	The switch provides two levels of configuration access. The admin account has read/write access of all configuration parameters, and the user account has read access only. A user account can view the configuration, but will not be able to make modifications.
User Name	User Name
Password	User Password
Confirm Password	Confirm the password

9.3 Log Information

Managed series of switches provide Log function, which can be easily enable and disable.
When enabling the function, if the following event occurs, it will be recorded in event list of switches.

- System Reboot
- Port Link Down / Link UP
- Power Status Change
- Login Information
- Broadcast Storm Occurs
- System Action and Operation Record
- RSTP Net Status Change
- NTP Time Synchronization



Setting	Description
Remote Syslog Setting	Enable / Disable remote syslog.
Log Server Address	Enter the IP address of Syslog server
Record Min Level	The different level of log can be choose.

The log can be downloaded or be cleared by the user.

9.4 File management

Setting	Description
Configuration File Backup	Configuration file for managed series of switches can be saved in one PC, click “Export”, a saving dialogue box prompts, select a proper file and save setting parameters in PC.
Configuration File Restore	Restore configuration file from PC , click **“Browse”**, open a setting file, then click **“Import”**. After finish recovering, switches need to reboot.
Firmware Upgrade	Upgrade switch following the steps below: ✓ Click **“Browse”**, open Firmware File（*.bin）. ✓ Click **“Upgrade”**, message box will prompts, if clicking **“OK”** in it, start to upgrade, if clicking **“Cancel”**, Quit upgrading. Firmware upgrading will last for a period of time till switches restart.
Reset to factory default	Restore factory default can restore factory default quickly. Click **“Start”** in Web page, select **“OK”** in confirmation information box prompted, and factory default can be restored. After finishing restoring, switches need to reboot.
System Restart	Click **“Start” to restart the switch.**