

TigerSwitch

10/100/1000

Managed Ethernet Switch

- ◆ 24 auto-MDI/MDI-X 10/100/1000BASE-T ports
- ◆ 4 ports shared with 4 SFP transceiver slots
- ◆ Non-blocking switching architecture
- ◆ Spanning Tree Protocol
- ◆ Up to eight LACP or static 8-port trunks
- ◆ Layer 2/3/4 CoS support through four priority queues
- ◆ Full support for VLANs with GVRP
- ◆ IGMP multicast filtering and snooping
- ◆ Support for jumbo frames up to 9 KB
- ◆ Manageable via console, Web, SNMP/RMON



TigerSwitch 10/100/1000 Installation Guide

From SMC's Tiger line of feature-rich workgroup LAN solutions

SMC[®]

Networks

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INTRODUCTION

The Tiger Switch SMC8024L2 is a high performance managed switch that delivers performance and control to your network. It provides 24 full-duplex 1000BASE-T ports that significantly improve network performance and boost throughput using features configured through the web interface. With 48 Gigabits of throughput bandwidth, these switches provide the quickest solution to meeting the growing demands on your network.

Features and Benefits

- User friendly web-management interface
- Supports Qos, Spanning Tree, IGMP, VLANs and trunk configuration
- Store-and-forward switching ensures error-free transmission
- Half- and full-duplex flow control prevents packets from being dropped under heavy loading
- Plug-and-play—optional configuration using web interface
- “At-a-glance” LEDs for port and system status monitoring
- Desktop or rack installation

INITIAL CONFIGURATION

To make use of the management features of your Tiger Switch, you must first configure it with an IP address that is compatible with the network it is being installed in. For simplicity, this should be done before you permanently install the switch in the network.

The following procedure is recommended:

1. Place your Tiger Switch close to the PC that you will use to configure it. It will help if you can see the front panel of the switch while working on your PC.
2. Connect the Ethernet port of your PC to any port on the front panel of your Tiger Switch. Connect power to the switch and verify that you have a link by checking the front-panel LEDs. (See the Hardware Description on page 2 for more information on the LEDs.)
3. The default IP address of the switch is 192.168.2.10 and the subnet mask is 255.255.255.0. If your PC has a different IP address from the switch but is on the same subnet (i.e. the PC and switch both have addresses that start 192.168.2.x) you can skip directly to step 4. Otherwise, you must set your PC's IP address manually. If you are unfamiliar with this process, see "Changing a PC's IP Address" on page 7.
4. Open your web browser and enter the address <http://192.168.2.10>. If your PC is properly configured, you will see the login page of your Tiger Switch. If you do not see the login page, please check your IP address and repeat step 3.
5. Enter the default password "smcadmin" and click on the Login button.

6. From the menu, click on SYSTEM, then click on LAN Settings. On the LAN Settings page, enter the new IP address, Subnet Mask and Gateway IP Address for the switch, then click on the APPLY button.

No other configuration changes are required at this stage, but it is recommended that you change the administrator's password before logging out. To change the password, click SYSTEM, Password, and then fill in all the fields on the Password Settings page before clicking on the APPLY button.

CONFIGURING THE SWITCH

Using the Web Interface

This switch provides an embedded HTTP web agent. Using a web browser you can configure the switch and view statistics to monitor network activity. The web agent can be accessed by any computer on the network using a standard web browser (Internet Explorer 5.5 or above, or Mozilla Firefox 1.0 or above).

Prior to accessing the switch from a web browser, be sure you have first performed the following tasks:

1. Configure the switch with a valid IP address, subnet mask, and default gateway. (Default: 192.168.2.10/255.255.255.0/0.0.0.0)
(See "Initial Configuration" on page 2.)
2. Set a new password using the web interface. (Default: "smcadmin").
Access to the web interface is controlled by the password.
(See "Configuring the Logon Password" on page 18.)

Note: If, at any point, you cannot remember the switch's IP address, you can restore the original settings by following the procedure described in the "Troubleshooting" section.

Navigating the Web Browser Interface

To access the web-browser interface you must first enter a password. The user has Read/Write access to all configuration parameters and statistics. The default password for the switch is “smcadmin.” If user input is not detected within five minutes, the current session will be terminated.

Home Page

When your web browser connects with the switch’s web agent, the home page is displayed as shown below. The home page displays the Main Menu on the left side of the screen and System Information on the right side. The Main Menu links are used to navigate to other menus, and display configuration parameters and statistics.

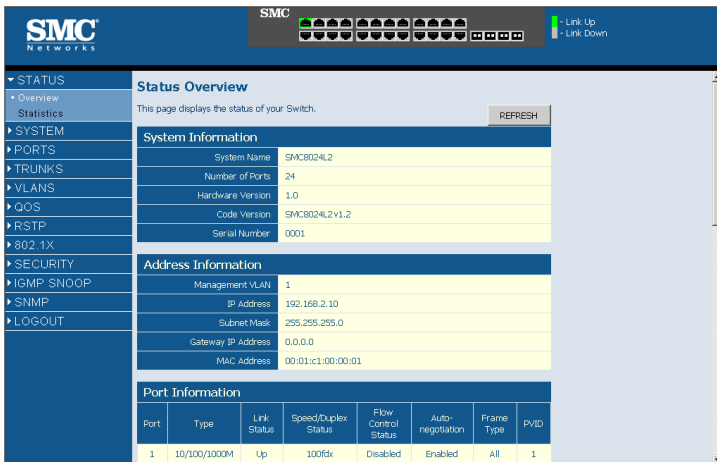


Figure 1 Home Page

Configuration Options

Configurable parameters have a dialog box or a drop-down list. Once a configuration change has been made on a page, be sure to click on the Apply button to confirm the new setting. The following table summarizes the web page configuration buttons.

Table 1 Web Page Configuration Buttons

Button	Action
Apply	Sets specified values to the system.
Cancel	Discards all changes and restores current values.
Help	Links directly to web help.

Notes: To ensure proper screen refresh, be sure that Internet Explorer is configured as follows: Under the menu “Tools / Internet Options / General / Temporary Internet Files / Settings,” the setting for item “Check for newer versions of stored pages” should be “Every visit to the page.”

Panel Display

The web agent displays an image of the switch’s ports. The port will turn green when the corresponding front-panel port is in connection with another device. To show the port number, place mouse pointer onto the intended port.



Figure 2 Front Panel Indicators

Main Menu

Using the onboard web agent, you can define system parameters, manage and control the switch, and all its ports, or monitor network conditions. The following table briefly describes the selections available from this program.

Table 2 Switch Main Menu

Menu	Description	Page
STATUS		9
Overview	Provides basic system description, including system information, address information, port information, trunk information, and VLAN information.	9
Statistics	Shows statistics for port, interface, and RMON.	13
SYSTEM		16
Name	Shows the name of the switch.	16
LAN Settings	Sets LAN IP address, subnet mask, and gateway IP address.	17
Password	Changes password.	18
Tools		19
Restore to Factory Defaults	Force the Switch to perform a power reset and restore the original factory settings.	19
Upgrade Firmware	Upgrade the Switch system firmware using a file provided by SMC.	20
Restart	Restarts the switch.	21
Register Product	Registers the switch online.	22
Static MAC	Creates Static MAC addresses.	22
Counter Config	Selects which statistics to count and show.	23
PORTS		24
Settings	Configure the speed and duplex mode of the port.	24

Table 2 Switch Main Menu (Continued)

Menu	Description	Page
Rate Limiting	Sets the rate limiting parameters for each port on the Switch	25
Storm Control	Sets the broadcast storm control parameters for every port on the Switch.	23
Port Mirroring	Sets up the port mirroring features of the switch to enable traffic monitoring.	28
Cable Diagnostic	Diagnoses cable faults.	29
TRUNKS		30
Membership	Specifies ports to group into static trunks	31
Settings	Configures trunk connection settings	31
Rate Limiting	Sets the rate limiting parameters for each Trunk configured on the Switch.	32
LACP Setup	Sets link aggregation.	33
LACP Status	Shows the LACP groups status.	34
VLANS		33
VLAN Membership	Sets VLAN group.	35
VLAN Port Config	Configures the VLANs on the switch for both Ports and Trunks.	33
QOS		38
Settings	Sets the priority of packets within the switch.	38
RSTP		40
Settings	Sets up RSTP configuration.	41
Status	Shows RSTP bridge and port status.	42
802.1X		43
Settings	Sets up 802.1X configuration.	44
Statistics	Displays the 802.1x statistics collected by the switch.	46
Security		47
IP Filter	Setus up IP filter.	47

Table 2 Switch Main Menu (Continued)

Menu	Description	Page
Port Security	Sets security policy for port.	49
ACL	Sets up management access filter.	51
IGMP Snoop		52
Settings	Sets up IGMP Snooping configuration	54
Status	Shows IGMP SNOOP instances and port states.	54
SNMP		55
Settings	Sets up SNMP agent.	55
LOGOUT	Quits to the Login page.	

Web Configuration

Displaying Status Overview

You can easily identify the system by displaying the device name, location and contact information.

Field Attributes

System Information

- **System Name** – Name assigned to the switch system.
- **Number of Ports** – Number of built-in ports.
- **Hardware Version** – Hardware version of the main board.
- **Code Version** – Version number of the code.
- **Serial Number** – The serial number of the switch.

Address Information

- **Management VLAN** – ID of the configured VLAN (this is set to 1 and cannot be changed) all ports on the unit are members of VLAN 1. The management station must always be attached to a port on VLAN 1.
- **IP Address** – Address of the VLAN to which the management station

is attached. (Note that the management station must always be on VLAN 1)
1) Valid IP addresses consist of four numbers, 0 to 255, separated by periods.

- **Subnet Mask** – This mask identifies the host address bits used for routing to specific subnets. (Default: 255.255.255.0)
- **Gateway IP Address** – IP address of the gateway router between the stack and management stations that exist on other network segments. (Default: 0.0.0.0)
- **MAC Address** – The physical layer address.

Port Information

- **Type** – Indicates the port type.
- **Link Status** – Indicates if the link is Up or Down.
- **Speed/Duplex Status** – Shows the current speed and duplex mode. Displays a number, the speed in Mbps, followed by either "fdx" for full-duplex or "hdx" for half-duplex.
- **Flow Control Status** – Indicates whether flow control is enabled or disabled.
- **Autonegotiation** – Shows if auto-negotiation is enabled or disabled.
- **Frame Type** – Either "Tagged" or "All". "Tagged" means that the port will only send and receive VLAN-tagged packets. When set to "All", the port will also send and receive untagged packets.
- **PVID** – VLAN ID assigned to untagged frames received on the interface. (Default: 1)

Trunk Information

- **Trunk** – The trunk label. "T1" through "T8" are used as trunk labels.
- **Type** – All trunks and ports on this switch are 10/100/1000M
- **Trunk Status** – An indication of the speed and duplex setting of the trunk. This is a number, the speed in Mbps, followed by either "Full" for full-duplex or "Half" for half-duplex. This can be changed on the TRUNKS > Settings page.
- **Ports** – The ports that are members of the trunk.

VLAN Information

- **VLAN ID** – A number in the range 1 - 4094 which identifies the VLAN.
- **VLAN Member** – A list of the ports that are members of the VLAN.
By default, all ports are members of VLAN 1.

Web – Click STATUS, Overview.

Status Overview

This page displays the status of your Switch. REFRESH

System Information	
System Name	SMC8024L2
Number of Ports	24
Hardware Version	1.0
Code Version	SMC8024L2 v1.2
Serial Number	0001

Address Information	
Management VLAN	1
IP Address	192.168.2.10
Subnet Mask	255.255.255.0
Gateway IP Address	0.0.0.0
MAC Address	00-01-c1-00-00-01

Port Information							
Port	Type	Link Status	Speed/Duplex Status	Flow Control Status	Auto-negotiation	Frame Type	PVID
1	10/100/1000M	Up	100fdx	Disabled	Enabled	All	1
2	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
3	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
4	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
5	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
6	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
7	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
8	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
9	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
10	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
11	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
12	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
13	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
14	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
15	10/100/1000M	Down	Auto	Disabled	Enabled	All	1
16	10/100/1000M	Down	Auto	Disabled	Enabled	All	1

Trunk Information			
Trunk	Type	Trunk Status	Ports
No Trunks Configured			

VLAN Information	
VLAN ID	VLAN Members
1	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16

HELP REFRESH

Figure 3 Switch Information

Showing Port Statistics

You can display statistics on network traffic from the ports. These statistics can be used to identify potential problems with the switch (such as a faulty port or unusually heavy loading). All values displayed have been accumulated since the last system reboot, but can be reset to zero by clicking the CLEAR button. The current statistics are not displayed until you click the REFRESH button.

Table 3 Port Statistics

Parameter	Description
<i>Interface Statistics</i>	
Received Octets	The total number of octets received on the interface, including framing characters.
Received Unicast Packets	The number of subnetwork-unicast packets delivered to a higher-layer protocol.
Received Errors	The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
Transmitted Multicast Packets	The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent.
Transmitted Broadcast Packets	The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a broadcast address at this sub-layer, including those that were discarded or not sent.
Received High Priority Packets	The total number of received packets that set as High Priority in the QoS settings.
Transmitted High Priority Packets	The total number of transmitted packets that set as High Priority in the QoS settings.
Received Multicast Packets	The number of packets, delivered by this sub-layer to a higher (sub-)layer, which were addressed to a multicast address at this sub-layer.

Table 3 Port Statistics (Continued)

Parameter	Description
Received Broadcast Packets	The number of packets, delivered by this sub-layer to a higher (sub-)layer, which were addressed to a broadcast address at this sub-layer.
Transmitted Octets	The total number of octets transmitted out of the interface, including framing characters.
Transmitted Unicast Packets	The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.
Transmitted Errors	The number of outbound packets that could not be transmitted because of errors.
Received Normal Priority Packets	The total number of received packets that set as High Priority in the QoS settings.
Transmitted Normal Priority Packets	The total number of transmitted packets that set as High Priority in the QoS settings.
<i>RMON Statistics</i>	
Drop Events	The total number of events in which packets were dropped due to lack of resources.
Received Frames	The total number of frames (bad, broadcast and multicast) received.
Multicast Frames	The total number of good frames received that were directed to this multicast address.
Undersize Frames	The total number of frames received that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.
Fragments	The total number of frames received that were less than 64 octets in length (excluding framing bits, but including FCS octets) and had either an FCS or alignment error.
Collisions	The best estimate of the total number of collisions on this Ethernet segment.

Table 3 Port Statistics (Continued)

Parameter	Description
Received Bytes	Total number of bytes of data received on the network. This statistic can be used as a reasonable indication of Ethernet utilization.
Broadcast Frames	The total number of good frames received that were directed to the broadcast address. Note that this does not include multicast packets.
CRC/Alignment Errors	The number of CRC/alignment errors (FCS or alignment errors).
Oversize Frames	The total number of frames received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.
Jabbers	The total number of frames received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS or alignment error.
64 Bytes Frames	The total number of frames (including bad packets) received and transmitted that were 64 octets in length (excluding framing bits but including FCS octets).
65-127 Byte Frames 128-255 Byte Frames 256-511 Byte Frames 512-1023 Byte Frames 1024-1518 Byte Frames	The total number of frames (including bad packets) received and transmitted where the number of octets fall within the specified range (excluding framing bits but including FCS octets).

Web – Click STATUS, Statistics.

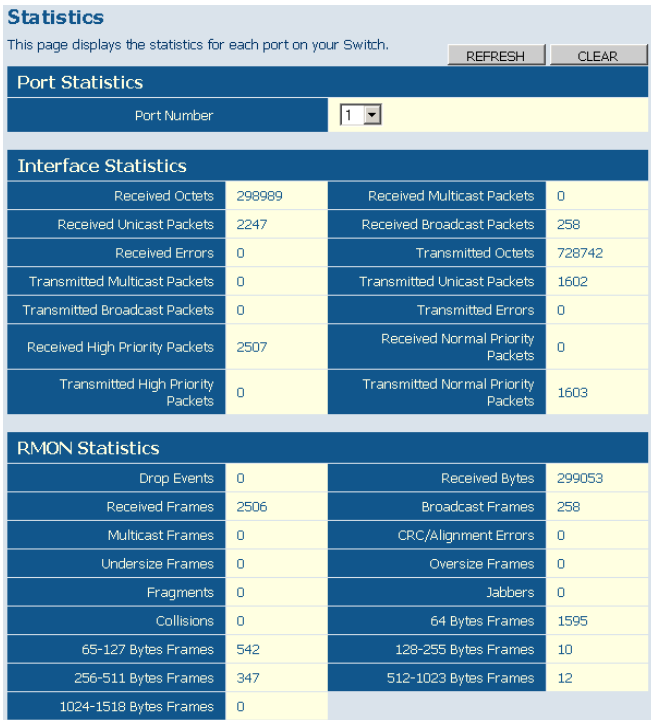


Figure 4 Port Statistics

Displaying System Name

You can easily identify the system by displaying the device name.

Field Attributes

- **Switch Name** – Name assigned to the switch system.

Web – Click System, Name.

Name

This page allows you to set a meaningful name for your switch, so that you can easily identify it when managing your network remotely.

Switch Name

Switch Name

HELP APPLY CANCEL

Figure 5 System Name

Setting the Switch's IP Address

This section describes how to configure an IP interface for management access over the network. The IP address for this switch is 192.168.2.10 by default. To manually configure an address, you need to change the switch's default settings (IP address 192.168.2.10 and netmask 255.255.255.0) to values that are compatible with your network. You may also need to establish a default gateway between the switch and management stations that exist on another network segment.

Field Attributes

- **DHCP Enabled** – Click to select the box to enable DHCP. (default: enabled)
- **LAN IP Address** – Address of the VLAN interface that is allowed management access. Valid IP addresses consist of four numbers, 0 to 255, separated by periods. (Default : 192.168.2.10)
- **Subnet Mask** – This mask identifies the host address bits used for routing to specific subnets. (Default: 255.255.255.0)
- **Gateway IP Address** – IP address of the gateway router between this device and management stations that exist on other network segments. (Default: 0.0.0.0)

Note: If, at any point, you cannot remember the switch's IP address, you can restore the original settings by following the procedure described in the "Troubleshooting" section.

Manual Configuration

Web – Click System, LAN Settings. Enter the IP address, subnet mask and gateway, then click APPLY.

LAN Settings	
DHCP Enabled	<input checked="" type="checkbox"/>
LAN IP Address	192 . 168 . 2 . 10
Subnet Mask	255 . 255 . 255 . 0
Gateway IP Address	0 . 0 . 0 . 0

HELP APPLY CANCEL

Figure 6 LAN Settings

Configuring the Logon Password

The administrator has write access for all parameters governing the onboard agent. You should therefore assign a new administrator password as soon as possible, and store it in a safe place.

Field Attributes

- **Password** – Specifies the user password.
(Range: 1-16 characters plain text, case sensitive)

Note: If, at any point, you cannot remember the password, you can restore the original settings by following the procedure described in the "Troubleshooting" section.

Web – Click System, Password. To change the password for the administrator, enter current password, the new password, confirm it by entering it again, then click APPLY.

Password Settings

Set a password to secure access to the Switch Web Management Interface.

Change Password	
Current Password	<input style="width: 90%;" type="password" value="XXXXXXXXXX"/> (Default: smcadmin)
New Password	<input style="width: 90%;" type="password" value="XXXXXXXXXX"/>
Confirm New Password	<input style="width: 90%;" type="password" value="XXXXXXXXXX"/>

Note: The password is case sensitive.

Note: If you forget your password, the only way to reset it is to reset the Switch's entire configuration to factory defaults.

Figure 7 Password Settings

Tools

On Tools page, you can restore the switch to default settings, upgrade the firmware of the switch, or restart the switch.

Restore to Factory Defaults

Force the Switch to restore the original factory settings. To reset the switch, select "Reset to Factory Defaults" from the drop-down list and click APPLY. The LAN IP Address, Subnet Mask and Gateway IP Address will not be reset.

Web – Click System, Tools, Reset to Factory Defaults.

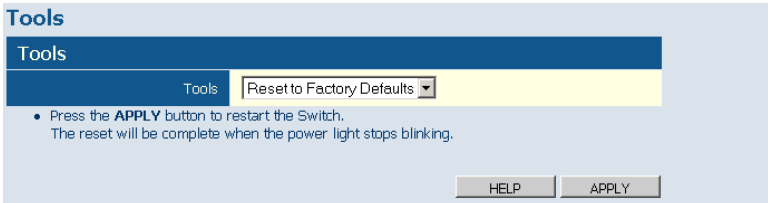


Figure 8 Reset to Factory Defaults

Upgrade Firmware

Upgrades the Switch system firmware using a file provided by SMC. Select "Upgrade Firmware" from the Tools drop-down list then click on the "Browse" button to select the firmware file. Finally, press the APPLY button to upgrade the selected Switch firmware file. You can download firmware files for your Switch from the Support section of www.smc.com.

Web – Click System, Tools, Reset to Factory Defaults.

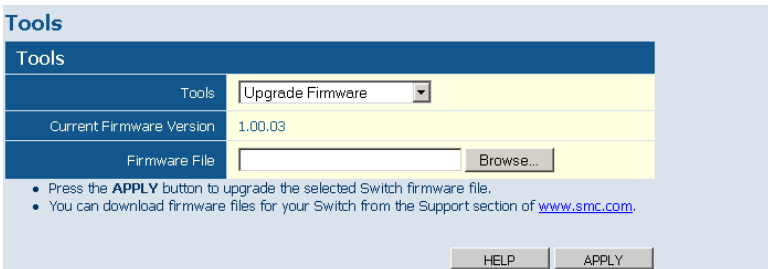


Figure 9 Upgrade Firmware

Upload/Download Configuration

Web – Click SYSTEM, Tools, Upload/Download Configuration. To upload or download the configuration file, select "Upload/Download Configuration" from the Tools drop-down list, then click "Upload" or "Download", and then click on the "Browse" button to select the file.

The screenshot shows a web interface titled "Tools" with a blue header. Below the header is a table with three rows: "Tools" (containing a dropdown menu set to "Upload/Download configuration"), "Operation" (with radio buttons for "Upload" and "Download"), and "Firmware File" (with a text input field and a "Browse..." button). Below the table is a bullet point: "Press the APPLY button to upload/download the Switch configuration file." A note follows: "Note: Please be patient as the firmware upgrade will take a few minutes to complete." At the bottom right are two buttons: "HELP" and "APPLY".

Figure 10 Upload/Download Configuration

Restart Switch

Web – Click SYSTEM, Tools, Restart Switch. To restart the switch, select from the Tools drop-down list, and then click APPLY. The reset will be complete when the user interface displays the login page.

The screenshot shows a web interface titled "Tools" with a blue header. Below the header is a table with two rows: "Tools" (containing a dropdown menu set to "Restart Switch") and "Operation" (with radio buttons for "Upload" and "Download"). Below the table is a bullet point: "Press the APPLY button to restart the Switch. The reset will be complete when the power light stops blinking." At the bottom right are two buttons: "HELP" and "APPLY".

Figure 11 Restart Switch

Register Product

Register your product if you have not already done so.

Web – Click System, Register Product. By clicking the Register Now button you will be taken to the SMC website, where you can enter the products details.

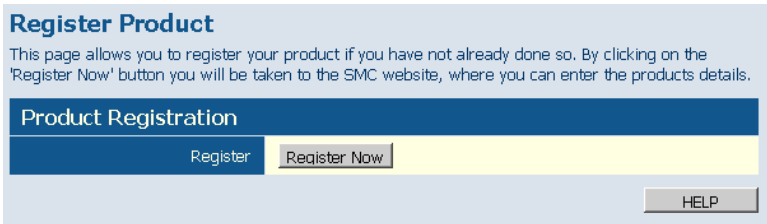


Figure 12 Register Product

Static MAC

A static MAC address is an entry in MAC table which can not be aged out.

Add Static MAC

Type the static MAC address and associated VLAN ID (1-4095) into corresponding fields in the Add Static MAC table. After pressing ADD button, you will be navigated to a new page to configure the Destination Mask for this MAC entry. Only one static MAC address can be added per time.

Static MAC Address Configuration

This table shows the stored static MAC entries in MAC table. Symbol X indicates that the corresponding bit for the port the symbol X represents is set to 1 in the destination mask. Click the radio button which is associated with the static MAC entry that is displayed immediately at its right side and use Modify or Delete button can modify or delete this entry. Modify button will navigate to a web page for reconfiguring the Destination Mask.

Web – Click System, Static MAC.

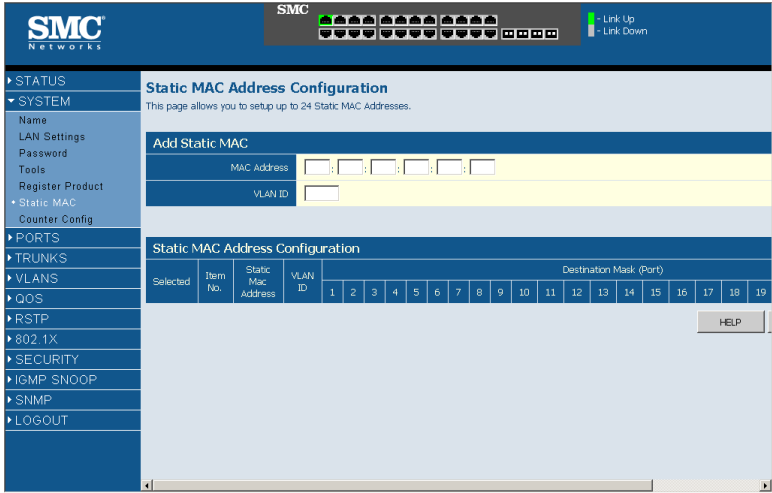


Figure 13 Static MAC Address Configuration

Counter Config

This page allows the customer to select the statistics to count and display. It is possible to monitor 5 Transmit counters, 5 receive counters as well as 1 transmit byte counter and receive byte counter at the same time. Please also note the following restrictions.

Received Unicast Packets can be enabled after Received Multicast Packets and Received Broadcast Packets are enabled.

Received Multicast Packets and Received Broadcast Packets can be disabled after Received Unicast Packets is disabled.

The above 2 rules are also applied to Transmitted Multicast Packets, Transmitted Unicast Packets and Transmitted Broadcast Packets.

Web – Click PORTS, Settings.



Figure 14 Counter Configuration

Port Configuration

You can use the Port Configuration page to manually fix the speed, duplex mode, and flow control.

Field Attributes

- **Speed/Duplex** – Allows you to manually set the port speed and duplex mode.
- **Flow Control** – Allows flow control to be enabled or disabled. When the box is checked, flow control is enabled.
- **Trunk** – Indicates if a port is a member of a trunk.

Web – Click PORTS, Settings.

Port Configuration
This page enables you to configure each Switch port.

Port	Speed/Duplex	Flow Control	Trunk
1	Auto Speed ▾	<input type="checkbox"/>	
2	Auto Speed ▾	<input type="checkbox"/>	
3	Auto Speed ▾	<input type="checkbox"/>	
4	Auto Speed ▾	<input type="checkbox"/>	
5	Auto Speed ▾	<input type="checkbox"/>	
6	Auto Speed ▾	<input type="checkbox"/>	
7	Auto Speed ▾	<input type="checkbox"/>	
8	Auto Speed ▾	<input type="checkbox"/>	
9	Auto Speed ▾	<input type="checkbox"/>	
10	Auto Speed ▾	<input type="checkbox"/>	
11	Auto Speed ▾	<input type="checkbox"/>	
12	Auto Speed ▾	<input type="checkbox"/>	
13	Auto Speed ▾	<input type="checkbox"/>	
14	Auto Speed ▾	<input type="checkbox"/>	
15	Auto Speed ▾	<input type="checkbox"/>	
16	Auto Speed ▾	<input type="checkbox"/>	

HELP APPLY CANCEL

Figure 15 Port Configuration

Configuring Rate Limits

This function allows the network manager to control the maximum rate for traffic transmitted or received on an interface. Rate limiting is configured on interfaces at the edge of a network to limit traffic into or out of the switch. Traffic that falls within the rate limit is transmitted, while packets that exceed the acceptable amount of traffic are dropped.

Rate limiting can be applied to individual ports or trunks. When an interface is configured with this feature, the traffic rate will be monitored by the hardware to verify conformity. Non-conforming traffic is dropped, conforming traffic is forwarded without any changes.

The Input/Output Bandwidth Limit field is a type-in box which accepts an integer number in the range 1 to 100. The number specifies the percentage

of the total input bandwidth of the port that can be used before packets are dropped or flow-control starts.

Web – Click PORTS, Rate Limiting. This page enables you to set the rate limiting parameters for each port on the Switch.

Rate Limiting
This page enables you to set the rate limiting parameters for each port on the Switch.

Port	Port Speed	Enable Input Rate Limiting	Input Bandwidth Limit (% of port speed)	Enable Output Rate Limiting	Output Bandwidth Limit (% of port speed)	Trunk
1	100fdx	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
2	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
3	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
4	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
5	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
6	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
7	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
8	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
9	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
10	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
11	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
12	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
13	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
14	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
15	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	
16	Auto	<input type="checkbox"/>	30	<input type="checkbox"/>	30	

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Figure 16 Rate Limiting

Storm Control

Broadcast storms may occur when a device on your network is malfunctioning, or if application programs are not well designed or properly configured. If there is too much broadcast traffic on your network, performance can be severely degraded or everything can come to complete halt.

You can protect your network from broadcast storms by setting a threshold for broadcast traffic for each port. Any broadcast packets exceeding the specified threshold will then be dropped.

Field Attributes

- **Type** – List the type of traffic which can be rate limited, including ICMP, Learn Frames, Broadcast, Multicast and Flooded Unicast frames.
- **Enable Storm Control** – Click to select the box to enable/disable the storm control for the type of frames listed just in the left side of it.
- **Rate(number of frame per second)** – The Rate field is set by a single drop-down list. The same threshold is applied to every port on the switch. When the threshold is exceeded, packets are dropped, irrespective of the flow-control settings.

Web – Click PORTS, Storm Control. This page enables you to set the broadcast storm control parameters for every port on the Switch.

Storm Control
 This page enables you to set the storm control parameters for the Switch.

Type	Enable Storm Control	Rate(number of frame per second)
ICMP Rate	<input type="checkbox"/>	1k
Learn Frames Rate	<input type="checkbox"/>	1k
Broadcast Rate	<input type="checkbox"/>	1k
Multicast Rate	<input type="checkbox"/>	1k
Unknown Destination Unicast Rate	<input type="checkbox"/>	1k

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Figure 17 Port Broadcast Control

Port Mirroring

You can mirror traffic from any source port to a target port for real-time analysis. You can then attach a logic analyzer or RMON probe to the target port and study the traffic crossing the source port in a completely unobtrusive manner.

Field Attributes

Ports to Mirror

Select the ports that you want to mirror from this section of the page. A port will be mirrored when the "Mirroring Enabled" check-box is checked.

- **Port to Mirror to** – The port that will “duplicate” or “mirror” the traffic on the source port. Only incoming packets can be mirrored. Packets will be dropped when the available egress bandwidth is less than ingress bandwidth.

Note: If the total ingress bandwidth exceeds the mirror port's egress bandwidth, packets will eventually be dropped on ingress to the

switch which means they will not reach the mirror port or their intended destination port. Input rate-limiting in conjunction with port flow-control could be used to ensure that the total ingress bandwidth never exceeds the egress bandwidth.

Web – Click PORTS, Port Mirroring.

Port Mirroring
This page enables you to set up the port mirroring features of the switch to enable traffic monitoring.

Ports to Mirror			
Port	Mirroring Enabled	Port	Mirroring Enabled
1	<input checked="" type="checkbox"/>	9	<input type="checkbox"/>
2	<input type="checkbox"/>	10	<input type="checkbox"/>
3	<input type="checkbox"/>	11	<input type="checkbox"/>
4	<input type="checkbox"/>	12	<input type="checkbox"/>
5	<input type="checkbox"/>	13	<input type="checkbox"/>
6	<input type="checkbox"/>	14	<input type="checkbox"/>
7	<input type="checkbox"/>	15	<input type="checkbox"/>
8	<input type="checkbox"/>	16	<input type="checkbox"/>

Port to Mirror to

Port to Mirror to

HELP APPLY CANCEL

Figure 18 Port Mirroring

Cable Diagnostic

You can perform cable diagnostics for all ports or selected ports to diagnose any cable faults (Short, Open etc..) and feedback a distance to the fault.

Field Attributes

- **Cable Diagnostics** – It can be performed on a per-port basis. Select the port that you want to do the cable diagnostics.
- **Cable Status** – Show the cable length, operating conditions and isolate a variety of common faults that can occur on the CAT5 twisted pair cabling.

Web – Click PORTS, Port Mirroring.

Cable Diagnostics

Cable diagnostics can be performed for all ports or selected ports. It can be performed from web interface to diagnose any cable faults (Short, Open etc..) and feedback a distance to the fault.

Port:

APPLY

Cable Status		
Pair	Length [m]	Status
A	0	Normal
B	0	Normal
C	0	Normal
D	0	Normal

HELP

Figure 19 Cable Diagnostics

Trunks Membership

This page allows you to create a maximum of eight trunks of up to eight ports each. The Membership Table has one row for each port and ten columns. Each row contains nine radio buttons which are used to indicate which trunk (if any) the port belongs to.

Field Attributes

- **Port** – The front-panel port-number of the port.
- **Not a Trunk Member** – If the radio button in this column is selected, the port is not a member of any trunks. This is the default state.
- **Trunk T1-T8** – These columns correspond to the eight trunks that are supported by the Switch. Clicking on the radio button in any one of these columns causes the port to become a member of the corresponding trunk.

Web – Click TRUNKS, Membership. Click to select which Trunk member to which each port belongs.

Membership
 This page enables you to configure trunks on the Switch.

Port	Not a Trunk Member	Trunk T1	Trunk T2	Trunk T3	Trunk T4	Trunk T5	Trunk T6	Trunk T7	Trunk T8
1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Figure 20 Trunk Membership

Trunk Configuration

Field Attributes

- **Trunk** – Indicates trunk identification.
- **Speed/Duplex** – Allows you to manually set the port speed and duplex mode for all ports in the trunk.
- **Flow Control** – Allows flow control to be enabled or disabled. When the box is checked, flow control is enabled.
- **Ports** – Indicates which ports belong to the trunk.

Web – Click TRUNKS, Settings.

Trunk Configuration			
This page enables you to configure each Trunk configured on the Switch.			
Port Configuration			
Trunk	Speed/Duplex	Flow Control	Ports
T1	Auto Speed ▾	<input type="checkbox"/>	2,3

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Figure 21 Trunk Configuration

Trunk Rate Limit

This page allows you to change the maximum data-rate into and out of each trunk on the switch.

Field Attributes

- **Trunk** – Indicates trunk identification.
- **Trunk Speed** – Indicates the trunk speed.
- **Enable Input Rate Limiting** - Click to select the box to enable the Input Rate Limiting function.
- **Input Limit** – Enter the desired limit. (% of port speed)
- **Enable Output Rate Limiting** – Click to select the box to enable the Output Rate Limiting function.
- **Output Limit** – Enter the desired limit. (% of port speed)
- **Ports** – Indicates which ports belong to the trunk.

Web – Click TRUNKS, Settings.

Rate Limiting

This page enables you to set the rate limiting parameters for each Trunk configured on the Switch.

Rate Limiting						
Trunk	Trunk Speed	Enable Input Rate Limiting	Input Limit (% of port speed)	Enable Output Rate Limiting	Output Limit (% of port speed)	Ports
T1	Auto	<input type="checkbox"/>	<input type="text" value="30"/>	<input type="checkbox"/>	<input type="text" value="30"/>	2,3

Figure 22 Trunk Rate Limiting

LACP Setup

This page enables you to setup the configuration of LACP on all or some ports. LACP (IEEE 802.3ad Link Aggregation Protocol) provides a way to set up aggregation automatically between switch

Field Attributes

- **Port** – The front-panel port-number of the port. This cannot be changed.
- **Enabled** – Enable LACP on the associated port.
- **Key Value** – Setup key value for each port.

Web – Click TRUNKS, Settings.

LACP Port Configuration

This page enables you to setup the configuration of LACP on all or some ports. LACP (IEEE 802.3ad Link Aggregation Protocol) provides a way to set up aggregation automatically between switches.

LACP Setting		
Port	Enabled	Key Value (0..255, 0 means autogenerated key)
1	<input type="checkbox"/>	<input type="text" value="0"/>

Figure 23 LACP Port Configuration

LACP Status

This page displays the LACP status of the switch.

LACP Aggregation

Shows the status of each port. The LACP Aggregation table has one row for each LACP group. Normal means no LACP group is active. For active LACP groups, a new row is created from which the status of its port members are displayed. Status of each port is indicated by a colored box, which use color and number to differentiate status.

Aggregation Information

Shows aggregation information for each LACP group.

Field Attributes

- **Aggregation Group** - The ID number of the LACP group.
- **Partner MAC Address** - The MAC address of link partner.
- **Local Ports Aggregated** - Port member list of the local LACP group.
- **Seconds Since Last Change** - Time in seconds for the LACP group since last setup.

LACP Port Status

Shows LACP port status.

Field Attributes

- **Port** - The port ID.
- **Port Active** - Show if the port is a member of active LACP group.
- **Partner Port Number** - List of port ID for the link partner.
- **Operational Port Key** - The current operational value of the Key for the LACP group.

Web – Click TRUNKS, LACP Status.

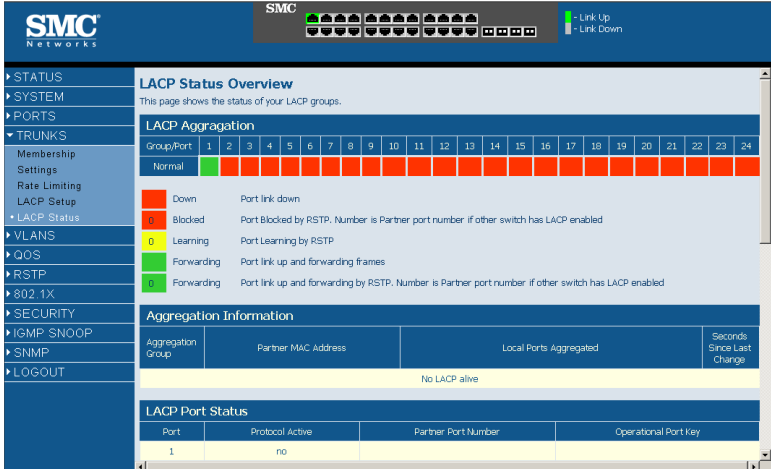


Figure 24 LACP Status Overview

VLAN Settings

You can configure VLAN behavior for specific interfaces, including the default VLAN identifier (PVID) and accepted frame types. This page allows you to create and delete VLANs (Virtual LANs) and to change the VLAN membership and behaviour of individual ports. VLANs are powerful but can be difficult to set up properly. Each row of the table corresponds to one port or trunk; trunked ports cannot be configured individually.

Introduction to VLANs

VLANs (or Virtual LANs) are logical partitions of the physical LAN. You can use VLANs to increase network performance or increase internal network security.

If the network has adequate performance and security for your current needs, it is recommended that you leave the VLAN settings in the default configuration. The default configuration is as follows:

- All ports are members of VLAN 1
- The switch management interface is on VLAN 1 (this cannot be changed)
- All ports have a Port VLAN ID (PVID) of 1
- All ports can send and receive both VLAN-tagged and untagged packets (i.e. they are hybrid ports)

In the default configuration, any port is able to send traffic to any other port and a PC connected to any port will be able to reach the management interface. Broadcast traffic, for example, will be flooded to all ports on the switch.

There are three different parameters that can be configured for each port on the switch; VLAN IDs (VLAN membership), PVID and Packet Type. Note that the ports within a Trunk cannot be configured individually; configure the Trunk instead (Trunks are labelled T1 to T8).

Field Attributes

- **Port/Trunk** – The front-panel port-number of the port or the ID of a trunk. This cannot be changed.
- **VLAN Awareness** – VLAN aware ports will strip the VLAN tag from received frames and insert the tag in transmitted frames (except PVID). VLAN unaware ports will not strip the tag from received frames or insert the tag in transmitted frames.
For QinQ application, customer port should be VLAN unaware and network port (trunk port) should be VLAN aware.
- **QinQ** – QinQ enabled port will accept packets up to 1526 bytes in length, which means double tag header frames can be accepted.
For QinQ application, the QinQ should be enabled for provider port but not for customer port.
Note: For QinQ application, customer ports indicate those ports which

are connected to normal VLAN aware switches at the customer network and the network ports are those which are connected to the service provider network. To tunnel the packets through MAN, QinQ needs to be enabled on network ports

- **Packet Type** – Sets the interface to accept all frame types, including tagged or untagged frames, or only tagged frames. When set to receive all frame types, any received frames that are untagged are assigned to the default VLAN. PCs should be connected to ports with Packet Type set to “All”. PCs cannot, in general, send or receive tagged packets. Switches should be connected to each other with Packet Type set to “Tagged”. If the Packet Type is set to “All”, the port can accept incoming tagged and untagged packets. Untagged packets will be associated with the VLAN identified by the PVID. Tagged packets will be dropped unless the port is a member of the VLAN identified by the VLAN tag in the packet. Outgoing packets will be tagged unless the packet's VLAN ID is the same as the PVID. If the Packet Type is set to “Tagged”, the port will drop untagged packets and will only send and receive tagged packets. Tagged packets will be dropped unless the port is a member of the VLAN identified by the VLAN tag in the packet. The PVID has no effect in this case.(Option: All, Tagged; Default: All)
- **PVID** – VLAN ID assigned to untagged frames received on the interface. The PVID is (Port VLAN ID) is the VLAN ID that is associated with untagged, ingress packets. It is not possible to remove a port from VLAN 1 unless its PVID has been changed to something other than 1. The PVID has no effect on ports that have Packet Type set to Tagged. (Default: 1)

Web – Click VLANS, VLAN Settings. Fill in the required settings for each interface, click Apply.

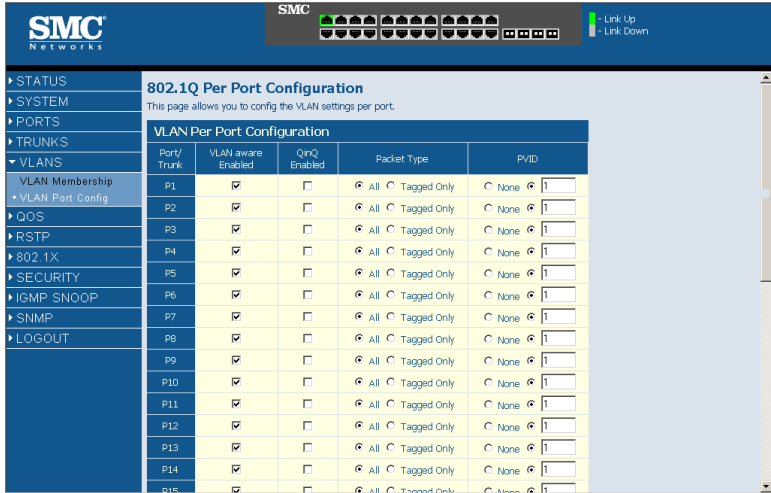


Figure 25 VLAN Settings

QoS Settings

QoS (Quality of Service) is a mechanism which is used to prioritize certain traffic as it moves through the switch. Traffic can be classified as High or Normal priority and, when the switch is heavily loaded, it is the Normal priority packets that are dropped first. You can select how traffic is prioritized by using one of the four QoS modes which is selected using the QoS Mode drop-down list.

Note: Only one QoS mode can be active at one time. It is not possible, for example, to prioritise traffic using the IP Port number and 802.1p tag.

QoS Disabled

QoS is turned off and all packets have equal priority.

802.1p

Packets are prioritized using the content of the VLAN-tag. The 802.1p field is held within the VLAN-tag of a packet. The field is three bits long so can hold eight values; 0 - 7 inclusive. When QoS Mode is set to 802.1p, the 802.1p Configuration table appears which allows a priority (normal or high) to be set for each of the eight values.

You can use the Prioritize Traffic drop-down list to quickly set the values in the 802.1p Configuration table. Select All Normal Priority to set all values to normal priority or select All High Priority to set all values to high priority. Use Custom if you want to set each value individually.

Note: Because end-stations, like PCs, are not usually VLAN aware, they do not create VLAN-tagged frames. As a result, this method of prioritization is not ideal when there are a lot of PCs connected to the Switch.

DSCP

Packets are prioritized using the DSCP (Differentiated Services Code Point) value.

The Differentiated Services Code Point (DSCP) is a six bit field that is contained within an IP (TCP or UDP) header. Six bits allows the DSCP field to take any value in the range 0 - 63 inclusive. When QoS Mode is set to DSCP, the DSCP Configuration table appears which allows a priority (normal or high) to be set for each of the DSCP values.

You can use the Prioritize Traffic drop-down list to quickly set the values in the DSCP Configuration table. Select All Normal Priority to set all values to normal priority or select All High Priority to set all values to high priority. Use Custom if you want to set each value individually.

Web – Click QOS, Settings. In QoS Mode, select QoS Disabled, 802.1p, or DSCP to configure the related parameters.

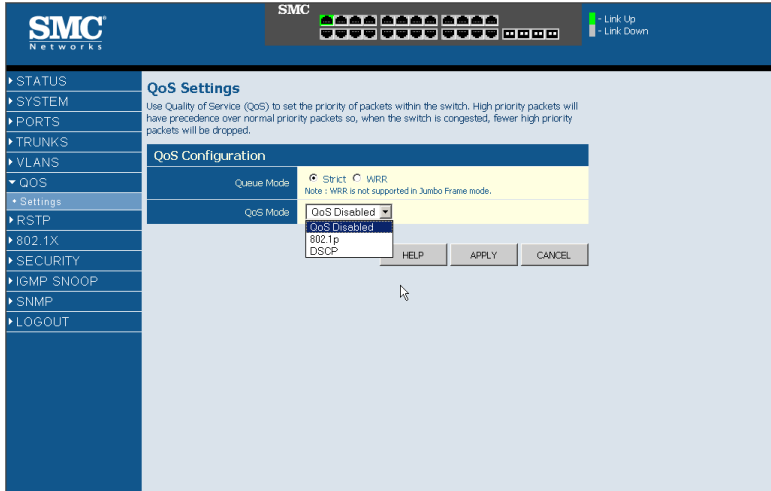


Figure 26 QoS Settings

RSTP

RSTP is a protocol that prevents loops in the network and dynamically reconfigures which physical links in a switch should forward frames.

STA Introduction

The Spanning Tree Algorithm (STA) can be used to detect and disable network loops, and to provide backup links between switches, bridges or routers. This allows the switch to interact with other bridging devices (that is, an STA-compliant switch, bridge or router) in your network to ensure that only one route exists between any two stations on the network, and provide backup links which automatically take over when a primary link goes down. The spanning tree algorithms supported by this switch are STP, Spanning Tree Protocol (IEEE 802.1D), and RSTP, Rapid Spanning Tree Protocol (IEEE 802.1w).

RSTP System Configuration

Field Attributes

- **System Priority** – This parameter configures the spanning tree priority globally for this switch. The device with the highest priority becomes the STA root device. However, if all devices have the same priority, the device with the lowest MAC address will then become the root device. Number between 0 - 61440 in increments of 4096. Therefore, there are 16 distinct values.
- **Hello Time** – Interval (in seconds) at which the root device transmits a configuration message (BPDU frame). Number between 1 - 10 (default is 2).
- **Max Age** – The maximum time (in seconds) a device can wait without receiving a configuration message before attempting to reconfigure. That also means the maximum life time for a BPDU frame. Number between 6 - 40 (default is 20).
- **Forward Delay** – The maximum time (in seconds) the root device will wait before changing states (i.e., discarding to learning to forwarding). Number between 4 - 30 (default is 15).
- **Force Version** – Set and show the RSTP protocol to use. Normal - use RSTP, Compatible - compatible with STP.

RSTP Port Configuration

Field Attributes

- **Port** - The port ID. It can not be changed. Aggregations means any configured trunk group.
- **Enabled** - Click on the tick-box to enable/disable the RSTP protocol for the port.
- **Edge** - Expect the port to be an edge port (linking to an end station) or a link to another STP device.

- **Path Cost** - This parameter is used by the STP to determine the best path between devices. Therefore, lower values should be assigned to ports attached to faster media, and higher values assigned to ports with slower media. Set the RSTP pathcost on the port. Number between 0 - 200000000. 0 means autogenerated pathcost.

Web – Click RSTP, Settings.

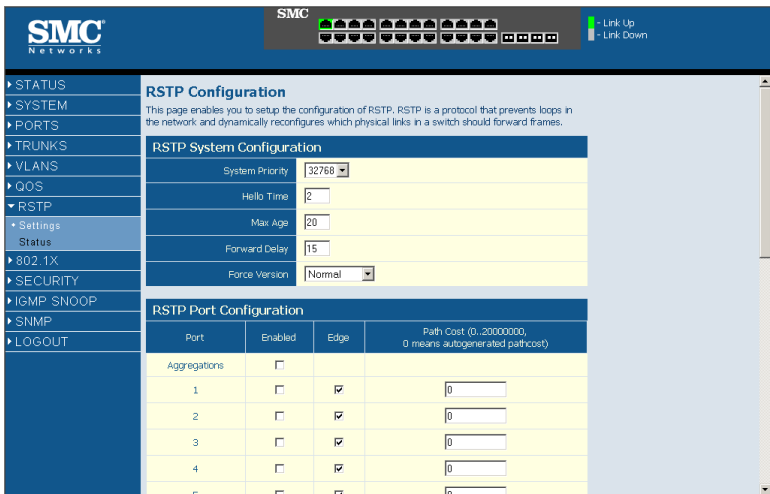


Figure 27 RSTP Configuration

RSTP Status Overview

The RSTP Bridge Overview table has one row to display settings for the whole switch. Hello Time, Maximum Age and Forward Delay are displayed. Topology shows the switch current state. Root ID indicates the root port ID for the switch.

RSTP Port Status

Shows the detailed RSTP information for each port.

Field Attributes

- **Port/Trunk** - Port/Trunk ID number.
- **VLAN ID** - VLAN IDs of the port.
- **Path Cost** - Show the path cost on this port.
- **Edge Port** - Yes if the port is an edge port which connects to an end station.
- **P2p Port** - Yes if the port link is connected to another STP device.
- **Protocol** - Show the running protocol, RSTP or STP.
- **Port State** - Show the current port state, blocking, forwarding, learning etc...

Web – Click RSTP, Status.

The screenshot shows the SMC Networks web interface. At the top, there is a navigation menu with options: STATUS, SYSTEM, PORTS, TRUNKS, VLANS, QOS, RSTP, 802.1X, SECURITY, IGMP SNOOP, SNMP, and LOGOUT. The RSTP section is expanded, showing 'Settings' and 'Status'. The 'RSTP Status Overview' section contains the following information:

RSTP Status Overview
This page shows the status of RSTP.

RSTP Bridge Overview

Hello Time	Max Age	Fwd Delay	Topology	Root ID
2	20	15	Steady	This switch is the Root

RSTP Port Status

Port/Trunk	VLAN ID	Path Cost	Edge Port	P2p Port	Protocol	Port State
P1						Non-STP
P2						Non-STP
P3						Non-STP
P4						Non-STP
P5						Non-STP
P6						Non-STP
P7						Non-STP
P8						Non-STP
P9						Non-STP
P10						Non-STP
P11						Non-STP
P12						Non-STP

Figure 28 RSTP Status Overview

802.1X

Network switches can provide open and easy access to network resources by simply attaching a client PC. Although this automatic configuration and access is a desirable feature, it also allows unauthorized personnel to easily

intrude and possibly gain access to sensitive network data. With IEEE 802.1X (dot1X), access to all switch ports in a network can be centrally controlled from a server, which means that authorized users can use the same credentials for authentication from any point within the network.

802.1 X Setting

The IEEE 802.1x standard defines a port-based access control procedure that prevents unauthorized access to a network by requiring users to first submit credentials for authentication.

Field Attributes

System Setting

- **Mode** - Indicates if 802.1x protocol is globally enabled or disabled on the switch.
- **RADIUS IP** - Set RADIUS server IP address.
- **RADIUS UDP Port** - Set up UDP Port for the external RADIUS server.
- **RADIUS Secret** - Set the secret shared between the switch and the RADIUS server.
- **Reauthentication Enabled** - Sets the client to be re-authenticated after the interval specified by the Re-authentication Period. Re-authentication can be used to detect if a new device is plugged into a switch port.
- **Reauthentication Period** - Sets the time period after which a connected client must be re-authenticated.
- **EAP timeout** - The time the switch shall wait for the supplicant response before re-transmitting a packet.

Port Setting

- **Port** - The port ID. It can not be changed.
- **Admin State** - Sets the authentication mode to one of the following options:
 - **Auto** - Requires a dot1x-aware client to be authorized by the authentication server. Clients that are not dot1x-aware will be

denied access.

- **Force-Authorized** - Forces the port to grant access to all clients, either dot1x-aware or otherwise.
- **Force-Unauthorized** - Forces the port to deny access to all clients, either dot1x-aware or otherwise.
- **Port State** - The state of the port.
- **Reset** - Two options available:
 - **Re-Authenticate** - Schedules a reauthentication to whenever the quiet-period of the port runs out.
 - **Force-Reinitialize** - Bypasses the quiet-period of the port and enables immediate reauthentication regardless of the status for the quiet-period.

Note: The reason for a "quiet-period" follows: If a re-authentication fails, the IEEE802.1X standard enforces a so-called "quiet-period" in which the authenticator (switch) shall be quiet and not re-try another authentication - also packets from supplicant are discarded in this quiet period - this way 'brute-force' attacks are prevented.

Web – Click 802.1X, Settings.

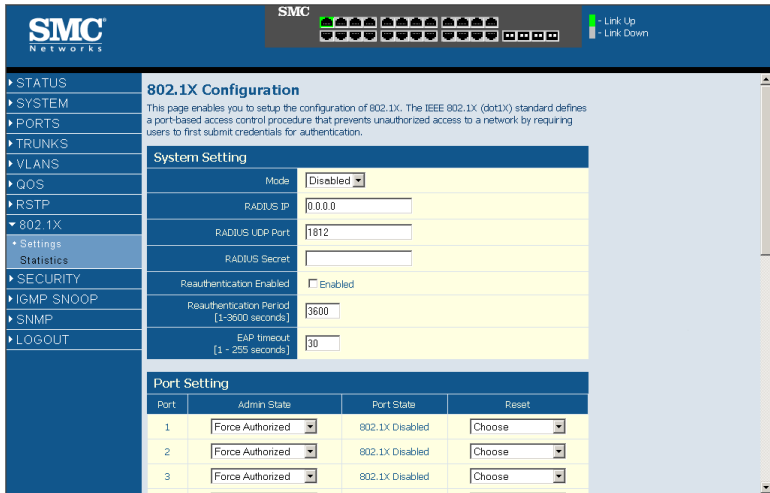


Figure 29 802.1X Configuration

802.1X

Field Attributes

- **Port Statistics** - Statistics can be viewed on a per-port basis. Select the port that you want to view here.
- **Authenticator counters** - General statistics for authenticator.
- **Backend Authenticator counters** - General statistics for Radius server.
- **Dot1x MIB counters** - MIB module defined for 802.1x.

Web – Click 802.1X, Statistics.



Figure 30 802.1X Statistics

Security

IP Filter

On this page, you can setup the source IP Filter on all or some ports. It is used to block unwanted access and provide access to the network for either a specific source IP address or a specific subnet. The IP Filter Configuration table has one row for each port and five columns.

Field Attributes

- **Port** - The front-panel port-number of the port. This cannot be changed.
- **Source IP Filter** - Set mode and IP addresses for IP filter.
- **Mode** - Select the mode for this port.
 - **Disabled** - Disable source IP filter.

- **Static** - Enable source IP filter with configured values in IP Address and IP Mask fields.
- **DHCP** - The IP address for the device connected to this port will be automatically assigned by DHCP server and only frames with the assigned IP address are allowed to access the network. The IP Address and IP Mask fields will be filled with the assigned IP address and 255.255.255.255 individually by software.
- **IP Address** - Setup IP addresses to allow accessing. Frames with IP address outside the allowed range will be dropped.
- **IP Mask** - Setup IP subnet mask to allow accessing for a subnet. If frame with a specific IP address is allowed, the mask should be set to 255.255.255.255.
- **DHCP Sever Allowed** - Set if DHCP server is enabled or disabled on this port. When DHCP Server Allowed is selected on a port, the port is allowed to be linked to a DHCP server. This can prevent the access of unwanted or unsolicited DHCP servers.

Web – Click Security, IP Filter.

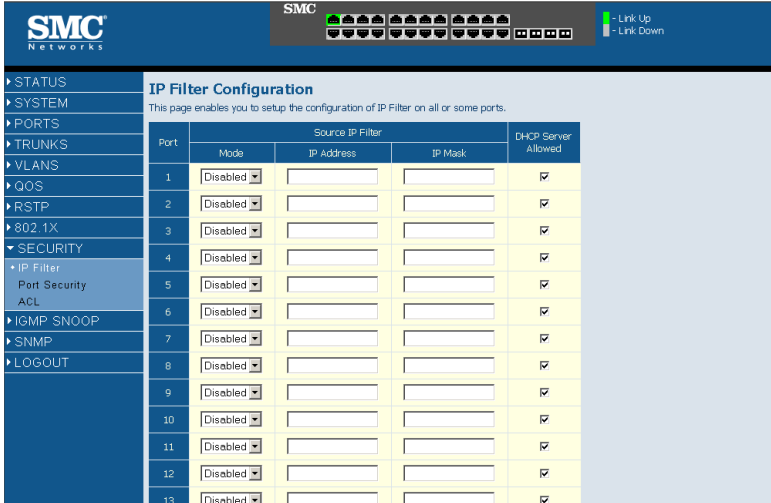


Figure 31 IP Filter Configuration

Port Security

Port security is a feature that allows you to configure a port with one or more MAC addresses that are authorized to access the network through that port. The Port Security table has one row for each port and five columns.

When port security is enabled on a port, the switch stops learning new MAC addresses on the specified port when it has reached a configured maximum number. Only incoming traffic with source addresses already stored in the dynamic or static address table will be accepted as authorized to access the network through that port. If a device with an unauthorized MAC address attempts to use the switch port, the intrusion will be detected and the switch can automatically take action which is specified in Intrusion Action.

Field Attributes

- **Port** - The front-panel port-number of the port. This cannot be changed.
- **Allowed number of Learned MAC addresses** - Set maximum of MAC addresses which can be learned by this port. The Mode settings for the port are set by a single drop-down list.
 - **No Limit** - No limitation on the number of dynamically learned MAC address. Also means disable port security.
 - **8/7/6/5/4/3/2/1** - The maximum number of dynamically learned MAC address.
 - **0** - No dynamically learned MAC address is allowed on this port. But this has no influence on the static MAC address.

Note: Port security only handles dynamically learned MAC addresses and have no limitations on static MAC addresses. On this switch, 24 static MAC address can be configured by System > Static MAC.

Note: The MAC addresses already in the address table will be retained and will not age out. Any other device that attempts to use the port will be prevented from accessing the switch.

- **Number of Learned MAC addresses** - Display the number of currently learned MAC addresses. The string '-' is displayed if a port is setup with "No Limit" mode in the Allowed number of Learned MAC addresses field.
- **Intrusion Action** - Action to be carried out if unauthorized MAC addresses are detected.
 - **Deny New Stations** - The station with unauthorized MAC address will be denied to access the port.
 - **Send Trap and Deny New Stations** - Besides denying the new station, trap message is sent by the switch to report an intrusion action.
- **Trunk** - Display the trunk ID if the port is member of a trunk group.

Web – Click Security, Port Security.

SMC Networks SMC

Port Security
This page enables you to set the security policy for each port on the Switch.

Rate Limiting

Port	Allowed number of Learned MAC addresses	Number of Learned MAC addresses	Intrusion Action	Trunk
1	No Limit	-	Deny New Stations	
2	No Limit	-	Deny New Stations	
3	No Limit	-	Deny New Stations	
4	No Limit	-	Deny New Stations	
5	No Limit	-	Deny New Stations	
6	No Limit	-	Deny New Stations	
7	No Limit	-	Deny New Stations	
8	No Limit	-	Deny New Stations	
9	No Limit	-	Deny New Stations	
10	No Limit	-	Deny New Stations	
11	No Limit	-	Deny New Stations	
12	No Limit	-	Deny New Stations	

Figure 32 Port Security

ACL

This page enables you to setup management access filter on the switch. With the Management Access Filter Configuration table, you can create a list of up to 8 IP addresses or IP address groups that are allowed management access to the switch through the web interface or SNMP. The management interfaces are open to all IP addresses by default. Once you add an entry to a filter list, access to that interface is restricted to the specified addresses. If anyone tries to access a management interface on the switch from an invalid address, the switch will reject the connection.

Note: Invalid frames will not be able to access management interface, but normal forwarding is not impacted.

Web – Click Security, ACL.

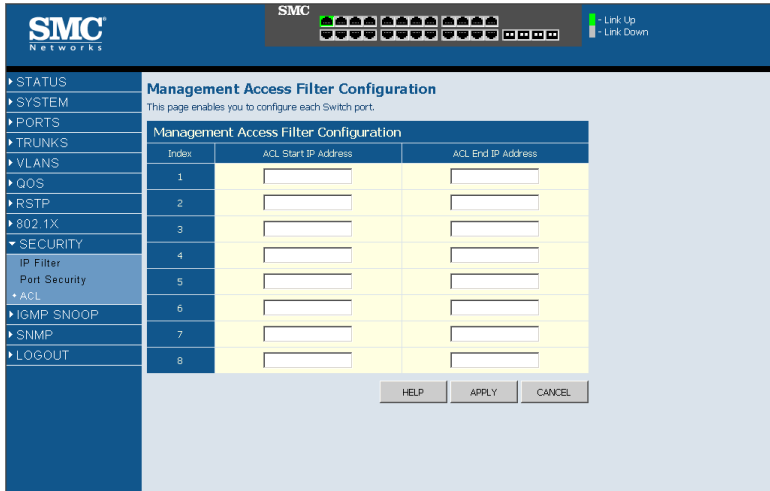


Figure 33 Management Access Filter Configuration

IGMP Snoop

IGMPSNOOP monitors IGMP service requests passing between multicast clients and servers, and dynamically configures the ports which need to receive the multicast traffic. For IGMPV3, basic support for reports only, Source Multicast not supported.

Settings

Field Attributes

IGMP Snooping Configuration

- **IGMP Enabled** - When enabled, the switch will monitor network traffic to determine which hosts want to receive multicast traffic.
- **Router Ports** - Set if ports are connecting to the IGMP administrative routers.

- **Unregistered IPMC Flooding enabled** - Set forwarding mode for unregistered (not-joined) IP multicast traffic. The traffic will flood when enabled, and forward to router-ports only when disabled.

IGMP Snooping VLAN Configuration

- **VLAN ID** - The VLAN ID. It can not be changed.
- **IGMP Snooping Enabled** -When enabled, the port will monitor network traffic to determine which hosts want to receive the multicast traffic.
- **IGMP Querying Enabled** - When enabled, the port can serve as the Querier, which is responsible for asking hosts if they want to receive multicast traffic.

Web – Click IGMP Snoop, Settings.

SMC Networks SMC Link Up / Link Down

IGMP Snooping Configuration
This page enables you to setup the configuration of IGMP Snooping.

IGMP Snooping Information

IGMP Enabled	<input type="checkbox"/>																							
Router Ports	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	<input type="checkbox"/>																							
	Unregistered IPMC Flooding enabled	<input checked="" type="checkbox"/>																						

VLAN ID	IGMP Snooping Enabled	IGMP Querying Enabled
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>

HELP APPLY REFRESH

Figure 34 IGMP Snooping Configuration

IGMP Status

Show the IGMP Snooping statistics for the whole switch.

Field Attributes

- **VLAN ID** - VLAN ID number.
- **Querier** - Show whether Querying is enabled.
- **Queries transmitted** - Show the number of transmitted Query packets.
- **Queries received** - Show the number of received Query packets.
- **v1 Reports** - Show the number of received v1 Report packets.
- **v2 Reports** - Show the number of received v2 Report packets.
- **v3 Reports** - Show the number of received v2 Report packets.
- **v3 Leave** - Show the number of v3 leave packets received.

Web – Click IGMP Snoop, Status.

The screenshot shows the SMC Networks web interface. At the top, there is a navigation menu with options like STATUS, SYSTEM, PORTS, TRUNKS, VLANS, QOS, RSTP, 802.1X, SECURITY, IGMP SNOOP, Settings, Status, SNMP, and LOGOUT. The main content area is titled "IGMP Snooping Configuration" and includes a sub-section "IGMP Snooping Information" with a table. The table has the following data:

VLAN ID	Querier	Queries transmitted	Queries received	v1 Reports	v2 Reports	v3 Reports	v2 Leaves
1	Disabled	0	0	0	0	0	0

Below the table are "HELP" and "REFRESH" buttons. The interface also features a status bar at the top right with "Link Up" and "Link Down" indicators.

Figure 35 IGMP Snoop Status

SNMP

Simple Network Management Protocol (SNMP) is a communication protocol designed specifically for managing devices on a network. Equipment commonly managed with SNMP includes switches, routers and host computers. SNMP is typically used to configure these devices for proper operation in a network environment, as well as to monitor them to evaluate performance or detect potential problems. The switch includes an onboard SNMP agent that continuously monitors the status of its hardware, as well as the traffic passing through its ports. A network management station can access this information using network management software. Access rights to the onboard agent are controlled by community strings. To communicate with the switch, the management station must first submit a valid community string for authentication.

Field Attributes

- **SNMP Enabled** - Activate or deactivate SNMP.
- **SNMP Trap Destination** - IP address of the trap manager.
Traps indicating status changes are issued by the switch to specified trap managers. You must specify trap managers so that key events are reported by this switch to your management station. SNMP trap destination specifies the IP address of the trap manager.
- **SNMP Read Community** - A community string that acts like a password and permits access to the SNMP protocol. The read community string specifies read-only access. Authorized management stations are only able to retrieve MIB objects.
- **SNMP Write Community** - Specifies read-write access. Authorized management stations are able to both retrieve and modify MIB objects.
- **SNMP Trap Community** - Community string sent with the notification operation.

Web – Click IGMP Snoop, Status.

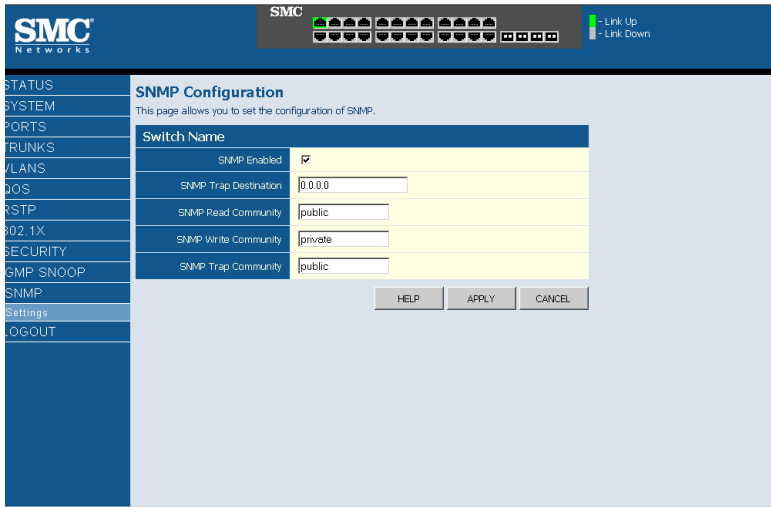


Figure 36 SNMP Configuration

TROUBLESHOOTING

Diagnosing Switch Indicators

1. Symptom

Power LED does not light after power on.

Probable Causes

- AC power cord may be defective.

Possible Solutions

- Check for loose connections.
- Check the power outlet by using it for another device.
- Replace the AC power cord.

2. Symptom

Link LED does not light after connection is made.

Probable Causes

- Switch port, network card or cable may be defective.

Possible Solutions

- Check that the switch and attached device are both powered on.
- Be sure the network cable is connected to both devices.
- Verify that Category 5 or better cable is used for 10/100 Mbps connections, Category 5 or 5e cable for 1000 Mbps connections, and that the length of any cable does not exceed 100 meters (328 feet).
- Check the network card and cable connections for defects.
- Replace the defective card or cable if necessary.

3. Forgotten password

If you have forgotten the administration password you can return the Switch to its factory default state by doing the following:

1. Remove the power cord from the back of the Switch.
2. Remove all cables from the front-panel ports.
3. Connect port 1 to port 2, on the front panel, using a standard network cable.
4. Reconnect the power cord to the rear of the Switch.
5. Wait at least 40 seconds before disconnecting port 1 from port 2.

After completing this procedure, the password will be “smcadmin” and the network address will be returned to the default; 192.168.2.10.

CHANGING A PC'S IP ADDRESS

To change the IP address of a Windows 2000 PC:

1. Click Start, Settings, then Network and Dial-up Connections.
2. For the IP address you want to change, right-click the network connection icon, and then click Properties.
3. In the list of components used by this connection on General tab, select Internet Protocol (TCP/IP), and then click the Properties button.
4. In the Internet Protocol (TCP/IP) Properties dialog box, click to select Use the following IP address. Then type your intended IP address, Subnet mask, and Default gateway in the provided text boxes
5. Click OK to save the changes.

To change the IP address of a Windows XP PC:

1. Click Start, Control Panel, then Network Connections.
2. For the IP address you want to change, right-click the network connection icon, and then click Properties.
3. In the list of components used by this connection on General tab, select Internet Protocol (TCP/IP), and then click the Properties button.
4. In the Internet Protocol (TCP/IP) Properties dialog box, click to select Use the following IP address. Then type your intended IP address, Subnet mask, and Default gateway in the provided text boxes
5. Click OK to save the changes.

CHANGING A PC'S IP ADDRESS

Note: For users of systems other than Windows 2000 or Windows XP, refer to your system documentation for information on changing the PC's IP address.

SOFTWARE SPECIFICATIONS

Software Features

Authentication

RADIUS, Port (802.1X), Port Security

Access Control Lists

IP, MAC (up to 88 lists)

DHCP Client

Port Configuration

100BASE-TX: 10/100 Mbps, half/full duplex

1000BASE-T: 10/100 Mbps at half/full duplex, 1000 Mbps at full duplex

Flow Control

Full Duplex: IEEE 802.3-2002

Half Duplex: Back pressure

Broadcast Storm Control

Traffic throttled above a critical threshold

Port Mirroring

One source port, one destination port

Rate Limits

Input Limit

Output limit

Range (configured per port)

Port Trunking

Static trunks (Cisco EtherChannel compliant)

Dynamic trunks (Link Aggregation Control Protocol)

Spanning Tree Algorithm

Spanning Tree Protocol (STP, IEEE 802.1D)

Rapid Spanning Tree Protocol (RSTP, IEEE 802.1w)

VLAN Support

Up to 255 groups; port-based or tagged (802.1Q),
GVRP for automatic VLAN learning, private VLANs

Class of Service

Supports four levels of priority and Weighted Round Robin Queuing
(which can be configured by VLAN tag or port),
Layer 3/4 priority mapping: IP Port, IP Precedence, IP DSCP

Multicast Filtering

IGMP Snooping (Layer 2)

Additional Features

BOOTP client
SNTP (Simple Network Time Protocol)
SNMP (Simple Network Management Protocol)
RMON (Remote Monitoring, groups 1,2,3,9)
SMTP Email Alerts

Management Features

In-Band Management

Telnet, Web-based HTTP or HTTPS, SNMP manager, or Secure Shell

Out-of-Band Management

RS-232 DB-9 console port

Software Loading

TFTP in-band or XModem out-of-band

SNMP

Management access via MIB database
Trap management to specified hosts

RMON

Groups 1, 2, 3, 9 (Statistics, History, Alarm, Event)

Standards

- IEEE 802.1D Spanning Tree Protocol and traffic priorities
- IEEE 802.1p Priority tags
- IEEE 802.1Q VLAN
- IEEE 802.1w Rapid Spanning Tree Protocol
- IEEE 802.1X Port Authentication
- IEEE 802.3-2002
 - Ethernet, Fast Ethernet, Gigabit Ethernet
 - Full-duplex flow control
 - Link Aggregation Control Protocol
- IEEE 802.3ac VLAN tagging
- DHCP Client (RFC 1541)
- HTTPS
- IGMP (RFC 1112)
- IGMPv2 (RFC 2236)
- RADIUS+ (RFC 2618)
- RMON (RFC 1757 groups 1,2,3,9)
- SNMP (RFC 1157)
- SNMPv2 (RFC 2571)
- SNTP (RFC 2030)
- SSH (Version 2.0)
- TFTP (RFC 1350)

Management Information Bases

Bridge MIB (RFC 1493)
Entity MIB (RFC 2737)
Ether-like MIB (RFC 2665)
Extended Bridge MIB (RFC 2674)
Extensible SNMP Agents MIB (RFC 2742)
Forwarding Table MIB (RFC 2096)
IGMP MIB (RFC 2933)
Interface Group MIB (RFC 2233)
Interfaces Evolution MIB (RFC 2863)
IP Multicasting related MIBs
MAU MIB (RFC 2668)
MIB II (RFC 1213)
Port Access Entity MIB (IEEE 802.1X)
Port Access Entity Equipment MIB
Private MIB
RADIUS Authentication Client MIB (RFC 2621)
RMON MIB (RFC 2819)
RMON II Probe Configuration Group (RFC 2021, partial
implementation)
SNMP Community MIB (RFC 2576)
SNMPv2 IP MIB (RFC 2011)
TACACS+ Authentication Client MIB
TCP MIB (RFC 2013)
Trap (RFC 1215)
UDP MIB (RFC 2012)

FOR TECHNICAL SUPPORT, CALL:

From U.S.A. and Canada (24 hours a day, 7 days a week)
(800) SMC-4-YOU; (949) 679-8000; Fax: (949) 679-1481
From Europe: Contact details can be found on
www.smc-europe.com or www.smc.com

INTERNET

E-mail addresses:
techsupport@smc.com
european.techsupport@smc-europe.com
Driver updates:
http://www.smc.com/index.cfm?action=tech_support_drivers_downloads
World Wide Web:
<http://www.smc.com>
<http://www.smc-europe.com>

FOR LITERATURE OR ADVERTISING RESPONSE, CALL:

U.S.A. and Canada:	(800) SMC-4-YOU;	Fax (949) 679-1481
Spain:	34-91-352-00-40;	Fax 34-93-477-3774
UK:	44 (0) 1932 866553;	Fax 44 (0) 118 974 8701
France:	33 (0) 41 38 32 32;	Fax 33 (0) 41 38 01 58
Italy:	39 (0) 335 5708602;	Fax 39 02 739 14 17
Benelux:	31 33 455 72 88;	Fax 31 33 455 73 30
Central Europe:	49 (0) 89 92861-0;	Fax 49 (0) 89 92861-230
Nordic:	46 (0) 868 70700;	Fax 46 (0) 887 62 62
Eastern Europe:	34 -93-477-4920;	Fax 34 93 477 3774
Sub Saharian Africa:	216-712-36616;	Fax 216-71751415
North West Africa:	34 93 477 4920;	Fax 34 93 477 3774
CIS:	7 (095) 7893573;	Fax 7 (095) 789 35 73
PRC:	86-10-6235-4958;	Fax 86-10-6235-4962
Taiwan:	886-2-8797-8006;	Fax 886-2-8797-6288
Asia Pacific:	(65) 6 238 6556;	Fax (65) 6 238 6466
Korea:	82-2-553-0860;	Fax 82-2-553-7202
Japan:	81-45-224-2332;	Fax 81-45-224-2331
Australia:	61-2-8875-7887;	Fax 61-2-8875-7777
India:	91-22-8204437;	Fax 91-22-8204443

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