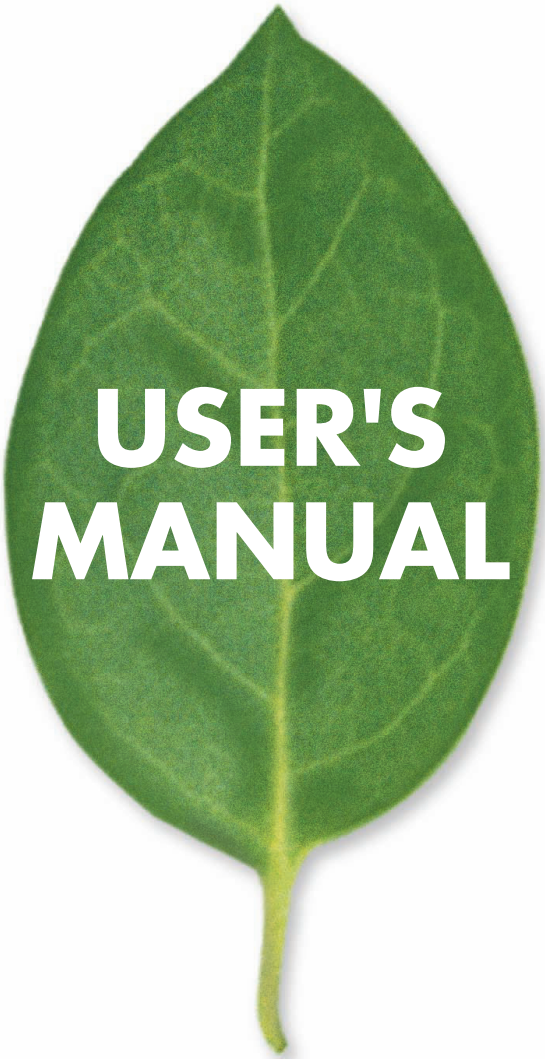

USER'S MANUAL

GIGABIT WEB SMART PLUS SWITCH

SWP-0412/0420G

PLANEX COMMUNICATIONS INC.

PLANEX
L2 Managed Switch
SWP-0412G/SWP-0420G
User Guide

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

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

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

WARNING! The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

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1 Introduction

Congratulations on becoming the owner of the SWP-0412/0420G managed web smart plus switch! You may now manage your LAN (local area network) through a friendly and powerful user interface.

This user guide tells you how to set up the SWP-0412/0420G web smart plus switch, and how to customize its configuration to get the most out of this product.

1.1 L2 managed features

- 24 10/100/1000BASE-TX auto-sensing Fast Ethernet ports
- four small form factor (SFP) Gigabit interface converter (miniGBIC) slots
- 802.1D transparent bridge/spanning tree protocol
- 8K MAC address cache with hardware-assisted aging
- 802.3x flow control
- 802.1Q-based tagged VLAN, up to 256 VLANs
- 802.1p class of service, 4 queues per port
- 802.3ad link aggregation (manual), up to 7 trunk groups
- Port Mirroring
- 802.1x and RADIUS
- RMON: support 4 groups (1, 2, 3, 9)
- SNMP v1, v2
- MIB-II
- Enterprise MIB for PSU, fan, and system temperature, voltage
- Telnet remote login
- FTP for firmware update and configuration backup
- Command Line Interpreter through console , telnet
- Web GUI
- LEDs for port link status
- LEDs system,

1.2 Conventions used in this document

1.2.1 Notations

- Acronyms are defined the first time they appear in text and in the glossary.
- For brevity, the SWP-0412/0420G switch is referred to as “the switch.”
- The terms *LAN* and *network* are used interchangeably to refer to a group of Ethernet-connected computers at one site.

1.2.2 Typography

- *Italics* are used to present the parameters for the command line interpreter.
- **Boldface** type text is used for items you select from menus and drop-down lists, and text strings you type when prompted by the program.

1.2.3 Symbols

This document uses the following icons to call your attention to specific instructions or explanations.

Note

Provides clarification or additional information on the current topic.

Definition

Explains terms or acronyms that may be unfamiliar to many readers. These terms are also included in the Glossary.

WARNING

Provides messages of high importance, including messages relating to personal safety or system integrity.

2 Getting to know the SWP-0412/0420G

2.1 Package contents

The SWP-0412/0420G switch package comes with the following items:

- SWP-0412/0420G
- AC Power cord
- Null modem cable for console interface (DB9)
- Rack installation kit (two brackets with six #6-32 screws)

2.2 Front Panel

The front panel includes LED indicators that show the system, , fan, and port status.

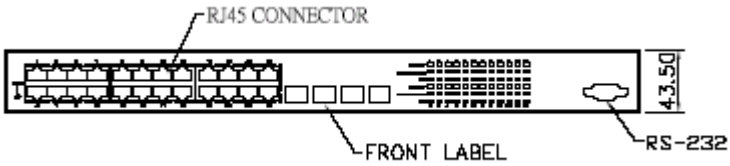

Figure 1. Front panel

Table 1. Front panel labels and LEDs

Label	Color	Status	Description
SYSTEM	Green	On	Unit is powered on
		Flashing	Self-test, INIT, or downloading
	Amber	On	Abnormal temperature or voltage
	Off		No power
10/100/1000 port status	Green	On	Link (RJ-45 or SFP) is present; port is enabled
		Flashing	Data is being transmitted/received
	Off		No Ethernet link
10/100/1000 port speed	Green	On	1000Mbps
	Amber	On	100Mbps
	Off		10Mbps or link is not present
10/100/1000 port duplex	Green	On	full duplex
	Amber	On	half dulplex
	Off		link is not present

2.3 Rear Panel

The switch rear panel contains the ports for the data and power connections.

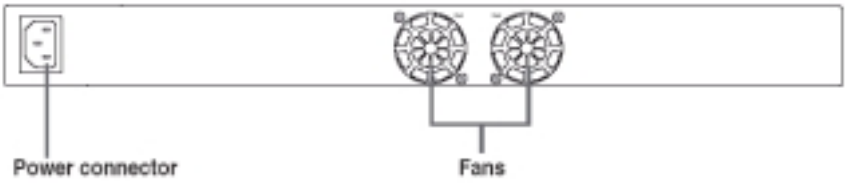

Figure 2. Rear panel

Table 2. Rear panel labels

No.	Label	Description
1	Power Connector	Connects to the supplied power cord
2	FAN1 – FAN2	System fans

2.4 Technical specifications

Table 3. Technical specifications

Physical Dimensions	43.5mm(H) X 444 mm(W) X 265mm(D)		
Power	Input	Consumption	
	100-240V AC/2.5A 50-60Hz	< 38 watts	
Environmental Ranges		Operating	Storage
	Temperature	0-40℃	0-40℃
	Humidity	35 to 85 %	35 to 85 %
	Altitude	up to 10,000 ft (3,000m)	40,000 ft (12,000m)
Replaceable Fans	Dimensions	Voltage and Current	Speed:
	40 x 40 x 20 mm	12VDC, 0.13A	8200RPM

3 Quick start guide

This section provides the basic instructions to set up the SWP-0412/0420G environment. Refer also to the SWP-0412/0420G Installation Guide.

Part 1 shows you how to install the SWP-0412/0420G on a flat surface or on a rack.

Part 2 provides instructions to set up the hardware.

Part 3 shows you how to configure basic settings on the SWP-0412/0420G.

Obtain the following information from your network administrator before proceeding:

IP address for the switch

Default gateway for the network

Network mask for this network

3.1 Part 1 — Installing the hardware

Connect the device to the power outlet, and your computer or network.

3.1.1 Installing the switch on a flat surface

The switch should be installed on a level surface that can support the weight of the switches and their accessories. Attach four rubber pads on the marked location on the bottom of the switch.

3.1.2 Mounting the switch on a rack

1. Attach brackets to each side of the switch and make the posts insert to the switch.
2. Insert and tighten two screws to securely attach the bracket to the rack on each side.

3.2 Part 2 — Setting up the switch

Connect the device to the power outlet, and your computer or network.

3.2.1 Connect the console port

For console management, use an RS232 (DB9) to connect the switch. If you want to use WEB interface, connect your PC to the switch using the Ethernet cable.

3.2.2 Connect to the computers or a LAN

You can use Ethernet cable to connect computers directly to the switch ports. You can also connect hubs/switches to the switch ports by Ethernet cables. You can use either the crossover or straight-through Ethernet cable to connect computers, hubs, or switches.

Use a twisted-pair Category 5 Ethernet cable to connect the 1000BASE-T port. Otherwise, the link speed can not reach 1Gbps.

3.2.3 Attach the power adapter

1. Connect the AC power cord to the POWER receptacle on the back of the switch and plug the other end of the power cord into a wall outlet or a power strip.
2. Check the front LED indicators with the description in Table 4. If the LEDs light up as described, the switch hardware is working properly.

Table 4. LED Indicators

No.	LED	Description
1	System	Solid green indicates that the device is turned on. If this light is off, check if the power adapter if attached to the switch and plugged into a power source.
2	Switch ports [1] to [24]	Solid green indicates that the device can communicate with the LAN, or flashing when the device is sending or receiving data from your LAN computer.

3.3 Part 3 — Basic switch setting for management

After completing the hardware connections, configure the basic settings for your switch. You can manage the switch using the following methods:

- Web interface: the switch has a set of pages to allow to you manage it using Java®-enabled IE5.5 or higher version.
- Command Line Interface: use console port to manage the switch.

3.3.1 Setting up through the console port

1. Use the supplied crossover RS-232 cable to connect to the console port on the back of the switch. This port is a male DB-9 connector, implemented as a data terminal equipment (DTE) connection. Tighten the retaining screws on the cable to secure it on the connector. Connect the other end of the cable to a PC running terminal emulation software. e.g Hyper Terminal.

2. Make sure the settings of your terminal emulation software as follows:
   a) Choose the appropriate serial port number
   b) Set the data baud rate to 9600
   c) Set the data format to no parity, 8 data bits and 1 stop bit
   d) No flow control
   e) Set VT1000 for emulation mode
3. After setting up the terminal, you can see the prompt "(PLANEX)%" on the terminal.
4. Type "login" to access the command line interface. The default user name is "admin". Password is "password" **<Enter>**.

You can change the password at any time through CLI (see section 5.3.1). To protect your switch from unauthorized access, you must change the default password as soon as possible.

5. Follow these steps to assign an IP address to the switch:
   a) Type "net interface ip sw0 <your ip address> <your network mask>". For example, if your switch IP is 192.168.10.1 and the network mask is 255.255.255.0. Then you should type "net interface ip sw0 192.168.10.1 255.255.255.0".
   b) If the switch has to be managed across networks, then a default gateway or a static route entry is required. Type "net route static add 0.0.0.0 <your network gateway IP> 0.0.0.0 1// as your default route entry, as shown in Figure 3.

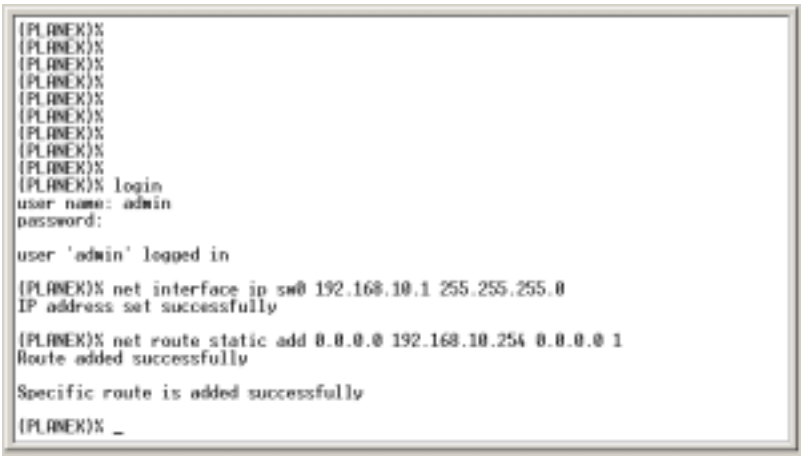

Figure 3. Login and IP setup Screen

3.3.2 Setting up through the Web interface

To successfully connect your PC to the switch, your PC must a valid IP in your network. Contact your network administrator to obtain a valid IP for the switch. If you wish to change the default IP address of the switch, follow section 3.3.1 to change the IP address. Since the switch does not support DHCP client function, a valid static IP for the switch is necessary to use Web interface.

1. It is not necessary to login Web interface at the first time to use Web interface because the default configuration for Web access authentication is enable. To secure the system configuration, please enable the authentication function at the "**Administration"** page under "**System"** category. Skip step 2 if the authentication is disabled.
2. At any PC connected to the network that the switch can access , open your Web browser (Internet Explorer), and type the following URL in the address/location box, and press **<Enter>**:

   http://192.168.1.1

   This is the factory default IP address of the switch.

   A login screen appears, as shown in Figure 4.

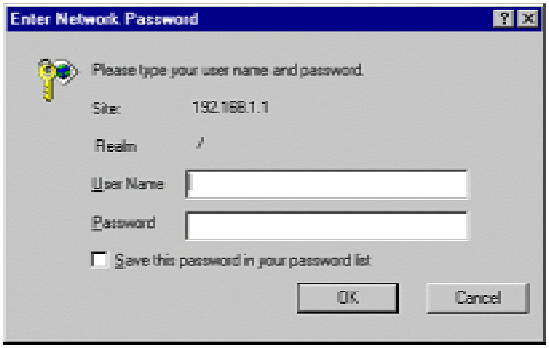

Figure 4. Login Screen

Enter your user name and password, and then click  to enter the Configuration Manager. Use the following defaults the first time you log into this interface:

Default User Name:	Admin
Default Password:	password

You can change the password at any time (see section 5.3.1 System Commands).

3. To setup a new IP address, click "**System**", then "**IP Setup**" (see Figure 8). Fill in the IP address, network mask and default gateway, then click  .

4. If your new address is different from the default, the browser can not update the switch status window or retrieve any page. This is normal. You have to retype the new IP address in the address/location box, and press **<Enter>**. The WEB link returns.

5. To enable authentication for Web access, click "**Administration**" on the menu list, then select "**Enabled**" to start the protection.

   A login window appears immediately after you click  . See the figures on the next page.

Figure 5. IP Setup

4 Management with the Web Interface

The switch provides Web pages that allow switch management through the Internet. The program is designed to work best with Microsoft Internet Explorer® 5.5, or later versions. **NOTE:** Netscape is not supported.

4.1 Log into Web user interface

1. From a PC, open your web browser, type the following in the web address (or location) box, and press **<Enter>**:

   http://192.168.1.1

   This is the factory default IP address for the switch. A login screen displays, as shown in Figure 6.

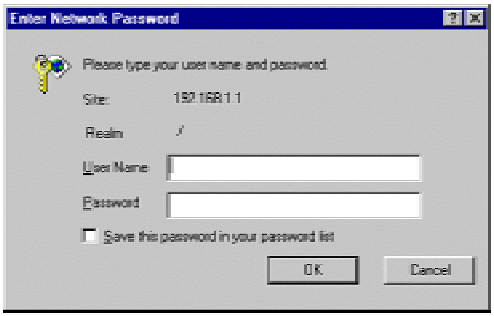

Figure 6. Configuration manager login screen

2. Enter your user name and password, then click OK.

   Use the following defaults the first time you log into the program. You can change the password at any time through CLI interface (see section 5.3.1 on page 62).

   Default User Name: admin

   Default Password: password

The home page appears each time you log into the program. See Figures 11 and 12).

Figure 7. Home page

4.2 Functional layout

Typical web page consists of three separate frames. The top frame has a switch logo as shown Figure 8

Figure 8. Top Frame

The left frame, a menu frame as shown in Figure 9, contains all the features available for switch configuration. These features are grouped into categories, e.g. System, Bridge, etc. You can click on any of these to display a specific configuration page.

Figure 9. Expanded Menu List

The right frame displays configuration pages or graphics for the statistics. See section 4.3 for details.

4.2.1 Menu navigation tips

- To expand a group of related menus, click on the corresponding group name. The ▸ sign will change to ▾ after expansion.
- To contract a group of related menus: click on the corresponding group name. The ▸ sign will appear next to the group name.
- To open a specific configuration page, click on the desired menu item.

4.2.2 Commonly used buttons and icons

The following table describes the function for each button and icon used in the application.

Table 5. Commonly used buttons and icons

Button/Icon	Function
	Stores any changes you have made on the current page.
	Adds the existing configuration to the system, e.g. a static MAC address or a firewall ACL rule and etc.
	Modifies an existing entry
	Modifies the existing configuration in the system, e.g. a static route or a filter ACL rule and etc.
	Deletes the selected item, e.g. a static route or a filter ACL rule and etc.
	Re-displays the current page with updated statistics or settings.

4.3 System Pages

System pages include management, IP setup, administration, reboot, and firmware update function.

4.3.1 Management

The **Management** page contains the following information:

Model Name: product name

MAC Address: switch MAC address

System Name: user assigned name to identify the system (editable)

System Contact (editable)

System Location (editable)

To save any changes and make it effective immediately, click OK. Use Reload to refresh the setting, as shown in Figure 10.

Figure 10. Management

4.3.2 IP Setup

The switch supports dynamic IP and static IP assignment. The dynamic IP is get from a DHCP server within the same VLAN. The **IP Setup** page contains the following editable information:

IP Address: assign a static IP address to the switch management interface.

Network Mask

Default Gateway

To save any changes and make it effective immediately, click OK. Use Reload to refresh the setting, as shown in Figure12.

Figure 11. IP Setup

4.3.3 Administration

The Administration page allows you enable or disable the authentication for web user by *password protection*.

To save any changes and make it effective immediately, click OK. Use Reload to refresh the setting, as shown in Figure 12. When you enable the password protection, you have to login again immediately.

You can change the password at any time through the CLI interface.(Please refer to section 5.3.1)

Figure 12. Administration

4.3.4 Reboot

The **Reboot** page contains a 

button. Clicking the button reboots the system.

Rebooting the system stops the network traffic and terminates the Web interface connection.

Figure 13. Reboot

4.3.5 Firmware Upgrade

The **Firmware** page contains the following information:

Hardware Version: shows the hardware revision number.

Boot ROM Version: shows the version of the boot code

Firmware Version: shows the current running firmware version. This number will be updated after the firmware update.

Enter the firmware location into the firmware space directly, or click 

to choose the file name of the firmware from prompt window. Click to update the switch firmware. See Figure 14 for reference.

Clicking the upload button loads the assigned firmware to the switch, then reboot system after a successful firmware update. You have to re-login to Web interface again

Figure 14. Firmware Upgrade

4.3.6 CPU Usage

This page displays the CPU usage of the switch. User can set the show count by entering a valid number from 1 to 10. Then click on Query to show the CPU usage. For example, if the user enters 5, then the display window will show the CPU usage 5 times.

Figure 15. CPU Usage

4.4 Physical Interface

The **Physical Interface** displays the Ethernet port status in real time. You can configure the port in following fields:

Port: select the port to configure

Admin: disable/enable the port

Mode: set the speed and duplex mode

Flow Control: enable/disable 802.3x flow control mechanism

Port Status Window: displays the following information for each port

a) Link status: the link speed and duplex for an existing link, otherwise link is down

b) State: the STP state (※ Don't support STP)

c) Admin: the setting value to disable or enable the port

d) Mode: the setting value for link speed and duplex mode

e) Flow Control: the setting value to enable or disable 802.3x flow control mechanism

Select the corresponding port number and configure the port setting, then click on the 

button. The field you change will update the content of the display window. However, the new settings do not take effect until the "*Save Configuration"* is executed.

Figure 16. Physical Interface

4.5 Bridge

The **Bridge** page group contains most layer 2 configurations, like link aggregation,...etc..

4.5.1 Link Aggregation

The page configures the link aggregation group (port trunking). The switch can have 7 link aggregation groups.

Show Trunk: Select "Add a new Trunk" for a new created group. Or select an existed group to display on the following fields and port icons.

Port Selection Criterion: the algorithm to distribute packets among the ports of the link aggregation group according to source MAC address, destination MAC address, source and destination MAC address, source IP address, destination IP address, or source and destination IP address.

Name: the group name.

Trunk ID: a number to identify the trunk group besides the group name.

Remove Trunk: Remove the selected trunk.

Port Icons: these port icons are listed in a way like the front panel. You have to click on the icon the select the group members. The port can be removed from the group by clicking the selected port again.

Click 

to make the setting send to the switch (HTTP server). Click 

to refresh the settings to current value. To make the configuration effective, go to "*Save Configuration*" page, then click 

.

You have to check the runtime link speed and duplex mode to make sure the trunk is physically active. Go to *Physical Interface* and check the link mode in the runtime status window for the trunk ports. If all the trunk members are in the same speed and full duplex mode, then the trunk group is set up successfully. If one of the members is not in the same speed or full duplex mode, the trunk is not set correctly. Check the link partner and change the settings to have the same speed and full duplex mode for all the members of your trunk group.

3 trunk methods are used. It is for per-system, not per-port

- All the ports in the link aggregation group MUST operate in full-duplex mode at the same speed.
- All the ports in the link aggregation group MUST be configured in auto-negotiation mode or full duplex mode. This configuration will make the full duplex link possible. If you set the ports in full duplex force mode, then the link partner MUST have the same setting. Otherwise the link aggregation could operate abnormally.
- All the ports in the link aggregation group MUST have the same VLAN setting.
- All the ports in the link aggregation group are treated as a single logical link. That is, if any member changes an attribute, the others will change too. For example, a trunk group consists of port 1 and 2. If the VLAN of port 1 changes, the VLAN of port 2 also changes with port 1.

Figure 17. Link aggregation

4.5.2 Mirroring

Mirroring, together with a network traffic analyzer, helps you monitor network traffics. You can monitor the selected ports for egress or ingress packets.

Mirror Mode: Enables or disables the mirror function for the selected group.

Monitor Port: Receives the copies of all the traffics in the selected mirrored ports.

The monitor port can not belong to any link aggregation group.

The monitor port can not operate as a normal switch port. It does not switch packets or do address learning.

4 ports are only supported for mirror egress port.

Click  to make the setting send to the switch (HTTP server). Click  to refresh the settings to current value.

Figure 18. Mirroring page

4.5.3 Traffic Control

Traffic control prevents the switch bandwidth from flooding packets including broadcast packets, multicast packets The limit number is a threshold to limit the total number of the checked type packets. For example, if broadcast and multicast are enabled, the total traffic amount for those two types will not exceed the limit value. Click  to save the new configuration. To make the configuration effective, go to "*Save Configuration*" page, then click  .

Figure 19. Traffic Control

4.5.4 Dynamic Addresses

This page displays the result of dynamic MAC address lookup by port, VLAN ID, or specified MAC address. The dynamic address is the MAC address learned by switch, it will age out from the address table if the address is not learned again during the age time. User can set the age time by entering a valid number from 10 to 600 in seconds. Then click on OK to save the new age value. To make the configuration effective, please go to "*Save Configuration*" page, then click on Save.

You can look up MAC addresses by checking the port, VLAN ID, or/and MAC address, then click on the Query. The address window will display the result of the query.

Figure 20. Dynamic Address

4.5.5 Static Addresses

You can add a MAC address into the switch address table. The MAC address added by this way will not age out from the address table. We call it static address.

MAC Address: enter the MAC address

VLAN ID: enter the VLAN ID that the MAC belongs

Port Selection: select the port which the MAC belongs

Discard: you can do packet filtering when the MAC address appears in the packets as destination address, source address, or either of them.

Click on the Add when you create a new static MAC address by the above information. Then you will see the new added entry shows in the address window. You can remove the existed address by selecting the entry with the mouse, then clicking on Remove. The Modify button updates the existed MAC address entries. Click OK to save effective. Click Reload to refresh the settings to current value. To make the configuration effective, please go to "save configuration" page, then click Save.

Figure 21. Static Address

4.5.6 Tagged VLAN

You can set up to 256 VLAN groups and show VLAN group in this page. There is a default VLAN created by the switch. It cannot be modify at all. This feature prevents the switch from malfunctions. You can remove any existed VLAN except the default VLAN.

You can assign the port to be a tagged port or an untagged port by toggling the port button. There are three types of button displays:

"U" type: untagged port that will remove VLAN tags from the transmitted packets.

"T" type: All packets transmitted from this port will be tagged.

"blank" type: This port is not a member of the VLAN group.

If one untagged port belongs to two or more VLAN groups at the same time, it will confuse the switch and cause flooding traffics. To prevent it, the switch only allow one untagged port belongs to one VLAN at the same time. That is, the untagged port belongs to the VLAN group which is called "PVID" and configured in the "Default Port VLAN & CoS" page. If you want to assign an untagged port from one VLAN to another, you have to remove it from the original VLAN, or change it to be tagged in the original VLAN first.

Show VLAN: select the existed VLAN to display or select "Add a new VLAN" to create a new VLAN group

Name: the VLAN name

VLAN ID: this field requires user to enter the VLAN ID when a new VLAN is created

Remove VLAN: Remove a existed VLAN. This field disappears in VLAN creation page.

Click on 

to save the configuration. To make the configuration effective, go to "*Save Configuration*" page, then click on 

.

Figure 22. Tagged VLAN

4.5.7 Default Port VLAN and CoS

Some VLAN tag related field settings for each port are included in this page. It includes:

Port: select the port to configure

PVID: port-based VLAN ID. Every untagged packet received from this port will be tagged with this VLAN group ID

CoS (Class of Service) value: every untagged packet received from this port will be assigned to this CoS in the VLAN tagged. Due to 4 internal traffic class mapping to 8 priority, Only CoS value 0,2,5,7 are valid according to Cos Queue Mapping

Click on Modify to change the content in the port list window. Click on OK to save the configuration. To make the configuration effective, go to "*Save Configuration*" page, then click Save.

Figure 23. Default Port VLAN and CoS

4.5.8 CoS Queue Mapping

The switch supports 4 egress queues for each port witch a strict priority scheduler. That is, each CoS value can map into one of the four queues. The queue 4 has the highest priority to transmit the packets. Click OK to save the configuration. To make the configuration effective, go to "*Save Configuration*" page, then click Save

Figure 24. CoS Queue Mapping

4.6 SNMP

This group offers the SNMP configuration including **Community Table, Host Table,** and ***Trap*** **Setting. To provide more secure management and access control.**

4.6.1 Community Table

You can type different community names and specify whether the community has the privilege to do set action (write access) by checking the box. Click OK to save the configuration permanently or Reload to refresh the page.

Figure 25. Community Table

4.6.2 Host Table

This page links host IP address to the community name that is entered in **Community Table** page. Type an IP address and select the community name from the drop-down list. Click OK to save the configuration permanently or Reload to refresh the page.

Figure 26. Host Table

4.6.3 Trap Setting

By setting trap destination IP addresses and community names, you can enable SNMP trap function to send trap packets in different versions(v1 or v2c).

Click OK to save the configuration permanently or Reload to refresh the page.

Figure 27. Trap Setting

4.7 Security

The switch has the 802.1x port-based security feature. Only authorized hosts are allowed to access the switch port. Traffic is blocked for hosts failed to authenticate themselves. The authentication service is provided by a RADIUS server or the local database in the switch.

The VLAN information for the users/ports should be configured in the authentication server properly before enabling this feature.

4.7.1 Port Access Control

Port Access Control is used to configure various 802.1x parameters. 802.1x uses either RADIUS server or local database to authenticate port users.

The first part is the Bridge(Global) settings:

- Reauthentication: Once enabled, The switch will try to authenticate the port user again when the re-authentication time is up.
- Reauthentication Time: If 'Reauthentication' is enabled, this is the time period the switch uses to re-send authentication request to the port user.(see above)
- Authentication Method: RADIUS or Local database can be used to authenticate the port user.
- Quiet Period: If authentication failed either from RADIUS or local database, the switch waits upon this time period before sending another authentication request to the port user.
- Retransmission Time: If the port user failed to respond to authentication request from the switch, the switch waits upon this time period before sending another authentication request to the port user.
- Max Reauthentication Attempts: Retry count if the port user failed to respond to authentication requests from the switch.

The second part is the port settings. Please click 

when you're done with the modifications.

- Port: Specify which port to configure.

- Multi-host: If enabled, ALL hosts connected to the selected port are allowed to use the port if ONE of the hosts passed the authentication. If disabled, only ONE host among other hosts passed the authentication is allowed to use the port.
- Authentication Control: If 'force_authorized' is selected, the selected port is forced authorized. Thus, traffic from all hosts is allowed to pass. Otherwise, if 'force_unauthorized' is selected, the selected port is blocked and no traffic can go through. If 'Auto' is selected, the behavior of the selected port is controlled by 802.1x protocol. All ports should be set to 'Auto' under normal conditions.

Click OK to make the settings permanent. Click Reload to refresh the settings to current value.

Figure 28. Port Access Control

4.7.2 Dial-In User

Dial-in User is used to define users in the local database of the switch.

- User Name: New user name.
- Password: Password for the new user.
- Confirm Password: Enter the password again.

Please click Add to add the new user. Click Modify when you're done with the modifications. Click Remove when you want to remove the selected user. Click OK to make the settings permanent. Click Reload to refresh the settings to current value.

Figure 29. Dial-In user

4.7.3 RADIUS

In order to use external RADIUS server, the following parameters are required to be setup:

- Authentication Server IP: The IP address of the RADIUS server.
- Authentication Server Port: The port number for the RADIUS server is listening to.
- Authentication Server Key: The key is used for communications between SWP-0412/0420G and the RADIUS server.
- Confirm Authentication Key: Re-type the key entered above.

The VLAN of the RADIUS server connected to the switch must be the same as the VLAN of the system management interface.

Please click OK to make the settings permanent. Click Reload to refresh the settings to current value.

Figure 30. RADIUS

4.8 VCT

VCT stands for "Virtual Cable Tester". The major function of VCT is to detect cable fault(open or short) and report the estimated fault location. Moreover, VCT can also detect PHY type(100M, 1000M or 10000M) as well as estimated cable length of normal cable. Cable length estimation only supports Giga speed mode.

Just select a port number and click GO. Test result shall be displayed accordingly.

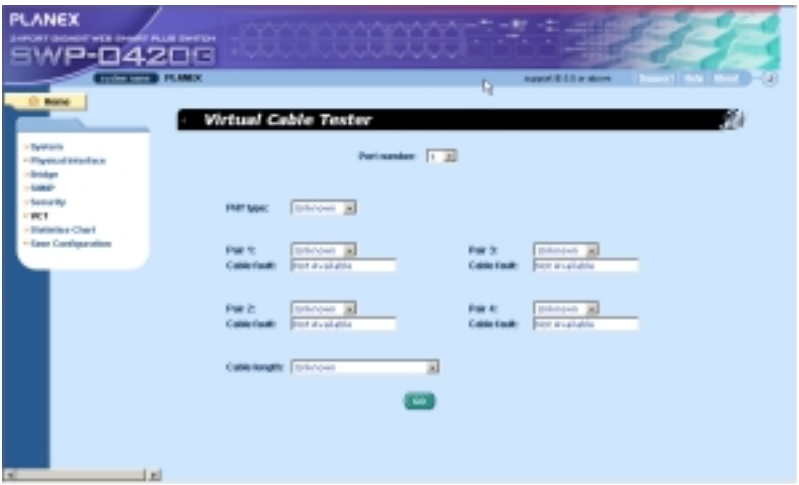

Figure 31. VCT

4.9 Statistics Chart

The **Statistics Chart** pages provide network flow in different charts. You can specify the period time to refresh the chart. You can monitor the network traffic amount in different graphic chart by these pages. Most MIB-II counters are displayed in these charts.

Click **Refresh Rate** to set the period for retrieving new data from the switch. You can differentiate the statistics or ports by selecting **Color**. Finally, click on **Draw** to let the browser to draw the graphic chart. Each new **Draw** will reset the statistics display.

4.9.1 Traffic Comparison

This page shows the one statistics item for all the ports in one graphic chart. Specify the statistics item to display and click the **Draw**, the browser will show you the update data and refresh the graphic periodically**.**

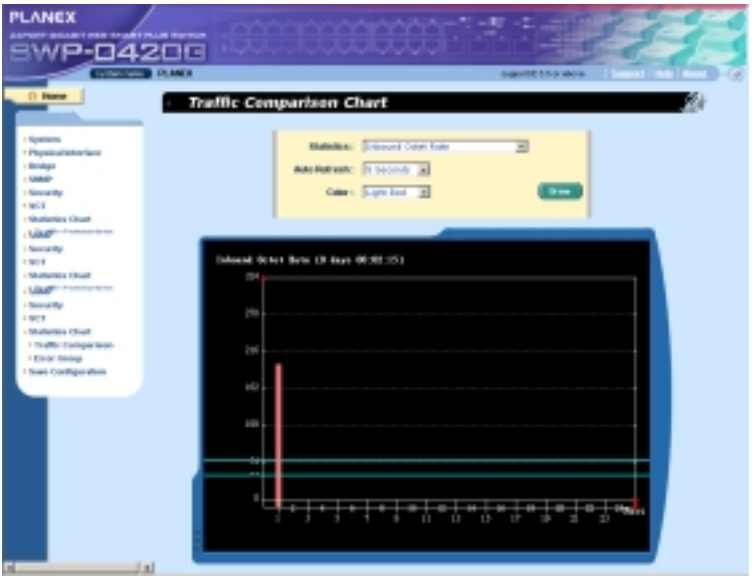

Figure 32. Traffic comparison

4.9.2 Error Group

Selecting the **Port** and display **Color**, then clicking the **Draw**, the statistics window shows you all the discards or error counts for the specified port. The data is updated periodically.

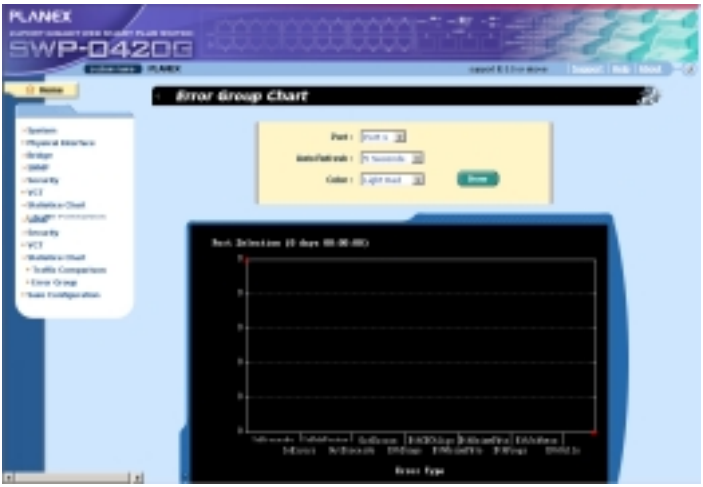

Figure 33. Error group

4.10 Save Configuration

To save configuration permanently, you have to click 

. The setting also takes effective after a successful save.

Sometimes you may want to reset the switch configuration, you can click on 

to reset the configuration file to factory default. Of course, a system reboot will follow this restoration process.

You will lose all the configurations when you choose to restore the factory default configurations.

Figure 34. Save Configuration

5 Console Interface

This chapter describes how to use console interface to configure the switch. The switch provides RS232 connectors to connect your PC. Use a terminal emulator on your PC such as HyperTerminal and command line interpreter to configure the switch. You have to set up the terminal emulator with baud rate 9600, 8 bit data, no parity, and 1 stop bit, and no flow control.

Once you enter CLI mode, type "*?*" will display all available command help messages. This is very useful when you are not familiar with the CLI commands. The CLI mode times out when idle for 10 minutes. You have to login again to enter CLI mode after the timeout.

All the CLI commands are case sensitive. In order to make them easier to use, you can enter into different category by typing the full command, then this category becomes your working category. Thereafter, you don't have to type "*sys*" before any sub-commands. For example, "*sys*" is a command category including a lot of sub-commands. You don't have to type "*sys*" for the sub-commands once you change your working category to "*sys*" by typing "*sys*". The prompt will become "(*system name)sys%*" when your working category is "*sys*".

5.1 Power On Self Test

POST is executing during the system booting time. It tests system memory, LED and hardware chips on the switchboard. It displays system information as the result of system test and initialization. You can ignore the information until the prompt, “(Planex)%”, appears (see Figure 35).

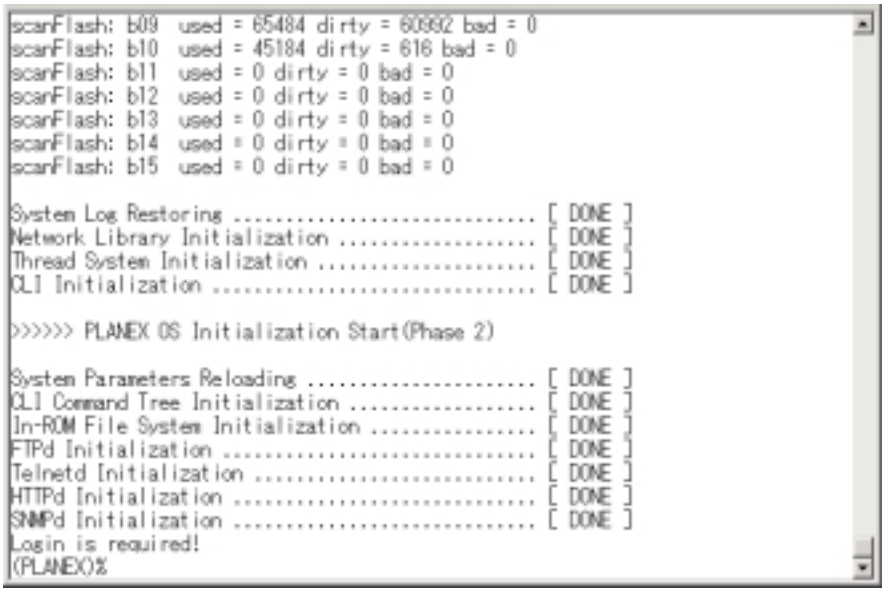

Figure 35. CLI interface

5.1.1 Boot ROM Command Mode

During the POST process, you can enter a "**Boot ROM Command**" mode by pressing <ENTER> key as shown in Figure 37.

Enter the "?" key to show the help messages for all available commands.

Although the commands are helpful in some situation, we STRONGLY suggest users not to use them if you don't know the command function.

```
FLASH ROM Read Test ..................................... 4096K
FLASH ROM Read Test ..................................... DONE
SDRAM Read/Write Test ................................... 32768K
SDRAM Read/Write Test ................................... DONE


>>>>>> Switch Software Information

Switch Type ............................................. SWP-0420G
Boot ROM Version ........................................ Rev 1.0
Boot ROM Build Date ..................................... Feb 17 2005 15:27:40
Firmware Address ........................................ 0xffd00000
Firmware Age ............................................ 0x00
Firmware Status ......................................... PASS
Firmware Version ........................................ 2.0.1K
Firmware Creation Date .................................. 3/9/2005 20:13:9
Firmware Size ........................................... 1844880 bytes
Firmware Checksum ....................................... 0x93fd
Firmware Starting Address ............................... 0x100000
Firmware Web Files Size ................................. 389075 bytes

Hit Any Key to Enter Command Mode in 2 Second(s)

[Planex OS Boot]:
```

Figure 36. Boot ROM Command Mode

5.1.2 Boot ROM Commands

Type “?” in the boot mode to display the valid commands list.

Table 6. Boot ROM commands

Command	Parameters	Usage	Notes
c	IP address	Configure TFTP client IP address	
g	NONE	Load and execute firmware	
h	NONE	Display online help	
m	mask	Configure network mask	You have to set up the terminal emulator with the same baud rate to make the work
p	NONE	Display current configuration	
R	NONE	System reboot	
s	IP address	Configure TFTP server IP address	
t	NONE	Toggle safe mode	
u	File name	Upload boot module/firmware via network using TFTP protocol	
v	NONE	Display boot rom version	
w	NONE	Toggle administrator password reset	

5.2 Login and Logout

By typing "**login**" to enter the CLI mode, you have to give a valid user name and password. As the first time login, you can enter "**admin**" as the user name and bypass the password. For security reason, please change the user name and password after login. Once you forget the use name and password, you may contact ASUS support team or erase the whole configuration file in the **Boot ROM Command** mode. If you take the second choice, the whole system configuration is lost at the same time. That is, you have to configure the switch again.

You type "*logout*" to leave the CLI mode safely. This action allows you to secure the CLI mode. The next user has to do login again with authorized user name and password.

5.3 CLI Commands

The switch provides CLI commands for all managed functions. The command uses are listed in the categories as the WEB management interface. This way, you can follow the instructions and set up the switch correctly as easily as using WEB interface to configure the switch. "save" command is used to save the configuration to flash. Some CLI command is only effective after "save" command is executed.

Always use "?" to get the available commands list and help.

Always use "/" to get back to the root directory.

Type the command only to get help for the command

5.3.1 System Commands

[System Name]

Displays the given name of the switch. This is an RFC-1213 defined MIB object in System Group, and provides administrative information on the managed node.

CLI command : sys name <*system name description*>

If you put a name in the name description field, the switch system name changes to the new one.

[System Contact]

Displays the detail information of contact about the switch. This is an RFC-1213 defined MIB object in System Group, and provides contact information on the managed node.

CLI command : sys contact <*system contact description*>

If you put the contact description in the contact description field, the switch contact will change to the new one.

[System Location]

Displays the physical location of the switch. This is an RFC-1213 defined MIB object in System Group, and provides the location information on the managed node.

CLI command : sys location <*system location description*>

Type in the location description in the location description field to change the location.

Figure 37. SYS commands

[IP Address/Network Mask]

Displays the static IP address for the switch. This IP address is used for manageable purpose, i.e.; network applications such as, http server, SNMP server, ftp server , telnet server and SSH server of the switch are all using this IP address.

CLI command: net interface ip sw0 < *IP address*> <*netmask*>

[Default Gateway]

Displays the IP address of the default gateway. This field is necessary if the switch network contains one or more routers.

CLI command: net route static add <*destination subnet/IP*> <*gateway*> <*netmask*> <*metric*>

[Password Protection is] *[Enabled/Disabled*]

When the password protection is enabled, the web interface will request a user name and password authentication while user accesses the switch through the browser.

CLI command : sys weblogin set <*enable/disable*>

[New/Modify Password]

The default user name is **admin**. By default, a password is password. You may set a password by configuring these fields.

CLI command : sys users modify <*user name, 'admin' by default*>

user name (*old user name, 'admin' by default*)**:** <*new user name*>

password (old password, 'password' by default): <*new password*>

privilege level(Only 3 is supported): (enter key)

[Reboot]

User can reboot the switch by issuing the reboot command.

CLI command: sys reboot

[Upload]

No CLI command for this function. Refer to Boot ROM commands for this function.

5.3.2 Physical Interface Commands

[Admin] [Enable/Disable]

Displays the port admin status, allow user to turn the port on or off.

CLI command : l2 port admin <*port number*> <*enable/disable*>

[Mode] [Auto/10M-Half/10M-Full/100M-Half/100M-Full/1G-Full]

Displays the current speed and duplex mode of the port. The speed and duplex mode can be automatically detected when auto-negotiation is enabled on a port.

CLI command : l2 port autoneg <*port number*> <*enable/disable*>

CLI command : l2 port speed <*port number*> <*10/100/1000*>

CLI command : l2 port duplex <*port number*> <*full/half*>

[Flow Control] [*Enable/Disable*]

Displays the IEEE802.3x flow control setting of a port. Note that this flow control is operating only in full duplex mode.

CLI command : l2 port flow <*port number*> <*enable/disable*>

[Reload]

Restores the previous port settings from the configuration file.

CLI command : l2 port retrieve

5.3.3 Bridge Commands

5.3.3.1 Trunk

[Show Trunk]

Displays a specific trunk group settings. User can create a new trunk group by specify a unique trunk ID, a trunk name description, the port selection criterion (rtag) and its trunk group member ports.

CLI command : l2 trunk show <*trunk id*>

[rtag]

Set traffic distribution algorithm (1~3). The "rtag" is the packet distribution algorithm for the trunk group.

CLI command : l2 trunk rtag <*1*|*2*|*3*>

Rtag values and corresponding meanings:

1: source XOR destination MAC(L2),

2: source XOR destination IP(L3)

3. source XOR destination Port(L4).

[Create Trunk]

Creates a new trunk group by giving trunk ID, rtag, name and port numbers. The "rtag" is the packet distribution algorithm for the trunk group.

CLI command : l2 trunk create <trunk id> <trunk name> <port list>

[Add/Remove Trunk]

Trunk group port members can be added to or removed from an existing trunk group.

CLI command : l2 trunk add <*trunk id*> <*port list*>

CLI command : l2 trunk remove <*trunk id*> <*port list*>

[Reload]
Restores the previous saved settings of trunking from configuration file.

CLI command : l2 trunk retrieve

5.3.3.2 Mirror

[Create/Remove Mirror Mode]

Displays the mirroring settings of the switch.

CLI command : l2 mirror create *<monitor port no> <enable/disable>*

CLI command : l2 mirror ingress *<port list>*

CLI command : l2 mirror egress *<port list>*

CLI command : l2 mirror remove *<ingress/egress> <port list>*

[Reload]
Restores the previous saved settings from configuration file.

CLI command : l2 mirror retrieve

[Show Rate Limiting]
Displays the current rate limitation value of the switch.

CLI command : l2 rate show

5.3.3.3 RateLimit

[Rate limit Broadcast]

[Rate limit Broadcast and Multicast]
User can limit the traffic rate for broadcast, multicast by turning the traffic control on.

[Limit Rate]

User can change this value by giving a new limit value. This value is applied to all of the traffic control mentioned above.It is for the whole system, not per port.

CLI command : l2 rate set <1: bcast/2: bcast and mcast> <enable/disable><limit rate>

[Reload]

Restores the previous saved settings from configuration file.

CLI command : l2 rate retrieve

5.3.3.4 ARL(Address Resolution Logic)

[Aging Time]

User can set the ARL(Address Resolution Logic) entries aging time by setting the aging time value.

CLI command : l2 arl age *[aging time value]*

[Query by Port]

ARL entries existed in ARL table can be queried according to port number.

CLI command : l2 arl port <*port number*>

[Query by VLAN ID]

ARL entries existed in ARL table can be queried according to VLAN ID.

CLI command : l2 arl vlan <*vlan id*>

[Query by MAC Address]

ARL entries existed in ARL table can be queried according to MAC address.

CLI command : l2 arl mac <*mac address*> *[vlan id]*

[MAC Address]

[VLAN ID]

[Port Selection]

[Discard] [none/source/destination/source & destination]

User can add or modify a static ARL entry by specifying a MAC address, VLAN ID, port number, trunk ID, and discard criteria.

CLI command : l2 arl static <mac> <vlan id> <port no> <trunk id> <discard: 0-3>

[Remove]

Static ARL entries can be deleted by indicating the MAC address and its VLAN ID. These two-field combination is formed as unique entry in ARL table.

CLI command : l2 arl delete <*mac address*> <*vlan id*>

[Reload]

Restores the previous saved settings from configuration file.

CLI command : l2 arl retrieve

5.3.3.5 VLAN

[Show VLAN]

Displays the existing VLAN information of the switch.

CLI command : l2 vlan show <*vlan id*>

[Create VLAN]

Allows user to config the VLAN settings. User may create a new VLAN by giving a unique VLAN ID, a VLAN description name, and its port member list, note that the port member here is indicated as tagged port member. To specify a VLAN port member as untagged port, CLI command utportadd can achieve this purpose. User may use CLI command add or remove to further add some port members to a VLAN or exclude some existing port members from a VLAN.

CLI command : l2 vlan create <vlan id> <vlan name> <port list>

[add/remove port from VLAN]

CLI command : l2 vlan add <*vlan id*> <*port list*>

CLI command : l2 vlan remove <*vlan id*> <*port list*>

[set untag-port]

CLI command : l2 vlan utportadd <*vlan id*> <*untagged port list*>

[Delete VLAN]

Allows user to completely destroy an existing VLAN.

CLI command : l2 vlan delete <*vlan id*>

[Reload]

Restores the previous saved settings from configuration file.

CLI command : l2 vlan retrieve

5.3.3.6 Port

[Show Port]

Displays the port configuration

CLI command : l2 port show <*port id or * for all ports*>

[PVID]

Sets the default VLAN for a port by giving a VLAN ID and its associated port member list.

CLI command : l2 port vlan <vlan id, 4095 to disable the port-based vlan> <port list>

[CoS Value]

Sets the Class of Service for a port by assigning it a priority (with range of 0-7) criteria value for untagged packets. .Due to 4 internal traffic class mapping to 8 priority, Only 4 Cos value (ex. 0,2,5,7 for default queue mapping) are valid according to Cos Queue Mapping.

CLI command : l2 port priority <*CoS*> <*port list*>

[Reload]

Restores the previous saved settings from configuration file.

CLI command : l2 port retrieve

5.3.3.7 QoS

[Cos] [Map]

Allows user to map the CoS priority (with range of 0-7) for a buffer queue (total of 4, with queue ID of 1-4).

CLI command : l2 cos map <queue id (1-4)> <cos (0-7)>

[Cos] [Sched]

Allows user to set scheduling with strict priority based or weight priority based.

CLI command : l2 cos sched <mode (1: strict 2: weighted round robin)> <Q1 weight> <Q2 weight> <Q3 weight> <Q4 weight>

[Reload]

Restores the previous saved settings from configuration file.

CLI command : l2 cos retrieve

5.3.4 SNMP

5.3.4.1 Community

[Add / Set / Delete Community Name]

A community entry contains a community description string and a set of privileges. Get privilege are turned on by default, and user can specify whether to give it the Set Privilege while create a new entry.

[Add]

CLI command : snmp community add

New community string: <*new community string*>

Get privileges: [y, always turn on by default]

Set privileges? (y/n):[n] <*set privilege, y for 'yes'; n for 'no'*>

[Set]

CLI command : snmp community set

User can modify a community entry in the table by reassigning its community string and privileges.

Community entry (table index): <entry id to config>

Community string (old community string): <new community string>

This action will modify all hosts with community string from '*old community*' to '*new community*'.

Are you sure? (y/n):[y] <y for 'yes'; n for 'no'>

Get privileges: [y, always turn on by default]

Set privileges? (y/n):[n] <set privilege, y for 'yes'; n for 'no'>

[Delete]

CLI command : snmp community delete

Allows user to delete a community entry from community table.

Community entry (table index): <entry id to delete>

This action will delete all hosts in community string with '*delete community*'.
Are you sure? (y/n):[y] <y for 'yes'; n for 'no'>

[Reload]
Restores the previous saved settings from configuration file.

CLI command : snmp community retrieve

5.3.4.2 SNMP Host

[Add SNMP host]
A host entry contains a host IP address, network mask and its dedicated community string.

CLI command : snmp host add

Host IP/Subnet: <*IP address*>

Netmask: <*netmask*>

Community: <*community string*>

[Set SNMP host]

CLI command : snmp host set

User can modify a host entry in the table by reassigning its allowed IP address, network mask and community string.

Host table entry (table index): <entry id to config>

Host IP/Subnet (old IP address): <new IP address>

Netmask (old netmask): <new netmask>

Community (old community string): <new community string>

[Delete SNMP host]

CLI command : snmp host delete

Allows user to delete a host entry from host table.

Entry id (table index): <entry id to delete>

[Reload]

Restores the previous saved settings from configuration file.

CLI command : snmp host retrieve

5.3.4.3 Trap

[Add/Set/Delete trap]

A trap entry contains SNMP version (currently support version 1 and version 2c), a destination IP address and the remote community string.

[Add]

CLI command : snmp trap add

SNMP version? (1/2c):[1, by default] <*snmp version*>

Destination IP: <*IP address*>

Community: <*community string*>

[Set]

CLI command : snmp trap set

User can modify a trap entry in the table by reassigning its SNMP version, destination IP address and community string.

Trap table entry (table index): <entry id to config>

SNMP version? (1/2c):[old snmp version] <new snmp version>

Destination IP (old IP address): <new IP address>

Community (old community string): <new community string>

[Delete]

CLI command : snmp trap delete

Allows user to delete a trap entry from trap table.

Trap table entry (*table index*): ***<entry id to delete>***

[Reload]

Restores the previous saved settings from configuration file.

CLI command : snmp trap retrieve

5.3.5 Security Commands

5.3.5.1 dot1x

[Reauthentication]
Allows user to enable or disable periodic reauthentication.

CLI command : security dot1x bridge reauth *<enable / disable>*

[Reauthentication Time]
Allows user to set up the reauthentication time.

CLI command : security dot1x bridge reauthtime *<reauthentication time (1-4294967295 sec)>*

[Authentication Method]
Allows user to set up the authentication method (RADIUS or Local database).

CLI command : security dot1x bridge authmeth *<type (1:local 2:radius)>*

[Quiet Period]
Allows user to set up the quiet period.

CLI command : security dot1x bridge quietperiod *<quiet period (1-65535 sec)>*

[Retransmission Time]
Allows user to set up the retransmission time.

CLI command : security dot1x bridge retxtime *<retransmission time (1-65535 sec)>*

[Max Reauthentication Attempts]
Allows user to set up the max number of the reauthentication attemps.

CLI command : security dot1x bridge reauthmax <*max reauthentication attemps (1-10)*>

[Multi-host]

Allows user to enable or disable Multi-host on some specific ports.

CLI command : security dot1x port multihost <*enable/disable*><*port list/**>

[Authentication Control]

Allows user to set up the authentication control of some specific ports.

CLI command : security dot1x port authctrl <*type (1: force_authorized 2:force_unauthorized 3: auto)*><*port list/**>

[Reload]

Restores the previous saved settings from configuration file.

CLI command : security dot1x retrieve

5.3.5.2 Dialuser

[Create/Modify/Remove Dialuser]

Create users in the local database of the switch for 802.1x authentication. A user entry contains a user name, password and dynamic VLAN.

CLI command : security dialinuser create

User Name: <user name string>

Password: <password string>

Confirm Password: <confirm password string>

CLI command : security dialinuser remove <*user name/**>

Allows user to delete a user entry from the local database.

CLI command : security dialinuser modify <*user name/**>

Allows user to modify a user entry from the local database. It contains a user name, password.

User Name: <new user name string>

Password: <new password string>

Confirm Password: <new confirm password string>

[Reload]

Restores the previous saved settings from configuration file.

CLI command : security dialinuser retrieve

5.3.5.3 Radius

[Set RADIUS User]

Allows user to config the RADIUS server IP, server port and server key .

CLI command : security radius set

authentication server ip <ip/none>: (old server ip)<new server ip >

authentication server port <port/default>: (old server port)<new server port>

authentication server key <key/none>: <server key>

confirm authentication key <key/none>: <confirm server key>

[Reload]

Restores the previous saved settings from configuration file.

CLI command : security radius retrieve

5.4 Miscellaneous Commands

sys uptime: show the time since the system boot up.

sys date: show the current date and time

sys settime: set the current time

net ping: ping remote host

net route show: display the entries in the routing table

6 IP Addresses, Network Masks, and Subnets

6.1 IP Addresses

This section pertains only to IP addresses for IPv4 (version 4 of the Internet Protocol). IPv6 addresses are not covered.

This section assumes basic knowledge of binary numbers, bits, and bytes. For details on this subject, see Appendix 6.

IP addresses, the Internet's version of telephone numbers, are used to identify individual nodes (computers or devices) on the Internet. Every IP address contains four numbers, each from 0 to 255 and separated by dots (periods), e.g. 20.56.0.211. These numbers are called, from left to right, field1, field2, field3, and field4.

This style of writing IP addresses as decimal numbers separated by dots is called *dotted decimal notation*. The IP address 20.56.0.211 is read "twenty dot fifty-six dot zero dot two-eleven."

6.1.1 Structure of an IP address

IP addresses have a hierarchical design similar to that of telephone numbers. For example, a 7-digit telephone number starts with a 3-digit prefix that identifies a group of thousands of telephone lines, and ends with four digits that identify one specific line in that group.

Similarly, IP addresses contain two kinds of information.

Network ID
: Identifies a particular network within the Internet or intranet

Host ID
: Identifies a particular computer or device on the network

The first part of every IP address contains the network ID, and the rest of the address contains the host ID. The length of the network ID depends on the network's *class* (see following section). Table 7 shows the structure of an IP address.

Table 7. IP address structure

	Field1	Field2	Field3	Field4
Class A	Network ID	Host ID		
Class B	Network ID		Host ID	
Class C	Network ID			Host ID

Following are examples of valid IP addresses:

Class A: 10.30.6.125 (network = 10, host = 30.6.125)
Class B: 129.88.16.49 (network = 129.88, host = 16.49)
Class C: 192.60.201.11 (network = 192.60.201, host = 11)

6.1.2 Network classes

The three commonly used network classes are A, B, and C. (There is also a class D but it has a special use beyond the scope of this discussion.) These classes have different uses and characteristics.

Class A networks are the Internet's largest networks, each with room for over 16 million hosts. Up to 126 of these huge networks can exist, for a total of over 2 billion hosts. Because of their huge size, these networks are used for WANs and by organizations at the infrastructure level of the Internet, e.g. your ISP.

Class B networks are smaller but still quite large, each being able to hold over 65,000 hosts. There can be up to 16,384 class B networks in existence. A class B network might be appropriate for a large organization such as a business or government agency.

Class C networks are the smallest, only able to hold 254 hosts at most, but the total possible number of class C networks exceeds 2 million (2,097,152 to be exact). LANs connected to the Internet are usually class C networks.

Some important notes regarding IP addresses:

The class can be determined easily from field1:

field1 = 1-126: Class A
field1 = 128-191: Class B
field1 = 192-223: Class C

(field1 values not shown are reserved for special uses)

A host ID can have any value except all fields set to 0 or all fields set to 255, as those values are reserved for special uses.

6.2 Subnet masks

A *mask* looks like a regular IP address, but contains a pattern of bits that tells what parts of an IP address are the network ID and what parts are the host ID: bits set to 1 mean "this bit is part of the network ID" and bits set to 0 mean "this bit is part of the host ID."

Subnet masks are used to define *subnets* (what you get after dividing a network into smaller pieces). A subnet's network ID is created by "borrowing" one or more bits from the host ID portion of the address. The subnet mask identifies these host ID bits.

For example, consider a class C network 192.168.1. To split this into two subnets, you would use the subnet mask:

255.255.255.128

It's easier to see what's happening if we write this in binary:

11111111. 11111111. 11111111.10000000

As with any class C address, all of the bits in field1 through field 3 are part of the network ID, but note how the mask specifies that the first bit in field 4 is also included. Since this extra bit has only two values (0 and 1), this means there are two subnets. Each subnet uses the remaining 7 bits in field4 for its host IDs, which range from 0 to 127 (instead of the usual 0 to 255 for a class C address).

Similarly, to split a class C network into four subnets, the mask is:

255.255.255.192 or 11111111. 11111111. 11111111.11000000

The two extra bits in Field 4 can have four values (00, 01, 10, 11), so there are four subnets. Each subnet uses the remaining six bits in field4 for its host IDs, ranging from 0 to 63.

Sometimes a subnet mask does not specify any additional network ID bits, and thus no subnets. Such a mask is called a *default subnet mask*. These masks are:

Class A: 255.0.0.0
Class B: 255.255.0.0
Class C: 255.255.255.0

These are called *default* because they are used when a network is initially configured, at which time it has no subnets.

7 Troubleshooting

This section gives instructions for using several IP utilities to diagnose problems. A list of possible problems with suggestion actions is also provided.

All the known bugs are listed in the release note. Read the release note before you set up the switch. Contact Customer Support if these suggestions do not resolve the problem.

7.1 Diagnosing problems using IP utilities

7.1.1 ping

Ping is a command you can use to check whether your PC can recognize other computers on your network and the Internet. A ping command sends a message to the computer you specify. If the computer receives the message, it sends messages in reply. To use it, you must know the IP address of the computer with which you are trying to communicate.

On Windows-based computers, you can execute a ping command from the Start menu. Click the Start button, and then click Run. In the Open text box, type a statement such as the following:

ping 192.168.1.1

Click 

. You can substitute any private IP address on your LAN or a public IP address for an Internet site, if known.

If the target computer receives the message, a Command Prompt window appears as shown in Figure 52.

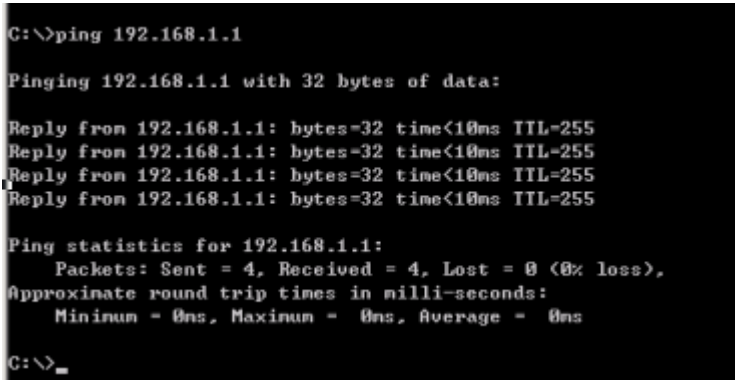

Figure 38. Using the ping utility

If the target computer cannot be located, you will receive the message "Request timed out."

Using the ping command, you can test whether the path to the switch is working (using the pre-configured default LAN IP address 192.168.1.1) or another address you assigned.

You can also test whether access to the Internet is working by typing an external address, such as that for www.yahoo.com (216.115.108.243). If you do not know the IP address of a particular Internet location, you can use the nslookup command, as explained in the following section.

From most other IP-enabled operating systems, you can execute the same command at a command prompt or through a system administration utility.

7.1.2 nslookup

You can use the nslookup command to determine the IP address associated with an Internet site name. You specify the common name, and the nslookup command looks up the name on your DNS server (usually located with your ISP). If that name is not an entry in your ISP's DNS table, the request is then referred to another higher-level server, and so on, until the entry is found. The server then returns the associated IP address.

On Windows-based computers, you can execute the nslookup command from the Start menu. Click the Start button, then click Run. In the Open text box, type the following:

nslookup

Click OK. A Command Prompt window displays with a bracket prompt (>). At the prompt, type the name of the Internet address you are interested in, such as www.absnews.com.

The window displays the associate IP address, if known. See Figure 39.

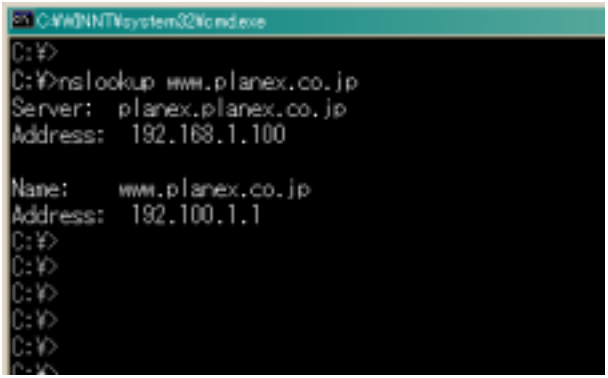

Figure 39. Using the nslookup utility

There may be several addresses associated with an Internet name. This is common for web sites that receive heavy traffic; they use multiple, redundant servers to carry the same information.

To exit from the nslookup utility, type **exit** and press **<Enter>** at the command prompt.

7.2 Simple fixes

The following table lists some common problems that you may encounter when installing or using the switch, and the suggested actions to solve the problems.

Table 8. Troubleshooting

Problem	Suggested Action
LEDs	
SYSTEM LED does not light up after the switch is turned on.	Verify if the power cord is securely connected to the switch and a wall socket/power strip.
Fast Ethernet Link LED does not illuminate after an Ethernet cable is attached.	1. Verify if the Ethernet cable is securely connected to your LAN switch/hub/PC and to the switch. Make sure the PC and/or hub/switch is turned on. 2. Verify if your cable is sufficient for your network requirements. A 100 Mbps network (100BaseTx) should use cables labeled Cat 5. 10Mbit/sec cables may tolerate lower quality cables.
Network Access	
PC cannot access another host in the same network	1. Check the Ethernet cabling is good and the LED is green. 2. If the port LED is amber, check if this port is disabled.
PCs cannot display web configuration pages.	1. The switch is powered up and the connecting port is enabled. The factory default IP for the switch is 192.168.1.1. 2. Verify your network setup in your PC for this information. If your PC does not have a valid route to access the switch, change the switch IP to an appropriate IP that your PC can access. 3. Ping "switch IP" from the PC, if it still fails, repeat step 2. 4. If ping is successful but the web configuration still fails, connecting PC through the console port by a RS232 , check if any filter rule or static MAC address is set to block the WEB traffics.
Web Configuration Interface	
You forgot/lost your WEB Configuration Interface user ID or password.	1. If you have not changed the password from the default, try using "admin" as the user ID and bypassing password. 2. Login to console mode through RS232 , use "sys user show" to display the lost information

Problem	Suggested Action
Some pages do not display completely	1. Verify that you are using Internet Explorer v5.5 or later. Netscape is not supported. Support for Javascript® must be enabled in your browser. Support for Java® may also be required. 2. Ping the switch IP address to see if the link is stable. If some ping packets fail, check your network setup to make sure a valid setting.
Changes to Configuration are not being retained.	Be sure to click on  button in the **Save Configuration** page to save any changes.
Console Interface	
Cannot show the texts on the terminal emulator.	1. The factory default baud rate is 9600, no flow control, 8 bit data, no parity check and stop bit is one. 2. Check if the cable is good.