



**SW-0216G2**

**User's Manual**



# ABOUT THIS GUIDE

This guide provides information about how to operate and use the management functions of the **Web Smart Switch**. The switch features multiple functions as shown below:

## Features Overview

- Supports real-time status (link, speed, duplex) of each port
- Supports port setting for enable or disable operation (the 1st port can't be disabled)
- Supports port setting for N-Way or force mode operation
- Supports Broadcast Storm Protection
- Supports Port-bases VLAN
- Supports priority queues for QoS

## Organization of the User Guide

The Web Management Switch Manual consists of the following chapters and each chapter contains some sections or subsections:

### CHAPTER 1 **The Introduction**

- Web browser—Introduce the web interface home page.
- Logging In—Gives information about how to log into the switch.

### CHAPTER 2 **System**

- displays System Information and some basic settings for the switch, including MAC address, IPv4 and IPv6 settings, User Account, and Port Setting.

### CHAPTER 3 **Configuration**

- includes Link Aggregation, VLAN, VLAN Stacking, IGMP Snooping, Spanning Tree, QoS, LLDP, etc.

### CHAPTER 4 **Security**

- MAC Address, 802.1x, and others

### CHAPTER 5 **Monitoring**

- Port Statistics

### CHAPTER 6 **Tools**

- HTTP Upgrade, Reset, Reboot

## CHAPTER 1 The Introduction

### Web Browser

You can log into the Web Management Switch through a Web browser and manage and maintain the switch intuitively by interacting with the built-in Web server. The home page is displayed as shown below. It displays the Main Menu on the left side of the screen and an image of the front panel on the right side. The Main Menu is used to navigate to other menus, and display configuration parameters and statistics.

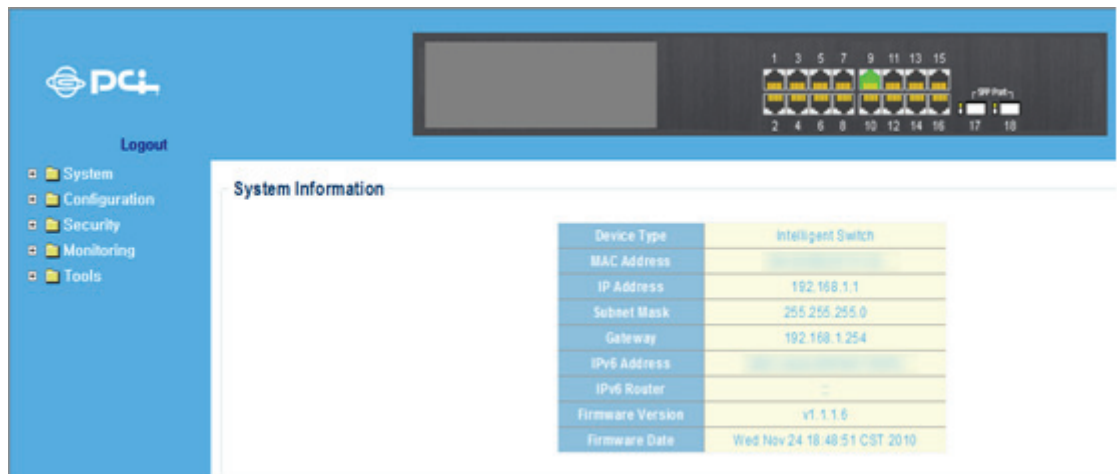


Figure 1: Home Page

## Logging In

Please follow the steps to configure this Web Smart switch. The configure procedure is as follows:

**Step 1:** Use Ethernet Category 5 cable to connect this switch to your PC.

**Step 2:** Check that your PC has an IP address on the same subnet as the switch. For example, the PC and the switch are on the same subnet if they both have addresses that start 192.168.1.x. The subnet mask is 255.255.255.0.

**Step 3:** Open the browser (like Microsoft Internet Explorer) and go to [http:// 192.168.1.1](http://192.168.1.1), which is the switch address, for example. If your PC is properly configured, you will see the login page like below:



Figure 2: Login Popping Up Window

**NOTE:** If you do not see the login page, check step 1 & 2.

**Step 4:** Please key in both the default user name “**admin**” and the password “**admin**” to pass the authentication. After the authentication procedure, the switch can be used now, as the web home page appears as follows:

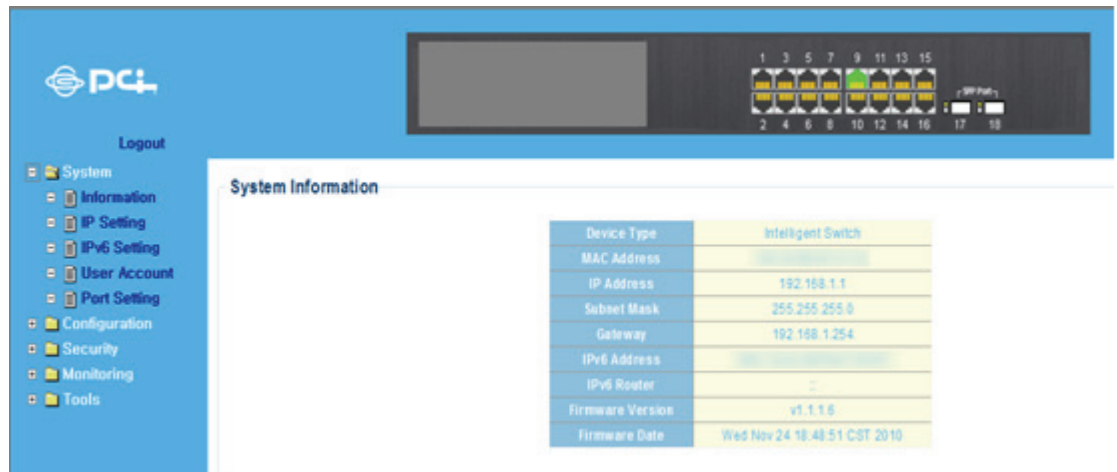


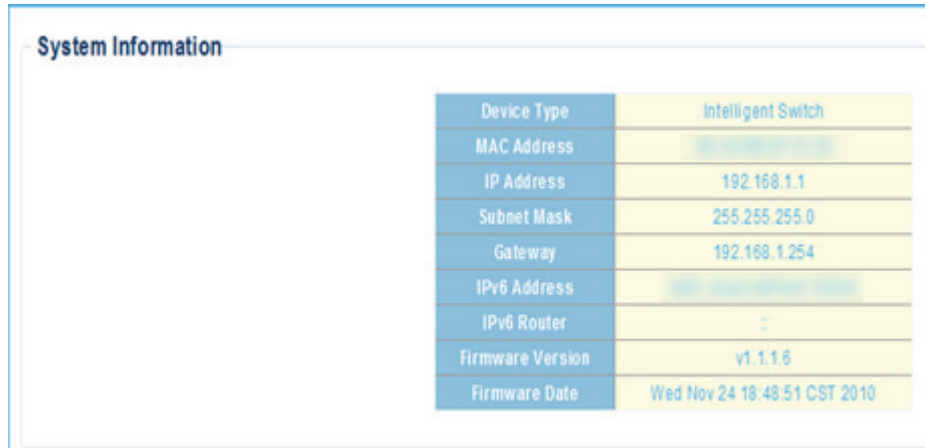
Figure 3: Web-Based Management Interface

## CHAPTER 2 System

### System Information

To lookup System Information in the Web browser, click System, then Information.

Web Smart switch interface



Device Type	Intelligent Switch
MAC Address	88-63-93-12-34-56
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Gateway	192.168.1.254
IPv6 Address	FE80::203:0:FF:FE00:0000
IPv6 Router	FE80::203:0:FF:FE00:0000
Firmware Version	v1.1.1.6
Firmware Date	Wed Nov 24 18:48:51 CST 2010

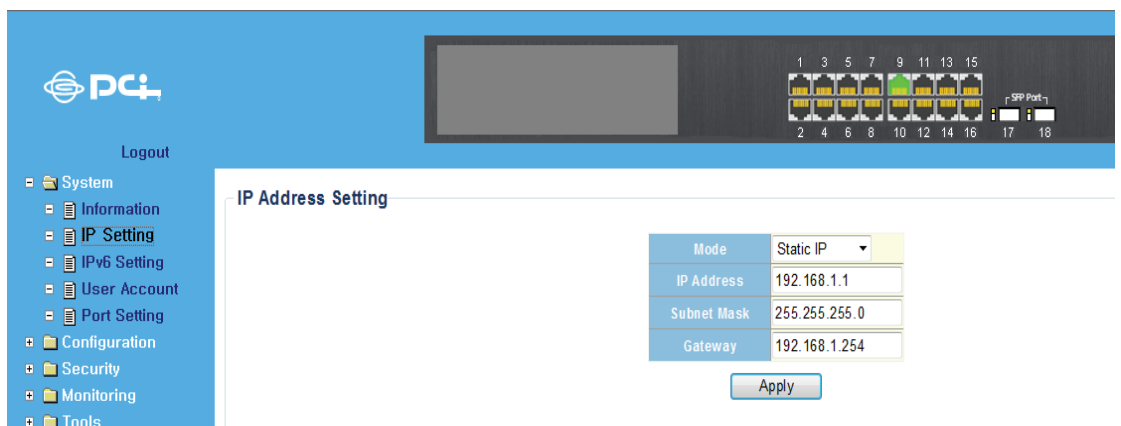
Figure 4: System Information

### IP Address Setting

To set up static IP address of the switch.

Web Smart switch interface

1. Click System, then IP Setting.
2. Set the Mode to "Static IP."
3. Specify the IP address, subnet mask, and gateway address.
4. Click [Apply].



Logout

- System
  - Information
  - IP Setting**
  - IPv6 Setting
  - User Account
  - Port Setting
- Configuration
- Security
- Monitoring
- Tools

#### IP Address Setting

Mode	Static IP
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Gateway	192.168.1.254

Apply

Figure 5: IP Setting



## IPv6 Address Setting

IPv6 is an Internet Layer protocol for packet-switched internetworking and provides end-to-end datagram transmission across multiple IP networks. IPv6 includes two distinct address types; link-local unicast and global unicast.

Web Smart switch interface

The screenshot shows the Web Smart switch interface. On the left is a navigation menu with a 'Logout' link and a tree structure containing: System, Information, IP Setting, IPv6 Setting (highlighted), User Account, Port Setting, Configuration, Security, Monitoring, and Tools. The main panel is titled 'IPv6 Address Setting'. It contains a table with four rows: 'Auto Configuration' with a dropdown set to 'Enabled', 'IPv6 Address' with the text 'fe80::dcad:beff:feef:102', 'Prefix Length' with the value '64', and 'Router' with the value '::'. Below the table is an 'Apply' button. At the top right of the interface, there is a status bar showing a network diagram with 18 ports, numbered 1 through 18, and a 'SFP Port' indicator.

Figure 6: IPv6 Address Setting

### Hint§

The following parameters are displayed on the IPv6 Address Setting page:

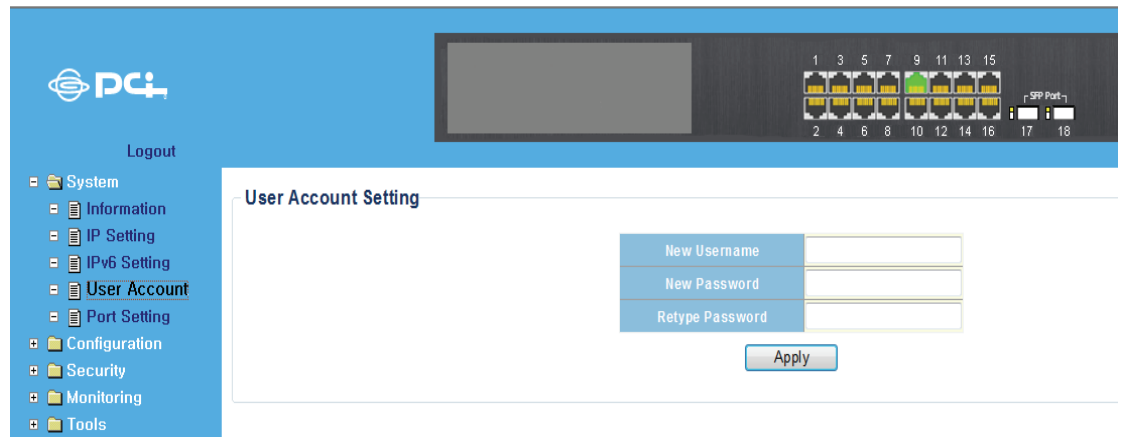
- **Auto Configuration**—Enables stateless autoconfiguration of IPv6 addresses on the interface and enables IPv6 functionality on the interface.
- **IPv6 Address**—Manually sets up a global unicast address by specifying the full address and network prefix length (in the Prefix field).
- **Prefix Length**—Defines the prefix length as a decimal value indicating how many contiguous bits (starting at the left) of the address comprise the prefix; that is, the network portion of the address.
- **Router**—Sets up the IPv6 address of the default next hop router. An IPv6 default gateway must be defined if the management station is located in a different IPv6 segment. An IPv6 default gateway can only be successfully set when a network interface that directly connects to the gateway has been configured on the switch.

## User Account Setting

To set up the System Password in the Web browser:

Web Smart switch interface

1. Click System, then User Account.
2. Enter the new user name.
3. Enter the new password.
4. Enter the new password again to confirm your input.
5. Click [Apply].



The screenshot displays the Web Smart switch interface. On the left is a blue sidebar with the 'PCi' logo and a 'Logout' link. Below these are several menu items: 'System' (expanded), 'Information', 'IP Setting', 'IPv6 Setting', 'User Account' (highlighted), 'Port Setting', 'Configuration', 'Security', 'Monitoring', and 'Tools'. The main content area is titled 'User Account Setting' and contains three input fields labeled 'New Username', 'New Password', and 'Retype Password'. An 'Apply' button is positioned below the 'Retype Password' field. In the top right corner of the interface, there is a status bar showing a row of 18 ports (numbered 1-18) and an 'SFP Port' indicator.

Figure 7: User Account Setting

## Port Setting

To specify options for enabling auto-negotiation or manually setting the speed and duplex mode, or enabling flow control.

To set up port configuration in the Web browser:

1. Click System, Port Setting.
2. Select one or more ports to configure.
3. Make any required changes to the connection settings.
4. Click [Apply].

Port	State	Speed/Duplex	Flow Control
Port 1	Enabled	Auto	Off
Port 2			
Port 3			
Port 4			
Port 5			
Port 6			

Apply

Port	State	Speed/Duplex		Flow Control	
		Config	Actual	Config	Actual
Port 1	Enabled	Auto	Link Down	On	Link Down
Port 2	Enabled	Auto	Link Down	On	Link Down
Port 3	Enabled	Auto	Link Down	On	Link Down
Port 4	Enabled	Auto	Link Down	On	Link Down
Port 5	Enabled	Auto	Link Down	On	Link Down
Port 6	Enabled	Auto	Link Down	On	Link Down
Port 7	Enabled	Auto	Link Down	On	Link Down
Port 8	Enabled	Auto	Link Down	On	Link Down
Port 9	Enabled	Auto	100Full	On	On
Port 10	Enabled	Auto	Link Down	On	Link Down
Port 11	Enabled	Auto	Link Down	On	Link Down
Port 12	Enabled	Auto	Link Down	On	Link Down
Port 13	Enabled	Auto	Link Down	On	Link Down
Port 14	Enabled	Auto	Link Down	On	Link Down
Port 15	Enabled	Auto	Link Down	On	Link Down
Port 16	Enabled	Auto	Link Down	On	Link Down
Port 17	Enabled	Auto	Link Down	On	Link Down
Port 18	Enabled	Auto	Link Down	On	Link Down

Figure 8: Port Setting

### Hint

The following parameters are displayed on the Port Setting configuration:

- **Port**—Setting up one or more ports. Hold down the CTRL key and click port numbers to select multiple ports. Hold down the SHIFT key to select a range of ports.
- **State**—Sets the link state of port interfaces. (Default: Enabled)
- **Speed/Duplex**—Configures the port speed and duplex mode using autonegotiation or manual selection. (Default: Auto-negotiation enabled)
  - **Auto** - Enables auto-negotiation. When using auto-negotiation, the optimal settings will be negotiated between the link partners based on their advertised capabilities. Auto must be enabled for all 1 Gbps connections.
  - **100M/Full** - Supports 100 Mbps full-duplex operation

- **100M/Half** - Supports 100 Mbps half-duplex operation
- **10M/Full** - Supports 10 Mbps full-duplex operation
- **10M/Half** - Supports 10 Mbps half-duplex operation
- **Flow Control**—Displays the following:
  - **Config** – The configured flow control mode of the port.
  - **Actual** – Indicates the link status of the port. When a link is up, indicates the operating flow control mode.

## CHAPTER 3 Configuration

### Trunk Group Setting

To configure a trunk group.

Web Smart switch interface

1. Click Configuration, Link Aggregation, Trunk Group Setting.
2. Select the trunk group ID to be created or modified.
3. Select the trunk type; Static or LACP.
4. Assign up to four port members to the trunk.
5. Click [Add/Modify].

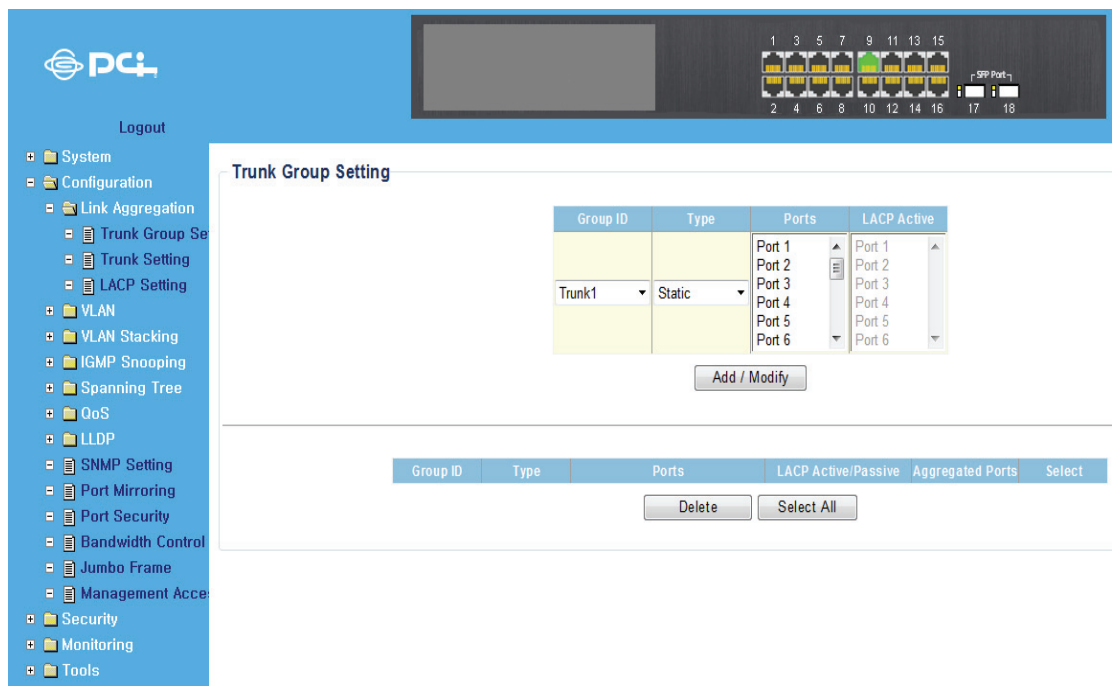


Figure 9: Trunk Group Setting

## Trunk Distribution Algorithm Setting

To configure a trunk's load-balancing settings.

Web Smart switch interface

1. Click Configuration, Link Aggregation, Trunk Setting.
2. Select the trunk group ID to be configured or modified.
3. Select the trunk Distribution Algorithm Parameters as required.
4. Click [Apply].

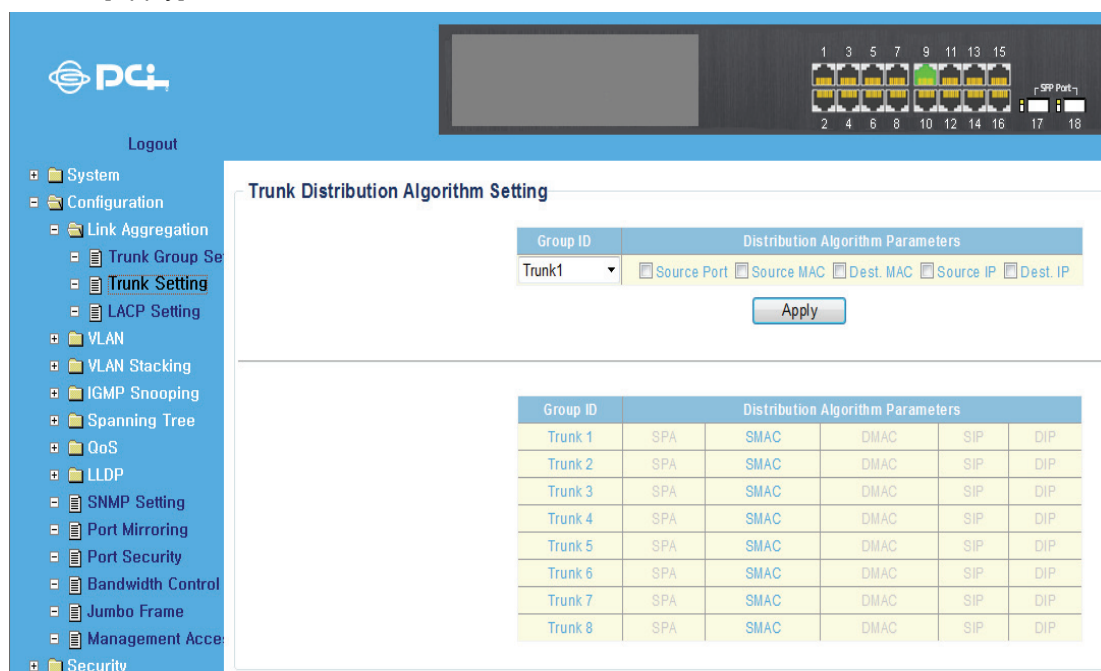


Figure 10: Trunk Distribution Algorithm Setting

### Hint

The switch provides five load-balancing methods to distribute a balanced load across all links in a trunk. The following parameters are displayed on the Trunk Distribution Algorithm Setting:

■ **Distribution Algorithm Parameters**—To ensure the switch traffic load is distributed evenly across all links in a trunk, the hash methods used in the load-balance calculation can be selected to provide the best result for trunk connections. The following options are supported:

■ **Source Port** - All traffic with the same source and destination TCP/UDP port number is output on the same link in a trunk. Avoid using this mode as a lone option. It may overload a single port member of the trunk for application traffic of a specific type, such as web browsing. However, it can be used effectively in combination with the IP Address option.

■ **Source MAC** - All traffic with the same source MAC address is output on the same link in a trunk. This mode works best for switch-to-switch trunk links where traffic through the switch is received from many different hosts.

■ **Destination MAC** - All traffic with the same destination MAC address is output on the same link in a trunk. This mode works best for switch-to-switch trunk links where traffic through the switch is destined for many different hosts. Do not use this mode for switch-to-router trunk links where the destination MAC address is the same for all traffic.

■ **Source IP** - All traffic with the same source and destination IP address is output on the same link in a trunk. This mode works best for switch-to-router trunk links where traffic through the switch is destined for many different hosts. Do not use this mode for switch-to-server trunk links where the destination IP address is the same for all traffic.

■ **Destination IP** - All traffic with the same source and destination IP address is output on the same link in a trunk. This mode works best for switch-to-router trunk links where traffic through the switch is destined for many different hosts. Do not use this mode for switch-to-server trunk links where the destination IP address is the same for all traffic.

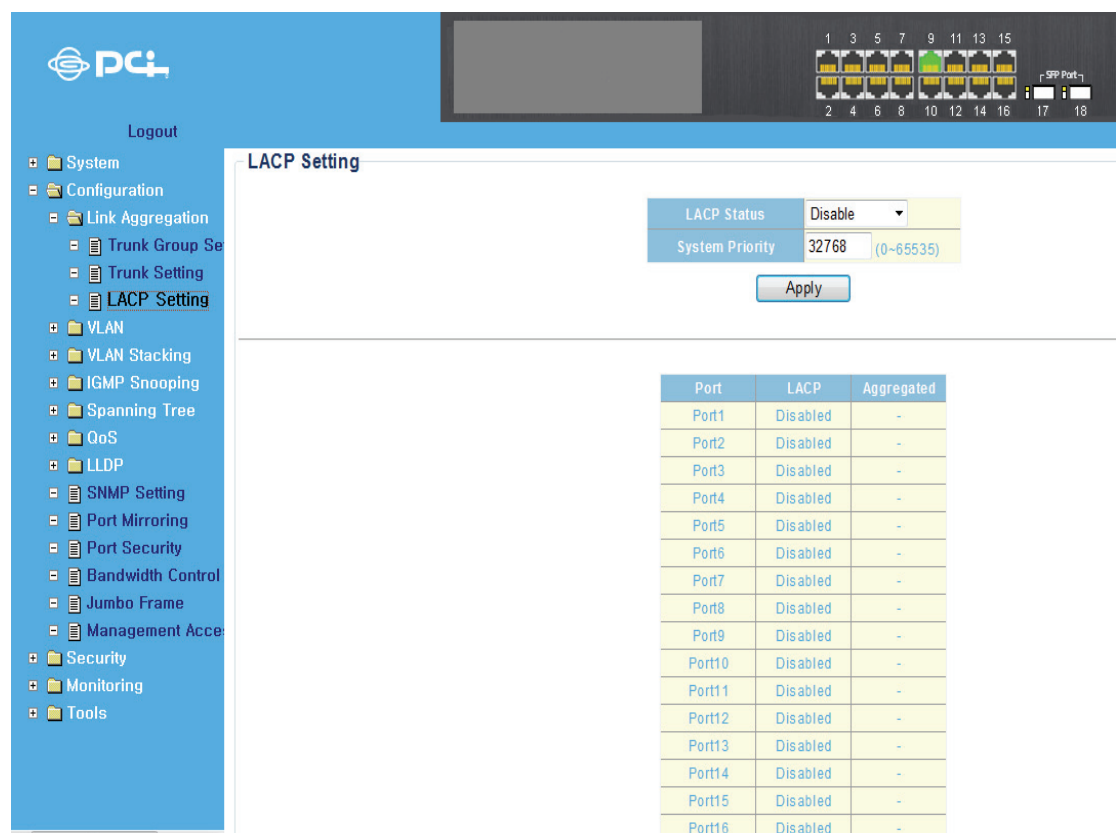
## LACP Setting

The LACP (link aggregation control protocol) dynamically aggregates ports and removes aggregations. LACP interacts with its peer by sending LACPDUs (link aggregation control protocol data units).

Web Smart switch interface

To arrange LACP settings,

1. Click Configuration, Link Aggregation, LACP Setting.
2. Enable LACP on the switch.
3. Specify the LACP System Priority to identify LAGs (link aggregation group) on the switch.
4. Click [Apply].



The screenshot displays the LACP Setting page in a web interface. On the left is a sidebar with a navigation menu containing categories like System, Configuration, VLAN, and Security. The 'LACP Setting' option is selected under the 'Link Aggregation' section. The top right of the interface shows a row of 18 port status indicators, with ports 1 through 16 highlighted in green. The main content area, titled 'LACP Setting', contains two configuration fields: 'LACP Status' set to 'Disable' and 'System Priority' set to '32768' (with a range of 0-65535). An 'Apply' button is located below these fields. At the bottom of the page, a table lists the LACP status for each of the 16 ports.

Port	LACP	Aggregated
Port1	Disabled	-
Port2	Disabled	-
Port3	Disabled	-
Port4	Disabled	-
Port5	Disabled	-
Port6	Disabled	-
Port7	Disabled	-
Port8	Disabled	-
Port9	Disabled	-
Port10	Disabled	-
Port11	Disabled	-
Port12	Disabled	-
Port13	Disabled	-
Port14	Disabled	-
Port15	Disabled	-
Port16	Disabled	-

Figure 11: LACP Setting

### Hint\$

The following parameters are shown on the LACP Setting:

- **LACP Status** – Specify whether LACP is enabled on this switch. LACP will aggregate two or more ports if they belong to the same group. LACP can form up to 8 trunks per switch.
- **System Priority** – LACP system priority is used to identify LAGs membership of this switch to other switches during LAG negotiations. (Range: 0-65535, Default: 32768)



## Static VLAN Table Setting

The VLAN (virtual local area network) technology is developed for switches to control broadcast operations in LANs. By creating VLANs in a physical LAN, you can divide the LAN into multiple logical LANs, each of which has a broadcast domain of its own. Hosts in the same VLAN communicate with each other as if they are in a LAN. However, hosts in different VLANs cannot communicate with each other directly. In this way, broadcast packets are confined within a VLAN.

Web Smart switch interface

To manage VLAN groups,

1. Click Configuration, VLAN, Static VLAN.
2. Select a VLAN ID number.
3. Define a name to identify the VLAN.
4. Mark the ports to be assigned to the new VLAN as tagged or untagged members.
5. Click [Add/Modify].

Static VLAN Table Setting

VLAN ID: (1-4094) VLAN Name:

Port	Select All	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Untagged	All	<input 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"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tagged	All	<input 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"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not Member	All	<input 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"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Port	Select All	15	16	17	18
Untagged	All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tagged	All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not Member	All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Add / Modify

VLAN ID	VLAN Name	Member Ports	Tagged Ports	Untagged Ports	Delete
1	default	1-18	-	1-18	<input type="checkbox"/>

Delete Select All

Figure 12: Static VLAN Table Setting

### Hint

The following parameters are shown on the Static VLAN Table Setting:

- **Port** – Selects VLAN membership for each interface by marking the appropriate radio button for a port or trunk as **Untagged**, **Tagged**, or **Not Member**
- **VLAN ID** – VLAN Identifier. (Range: 1-4094)
- **VLAN Name** – Name of the VLAN (1-16 characters)

## VLAN Port Setting

Arranging VLAN attributes for specific interfaces, including the default Port VLAN identifier (PVID).

Web Smart switch interface

To specify attributes for VLAN port members,

1. Click Configuration, VLAN, VLAN Setting.
2. Select one or more ports or trunks to configure.
3. Configure the required PVID setting.
4. Click [Apply].

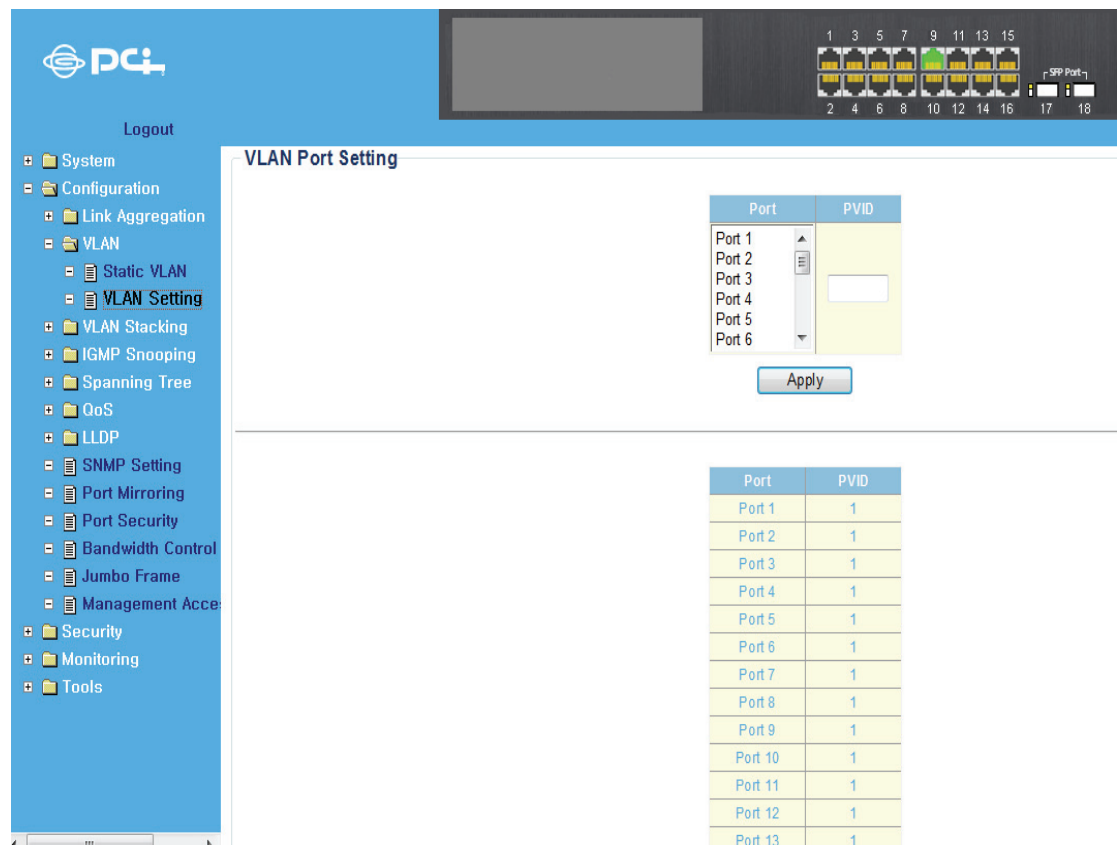


Figure 13: VLAN Port Setting

### Hint

The following parameters are shown on the Static VLAN Table Setting:

- **Port** –Selects one or more ports to configure. Hold down the CTRL key and click port numbers to select multiple ports. Hold down the SHIFT key to select a range of ports.
- **PVID** - The VLAN ID assigned to untagged frames received on the interface. (Range: 1-4094, Default: 1) Ports must be a member of the same VLAN as the Port VLAN ID.

## VLAN-Stacking Table Setting

Sets the stacking VLAN membership for selected interfaces to be part of the Service Provider VLAN (S-VLAN), that is uplink ports for a 802.1Q Tunnel. This stacking VLAN is used to segregate and preserve customer VLAN IDs for traffic crossing the service provider network. The switch supports up to 64 S-VLAN IDs.

Web Smart switch interface

To manage stacking VLAN port members,

1. Click Configuration, VLAN Stacking, S-VLAN Table.
2. Specify the S-VLAN ID number.
3. Mark the ports to be included as stacking VLAN port members for specified S-VLAN.
4. Click [Add].

The screenshot displays the 'VLAN-Stacking Table Setting' web interface. On the left is a sidebar with a navigation menu containing categories like System, Configuration, VLAN, and Security. The 'Configuration' menu is expanded, showing 'VLAN Stacking' and 'S-VLAN Table'. The top right of the interface features a status bar with port indicators numbered 1 through 18. The main content area is titled 'VLAN-Stacking Table Setting' and contains a form for adding new entries. This form includes a text input field for 'S-VLAN ID' with a hint '(1-4094)' and a list of 'Member Port' options (Port 1 through Port 6). An 'Add' button is positioned below the form. At the bottom of the interface, there is a table with columns: 'No.', 'S-VLAN ID', 'Member Ports', and 'Delete'. Below the table are 'Delete' and 'Select All' buttons.

Figure 14: VLAN-Stacking Table Setting

### Hint\$

The following parameters are shown on the VLAN-Stacking Table Setting:

- **S-VLAN ID** - The VLAN identifier of a stacking VLAN. (Range: 1-4094)
- **Member Ports** - Switch ports that are members of the stacking VLAN. That is, ports that will double tag ingress and egress packets.

## Vlan Stacking Setting

After configuring port members for stacking VLANs on the switch, the ports connected to a service provider network need to be enabled as doubled tagged ports. Also the Tag Protocol Identifier (TPID) value must be set for the doubled-tagged ports to identify 802.1Q tagged frames.

Web Smart switch interface

To manage stacking VLAN port settings,

1. Click Configuration, VLAN Stacking, S-VLAN Setting.
2. Specify the Tag Protocol ID number.
3. Set the stacking PVID for service provider ports and configure them as “Enabled.”
4. Click [Apply].

**Tag Protocol ID**

Tag Protocol ID:  (0x0600~0xffff)

**S-VLAN Port Configuration**

Port	PVID	Provider Network Port
Port 1	1	Disabled
Port 2	1	Disabled
Port 3	1	Disabled
Port 4	1	Disabled
Port 5	1	Disabled
Port 6	1	Disabled

Figure 15: Vlan Stacking Settings

### Hint\$

The following parameters are shown on the VLAN-Stacking Table Setting:

- **Tag Protocol ID** - Tag Protocol Identifier specifies the ethertype of incoming packets on a tunnel port. (Range: 0x0600~0xFFFF hexadecimal, Default: 0x88a8)
- **PVID** - The stacking VLAN Port VLAN Identifier. The PVID determines the stacking VLAN tag for single-tagged packets forwarded to an enabled S-VLAN port.
- **Provider Network Port** - Set the S-VLAN membership mode for the selected interface. This mode is used to segregate and preserve customer VLAN IDs for traffic crossing the service

provider network.

(Default: Disable)

- **Enable** - Indicates a port linked to a service provider (an 802.1Q Tunnel port).
- **Disable** - Indicates a port linked to a customer.

## IGMP Multicast Group Information

To display multicast group and router port information, click Configuration, IGMP Snooping, Multicast Entry Table.

The IGMP Multicast Router Information table displays the current multicast groups learned through IGMP Snooping. Multicast routers that are attached to ports on the switch use information obtained from IGMP, along with a multicast routing protocol such as DVMRP or PIM, to support IP multicasting across the Internet. You can use the IGMP Multicast Router Information table to see which ports on the switch are attached to a neighboring multicast router.

The screenshot shows the PC4 network management interface. On the left is a navigation menu with categories like System, Configuration, Security, and Monitoring. The 'Configuration' menu is expanded, showing options like Link Aggregation, VLAN, and IGMP Snooping. The 'IGMP Snooping' option is selected, leading to the 'Multicast Entry Table' page. The page has a top header with the PC4 logo, a 'Logout' button, and a physical switch icon with 18 ports. The main content area contains two tables:

VID	VLAN Name	Source IP	Group Address	Member Port
-----	-----------	-----------	---------------	-------------

VID	VLAN Name	Dynamic Router Port
-----	-----------	---------------------

Figure 16: Multicast Entry Table

### Hint\$

The following parameters are shown on the Multicast Entry Table page:

- **VID** - A VLAN on the switch that is forwarding multicast traffic to downstream ports for the specified multicast group address.
- **VLAN Name** – The name of the VLAN on the switch that is forwarding multicast traffic.
- **Source IP** - The IP address of one of the multicast servers transmitting traffic to the specified group.
- **Group Address** – IP multicast group address with subscribers directly attached or downstream from the switch, or a static multicast group assigned to this interface.
- **Member Port** – An downstream port that is receiving traffic for the specified multicast group.
- **Dynamic Router Port** – The port interfaces dynamically discovered by the switch to be attached to Multicast routers.

## IGMP Snooping

IGMP Snooping (Internet Group Management Protocol Snooping) is a multicast constraining mechanism that runs on Layer 2 switch to manage and control multicast groups.

The screenshot displays the configuration interface of a PCi switch. On the left is a navigation menu with categories like System, Configuration, Security, and Monitoring. The 'Configuration' section is expanded, showing various settings including IGMP Snooping. The main area is divided into two sections: 'IGMP Global Setting' and 'IGMP VLAN Setting'.

**IGMP Global Setting**

IGMP Snooping	Disabled
IGMP Fast-Leave	Disabled
Unknown Multicast	Drop
Query Interval	125 (60-600 Sec)
Response Time	10 (10-25 Sec)
Router Timeout	125 (60-600 Sec)
Last Member Query Interval	1 (1-25 Sec)
Robustness Variable	2 (1-255)
Host Timeout	260 Sec
Querier Election Time	255 Sec

Update

**IGMP VLAN Setting**

VLAN ID	Snooping State	Querier State
1	Disable	Disable

Apply

Below the VLAN settings, a summary table is shown:

VLAN ID	VLAN Name	Snooping State	Querier State
1	default	Enabled	Disabled

Figure 17: IGMP Snooping

## IGMP Global Setting

Web Smart switch interface

To manage IGMP Snooping global settings,

1. Click Configuration, IGMP Snooping, IGMP Snooping Setting.
2. Enable IGMP Snooping on the switch.
3. Modify other IGMP global settings as required.
4. Click [Update].

### Hint

The following parameters are shown on the IGMP Snooping global settings page:

- **IGMP Snooping** - When enabled, the switch will monitor network traffic to determine which hosts want to receive multicast traffic. (Default: Disabled) This switch can passively snoop on IGMP Query and Report packets transferred between IP multicast routers/switches and IP multicast host groups to identify the IP multicast group members. The switch monitors the IGMP packets passing through it, picks out the group registration information, and configures the multicast filters accordingly.
- **IGMP Fast-Leave** - Immediately deletes a member port of a multicast service if a leave packet is received on that port. Fast Leave can improve bandwidth usage for a network which frequently experiences many IGMP host add and leave requests. (Default: Disabled)
- **Unknown Multicast** - When the table used to store multicast entries for IGMP snooping is filled, no new entries are learned. If no router port is configured in the attached VLAN, any subsequent multicast traffic not found in the table is either dropped or flooded throughout the VLAN. (Default: Drop)
- **Query Interval** - Sets the frequency at which the switch sends IGMP host-query messages. (Range: 60-600 seconds, Default: 125)
- **Response Time** - Sets the time between receiving an IGMP Report for an IP multicast address on a port before the switch sends an IGMP Query out of that port and removes the entry from its list. (Range: 10-25 seconds, Default: 10)
- **Router Timeout** - On a multicast network running IGMP, a Layer 3 multicast switch may exist that serves as an IGMP querier responsible for sending IGMP query messages. The time the switch waits after the previous querier stops before it considers it to have expired. (Range: 60-600 seconds, Default: 125)
- **Last Member Query Interval** - The interval to wait for a response to a group-specific or group-and-source-specific query message. (Range: 1-25 seconds, Default: 1 second)
- **Robustness Variable** - Specifies the robustness or expected packet loss for interfaces. The robustness value is used in calculating the appropriate range for other IGMP variables. (Range: 1-255, Default: 2)
- **Host Timeout** - The time the switch waits for an IGMP report from a host for a multicast



group. When IGMP reports are not received, host ports are removed from the member list of that multicast group.

- **Querier Election Time** - The time the switch waits to receive IGMP queries from other routers. If no queries are received, the switch itself will become the querier (when enabled).

## IGMP VLAN Setting

Web Smart switch interface

To manage IGMP Snooping settings,

1. Click Configuration, IGMP Snooping, IGMP Snooping Setting.
2. Specify the VLAN ID.
3. Enable IGMP Snooping on the VLAN.
4. Enable IGMP Querier on the VLAN if you want this switch to be elected as querier.
5. Click [Apply].

### Hint§

The following parameters are shown on the IGMP Snooping VLAN settings page:

- **VLAN ID** - Specifies the ID of a configured VLAN on the switch. (Range: 1-4094)
- **VLAN Name** - Displays the name of the VLAN.
- **Snooping State** - Enables IGMP snooping on the VLAN. (Default: Enabled)
- **Querier State** - Enables IGMP querier on the VLAN. (Default: Disabled)

## Spanning Tree Setting

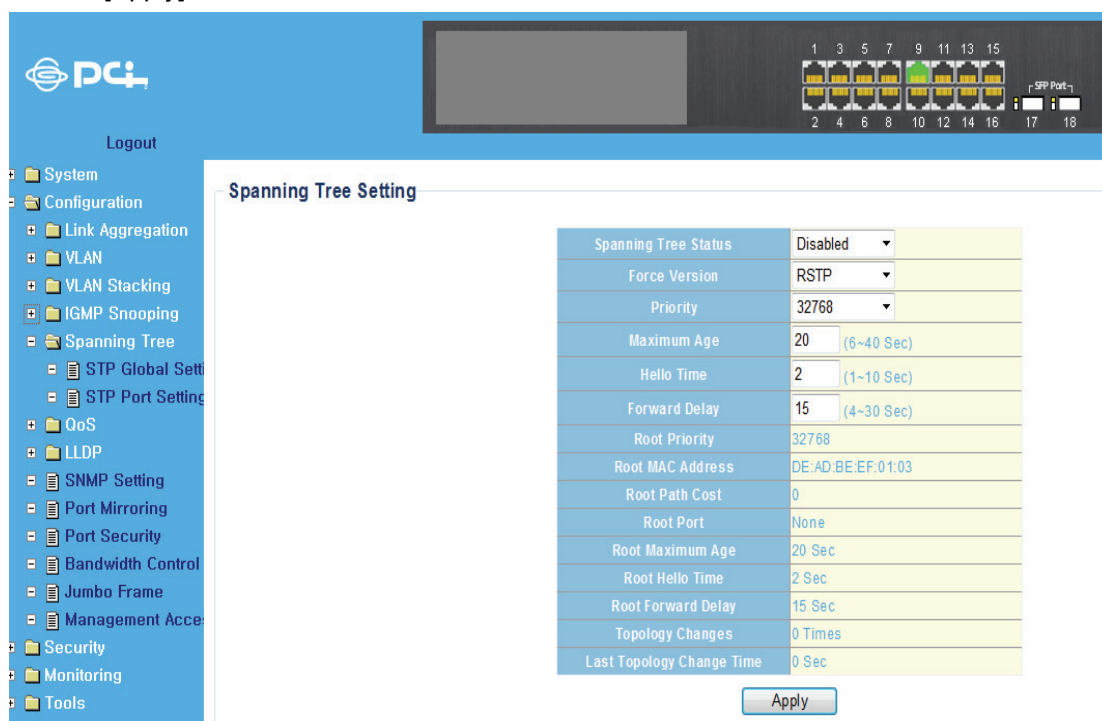
### Meaning of Spanning Tree

The spanning tree protocol is used to eliminate loops in a local area network. A switch running this protocol detects any loop in the network by exchanging information with one another and eliminates the possible loop by blocking certain ports until the loop network is pruned into a loop-free tree, thereby avoiding infinite recycling of packets in a loop network.

Web Smart switch interface

To manage global settings for Spanning Tree,

1. Click Configuration, Spanning Tree, STP Global Setting.
2. Set the Spanning Tree Status to enabled.
3. Modify other required parameters.
4. Click [Apply].



The screenshot shows the 'Spanning Tree Setting' page. The sidebar on the left contains a tree view with categories like System, Configuration, Security, and Monitoring. Under Configuration, 'Spanning Tree' is expanded, showing 'STP Global Setting' and 'STP Port Setting'. The main content area displays a table of settings for Spanning Tree.

Spanning Tree Status	Disabled
Force Version	RSTP
Priority	32768
Maximum Age	20 (6~40 Sec)
Hello Time	2 (1~10 Sec)
Forward Delay	15 (4~30 Sec)
Root Priority	32768
Root MAC Address	DE:AD:BE:EF:01:03
Root Path Cost	0
Root Port	None
Root Maximum Age	20 Sec
Root Hello Time	2 Sec
Root Forward Delay	15 Sec
Topology Changes	0 Times
Last Topology Change Time	0 Sec

An 'Apply' button is located at the bottom right of the settings table.

Figure 18: spanning tree settings

### Hint

The following parameters are shown on the Spanning Tree settings page:

- **Spanning Tree Status** - Enable Spanning Tree on the switch. (Default: Disabled)
- **Force Version** - Select the type of spanning tree used on this switch. Options: RSTP or STP, Default: RSTP
- **Priority** - Bridge priority is used in selecting the root switch, root port, and designated port. The switch with the highest priority becomes the STP root switch. However, if all switches have the same priority, the switch with the lowest MAC address will then become the root switch. Note that lower numeric values indicate higher priority. (Options: 0-61440, in steps of 4096; Default: 32768)

■ **Maximum Age** - The maximum time (in seconds) a switch can wait without receiving a configuration message before attempting to reconfigure. All switch ports (except for designated ports) should receive configuration messages at regular intervals. Any port that ages out STP information (provided in the last configuration message) becomes the designated port for the attached LAN. If it is a root port, a new root port is selected from among the switch ports attached to the network. (Note that references to “ports” in this section mean “interfaces,” which includes both ports and trunks.)

Minimum: The higher of 6 or  $[2 \times (\text{Hello Time} + 1)]$

Maximum: The lower of 40 or  $[2 \times (\text{Forward Delay} - 1)]$

Default: 20

■ **Hello Time** - The interval (in seconds) at which the root switch transmits a configuration message.

Default: 2

Minimum: 1

Maximum: The lower of 10 or  $[(\text{Max. Message Age} / 2) - 1]$

■ **Forward Delay** - The maximum time (in seconds) this switch will wait before changing states (i.e., discarding to learning to forwarding). This delay is required because every switch must receive information about topology changes before it starts to forward frames. In addition, each port needs time to listen for conflicting information that would make it return to a discarding state; otherwise, temporary data loops might result.

Minimum: The higher of 4 or  $[(\text{Max. Message Age} / 2) + 1]$

Maximum: 30

Default: 15

■ **Root Priority** - The priority of the switch in the Spanning Tree that this switch has accepted as the root switch.

■ **Root MAC Address** - The MAC address of the switch in the Spanning Tree that this switch has accepted as the root switch.

■ **Root Path Cost** - The path cost from the root port on this switch to the root switch.

■ **Root Port** - The number of the port on this switch that is closest to the root. This switch communicates with the root switch through this port. If there is no root port, then this switch has been accepted as the root switch of the Spanning Tree network.

■ **Root Maximum Age** - The maximum time (in seconds) this switch can wait without receiving a configuration message before attempting to reconfigure. All switch ports (except for designated ports) should receive configuration messages at regular intervals. If the root port ages out STA information (provided in the last configuration message), a new root port is selected from among the switch ports attached to the network. (References to “ports” in this section means “interfaces,” which includes both ports and trunks.)

■ **Root Hello Time** - The interval (in seconds) at which this switch transmits a configuration message.

■ **Root Forward Delay** - The maximum time (in seconds) this switch will wait before changing

states (i.e., discarding to learning to forwarding). This delay is required because every switch must receive information about topology changes before it starts to forward frames. In addition, each port needs time to listen for conflicting information that would make it return to a discarding state; otherwise, temporary data loops might result.

- **Topology Changes** — The number of times the Spanning Tree has been reconfigured.
- **Last Topology Change Time** - The time since the Spanning Tree was last reconfigured.

## Spanning Tree Port Setting

Use the STP Port Setting page to configure Spanning Tree attributes for specific interfaces, including path cost, port priority, edge port (for fast forwarding), automatic detection of an edge port, and point-to-point link type.

Web Smart switch interface

To configure port settings for Spanning Tree,

1. Click Configuration, Spanning Tree, STP Port Setting.
2. Modify the required attributes for one or a group of ports.
3. Click [Apply].

Spanning Tree Port Setting

Port	Path Cost	Priority	P2P	Edge
Port 1	0 (1~200000000), 0 = Auto	128	Auto	False
Port 2				
Port 3				
Port 4				
Port 5				
Port 6				

Apply

Port	State	Role	Path Cost		Priority	P2P		Edge	
			Config	Actual		Config	Actual	Config	Actual
Port 1	Disabled	-	Auto	-	128	Auto	-	False	-
Port 2	Disabled	-	Auto	-	128	Auto	-	False	-
Port 3	Disabled	-	Auto	-	128	Auto	-	False	-
Port 4	Disabled	-	Auto	-	128	Auto	-	False	-
Port 5	Disabled	-	Auto	-	128	Auto	-	False	-
Port 6	Disabled	-	Auto	-	128	Auto	-	False	-
Port 7	Disabled	-	Auto	-	128	Auto	-	False	-
Port 8	Disabled	-	Auto	-	128	Auto	-	False	-
Port 9	Disabled	-	Auto	-	128	Auto	-	False	-
Port 10	Disabled	-	Auto	-	128	Auto	-	False	-
Port 11	Disabled	-	Auto	-	128	Auto	-	False	-
Port 12	Disabled	-	Auto	-	128	Auto	-	False	-
Port 13	Disabled	-	Auto	-	128	Auto	-	False	-
Port 14	Disabled	-	Auto	-	128	Auto	-	False	-
Port 15	Disabled	-	Auto	-	128	Auto	-	False	-
Port 16	Disabled	-	Auto	-	128	Auto	-	False	-
Port 17	Disabled	-	Auto	-	128	Auto	-	False	-
Port 18	Disabled	-	Auto	-	128	Auto	-	False	-

Figure 19: spanning tree port settings

### Hint\$

The following parameters are shown on the Spanning Tree Port settings page:

- **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. (Path cost takes precedence over port priority.)
- **Priority** — Specify the priority used for this port in the Spanning Tree Protocol. If the path cost for all ports on a switch are the same, the port with the highest priority (i.e., lowest value) will be configured as an active link in the Spanning Tree. This makes a port with higher priority

less likely to be blocked if the Spanning Tree Protocol is detecting network loops. Where more than one port is assigned the highest priority, the port with lowest numeric identifier will be enabled. (Range: 0-240, in steps of 16; Default: 128)

- **P2P** - The link type attached to an interface can be set to automatically detect the link type, or manually configured as point-to-point or shared medium. Transition to the forwarding state is faster for

point-to-point links than for shared media. These options are described below:

- **Auto** - The switch automatically determines if the interface is attached to a point-to-point link or to shared medium. (This is the default setting.)

- **True** - A point-to-point connection to exactly one other bridge.

- **False** - A shared connection to two or more bridges.

- **Edge** (Fast Forwarding) — You can enable this option if an interface is attached to a LAN segment that is at the end of a bridged LAN or to an end node. Since end nodes cannot cause forwarding loops, they can pass directly through to the spanning tree forwarding state. Specifying edge ports provides quicker convergence for devices such as workstations or servers, retains the current forwarding database to reduce the amount of frame flooding required to rebuild address tables during reconfiguration events, does not cause the spanning tree to initiate reconfiguration when the interface changes state, and also overcomes other STP-related timeout problems. However, remember that this feature should only be enabled for ports connected to an endnode device. (Default: False)

- **State** - Displays current state of this port within the Spanning Tree.

- **Disabled** - There is no connection on the port.

- **Discarding** - Port receives STP configuration messages, but does not forward packets.

- **Learning** - Port has transmitted configuration messages for an interval set by the Forward Delay parameter without receiving contradictory information. Port address table is cleared, and the port begins learning addresses.

- **Forwarding** - Port forwards packets, and continues learning addresses.

- **Role** - Roles are assigned according to whether the port is part of the active topology connecting the bridge to the root bridge (that is, **root** port), connecting a LAN through the bridge to the root bridge (that is, **designated** port), or is an **alternate** or **backup** port that may provide connectivity if other bridges, bridge ports, or LANs fail or are removed. The role is set to disabled (that is, **disabled** port) if a port has no role within the spanning tree.

- **Path Cost** - The path cost setting for the port,

- **Config** - The administrator configured path cost setting.

- **Actual** - The contribution of this port to the path cost of paths towards the spanning tree root which include this port.

- **P2P** - The point-to-point setting for the port,

- **Config** - The administrator configured P2P setting.

- **Actual** - The operational point-to-point status of the LAN segment attached to this interface. This parameter is determined by manual configuration or by auto-detection.

- **Edge** — The Edge setting for the port,
  - **Config** — The administrator configured Edge setting.
  - **Actual** — This parameter is initialized to the port setting for Edge (that is, True or False), but will be set to false if a BPDU is received, indicating that another bridge is attached to this port.



## Quality of Service (QoS)

QoS is the evaluation on the service ability of network delivery or on the capacity of dealing with situations such as delay, delay jitter and packet loss rate in packet delivery.

## Port-based Priority Setting

Management of the default port priority for each port on the switch.

Web Smart switch interface

To configure global settings for Spanning Tree:

1. Click Configuration, QoS, Port-based Priority.
2. For one or a group of ports, set the default priority value.
3. Click [Apply].

Port-based Priority Setting

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

Apply

Port	Priority
Port 1	0
Port 2	0
Port 3	0
Port 4	0
Port 5	0
Port 6	0
Port 7	0
Port 8	0
Port 9	0
Port 10	0
Port 11	0
Port 12	0

Figure 20: Port-based Priority Setting

### Hint

The following parameters are shown on the Port-based Priority Setting page:

- **Priority** - The default priority used when adding a tag to untagged frames. (Range: 0-7; Default: 0)

## DSCP-based Priority Setting

The Differentiated Services Code Point (DSCP) is a six-bit field in the IP header, allowing coding for up to 64 different forwarding behaviors. The DSCP replaces the ToS bits, but it retains backward compatibility with the three precedence bits so that non-DSCP compliant, ToS-enabled devices, will not conflict with the DSCP mapping. Based on network policies, different kinds of traffic can be marked for different kinds of forwarding. Note that all the DSCP values that are not specified are mapped to priority value 0.

Web Smart switch interface

To configure port-level DSCP remarking,

1. Click Configuration, QoS, DSCP-based Priority.
2. Map one or more DSCP values to a priority value.
3. Click [Apply].

**DSCP-based Priority Setting**

DSCP	Priority
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0

Figure 21: DSCP-based Priority Setting

### Hint

The following parameters are shown on the DSCP-based Priority Setting page:

- **DSCP** - Lists the DSCP values. (Range: 0-63)
- **Priority** — Maps a priority value to the selected DSCP Priority value.

Note that “0” represents low priority and “7” represent high priority.

- **DSCP Priority Table** — Shows the DSCP to Priority map.

## Priority to Queue Mapping Setting

The QoS technique known as class of service (CoS), is a 3-bit field within an Ethernet frame header when using tagged frames on an 802.1 network. So up to eight separate traffic priorities are defined in IEEE 802.1p. Always can map the priority levels to the switch's output queues in any way that benefits application traffic for our own network.

Web Smart switch interface

To configure port-level DSCP remarking,

1. Click Configuration, QoS, Priority to Queue Mapping.
2. Map one or more priority values to a queue ID.
3. Click [Apply].

Priority to Queue Mapping Setting

Priority	Queue ID
0	1(lowest)
1	
2	
3	
4	
5	
6	
7	

Apply

Priority	Queue ID
0	1
1	2
2	3
3	4
4	5
5	6
6	7
7	8

Figure 22: Priority to Queue Mapping Setting

### Hint\$

The following parameters are shown on the DSCP-based Priority Setting page:

- Priority - CoS value. (Range: 0-7, where 7 is the highest priority)
- Queue ID - Output queue buffer. (Range: 1-8, where 8 is the highest priority queue)

## Packet Scheduling Setting

You can set the switch to service the queues based on a strict rule that requires all traffic in a higher priority queue to be processed before lower priority queues are serviced, Weighted Fair Queuing (WFQ), or Weighted Round-Robin (WRR) queuing that specifies a relative weight of each queue. The traffic classes are mapped to one of the eight egress queues provided for each port. You can assign a weight to each of these queues (and thereby to the corresponding traffic priorities). This weight sets the frequency at which each queue will be polled for service, and subsequently affects the response time for software applications assigned a specific priority value.

Web Smart switch interface

To configure port-level DSCP remarking,

1. Click Configuration, QoS, Packet Scheduling.
2. Select the scheduling algorithm, WFQ or WRR.
3. Map scheduling weights to a queue ID, or select "Strict."
4. Click [Apply].

Queue ID	Weight
1	
2	
3	
4	Strict priority
5	
6	
7	
8	

Queue ID	Scheduling Algorithm	Weight
1	Weight-fair-queue	1
2	Weight-fair-queue	2
3	Weight-fair-queue	3
4	Weight-fair-queue	4
5	Weight-fair-queue	5
6	Weight-fair-queue	6
7	Weight-fair-queue	7
8	Weight-fair-queue	8

Figure 23: Packet Scheduling Setting

### Hint

The following parameters are shown on the DSCP-based Priority Setting page:

- **Scheduling Algorithm** - Selects the service method used for port egress queues.
  - **Weight-fair-queue** - Services the egress queues containing data based on the weight of

the queue compared to the sum of the weights of all queues. (This is the default selection.)

- **Weight-round-robin** - Shares bandwidth at the egress ports by using the scheduling weights for queues 1 through 8 respectively. WRR specifies a relative weight for each queue that determines the percentage of service time the switch services each queue before moving on to the next queue.

- **Queue ID** - Output queue buffer. (Range: 1-8, where 8 is the highest priority queue)

- **Weight** - Set a new weight for the selected traffic class. (Range: Strict or 1-15)

Use queue weights 1-15 for queues to allocate service time based on WFQ or WRR. Queue weights must be configured in ascendant manner, assigning more weight to each higher numbered queue.

Strict priority requires all traffic in the queue to be processed before lower priority queues are serviced.

## LLDP Configurations

LLDP is a Layer 2 protocol that uses periodic broadcasts to advertise information about the sending device.

Web Smart switch interface

To configure global and port settings for LLDP:

1. Click Configuration, LLDP, LLDP Settings.
2. Enable LLDP for the switch.
3. If required, modified other LLDP parameters.
4. For one or a group of ports, set the LLDP mode.
5. Click [Apply].

The screenshot shows the PCi switch web interface. On the left is a navigation menu with categories: System, Configuration, Security, Monitoring, and Tools. Under Configuration, LLDP is expanded, showing LLDP Setting and LLDP Neighbors. The main content area is titled 'LLDP Configurations' and contains a table for global settings:

LLDP Status	Disable
Transmission Interval	30 (5~32768)
Hold Time Multiplier	4 (2~10)

Below this table is an 'Apply' button. Underneath is a table for port settings:

Port	State
Port 1	Disable
Port 2	
Port 3	
Port 4	
Port 5	
Port 6	

Below this table is another 'Apply' button. At the bottom is a section titled 'LLDP Port State' with a table showing the state of each port:

Port	State
Port 1	TX and RX
Port 2	TX and RX
Port 3	TX and RX
Port 4	TX and RX
Port 5	TX and RX
Port 6	TX and RX

Figure 24: LLDP Settings

### Hint\$

The following parameters are shown on the LLDP Settings.

- **LLDP Status** - Enables LLDP on the switch. (Default: Disabled)
- **Transmission Interval** - Configures the periodic transmit interval for LLDP advertisements. (Range: 5-32768 seconds; Default: 30 seconds)

This attribute must comply with the following rule:  $(\text{Transmission Interval} * \text{Transmission Hold Time}) \leq 65536$ , and  $\text{Transmission Interval} \geq (4 * \text{Transmission Delay})$

- **Hold Time Multiplier** - Configures the time-to-live (TTL) value sent in LLDP advertisements as shown in the formula below. (Range: 2-10; Default: 4)

The time-to-live tells the receiving LLDP agent how long to retain all information pertaining to

the sending LLDP agent if it does not transmit updates in a timely manner. TTL in seconds is based on the following rule:  $(\text{Transmission Interval} * \text{Transmission Hold Time}) \leq 65536$ .

Therefore, the default TTL is  $30 * 3 = 90$  seconds.

- **Port** - Port identifier. (Range: 1-18)
- **State** - Enables LLDP message transmit and receive modes for LLDP Protocol Data Units. (Options: Disable, Tx only, Rx only, Tx and Rx ; Default: Tx and Rx)

## LLDP Neighbors

To display information about devices connected directly to the switch's ports which are advertising information through LLDP.

Web Smart switch interface

To display LLDP neighbors, click Configuration, LLDP, LLDP Neighbors.

Click the [Refresh] button to update the LLDP information.

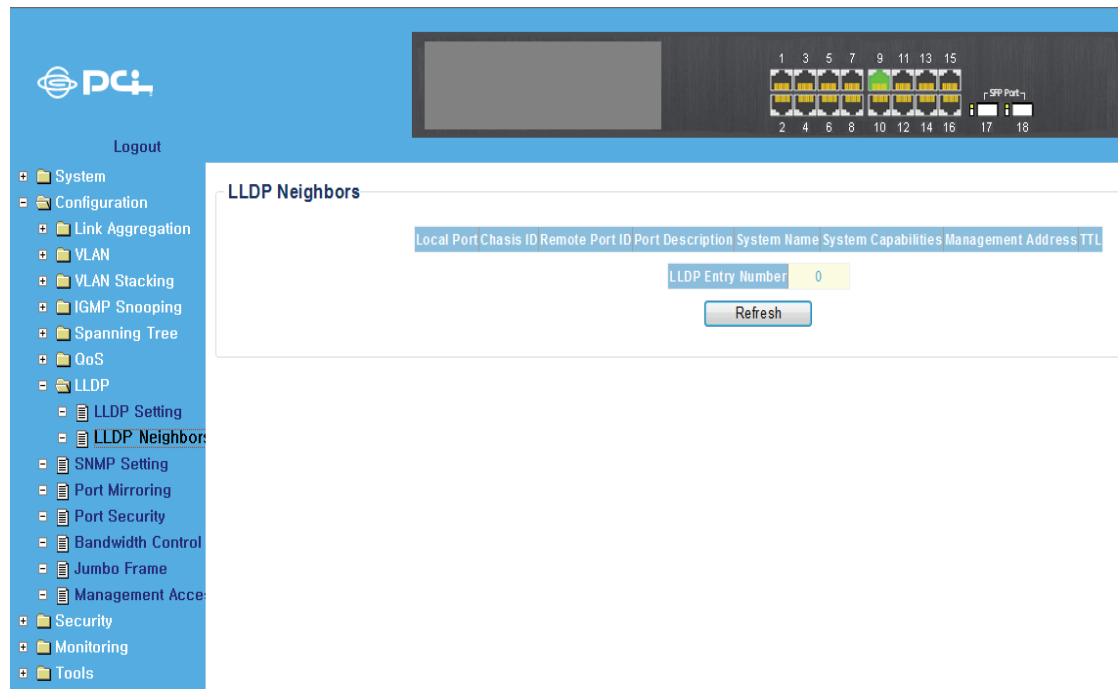


Figure 25: LLDP Neighbors

### Hint\$

The following parameters are shown on the LLDP Neighbors page.

- **Local Port** - The local port to which a remote LLDP-capable device is attached.
- **Chassis ID** - An octet string indicating the specific identifier for the particular chassis in this system.
- **TTL** - Indicates the time (in seconds) the remote device's information should be treated as valid.
- **LLDP Entry Number** - The number of the LLDP table entry.



## SNMP Setting

SNMP (Simple Network Management Protocol) monitor network switches through TCP/IP protocol suite. It offers automatic network management and avoids the physical differences between various switches, and thus provides automatic management of products from different manufacturers.

Web Smart switch interface

To specify SNMP system settings:

1. Click Configuration, SNMP Setting.
2. Enable SNMP for the switch.
3. Configure the Name, Location, and Contact information.
4. Define at least one new community string with read-write access.
5. Delete the default “private” string for security reasons.
6. Click [Apply].

The screenshot displays the Web Smart switch interface with a blue header and a left sidebar. The main content area is divided into three sections: SNMP Setting, Community Strings Setting, and Trap Receivers Setting.

**SNMP Setting**

SNMP Status	Disabled
System Name	Layer 2 Switch
System Location	No Location
System Contact	No Contact

[Apply]

**Community Strings Setting**

String	Type
	read-only

[Apply]

String	Type	Select
public	read-only	<input type="checkbox"/>
private	read-write	<input type="checkbox"/>

[Delete]

**Trap Receivers Setting**

IP Address	Community String

[Apply]

IP Address	Community String	Select

[Delete]

Figure 26: SNMP Setting, Community Strings Setting, Trap Receivers Setting

### Hint§

The following parameters are shown on the SNMP Setting, Community Strings Setting.

- **SNMP Status** - Enables or disables SNMP service. (Default: Disabled)
- **System Name** - A name assigned to the switch system.

- **System Location** - Specifies the system location.
- **System Contact** - An administrator responsible for the system.
- **String** – A community string that acts like a password and permits access to the SNMP protocol.

Default strings: “public” (read-only access), “private” (read-write access) Range: 1-32 characters, case sensitive

- **Type** - Specifies the access rights for the community string:
  - **Read-Only** - Authorized management stations are only able to retrieve MIB objects.
  - **Read-Write** - Authorized management stations are able to both retrieve and modify MIB objects.

## Trap Receivers Setting

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 (using network management software).

Web Smart switch interface

To configure SNMP system settings:

1. Click Configuration, SNMP Setting.
2. Specify the IP address of management station that will receive SNMP trap messages.
3. Specify a configured community string for the trap receiver.
4. Click [Apply].

### Hint\$

The following parameters are shown on the Trap Receivers Setting.

- **IP Address** - IP address of a new management station to receive notification messages.
- **Community String** – Specifies a valid community string for the new trap manager entry.

The string must already be defined in the Community String Setting section.

(Range: 1-15 characters, case sensitive)

## Port Mirroring Setting

Port mirroring includes local mirroring groups, remote source mirroring groups and remote destination mirroring groups.

Web Smart switch interface

To configure port mirroring:

1. Click Configuration, Port Mirroring.
2. Select the Mirror Set Index.
3. Select the Mirror Direction.
4. Select the Mirroring (target) port.
5. Select the one or more mirrored (source) ports.
6. Click [Apply].

Mirror Set Index	Mirror Direction	Mirroring Port	Mirrored Port List
1	RX	Port 1	Port 1 Port 2 Port 3 Port 4 Port 5 Port 6

Apply

Mirror Set Index	Mirror Direction	Mirroring Port	Mirrored Port List	Select
1	Disabled	-	-	<input type="checkbox"/>
2	Disabled	-	-	<input type="checkbox"/>

Delete

Figure 27: Port mirroring

### Hint

The following parameters are shown on the LLDP Neighbors page.

- **Mirror Set Index** — Displays a list of current mirror sessions.
- **Mirror Direction** — Allows you to select which traffic to mirror to the target port, Rx (receive) or Tx (transmit). (Default: Rx)
- **Mirrored Port List** — One or more source ports whose traffic will be monitored. (Range: 1-18 and configured trunks)
- **Mirroring Port** — The target port that will mirror the traffic on the source ports. (Range: 1-18)

## Port Security Setting

Port security is a feature that allows you to configure a switch port with a maximum number of MAC addresses that are authorized to access the network through that port. 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 a specified action.

Web Smart switch interface

To configure port security:

1. Click Configuration, Port Security.
2. Select the ports to configure.
3. Set Security to Enable.
4. Configure the maximum number of MAC addresses allowed on the port.
5. Set an action for port security violations.
6. Click [Apply].

Port Security Setting

Port	Security	Maximum L2 Entry	Action
Port 1	Disabled	Unlimited (0-16447)	Trap to CPU
Port 2	Disabled	-	-
Port 3	Disabled	-	-
Port 4	Disabled	-	-
Port 5	Disabled	-	-
Port 6	Disabled	-	-
Port 7	Disabled	-	-
Port 8	Disabled	-	-
Port 9	Disabled	-	-
Port 10	Disabled	-	-
Port 11	Disabled	-	-
Port 12	Disabled	-	-
Port 13	Disabled	-	-

Figure 28: Port security

## Hint§

The following parameters are shown on the Port security page.

- **Port** - Port number.
- **Security** — Enables or disables port security for the selected ports. (Default: Disabled)
- **Maximum L2 Entry** — The maximum number of MAC addresses that can be learned on a port. (Range: 0 - 16447, where 0 means disabled)
- **Action** — Indicates the action to be taken when a port security violation is detected:
  - **Trap to CPU**: Send an SNMP trap message. (This is the default.)
  - **Drop**: Drop other traffic from the port.
  - **Forward**: No action is taken. Traffic is forwarded as normal.

## Bandwidth Control Setting

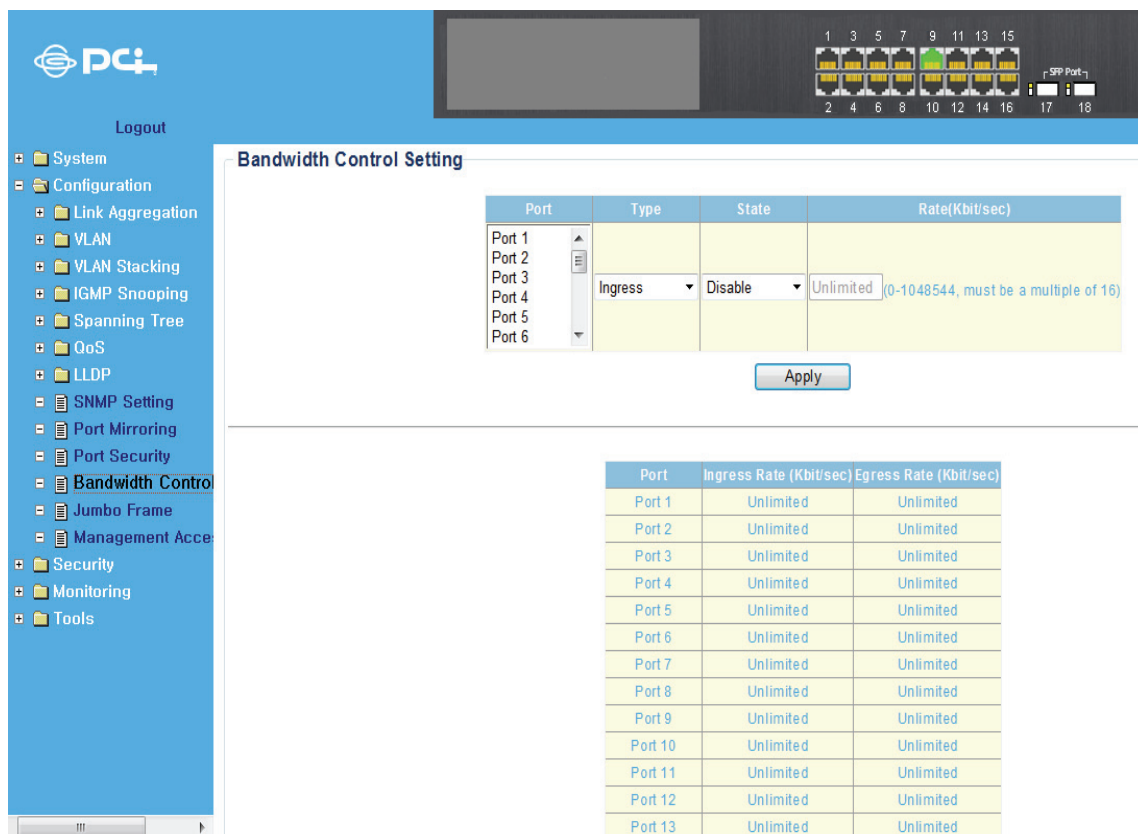
This function allows the network manager to control the maximum rate for traffic received on a port or transmitted from a port. Rate limiting is configured on ports at the edge of a network to limit traffic into or out of the switch. Packets that exceed the acceptable amount of traffic are dropped.

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. Input and output rate limits can be enabled or disabled for individual interfaces.

Web Smart switch interface

To configure bandwidth control:

1. Click Configuration, Bandwidth Control.
2. Select the ports to configure.
3. Set Type to Ingress or Egress .
4. Set State to Enable.
5. Configure the maximum rate allowed on the ports.
6. Click [Apply].



The screenshot displays the DCI Web Smart switch interface. The left sidebar contains a navigation menu with the following items: System, Configuration, Link Aggregation, VLAN, VLAN Stacking, IGMP Snooping, Spanning Tree, QoS, LLDP, SNMP Setting, Port Mirroring, Port Security, Bandwidth Control, Jumbo Frame, Management Access, Security, Monitoring, and Tools. The main content area is titled "Bandwidth Control Setting". It features a table with the following columns: Port, Type, State, and Rate(Kbit/sec). The table lists ports 1 through 13. For all ports, the Type is set to "Ingress", the State is set to "Disable", and the Rate is set to "Unlimited". A note next to the Rate column states "(0-1048544, must be a multiple of 16)". Below the table is an "Apply" button. At the bottom of the page, there is a summary table showing the Ingress Rate (Kbit/sec) and Egress Rate (Kbit/sec) for each port, both of which are set to "Unlimited".

Port	Type	State	Rate(Kbit/sec)
Port 1	Ingress	Disable	Unlimited
Port 2	Ingress	Disable	Unlimited
Port 3	Ingress	Disable	Unlimited
Port 4	Ingress	Disable	Unlimited
Port 5	Ingress	Disable	Unlimited
Port 6	Ingress	Disable	Unlimited
Port 7	Ingress	Disable	Unlimited
Port 8	Ingress	Disable	Unlimited
Port 9	Ingress	Disable	Unlimited
Port 10	Ingress	Disable	Unlimited
Port 11	Ingress	Disable	Unlimited
Port 12	Ingress	Disable	Unlimited
Port 13	Ingress	Disable	Unlimited

Port	Ingress Rate (Kbit/sec)	Egress Rate (Kbit/sec)
Port 1	Unlimited	Unlimited
Port 2	Unlimited	Unlimited
Port 3	Unlimited	Unlimited
Port 4	Unlimited	Unlimited
Port 5	Unlimited	Unlimited
Port 6	Unlimited	Unlimited
Port 7	Unlimited	Unlimited
Port 8	Unlimited	Unlimited
Port 9	Unlimited	Unlimited
Port 10	Unlimited	Unlimited
Port 11	Unlimited	Unlimited
Port 12	Unlimited	Unlimited
Port 13	Unlimited	Unlimited

Figure 29: bandwidth control

### Hint§

The following parameters are shown on the LLDP Neighbors page.

- **Port** - Displays the port/trunk number.
- **Type** - Specifies ingress or egress traffic. (Default: Ingress)
- **State** - Enables or disables the rate limit. (Default: Disable)
- **Rate (Kbit/sec)** - Sets the rate limit level. (Range: 0 - 1048544 Kbps in steps of 16)

## Jumbo Frame Setting

The switch provides more efficient throughput for large sequential data transfers by supporting jumbo frames up to 9216 bytes.

Web Smart switch interface

To configure Jumbo Frames:

1. Click Configuration, Jumbo Frame.
2. Select the frame size to configure.
3. Click [Apply].

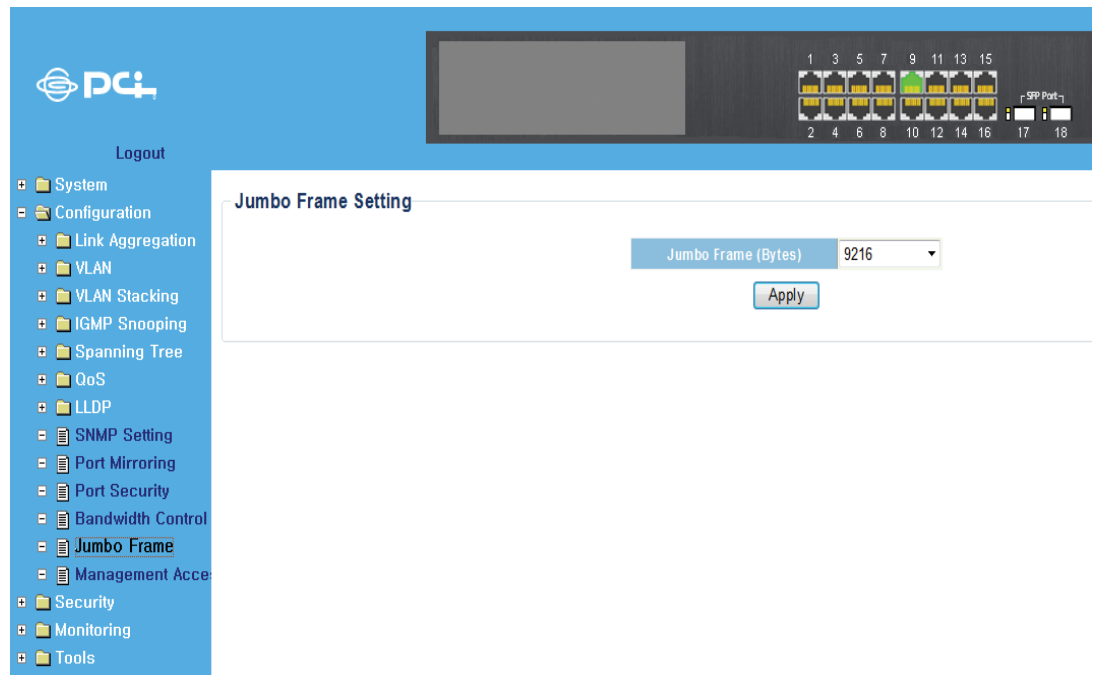


Figure 30: Jumbo Frame Setting

### Hint\$

The following parameters are shown on the LLDP Neighbors page.

- **Jumbo Frame (Bytes)** - Configures support for jumbo frames. (Options: 9216, 1522, 1536, 1552 Bytes; Default: 9216 bytes)



## Management Access Filter

To create up to eight IP addresses or IP address groups that are allowed access to the switch through the Web browser.

Web Smart switch interface

1. Click Configuration, Management Access Filter.
2. Enter an IP address
3. Specify a netmask to define a single IP address, or an address range.
4. Select the table entry to activate the filter.
5. Click [Apply].

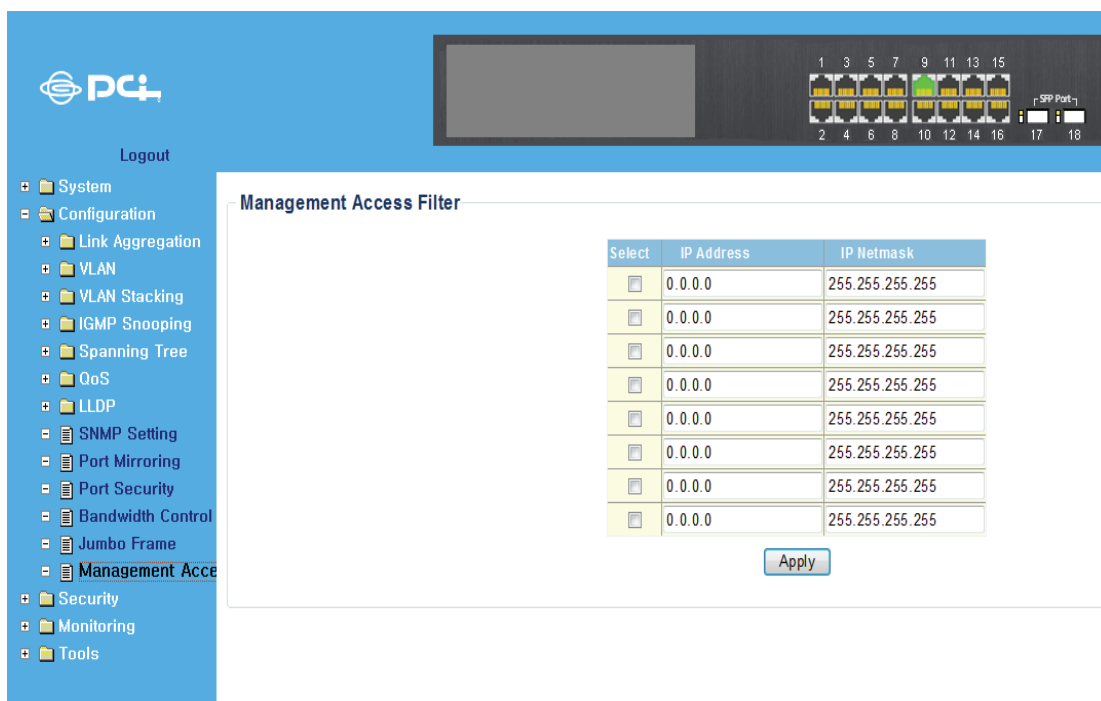


Figure 31: Management Access Filter

### Hint\$

The following parameters are shown on the LLDP Neighbors page.

- **IP Address** - An IP address specifies a range, that is allowed management access to the switch.
- **IP Netmask** - A mask that specifies a single IP address, or a range of IP addresses. (Default: 255.255.255.255 for a single IP address)

## CHAPTER 4 Security

### MAC Address Information

To display the MAC address forwarding table.

Web Smart switch interface

1. Click Configuration.
2. Then click Security, MAC Address, MAC Forwarding Table.

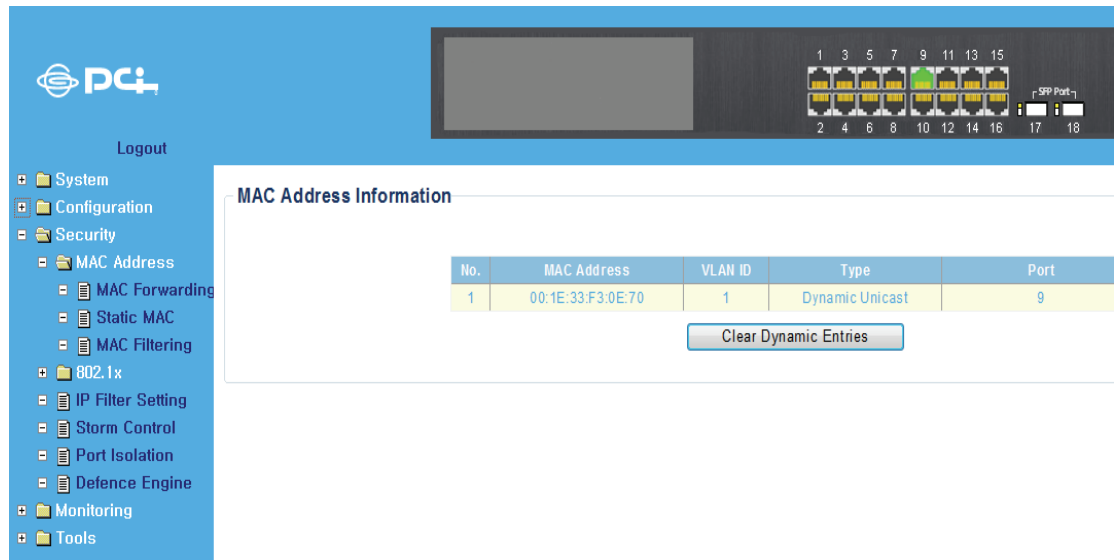


Figure 32 MAC Address Information

#### Hint\$

The following parameters are shown on the MAC Address Information page.

- **No.** - The number of the address entry in the forwarding table.
- **MAC Address** - Physical address associated with this interface.
- **VLAN ID** - The ID of a configured VLAN (1-4094).
- **Type** - Indicates if the MAC address has been dynamically learned or configured as a static entry.
- **Port** - Indicates the port.
- **Clear Dynamic Entries** — Removes all dynamically learned addresses from the forwarding table.

## Static MAC Setting

A static address can be assigned to a specific interface on the switch. Static addresses are bound to the assigned interface and will not be moved.

Web Smart switch interface

To configure static MAC addresses:

1. Click Security, MAC Address, Static MAC.
2. Specify the MAC address to be statically assigned.
3. Specify the VLAN ID.
4. Select the port or trunk interface for the static assignment.
5. Click [Add].

Static MAC Setting

MAC Address	VLAN ID	Port
00:00:00:00:00:00	(1~4094)	Port 1

Add

No.	MAC Address	VLAN ID	Port	Select
-----	-------------	---------	------	--------

Delete

Figure 33 Static MAC Setting

### Hint\$

The following parameters are shown on the Static MAC Setting page.

- **MAC Address** - Physical address of a device mapped to an interface.
- **VLAN ID** - The ID of a configured VLAN (1-4094).
- **Port** - Port or trunk associated with the device that is assigned as a static address.

## MAC Filtering Setting

The MAC Filtering pages are used to filter service to clients attempting to access the Internet based on protocol type, destination/source MAC address, and the direction of traffic for each packet.

Web Smart switch interface

To configure MAC Address Filtering:

1. Click Security, MAC Address, MAC Address Filtering.
2. Specify the MAC address to be filtered.
3. Specify the VLAN ID.
4. Select to filter the MAC address as the source, destination, or both.
5. Set a name to describe the filter.
6. Click [Add].

MAC Filtering Setting

MAC Address	VLAN ID	Filter	Name
00:00:00:00:00:00	(1~4094)	Source MAC	

Add

No.	MAC Address	VLAN ID	Filter	Name	Select
-----	-------------	---------	--------	------	--------

Delete

Figure 34 MAC Filtering Setting

### Hint\$

The following parameters are shown on the LLDP Neighbors page.

- **MAC Address** - Physical address of a device.
- **VLAN ID** - The ID of a configured VLAN (1-4094).
- **Filter** - Filters traffic matching the MAC address in packets. (Options: Source MAC, Destination MAC, Both; Default: Source MAC)
  - **Destination MAC** - Filters packets with a matching destination MAC address.
  - **Source MAC** - Filters packets with a matching source MAC address.
  - **Both** - Filters packets with a matching the source or destination MAC address.
- **Name** – A descriptive name for the MAC address filter.

## 802.1x Setting

The 802.1X protocol provides port authentication. The 802.1X protocol must be enabled globally for the switch system before port settings are active.

Web Smart switch interface

To configure 802.1X global settings:

1. Click Security, 802.1X, 802.1X Setting.
2. Set 802.1X to Enabled.
3. Specify the RADIUS server IP address.
4. Specify the RADIUS server shared key.
5. Modified other parameters as required.
6. Click [Apply].

802.1X	Disabled
Radius Server IP	192.168.1.99
Server Port (1024-65535)	1812
Shared Key (max. 30 characters)	
Retype Shared Key	
ReauthEnabled	Enabled
Reauth Period (30~65535 sec)	3600

Apply

Figure 35 802.1x Setting

### Hint

The following parameters are shown on the LLDP Neighbors page.

- **802.1X** — Sets the global setting for 802.1X. (Default: Disabled)
- **RADIUS Server IP** — Address of the authentication server.
- **Server Port** — Network (UDP) port of RADIUS server used for authentication messages. (Range: 1024-65535; Default: 1812)
- **Shared Key** — Encryption key used for RADIUS server messages. Do not use blank spaces in the string. (Maximum length: 30 characters)
- **Retype Shared Key** — Re-type the string entered in the previous field to ensure no errors were made. The switch will not change the encryption key if these two fields do not match.
- **ReauthEnabled** — Sets clients to be re-authenticated after the interval specified by the Reauth Period. Re-authentication can be used to detect if a new device is plugged into a switch port. (Default: Enabled)

■ **Reauth Period** — Sets the time period after which a connected client must be re-authenticated. (Range: 30-65535 seconds; Default: 3600 seconds)

## 802.1x Port Setting

When 802.1X is enabled, you need to configure the parameters for the authentication process that runs between the client and the switch (that is, authenticator), as well as the client identity lookup process that runs between the switch and authentication server.

Web Smart switch interface

1. Click Security, 802.1X, 802.1X Port Setting.
2. Select one or more ports to configure.
3. Set the 802.1X Mode to "Authentication."
4. Click [Apply].

802.1x Port Setting

Port	Mode
Port 1	Force Unauthorized
Port 2	
Port 3	
Port 4	
Port 5	
Port 6	

Apply

Port	Mode	State
Port 1	No Authentication	Initialize
Port 2	No Authentication	Initialize
Port 3	No Authentication	Initialize
Port 4	No Authentication	Initialize
Port 5	No Authentication	Initialize
Port 6	No Authentication	Initialize
Port 7	No Authentication	Initialize
Port 8	No Authentication	Initialize
Port 9	No Authentication	Initialize
Port 10	No Authentication	Initialize
Port 11	No Authentication	Initialize
Port 12	No Authentication	Initialize
Port 13	No Authentication	Initialize

Figure 36 802.1x Port Setting

### Hint

The following parameters are shown on the 802.1X Port Setting page.

■ **Mode** - Sets the authentication mode to one of the following options:

- **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.
- **Authentication** - Requires a dot1x-aware client to be authorized by the authentication server. Clients that are not dot1x-aware will be denied access.
- **No Authentication** - Disables 802.1X authentication on the port. (This is the default

setting.)

- **State** - Shows the current status of the 802.1X authentication process.



## IP Filter Configurations

IP Filter Security is a feature that filters IP traffic on port interfaces based on manually configured entries in the IP Filter table, or allowed IP address assignment through DHCP. IP Filter Security can be used to prevent traffic attacks caused when a host tries to use the IP address of a neighbor to access the network.

Web Smart switch interface

To configure IP Filter settings:

1. Click Security, IP Filter Setting.
2. Select one or more ports to configure.
3. Select the mode Static and set an IP address, or select DHCP.
4. Select ports on which to allow traffic to DHCP servers.
5. Click [Apply].

The screenshot displays the 'IP Filter Configurations' page in a web interface. On the left is a sidebar with a 'Logout' button and a tree view containing 'System', 'Configuration', 'Security', 'Monitoring', and 'Tools'. Under 'Security', 'IP Filter Setting' is selected. The main content area has a title 'IP Filter Configurations' and a port status diagram at the top right showing 18 ports, with ports 1-15 numbered and ports 16-18 labeled 'SFP Port'. Below the title, there are two configuration sections. The first section is a table with columns: Port, Mode, IP Address, and IP Netmask. It lists Port 1 through Port 6. Port 3 is selected, and its Mode is 'IP Filter Disable', IP Address is '0.0.0.0', and IP Netmask is '255.255.255.0'. An 'Apply' button is below this table. The second section is a table with columns: Port (1-18) and DHCP Server Allowed. All ports have a checked checkbox in the 'DHCP Server Allowed' column. An 'Apply' button is below this table. At the bottom of the page, there is a summary table showing the configuration for all 8 ports.

Port	Mode	IP Address	IP Netmask
Port 1			
Port 2			
Port 3	IP Filter Disable	0.0.0.0	255.255.255.0
Port 4			
Port 5			
Port 6			

Apply

Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
DHCP Server Allowed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Apply

Port	Mode	IP	IP Netmask
Port 1	IP Filter Disable	-	-
Port 2	IP Filter Disable	-	-
Port 3	IP Filter Disable	-	-
Port 4	IP Filter Disable	-	-
Port 5	IP Filter Disable	-	-
Port 6	IP Filter Disable	-	-
Port 7	IP Filter Disable	-	-
Port 8	IP Filter Disable	-	-

Figure 37 IP Filter Configurations

### Hint\$

The following parameters are shown on the IP Filter Configurations page.

■ **Mode** – Configures the switch to filter traffic based on IP addresses. (Default: IP Filter Disable)

■ **IP Filter Disable** – Disables IP filtering on the port.

■ **Static** – Enables traffic filtering based on IP addresses configured in the table.

■ **DHCP** – Enables traffic filtering based on IP addresses assigned through DHCP.

- **IP Address** — An IP address, or an address specifying a range, that is allowed access through the switch.
- **IP Netmask** — A mask that specifies a single IP address, or defines a range of IP addresses.  
(Default: 255.255.255.0)
- **DHCP Server Allowed** — Permits traffic from a DHCP server through the specified ports.  
(Default: All ports allowed)

## Storm Control Setting

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. Any broadcast packets exceeding the specified threshold will then be dropped.

Web Smart switch interface

To configure Storm Control settings:

1. Click Security, Storm Control.
2. Select the Storm Control type.
3. Select one or more ports to configure.
4. Set the State to “On” and set the threshold rate.
5. Click [Apply].

Storm Type	Port	State	Rate (pps)
Broadcast	Port 1	Off	(0-1000000)
	Port 2		
	Port 3		
	Port 4		
	Port 5		
	Port 6		

Apply

Port	Broadcast (pps)	Multicast (pps)	Unknown Unicast (pps)	Unknown Multicast (pps)
Port 1	Off	Off	Off	Off
Port 2	Off	Off	Off	Off
Port 3	Off	Off	Off	Off
Port 4	Off	Off	Off	Off
Port 5	Off	Off	Off	Off
Port 6	Off	Off	Off	Off
Port 7	Off	Off	Off	Off
Port 8	Off	Off	Off	Off
Port 9	Off	Off	Off	Off
Port 10	Off	Off	Off	Off
Port 11	Off	Off	Off	Off
Port 12	Off	Off	Off	Off
Port 13	Off	Off	Off	Off

Figure 38 Storm Control settings

### Hint\$

The following parameters are shown on the LLDP Neighbors page.

- **Storm Type** — Selects the storm control type. (Broadcast, Multicast, Unknown Unicast, Unknown Multicast)
- **Port** — Selects port and trunk interfaces. (Port Range: 1-18)

- **State** — Enables or disables storm control. (Default: Off)
- **Rate** — Threshold as packets per second (pps). (Range: 0-1000000)

## Port Isolation Setting

The feature provides port-based security and isolation of local ports. The switch isolates port traffic by specifying those ports to which it can forward or receive traffic.

Web Smart switch interface

To configure Port Isolation settings:

1. Click Security, Port Isolation.
2. Select one or more ports to configure.
3. Select one or more ports to which traffic can be forwarded and received.
4. Click [Apply].

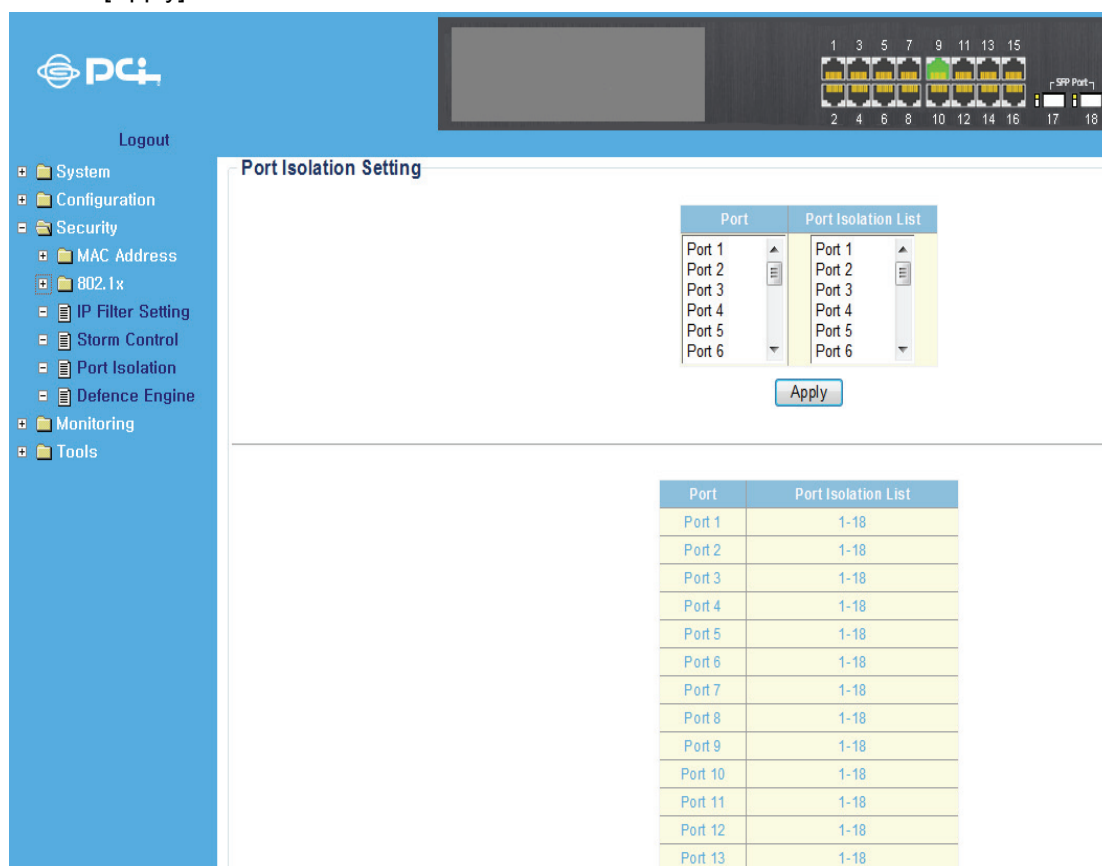


Figure 39: Port Isolation

### Hint\$

The following parameters are shown on the Port Isolation page.

- **Port** — Selects port and trunk interfaces. (Port Range: 1-18)
- **Port Isolation List** — Selects port and trunk interfaces to which traffic can be forwarded and received. (Port Range: 1-18; Default: All ports and trunks)

## Defence Engine Setting

Defence Engine is an advanced feature that can prevent switch's CPU from being overwhelmed by flooded packets, such as unknown unicast, unknown multicast, or broadcast packets. This function can be used to prevent malicious viruses or worm attacks.

Web Smart switch interface

To configure Defence Engine settings:

1. Click Security, Defence Engine.
2. Set Defence Engine status to Enabled.
3. Click [Apply].

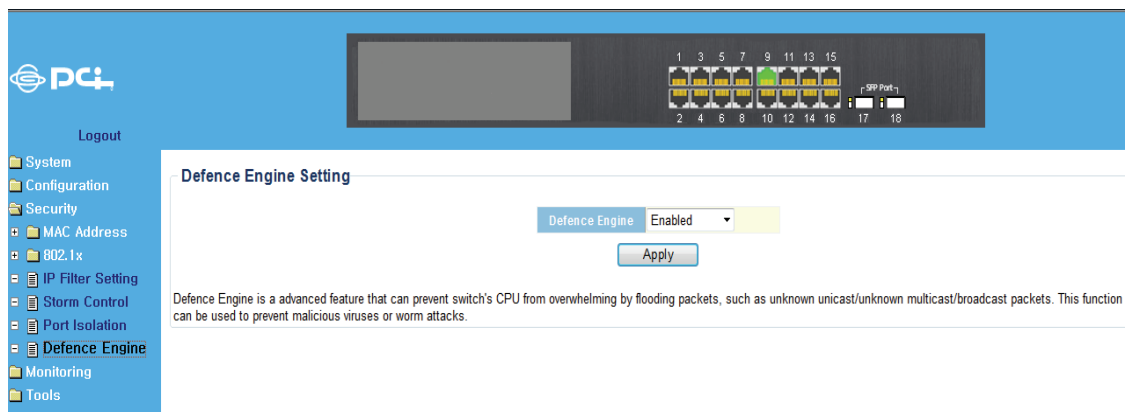


Figure 40: Defence Engine

### Hint

The following parameters are shown on the LLDP Neighbors page.

- **Defence Engine** — Enables or disables the feature. (Default: Enabled)

## CHAPTER 5 Monitoring

### Port Statistics Information

You can display standard statistics on network traffic passing through each port. This information 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.

Web Smart switch interface

To click Monitoring, Port Statistics to display port statistics.

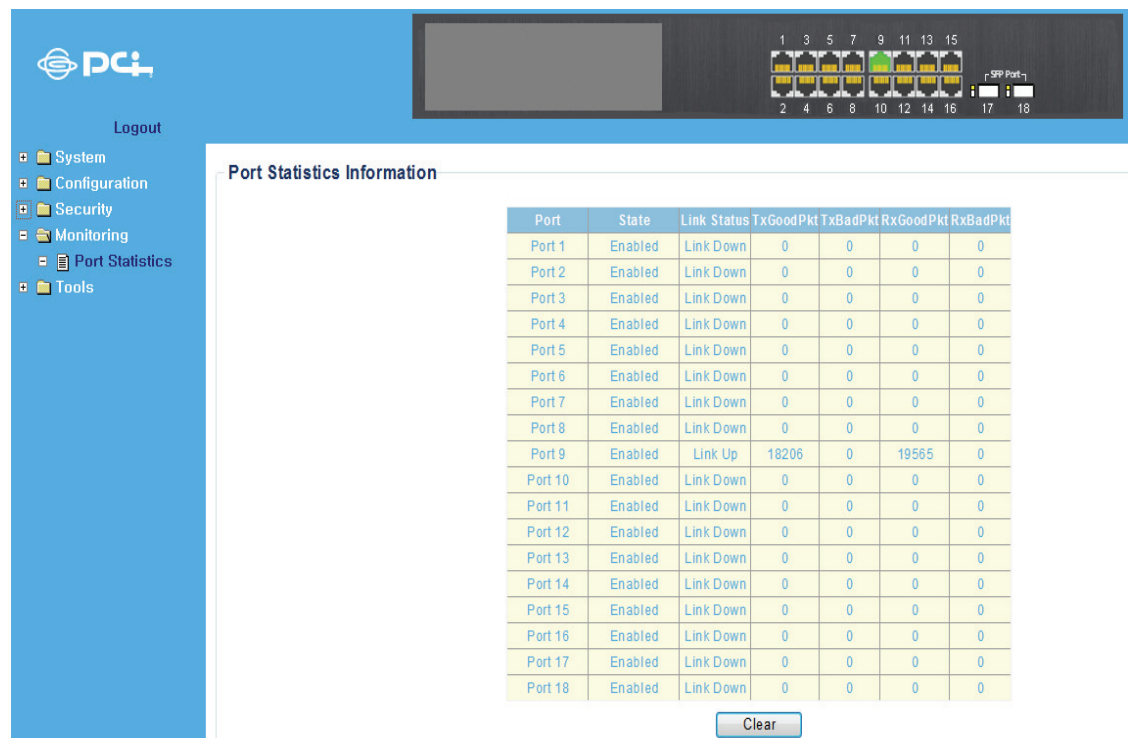


Figure 41: Port Statistics Information

### Hint\$

The following parameters are shown on the Port Statistics Information page.

- **Port** - The port number.
- **State** - Displays the link state of port interfaces (Enabled or Disabled).
- **Link Status** - Displays the link state of the port interface (Link Up or Link Down).
- **TxGoodPkt** - The total number of packets transmitted out of the interface.
- **TxBadPkt** - The total number of outbound packets that could not be transmitted because of errors.
- **RxGoodPkt** - The total number of packets received on the interface.
- **RxBadPkt** - The total number of inbound packets that contained errors preventing them from being deliverable.
- **Clear** - Click the button to reset all counters.

## CHAPTER 6 Tools

### Http Upgrade

Use the HTTP Upgrade page to upgrade the switch's system firmware by specifying a new software file. You can also use the HTTP Upgrade page to save the current configuration to a file on your computer, or to restore previously saved configuration settings to the switch.

Web Smart switch interface

To upgrade switch software:

1. Click Tools, HTTP Upgrade.
2. Click the Browse button, and select the firmware file.
3. Click the [Upgrade] button to upgrade the switch's firmware.

After the software file is uploaded, the switch prompts for a reboot.

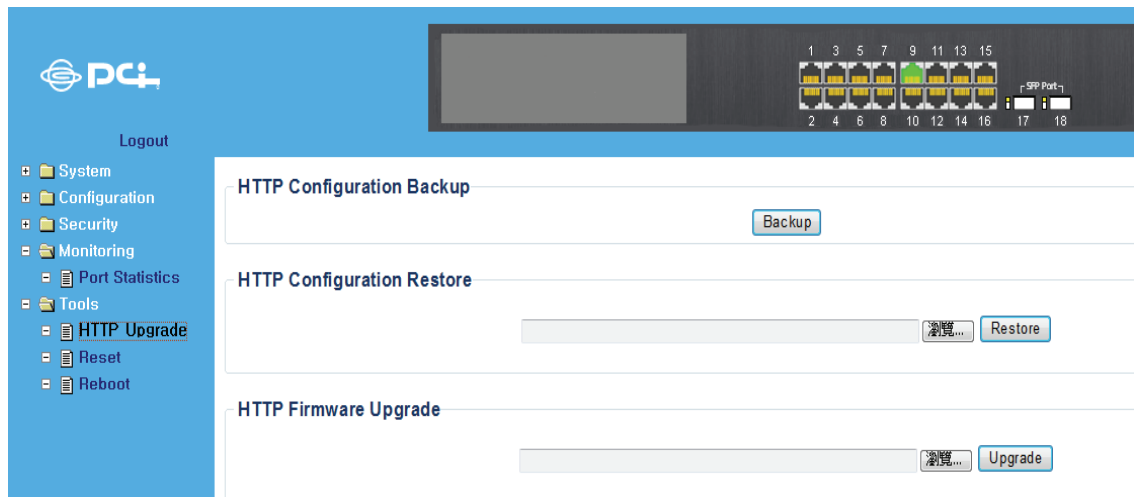


Figure 42: Http Upgrade

### Hint\$

The following parameters are shown on the Http Upgrade page.

- **HTTP Configuration Backup** - Click the Backup button to save the current configuration settings to a file on the local web management station.
- **HTTP Configuration Restore** - Restores previously saved configuration settings to the switch from a file on the local web management station. Use the Browse button to locate the configuration file, then click Restore.
- **HTTP Firmware Upgrade** - Upgrades the switch software from a file on the local web management station. Use the Browse button to locate the software file, then click Upgrade.



## Reset Factory Defaults

To restore factory defaults.

Web Smart switch interface

To click Tools, Reset, then click the [Reset] button. The reset will be complete when the Web browser displays the login page.

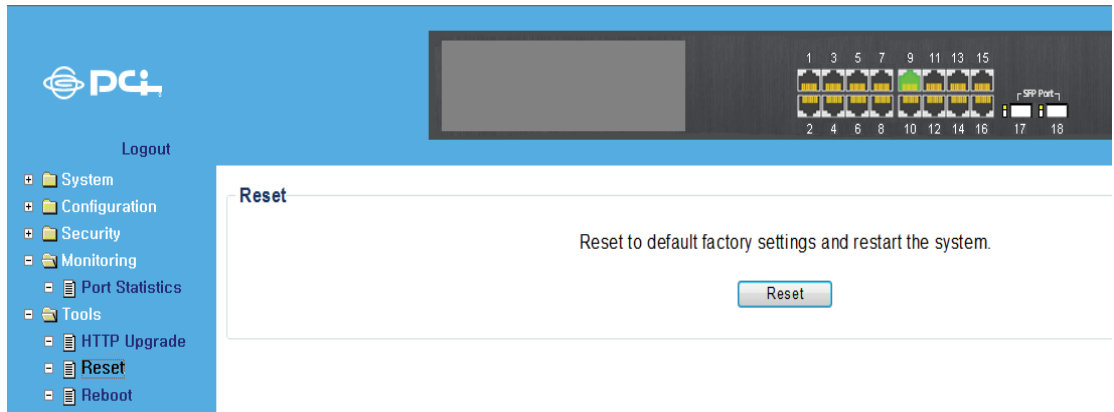


Figure 43: Reset

## Reboot

To restart the switch.

Web Smart switch interface

To click Tools, Reboot, then click the [Reboot] button. The reboot will be complete when the web interface displays the login page.

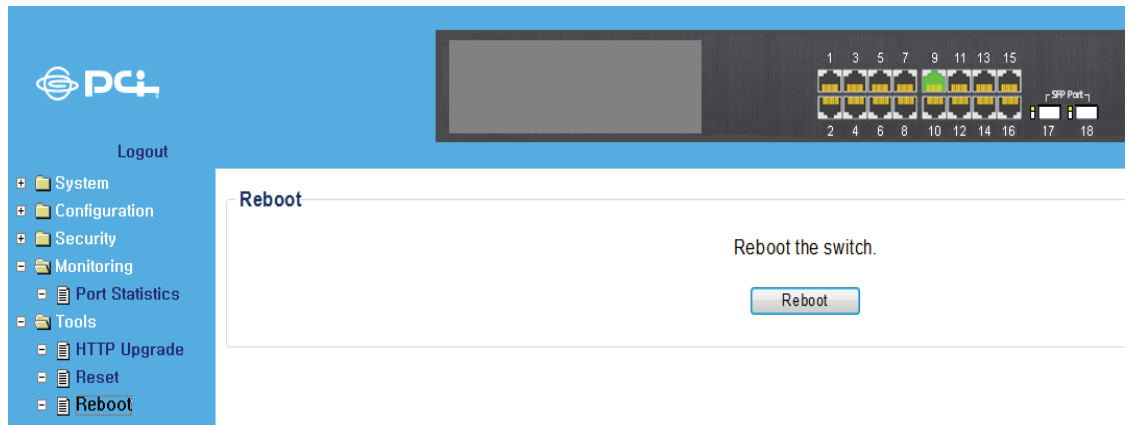


Figure 44: Reboot