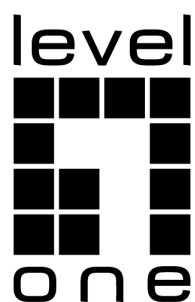


# Web Management Guide

( Hilbert PoE Smart Lite Switches )



# **FCC STATEMENT**

## **Manual Description**

This user guide is provided for using this type of switch. The manual includes the switch performance and function. Please read this manual before managing the device:

## **Intended Audience**

This guide is intended for network administrators familiar with IT concepts and network terminology.

## **SAFETY NOTICES**

Do not use this product near water, for example, in a wet basement or near a swimming pool. Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.

# TABLE OF CONTENTS

|                                                 |    |
|-------------------------------------------------|----|
| Chapter 1: Introduction.....                    | 4  |
| 1.1 Features .....                              | 5  |
| Technical Specifications.....                   | 5  |
| Chapter 2: Mounting Device .....                | 5  |
| 2.1 Installation Precautions .....              | 5  |
| 2.2 AC POWER.....                               | 5  |
| Chapter3: Login The Device.....                 | 6  |
| 3.1 configure the computer .....                | 6  |
| 3.1.1 Windows 7/Windows Vista.....              | 6  |
| 3.2 Check the connection .....                  | 9  |
| 3.3 Login the device .....                      | 10 |
| 3.4 Functional Overview .....                   | 10 |
| Chapter4: System .....                          | 11 |
| 4.1 The Home page.....                          | 11 |
| 4.2 System Information .....                    | 11 |
| 4.3 IP Address .....                            | 12 |
| 4.4 User Account.....                           | 12 |
| 4.5 Port Setting .....                          | 13 |
| Chapter5: Configuration.....                    | 14 |
| 5.1 VLAN .....                                  | 14 |
| 5.1.1 Static VLAN (802.1Q VLAN) Configure ..... | 15 |
| 5.1.2 Port-base VLAN Configure .....            | 16 |
| 5.2 QoS.....                                    | 18 |
| 5.2.1 Priority selection Setting.....           | 18 |
| 5.2.2 DSCP remapping .....                      | 19 |
| 5.2.3 Priority to Queue .....                   | 19 |
| 5.2.4 Port-based Priority .....                 | 20 |
| 5.2.5 Packet Scheduling .....                   | 20 |
| 5.3 IGMP Snooping .....                         | 22 |
| 5.4 Link Aggregation .....                      | 22 |
| 5.5 Port-based Mirroring .....                  | 23 |
| 5.6 Port Isolation .....                        | 23 |
| 5.7 Bandwidth Control.....                      | 24 |
| 5.8 Jumbo Frame .....                           | 24 |
| Chapter6: Security.....                         | 26 |
| 6.1 MAC Address .....                           | 26 |
| 6.1.1 Static MAC.....                           | 26 |

|                                 |    |
|---------------------------------|----|
| 6.1.2 MAC Constraint.....       | 28 |
| 6.2 Storm Control Setting ..... | 28 |
| 6.3 DHCP Snooping .....         | 29 |
| Chapter7: Monitoring.....       | 30 |
| 7.1 Port Statistics .....       | 30 |
| Chapter8: Tools .....           | 30 |
| 8.1 Backup Configuration .....  | 30 |
| 8.2 Firmware Upgrade .....      | 31 |
| 8.3 Reboot .....                | 31 |
| 8.4 Save Configuration.....     | 32 |
| 8.5 Reset Factory Default.....  | 32 |
| Chapter9: PoE.....              | 33 |
| 9.1 PoE Configuration .....     | 33 |

# Chapter 1: Introduction

## 1.1 Running the Application

Can be matched with the latest LevelOne IP Locator, the software is the easiest to use switch discovery tool, it can search all Hilbert series switches, instantly know the forgotten IP and other info. Compatible with mainstream Windows and Mac operating systems.

1. Scan the Setup code, download the LevelOne IP Locator and launch it.

<http://level1.info/iplocator>

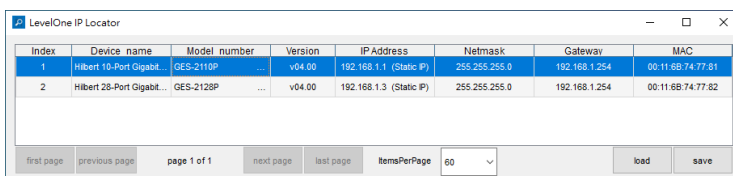


levelone IP Locator

2. Execute the application “**LevelOne IP Locator.exe**”.

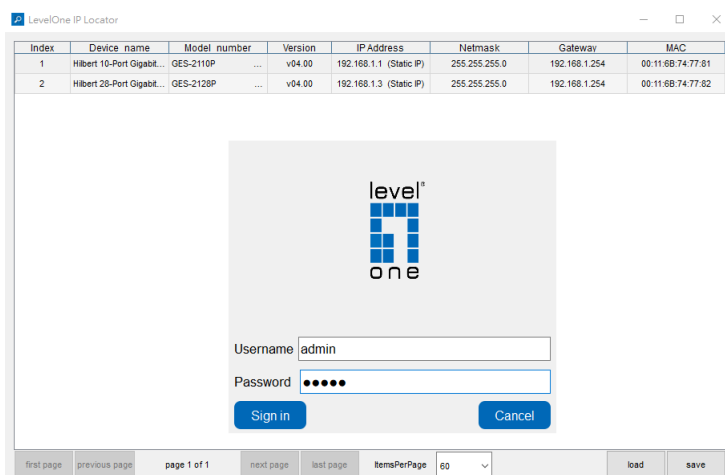


3. The LevelOne IP Locator Utility will search all Hilbert series switches based on the connect network interface card (NIC), instantly know the forgotten IP address and other info.



| Index | Device name                | Model number | Version | IP Address              | Netmask       | Gateway       | MAC               |
|-------|----------------------------|--------------|---------|-------------------------|---------------|---------------|-------------------|
| 1     | Hilbert 10-Port Gigabit... | GES-2110P    | v04.00  | 192.168.1.1 (Static IP) | 255.255.255.0 | 192.168.1.254 | 00:11:6B:74:77:81 |
| 2     | Hilbert 28-Port Gigabit... | GES-2128P    | v04.00  | 192.168.1.3 (Static IP) | 255.255.255.0 | 192.168.1.254 | 00:11:6B:74:77:82 |

4. Simply click with the mouse on the device's IP address in the device list for configuration. On the displayed login screen, enter the factory username "admin" and password "admin", then click "Sign in".



| Index | Device name                | Model number | Version | IP Address              | Netmask       | Gateway       | MAC               |
|-------|----------------------------|--------------|---------|-------------------------|---------------|---------------|-------------------|
| 1     | Hilbert 10-Port Gigabit... | GES-2110P    | v04.00  | 192.168.1.1 (Static IP) | 255.255.255.0 | 192.168.1.254 | 00:11:6B:74:77:81 |
| 2     | Hilbert 28-Port Gigabit... | GES-2128P    | v04.00  | 192.168.1.3 (Static IP) | 255.255.255.0 | 192.168.1.254 | 00:11:6B:74:77:82 |



Username

Password

## 1.2 Features

- Support link aggregation.
- Support port VLAN and IEEE 802.1Q VLAN.
- Support rate limit, port statistics.
- Support port mirroring.
- Support QoS, providing strict priority.
- Support Loop Prevention.
- Support MAC Address binding.
- Support storm control.
- Support the port Isolation.
- Support IGMP snooping, multicast probe.
- Support WEB-based management.
- Support WEB-based firmware upgrade.
- Support parameter backup and recovery.

## Technical Specifications

The web-smart switch front panel has 8/16/24 port 10/100M adaptive UTP ports, and the LED indicator. The 8/16/24 ports support 10/100Mbps bandwidth connection device, auto-negotiation capability. Each port corresponds to a set of indicator, LNK / ACT.

## Chapter 2: Mounting Device

### 2.1 Installation Precautions

Ensure the surface on which the device is placed is adequately secured to prevent it from becoming unstable. Ensure the power outlet is placed within 1.8m (6feet) of the device. Ensure the device is connected safely to the power outlet with the AC power cable. Ensure the device around good ventilation and heat dissipation.

Do not place heavy objects on the device

### 2.2 AC POWER

The switch can be used with AC power supply 100 to 240V AC, 50 to 60Hz.. Switch built-in power supply system can be the actual input voltage automatically adjusts its operating voltage. The power connector is located on the rear panel switch. Disconnect the power cord is a plug on the power switch on the rear panel interface, the other end plugged into a power outlet.

# Chapter3: Login The Device

You can use the web browser-based configuration to manage Web-Smart Switch. The Web-Smart Switch to be configured through a web browser, at least a reasonable allocation of computer through an Ethernet connection to Web-Smart Switch.

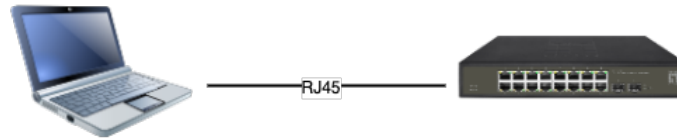


Figure 3-1

Default IP address of the switch:192.168.1.1. Subnet mask: 255.255.255.0.

When logging in the switch, make sure that the IP addresses of the host network card and the switch are in the same network segment: 192.168.1. \*\*\* (1 <\*\*\* <255, \*\*\* is not 11). See the following setting steps:

## 3.1 configure the computer

The Management switch is managed via WEB pages. The smart and friendly interfaces make the switch management an easy job. Due to the difference of Operating system, the WEB page display may differ between variable Operating System.

### 3.1.1 Windows 7/Windows Vista

Follow these steps to configure your computer

1、Start-Control Panel

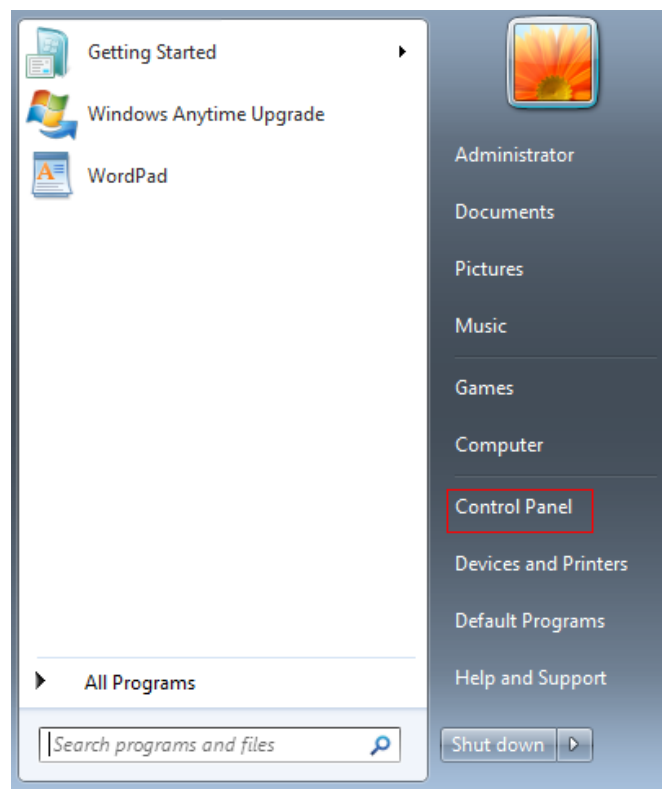


Figure 3-1-8

## 2、Click "Network and Internet "

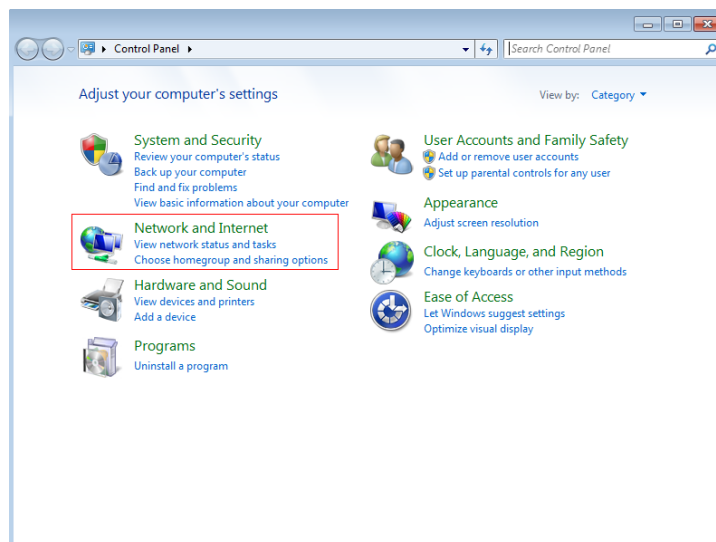


Figure 3-1-9

## 3、Click "Change adapter settings"

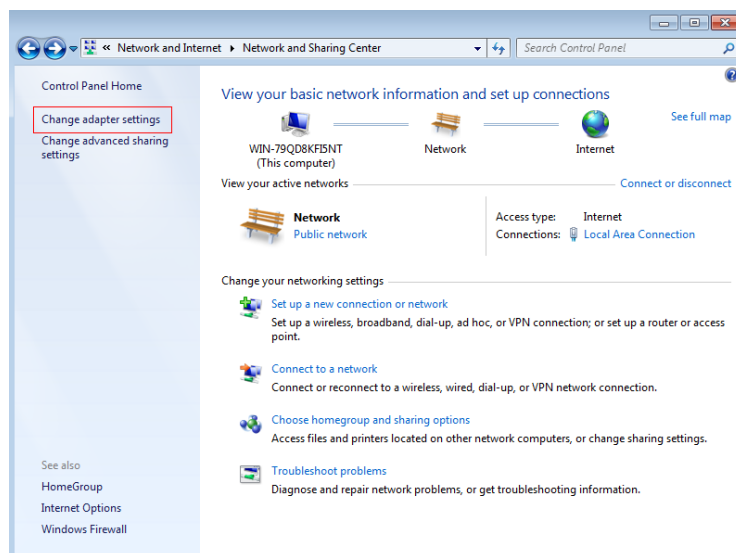


Figure 3-1-10

## 4. click right-hand button on the adapter icon and click "Properties"

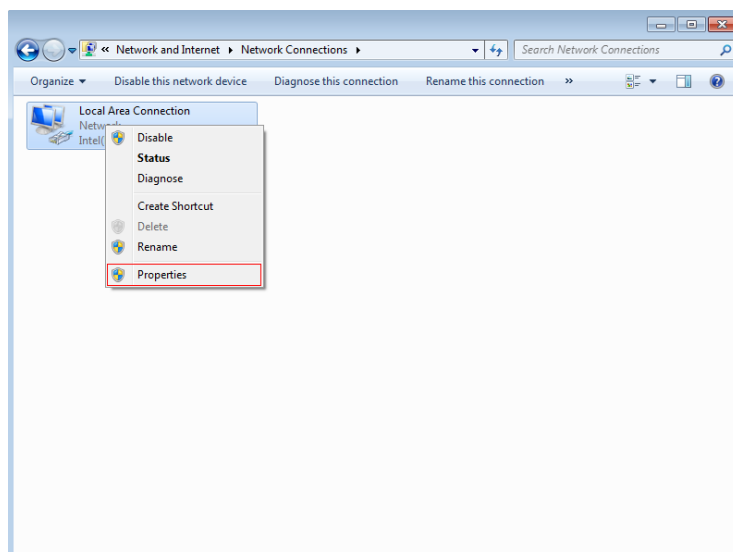


Figure 3-1-11



5. Double click "Internet protocol Version 4(TCP/IPv4)"

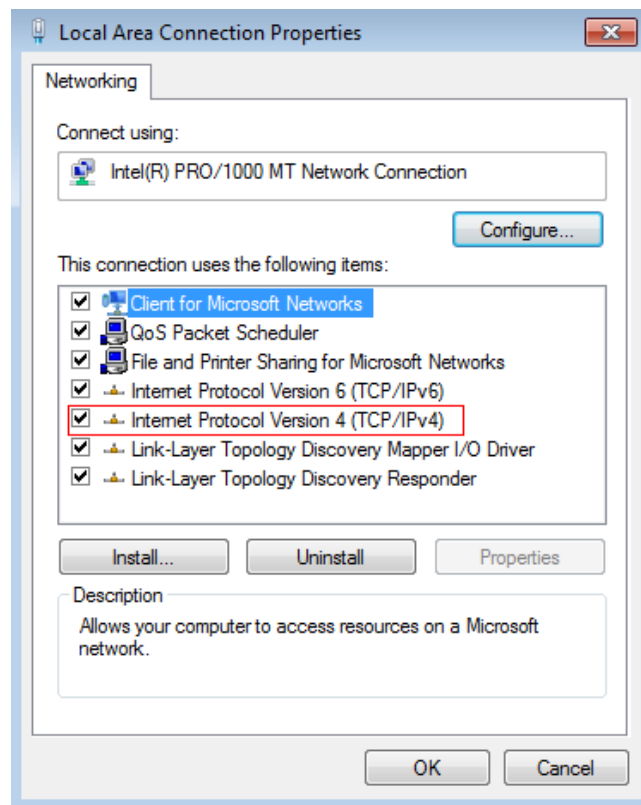
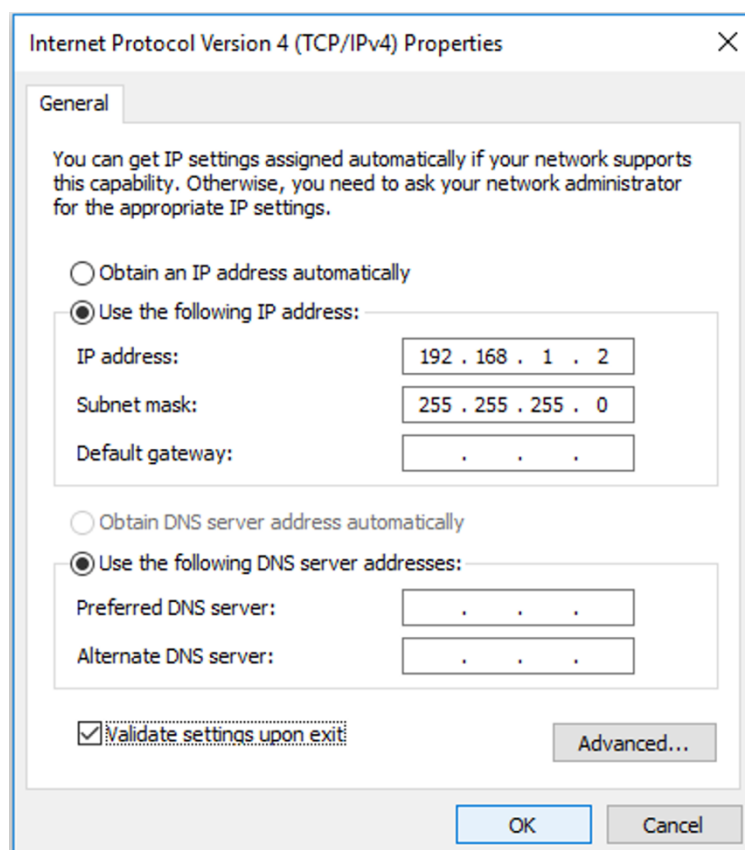


Figure 3-1-12

5、 Use the following IP address: input IP 192.168.1.\*\*\* (1 <\*\*\* <255, \*\*\* is not 11, because the default IP of the switch is 192.168.1.1), Subnet mask: 255.255.255.0. The default gateway and DNS server are optional, and then click "OK" to close the Internet TCP / IP properties window.

Figure 3-1-13



6、CLICK “OK” and Close the Local Area Connection Properties window

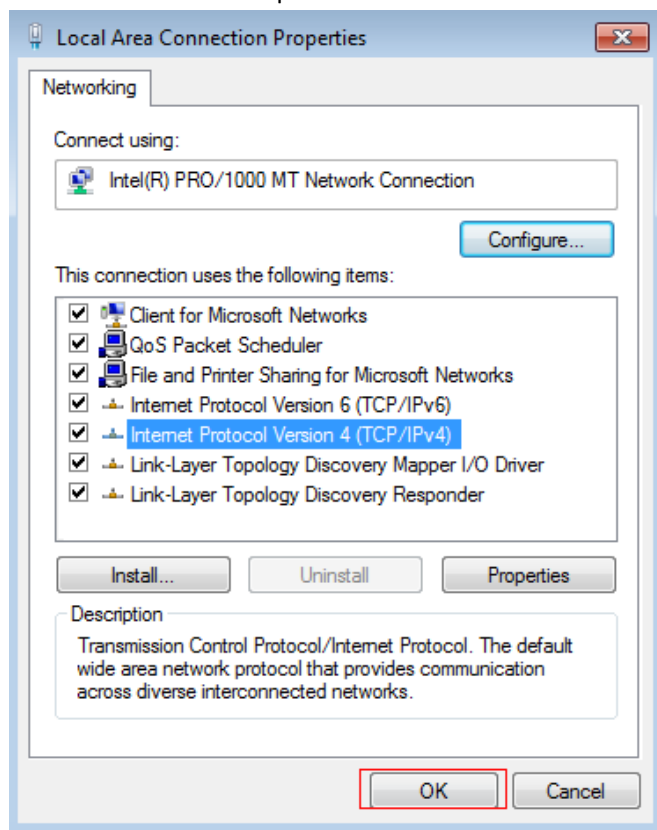


Figure 3-1-14

## 3.2 Check the connection

After setting the TCP / IP protocol, you can use the Ping command to verify whether the computer can communicate with Web-Smart Switch. To perform a ping command, open a command window, the IP address in the command prompt where the Ping Web-Smart Switch

Windows XP, START-Control, type cmd in the search bar and press Enter Windows 7, Click Start, type cmd in the search bar and press Enter where the DOS prompt, enter the following command.

If the command window return to something like the following:

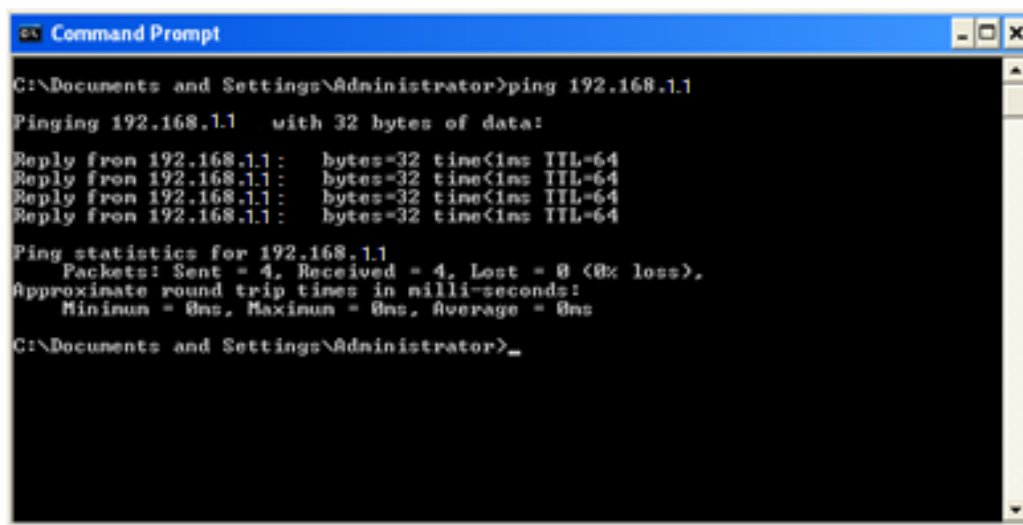


Figure 3-2-1

Then Connection between Web-Smart Switch and computer is successful

If the computer failed to connect on of Web-Smart Switch, the command window will return the following content

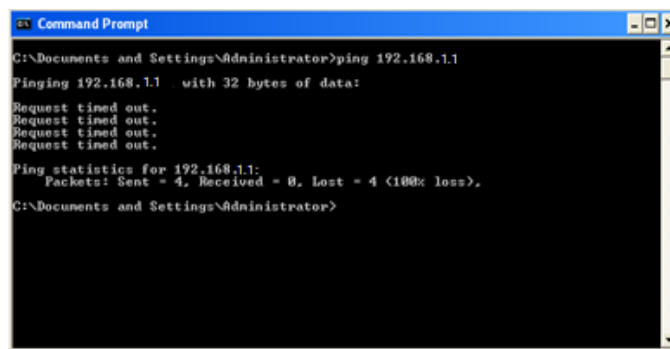


Figure 3-2-2

Then make sure that your computer's network settings are correct and the cable is intact.

**Caution:**

YOU need to use a twisted pair to connect the port of your computer's network card to the switch port before entering the above command

## 3.3 Login the device

1、Open IE browser,enter <http://192.168.1.1> in the address bar, then return.

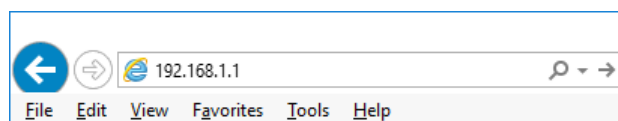


Figure 3-3-1

2、In the pop-up window to enter user name: admin, password: admin, then press the OK button.

**NOTES:**

If you are successful login into the switch webpage, the page from time to time automatically refresh, allowing you to dynamically view the port status.

## 3.4 Functional Overview

The Web-Smart Switch have rich feature, including the functions of system management, Port Management, Redundancy management, Security management, QoS management, Network Analysis, next chapter will introduce you these functions.

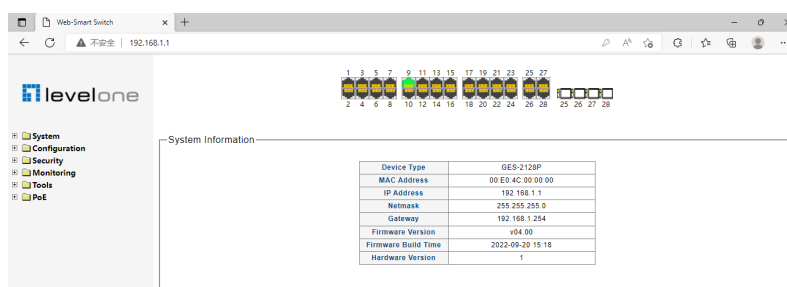


Figure 3-4-1

# Chapter4: System

## 4.1 The Home page

After logging into the switch, the main page appears as the following. It contains three parts:

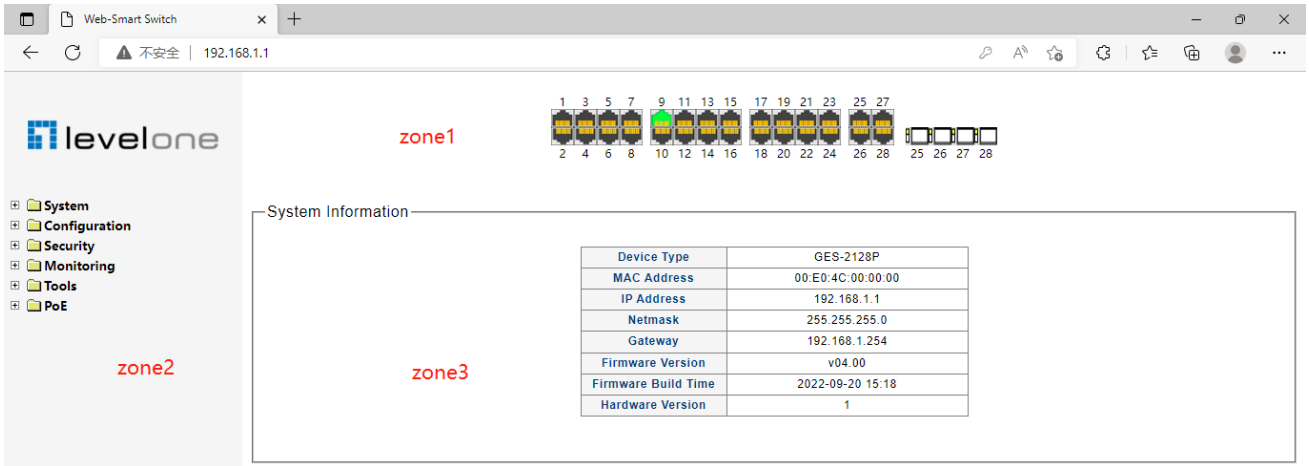


Figure 4-1-1

- zone"1"**: The Port table lies at the top of the page. It provides a visual representation of the ports. The green icon indicates that the port is linked; the gray icon indicates that the port is not linked;
- zone"2"**: On the left side of the page is the menu table. It contains 5 main menus. Each menu has some submenus. Click on a menu, it will open its submenus and the main window.
- zone"3"**: The main part of the page is the main window to display the configuration page.

## 4.2 System Information

Click on the "System", the switch manage page will show as figure below, the system submenu have basic information, including: Information, IP Address, User Account, Port Setting. The following picture is the detailed description.

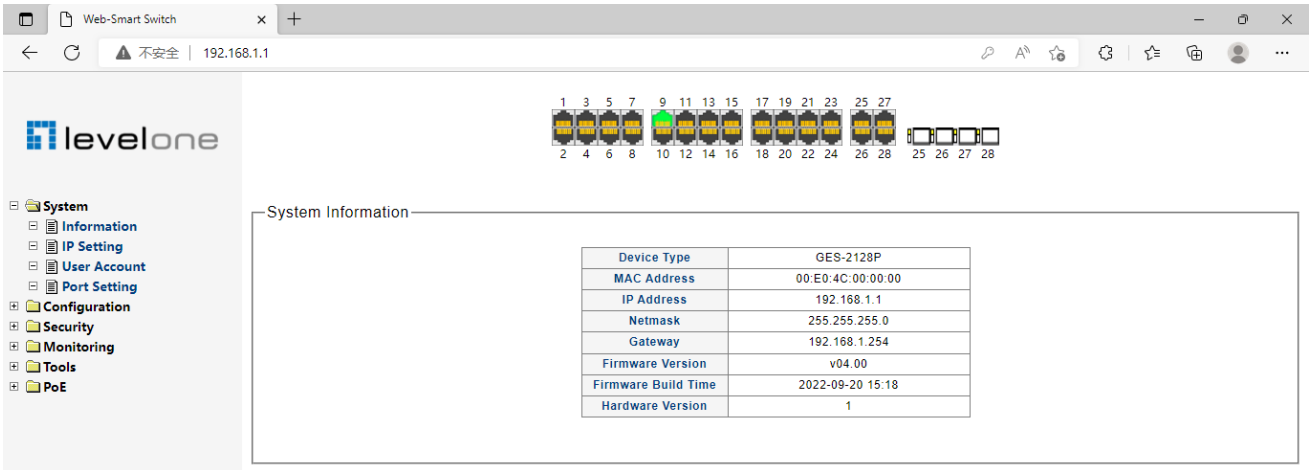


Figure 4-2-1

The System Information shows the system information of the switch, such as Device Type, MAC address, IP Address, Hardware and Software version information.

### 4.3 IP Address

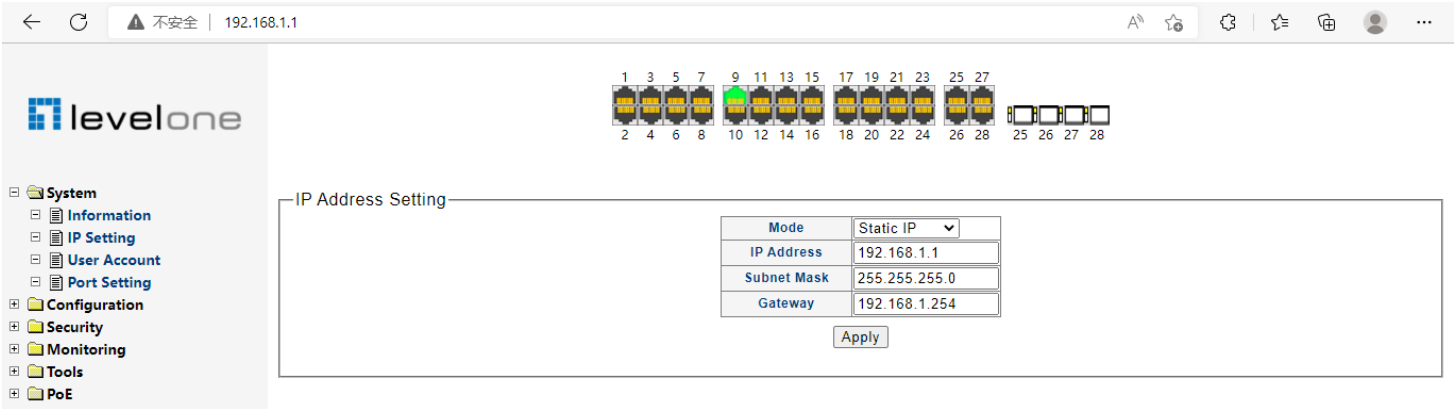


Figure 4-3-1

On this page you can manually set the IP address, subnet mask, gateway and other information; can also use your network, among other DHCP SERVER switch automatically assigns an IP address. The switch default IP address is: 192.168.1.1 default subnet mask: 255.255.255.0 Default Gateway: 192.168.1.254. When finished editing, click the "Apply" to complete the IP address settings.

**Notes:**

- (1)When you select "DHCP Settings" is disabled, the switch will have to manually assign an IP address.
- (2)When DHCP client is enabled, the IP parameters are obtained automatically from the DHCP server.

### 4.4 User Account

This page provides the interface of configuring username and password.

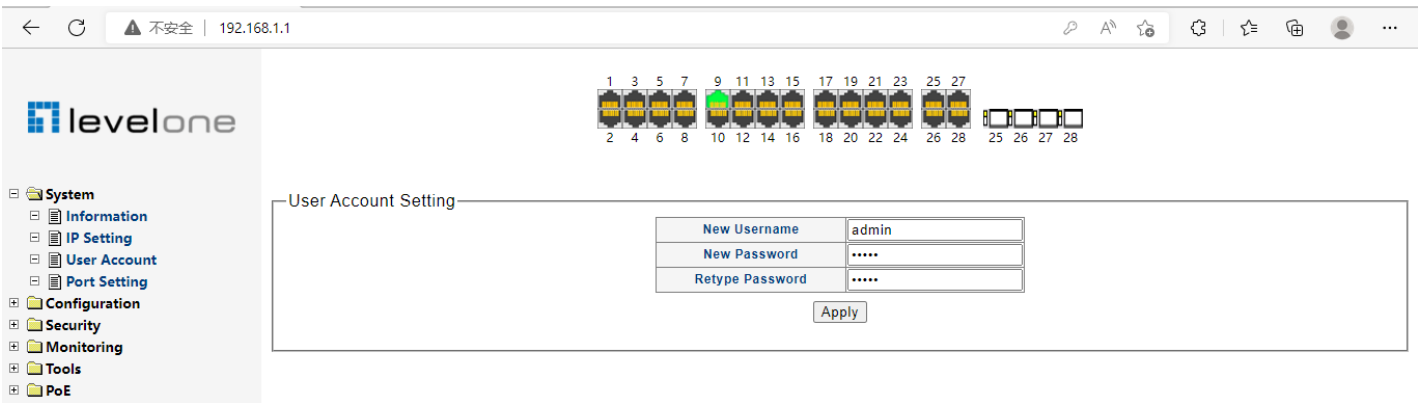


Figure 4-4-1

You are kindly suggested to retype the new password in "Confirm new password" box instead of copying in order to avoid typing mistakes.

#### Caution:

Only letters, numbers and punctuations can be input into username and password. The other characters are considered illegal. The initial password is admin.

#### Notes:

After modifying the password with immediate effect, the parameters will not be lost though is powered off.

## 4.5 Port Setting

The screenshot displays the LevelOne web management interface. The browser address bar shows '192.168.1.1'. The sidebar on the left contains a tree view with categories: System (Information, IP Setting, User Account, Port Setting), Configuration, Security, Monitoring, Tools, and PoE. The 'Port Setting' page is active, showing a port status diagram at the top with ports 1-28. Below the diagram is the 'Port Setting' configuration area. It includes a table for configuring individual ports (Port 1 to Port 6 are visible) with columns for Port, Port Name, State, Speed/Duplex, and Flow Control. An 'Apply' button is located below this table. At the bottom, there is a detailed table showing the status of all 28 ports.

| Port    | Port Name | State  | Speed/Duplex |           | Flow Control |           |
|---------|-----------|--------|--------------|-----------|--------------|-----------|
|         |           |        | Config       | Actual    | Config       | Actual    |
| Port 1  |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 2  |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 3  |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 4  |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 5  |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 6  |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 7  |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 8  |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 9  |           | Enable | Auto         | 1000MFull | On           | Off       |
| Port 10 |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 11 |           | Enable | Auto         | Link Down | On           | Link Down |
| Port 12 |           | Enable | Auto         | Link Down | On           | Link Down |

Figure 4-5-1

On this page, you can configure the basic parameter for the ports. When the port is disabled, the packers on the port will be discard. Shut down the port which is vacant for a long time can reduce the power consumption effectively. And you can enable the port when it is in need. The parameters will affect the working mode of the ports, please set the parameters appropriate. **Status:** Allows you to Enable/Disable the port. When Enable is set, the port can forward the packets normally.

**Speed and Duplex:** Select the speed and Duplex mode for the port. The device connected to the switch should be in the same Speed and Duplex mode with the switch. When "Auto" is set, the Speed and Duplex mode will be determined by auto-negotiation. But the SFP port, this Switch does not support auto-negotiation.

**Flow Control:** Allows you to Enable /Disable the Flow Control feature. When Flow Control is enabled, the switch can synchronize the speed with its peer to avoid the congestion.

# Chapter5: Configuration

## 5.1 VLAN

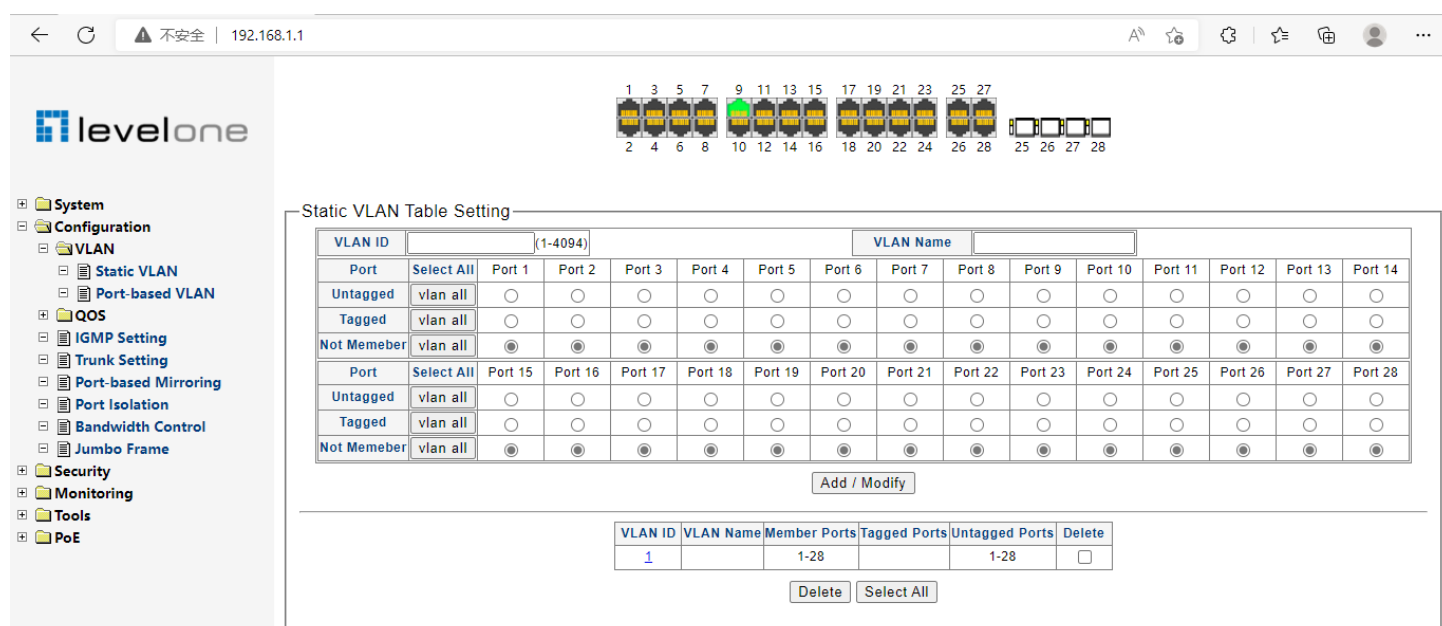


Figure 5-1-1

### Introduction to VLAN

The traditional Ethernet is a broadcast network, where all hosts are in the same broadcast domain and connected with each other through hubs or switches. Hubs and switches, which are the basic network connection devices, have limited forwarding functions.

- A hub is a physical layer device without the switching function, so it forwards the received packet to all ports except the inbound port of the packet.
- A switch is a link layer device which can forward a packet according to the MAC address of the packet. A switch builds a table of MAC addresses mapped to associated ports with that address and only sends a known MAC's traffic to one port. When the switch receives a broadcast packet or an unknown unicast packet whose MAC address is not included in the MAC address table of the switch, it will forward the packet to all the ports except the inbound port of the packet. The above scenarios could result in the following network problems.
- Large quantity of broadcast packets or unknown unicast packets may exist in a network, wasting network resources.
- A host in the network receives a lot of packets whose destination is not the host itself, causing potential serious security problems.
- Related to the point above, someone on a network can monitor broadcast packets and unicast packets and learn of other activities on the network. Then they can attempt to access other resources on the network, whether or not they are authorized to do this.

Isolating broadcast domains is the solution for the above problems. The traditional way is to use routers, which forward packets according to the destination IP address and does not forward broadcast packets in the link layer. However, routers are expensive and provide few ports, so they cannot split the network efficiently. Therefore, using routers to isolate broadcast domains has many limitations.

The Virtual Local Area Network (VLAN) technology is developed for switches to control broadcasts in LANs.

A VLAN can span multiple physical spaces. This enables hosts in a VLAN to be located in different physical locations. 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 in the traditional Ethernet way. However, hosts in different VLANs cannot communicate with each other directly but need the help of network layer devices, such as routers and Layer 3 switches.

## Advantages of VLANs

Compared with traditional Ethernet technology, VLAN technology delivers the following benefits:

- Confining broadcast traffic within individual VLANs. This saves bandwidth and improves network performance.
- Improving LAN security. By assigning user groups to different VLANs, you can isolate them at Layer 2. To enable communication between VLANs, routers or Layer 3 switches are required.
- Flexible virtual workgroup creation. As users from the same workgroup can be assigned to the same VLAN regardless of their physical locations, network construction and maintenance is much easier and more flexible.

### 5.1.1 Static VLAN (802.1Q VLAN) Configure

1. Choose the menu **Configuration** → **VLAN** → **Static VLAN** to load VLAN page.

Static VLAN Table Setting

| VLAN ID     | (1-4094)   |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | VLAN Name |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------|------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Port        | Select All | Port 1                           | Port 2                           | Port 3                           | Port 4                           | Port 5                           | Port 6                           | Port 7                           | Port 8                           | Port 9                           | Port 10                          | Port 11                          | Port 12                          | Port 13                          | Port 14                          |           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Untagged    | vlan 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      | vlan 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 Memeber | vlan all   | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Port        | Select All | Port 15                          | Port 16                          | Port 17                          | Port 18                          | Port 19                          | Port 20                          | Port 21                          | Port 22                          | Port 23                          | Port 24                          | Port 25                          | Port 26                          | Port 27                          | Port 28                          |           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Untagged    | vlan 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      | vlan 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 Memeber | vlan all   | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Add / Modify

| VLAN ID           | VLAN Name | Member Ports | Tagged Ports | Untagged Ports | Delete                   |
|-------------------|-----------|--------------|--------------|----------------|--------------------------|
| <a href="#">1</a> |           | 1-28         |              | 1-28           | <input type="checkbox"/> |

Delete    Select All

Figure 5-1-2



# 5.1.2 Port-base VLAN Configure

2. Choose the menu **Configuration →VLAN →802.1Q PVID** to load the following page.  
Configure PVID on this page.

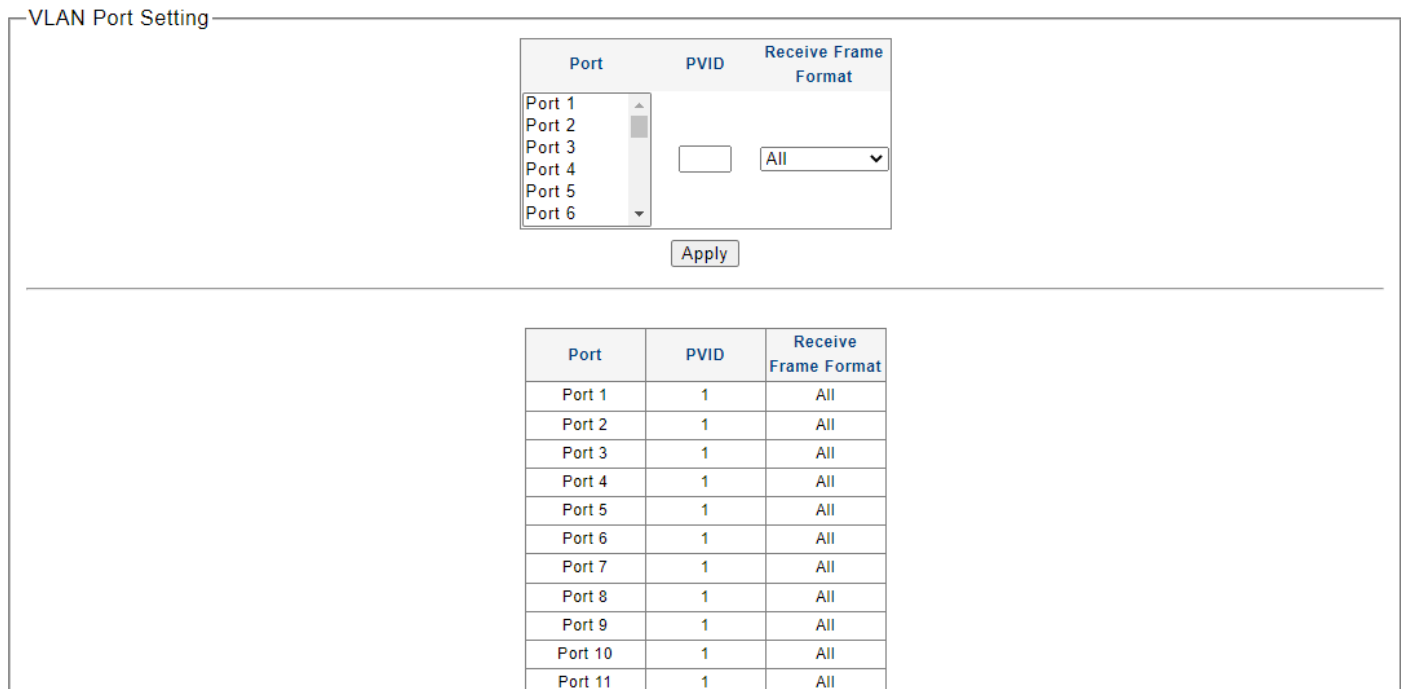


Figure 5-1-3

- 1). Select the desired port which to set PVID. Here is port 2 e.g.
- 2). Specify the PVID number of this port. Here is VLAN 2 e.g.
- 3). Select the frame type allowed of this port: ALL, Only with tag or Only no with tag.
- 4). Click Apply to change PVID of port 2.

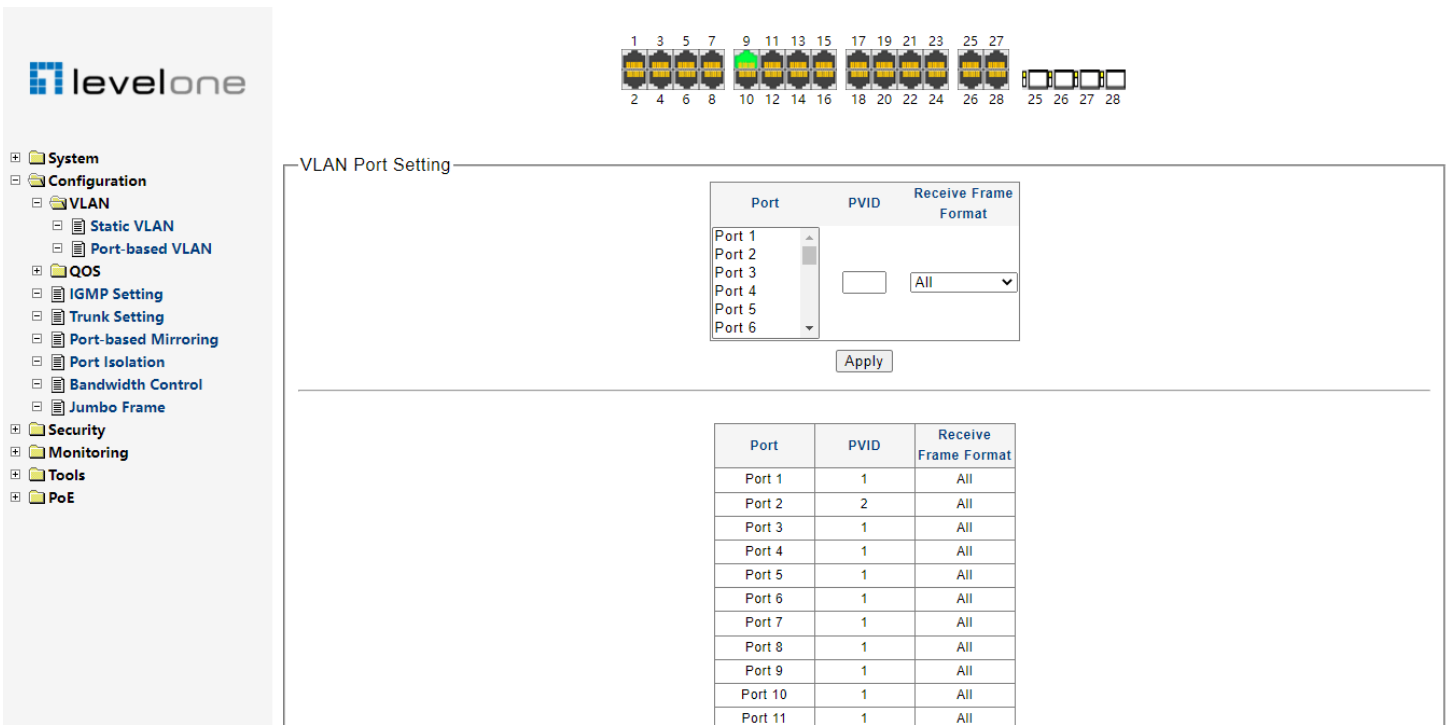


Figure 5-1-4

3. Choose the menu **Configuration** → **VLAN** → **802.1Q VLAN** to load the following page.

Configure 802.1Q VLAN member port on this page.

Here configure port 2 as access=2, port 1,3 as trunk =2 e.g.

1). Specify the VLAN ID need to configure. Here is VLAN 2 e.g.

2). Specify the VLAN Name of VLAN 2. Here is VLAN2.

3). Select the member port of VLAN 2, and frame type supported: Untagged or Tagged. Select port 2 as Untagged. Select port 1,3 as Tagged e.g.

Static VLAN Table Setting

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

| VLAN ID | VLAN Name | Member Ports | Tagged Ports | Untagged Ports | Delete                   |
|---------|-----------|--------------|--------------|----------------|--------------------------|
| 1       |           | 1-28         |              | 1-28           | <input type="checkbox"/> |
| 2       |           | 1-3          | 1,3          | 2              | <input type="checkbox"/> |

Buttons: Add / Modify, Delete, Select All

Figure 5-1-5

4). Click vlan id 2 to see the detailed configuration parameters of vlan 2.

Static VLAN Table Setting

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

| VLAN ID | VLAN Name | Member Ports | Tagged Ports | Untagged Ports | Delete                   |
|---------|-----------|--------------|--------------|----------------|--------------------------|
| 1       |           | 1-28         |              | 1-28           | <input type="checkbox"/> |
| 2       |           | 1-3          | 1,3          | 2              | <input type="checkbox"/> |

Buttons: Add / Modify, Delete, Select All

Figure 5-1-6

## 5.2 QoS

QoS (Quality of Service) functions to provide different quality of service for various network applications and requirements and optimize the bandwidth resource distribution so as to provide a network service experience of a better quality.

### QoS

This switch classifies the ingress packets, maps the packets to different priority queues and then forwards the packets according to specified scheduling algorithms to implement QoS function.

Traffic classification: Identifies packets conforming to certain characters according to certain rules.

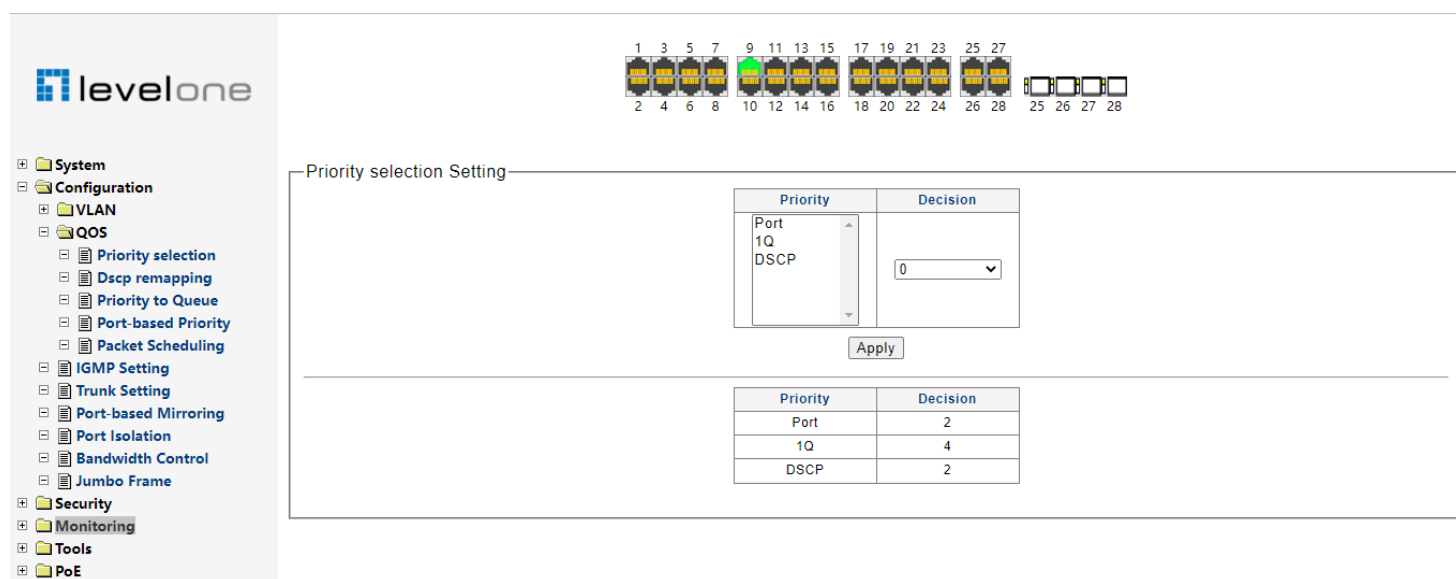
Map: The user can map the ingress packets to different priority queues based on the priority modes. This switch implements priority modes based on port.

Queue scheduling algorithm: When the network is congested, the problem that many packets compete for resources must be solved, usually in the way of queue scheduling. The switch supports three schedule modes: SP, WFQ, WRR

### 5.2.1 Priority selection Setting

This switch implements three priority modes based on port, on 802.1P and on DSCP. By default, it is based on port, 802.1P and DSCP priority modes.

Choose the menu **Configuration → Priority selection Setting** to load the following page.



Priority selection Setting

| Priority | Decision |
|----------|----------|
| Port     | 2        |
| 1Q       | 4        |
| DSCP     | 2        |

Figure 5-2-1

## 5.2.2 DSCP remapping

The device provides various types of priority maps. By looking through a priority map, the device decides which priority value to assign to a packet for subsequent packet processing.

You can configure the mapping relationship between dscp and priority.

Choose the menu **Configuration → QoS → DSCP Remapping** to load the following page.

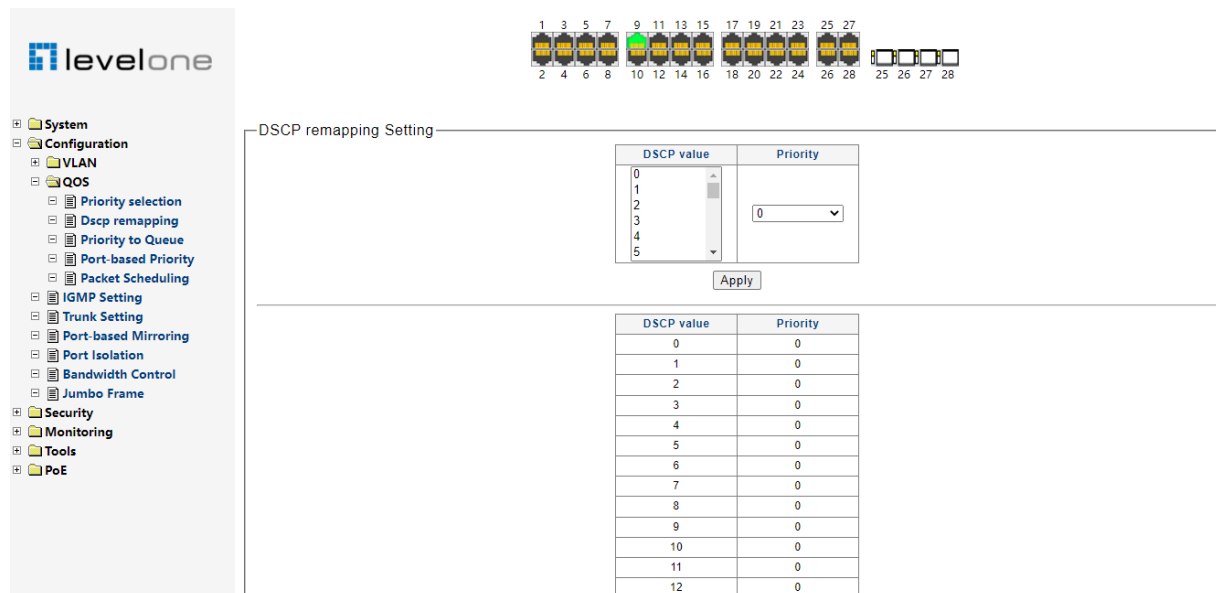


Figure 5-2-2

## 5.2.3 Priority to Queue

The switch sends packets to the specified queue based on the mappings between local priorities and queues. Configuration of priority and queue mapping relationship.

Choose the menu **Configuration → QoS → Priority to Queue** to load the following page.

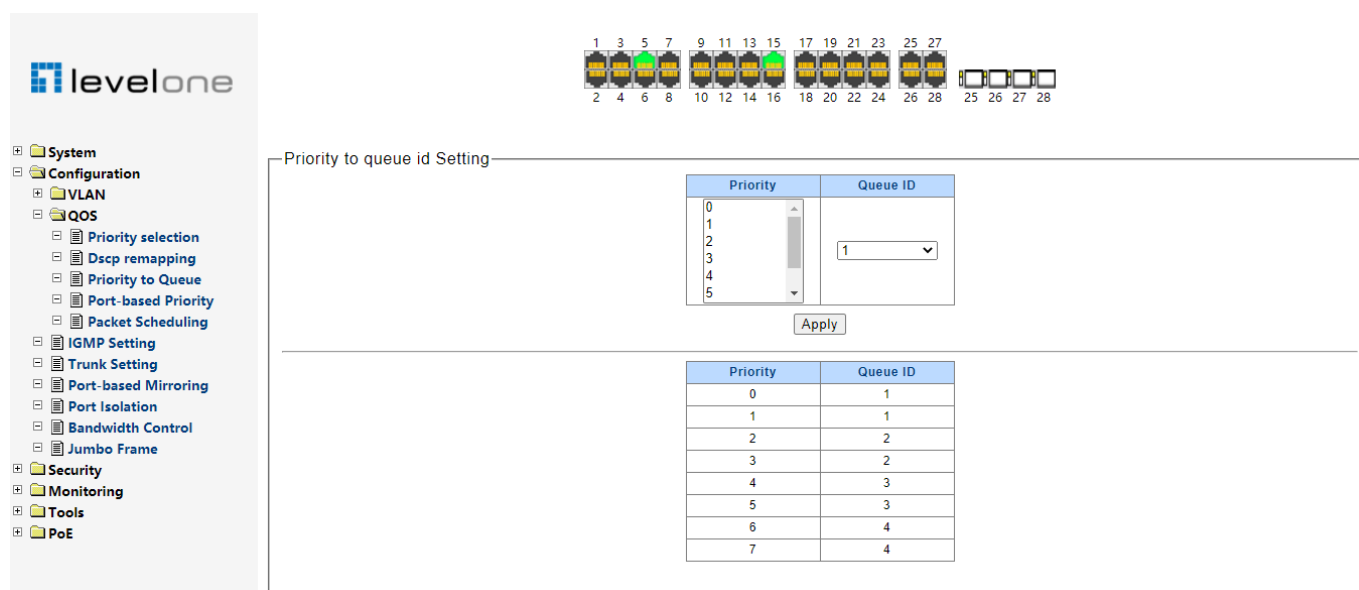


Figure 5-2-3

## 5.2.4 Port-based Priority

Port priority is a priority level of the port. After port priority is configured, the data stream will be mapped to the egress queues directly according to the priority level of the port.

Choose the menu **Configuration → QoS → Port-based Priority** to load the following page.

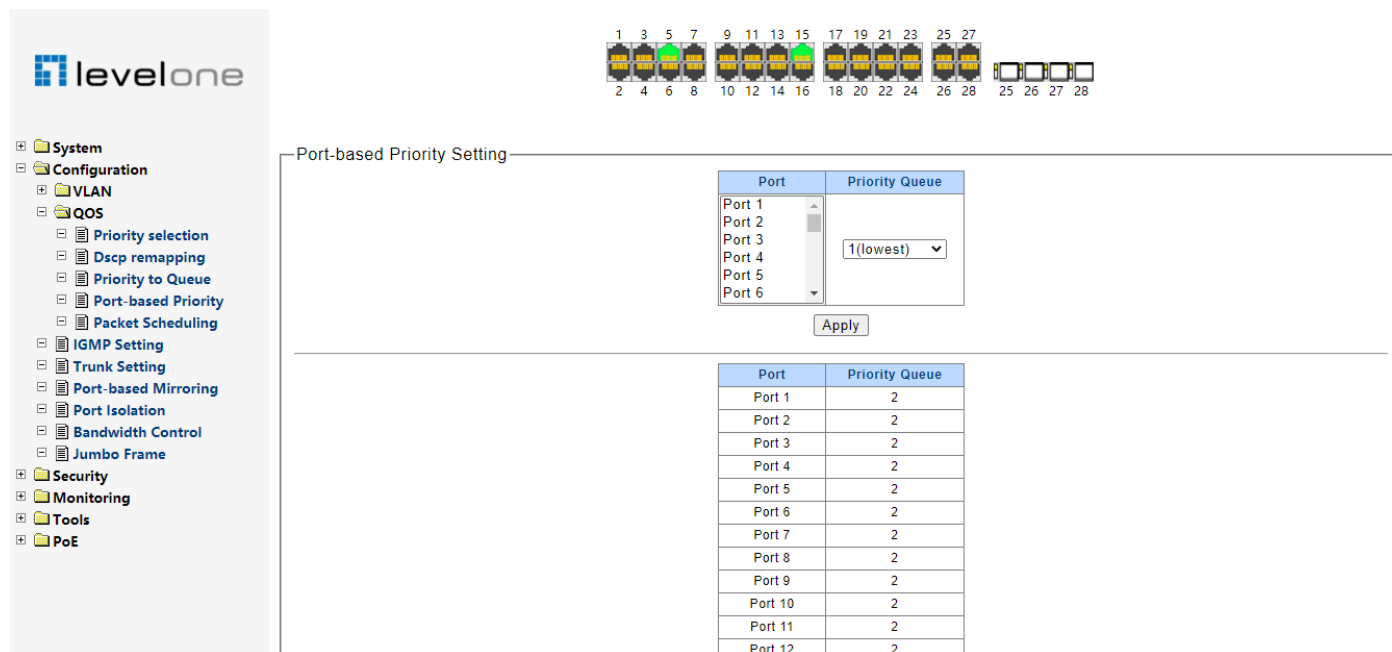


Figure 5-2-4

1. Displays the physical port number of the switch.
2. Select the desired port to configure its priority.
3. Specify the priority for the port.

## 5.2.5 Packet Scheduling

When the network is congested, the problem that many packets compete for resources must be solved, usually in the way of queue scheduling. The switch implements eight scheduling queues.

**SP-Mode: Strict-Priority Mode.** In this mode, the queue with higher priority will occupy the whole bandwidth. Packets in the queue with lower priority are sent only when the queue with higher priority is empty. The switch has four egress queues labeled. The disadvantage of SP queue is that: if there are packets in the queues with higher priority for a long time in congestion, the packets in the queues with lower priority will be “starved to death” because they are not served.

**WFQ-Mode: Weighted fair queueing (WFQ)** is a method of automatically smoothing out the flow of data in packet-switched communication networks by sorting packets to minimize the average latency and prevent exaggerated discrepancies between the transmission efficiency afforded to narrowband versus broadband signals. In WFQ, the priority

given to network traffic is inversely proportional to the signal bandwidth. Thus, narrowband signals are passed along first, and broadband signals are buffered.

WRR-Mode: Weighted Round Robin (WRR) — In WRR mode the number of packets sent from the queue is proportional to the weight of the queue (the higher the weight the more frames are sent). WRR queuing schedules all the queues in turn to ensure that every queue is served for a certain time.

Choose the menu **Configuration →QoS →Packet Scheduling** to load the following page.

levelone

System

Configuration

VLAN

QOS

Priority selection

Dscp remapping

Priority to Queue

Port-based Priority

Packet Scheduling

IGMP Setting

Trunk Setting

Port-based Mirroring

Port Isolation

Bandwidth Control

Jumbo Frame

Security

Monitoring

Tools

PoE

1 3 5 7 9 11 13 15 17 19 21 23 25 27

2 4 6 8 10 12 14 16 18 20 22 24 26 28

25 26 27 28

Packet Scheduling Setting

Scheduling Algorithm

Weight-fair-queue

Apply

Queue ID

Weight

1 (lowest)

2

3

4

Strict priorit

Apply

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

Figure 5-2-5

## 5.3 IGMP Snooping

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

The switch, running IGMP Snooping, listens to the IGMP messages transmitted between the host and the router, and tracks the IGMP messages and the registered port. When receiving IGMP report message, the switch adds the port to the multicast address table; when the switch listens to IGMP leave message from the host, the router sends the Group-Specific Query message of the port to check if other hosts need this multicast, if yes, the router will receive IGMP report message; if no, the router will receive no response from the hosts and the switch will remove the port from the multicast address table. The router regularly sends IGMP query messages. After receiving the IGMP query messages, the switch will remove the port from the multicast address table if the switch receives no IGMP report message from the host within a period of time.

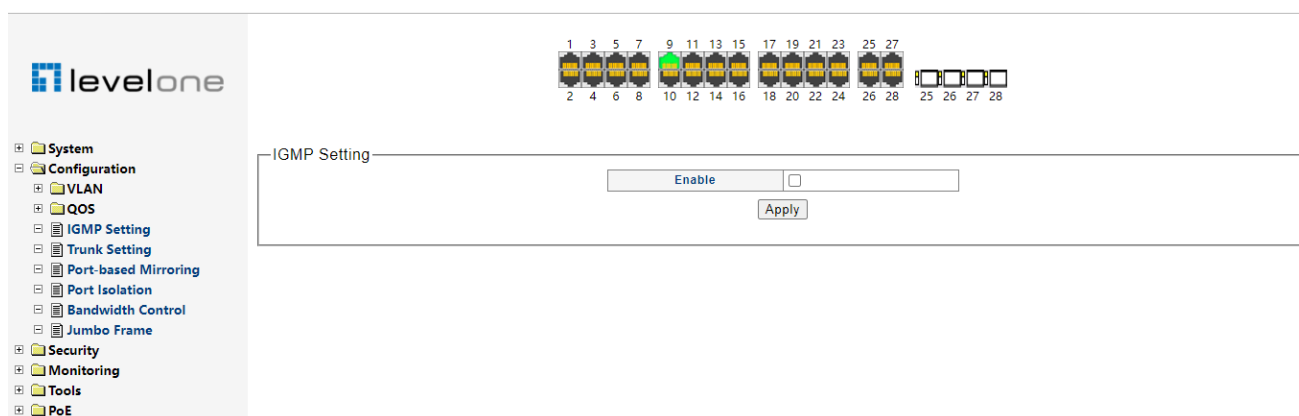


Figure 5-3-1

Unknown multicast data refers to multicast data for which no entries exist in the IGMP Snooping forwarding table. When the switch receives such multicast traffic:

- With the function of dropping unknown multicast data, the switch drops all the unknown multicast data received.
- With the function of forwarding unknown multicast data, the switch floods unknown multicast data in the VLAN which the unknown multicast data belongs to.

## 5.4 Link Aggregation

Link Aggregation is to combine a number of ports together to make a single high-bandwidth data path, so as to implement the traffic load sharing among the member ports in the group and to enhance the connection reliability.

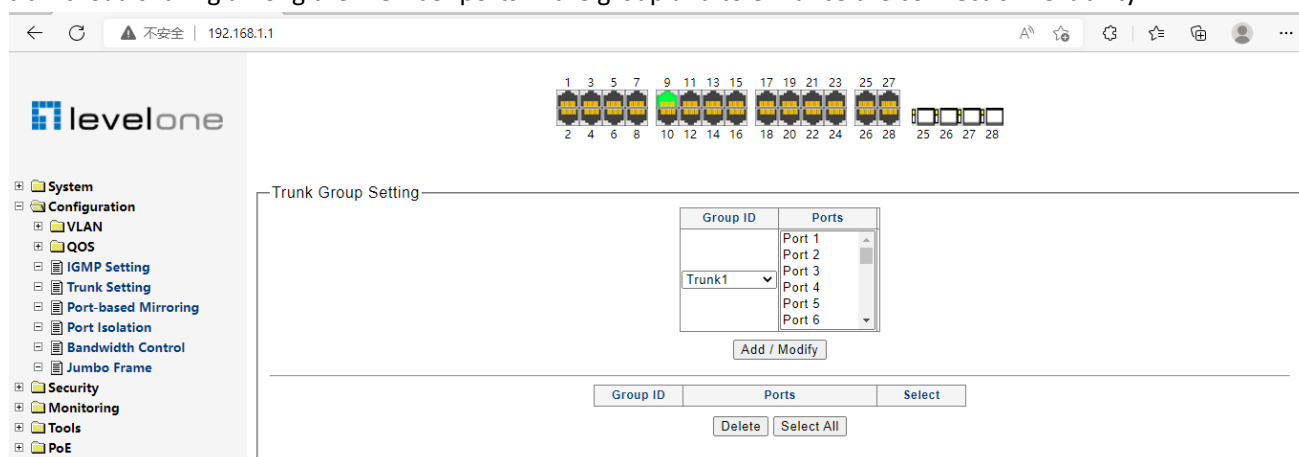


Figure 5-4-1

Select a aggregation group number, then add port in the left form to the right form, that make port join into aggregation group. Web-Smart Switch has max 8 groups, and one aggregation group can support max 8 member ports.

## 5.5 Port-based Mirroring

Port mirroring allows you to duplicate the packets passing specified ports to the destination mirroring port. As destination mirroring ports usually have data monitoring devices connected to them, you can analyze the packets duplicated to the destination mirroring port on these devices so as to monitor and troubleshoot the network.

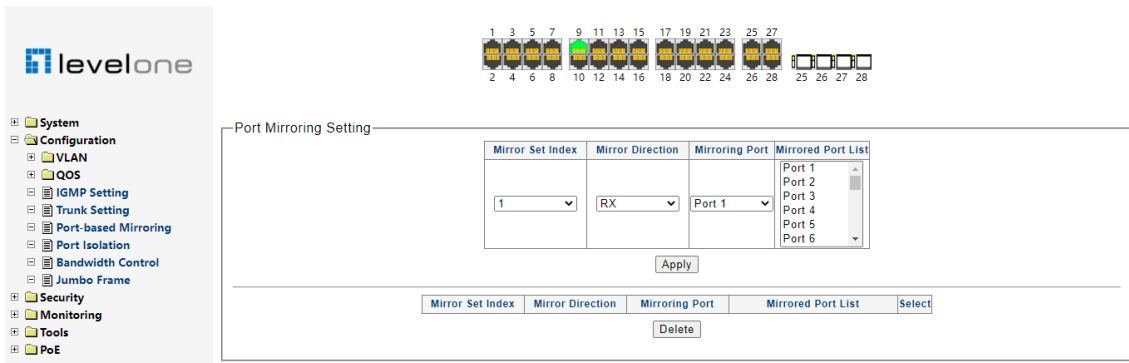


Figure 5-5-1

Choose the menu **Configuration→Port-based Mirroring** to load the following page.

Select the Source Port from where you want to copy frames and the Target Port, which receives the copies from the source port.

1. Change the Port-base Mirroring Status menu to On.
2. Click Apply to let the changes take effect.
3. Select the Source Direction, RX, TX, Both.

## 5.6 Port Isolation

To implement isolation, you can add different ports to different VLANs. However, this will waste the limited VLAN resource. With port isolation, the ports can be isolated within the same VLAN. Thus, you need only to add the ports to the isolation group to implement isolation. This provides you with more secure and flexible networking schemes.

Choose the menu **Configuration→Port Isolation** to load the following page.

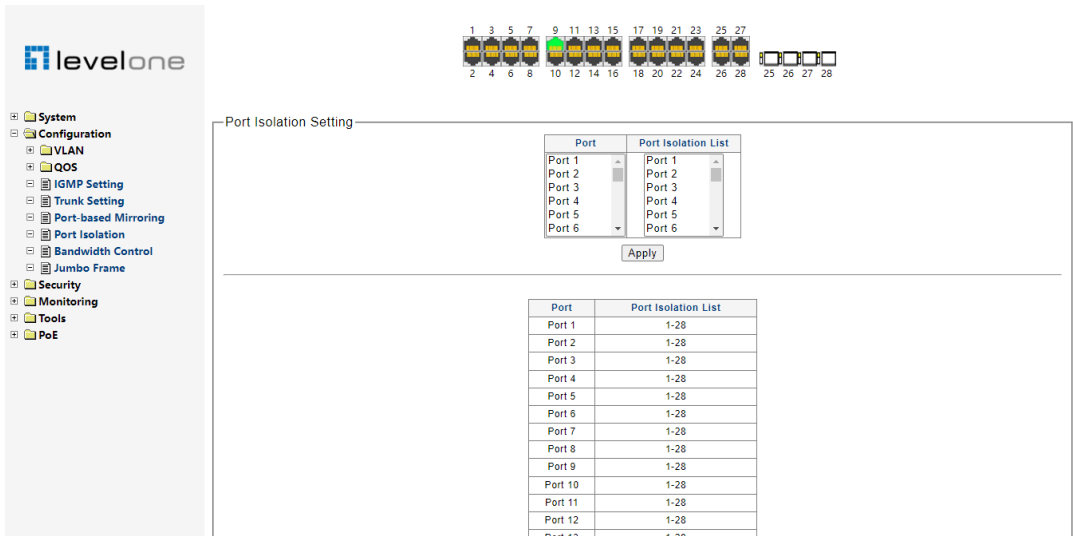


Figure 5-6-1



On the current device:

- Currently, each port can be configured on the device to forward data to other ports.

## 5.7 Bandwidth Control

Rate limit functions to control the ingress/egress traffic rate on each port via configuring the available bandwidth of each port. In this way, the network bandwidth can be reasonably distributed and utilized.

Choose the menu **Configuration**→ **Bandwidth Control** to load the following page.

Bandwidth Control Setting

| Port   | Type    | State   | Rate(Kbit/sec)                                  |
|--------|---------|---------|-------------------------------------------------|
| Port 1 | Ingress | Disable | Unlimited (0-1048544, must be a multiple of 16) |
| Port 2 |         |         |                                                 |
| Port 3 |         |         |                                                 |
| Port 4 |         |         |                                                 |
| Port 5 |         |         |                                                 |
| Port 6 |         |         |                                                 |

Apply

| 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              |

Figure 5-7-1

If you select port to set ingress/egress rate, the system will automatically select integral multiple of 16Kbps that closest to the rate you entered as the real ingress/egress rate.

**Ingress:** Configure the bandwidth for receiving packets on the port. You can select a port to set Ingress rate, the system will automatically select integral multiple of 16Kbps that closest to the rate you entered as the real Ingress rate.

**Egress:** Configure the bandwidth for sending packets on the port. You can select a port to set Egress rate, the system will automatically select integral multiple of 16Kbps that closest to the rate you entered as the real Egress rate.

## 5.8 Jumbo Frame

Due to tremendous amount of traffic occurring in Ethernet, it is likely that some frames might have a frame size greater than the standard Ethernet frame size. By allowing such frames (called jumbo frames) to pass through Ethernet ports, you can forward frames with a size greater than the standard Ethernet frame size and yet still within the specified parameter range.

Choose the menu **Configuration→ Jumbo Frame** to load the following page.

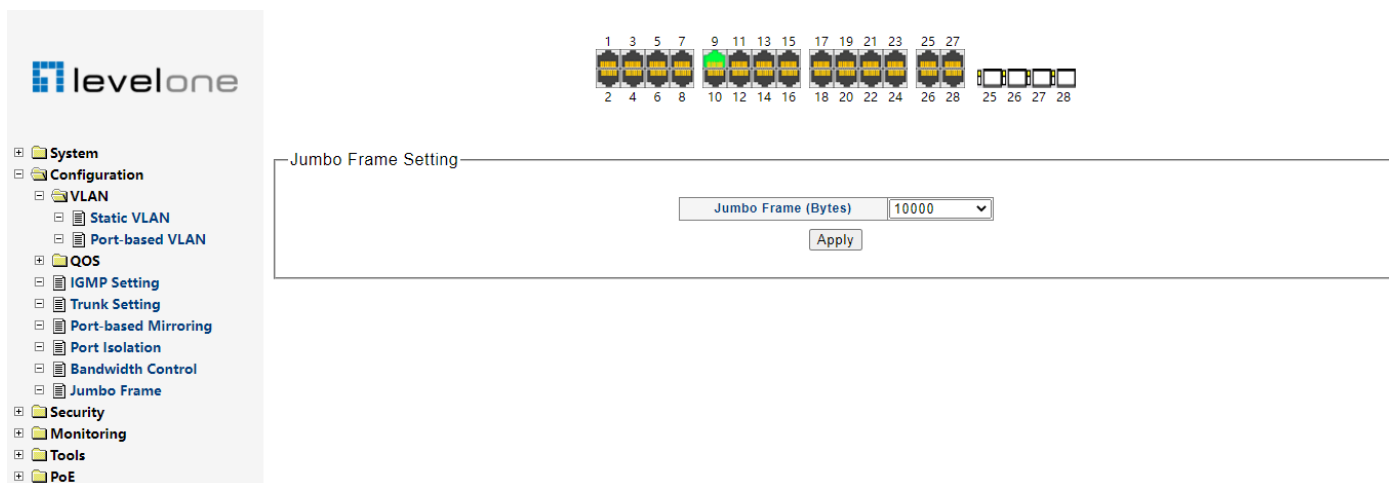


Figure 5-8-1

you can set the length of jumbo frames that can pass through all the Ethernet ports.

By default, the device allows jumbo frames with the length of 1522/1536/1552/9216/10000 bytes to pass through all Ethernet ports.

# Chapter6: Security

## 6.1 MAC Address

A switch maintains a MAC address table for frame forwarding. Each entry in this table contains the MAC address of a connected device, to which port this device is connected and to which VLAN the port belongs.

### 6.1.1 Static MAC

A MAC address table consists of two types of entries: static and dynamic. Static entries are manually configured and never age out. Dynamic entries can be manually configured or dynamically learned and may age out.

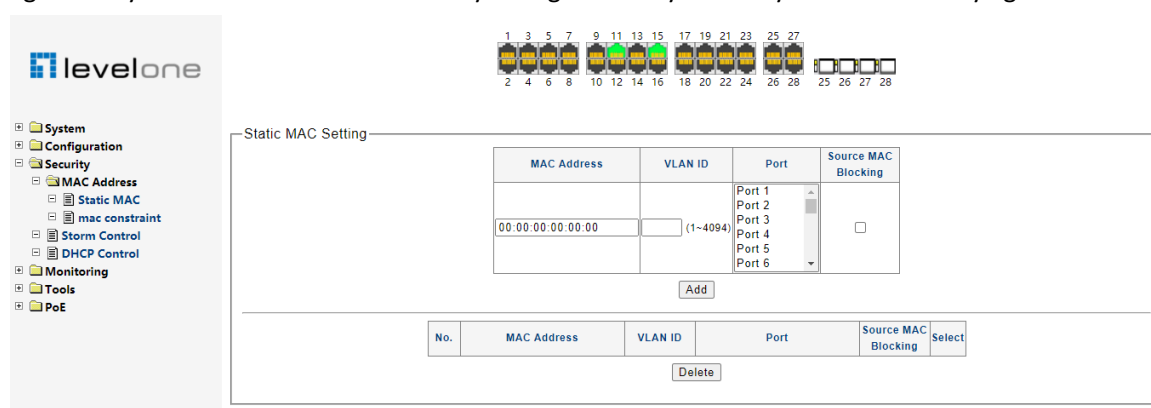


Figure 6-1-1

#### 6.1.1.1 MAC Binding

The static address table maintains the static address entries which can be added or removed manually. In the stable networks, the static MAC address entries can facilitate the switch to reduce broadcast packets and remarkably enhance the efficiency of packets forwarding without learning the address. The static MAC address learned by the port in the binding mode will be displayed in the Static Address Table.

Choose the menu **Configuration**→**Security**→**mac static** to load the following page.

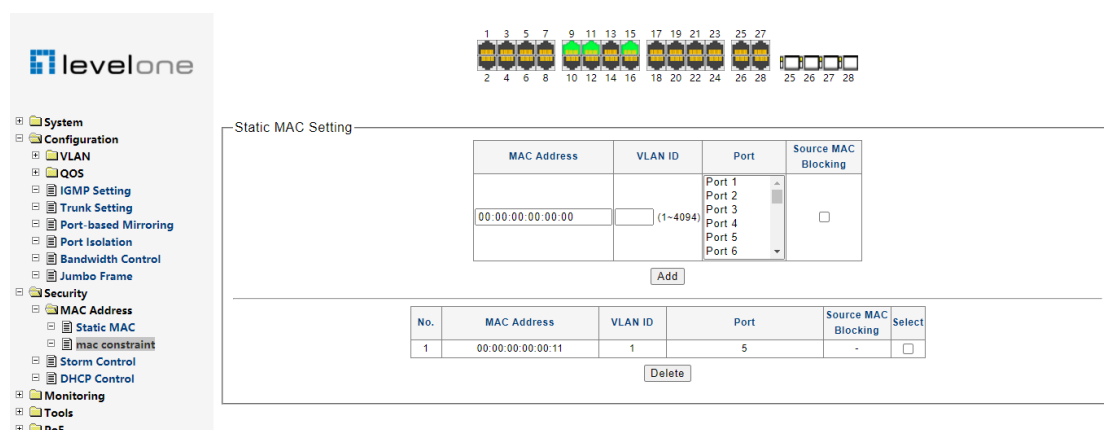


Figure 6-1-2

The above configuration means that mac 0000.0000.0011 is bound to port 5 and can only communicate with vlan1. If you want the devices to be connected as planned, you can use this function. The mac can only be used on this port 5.

## 6.1.1.2 MAC Blocking

If the MAC address blocking table entry is set in this switch, if the message with this MAC address whether in source MAC or destination MAC, it will be discarded as long as the switch receives it.

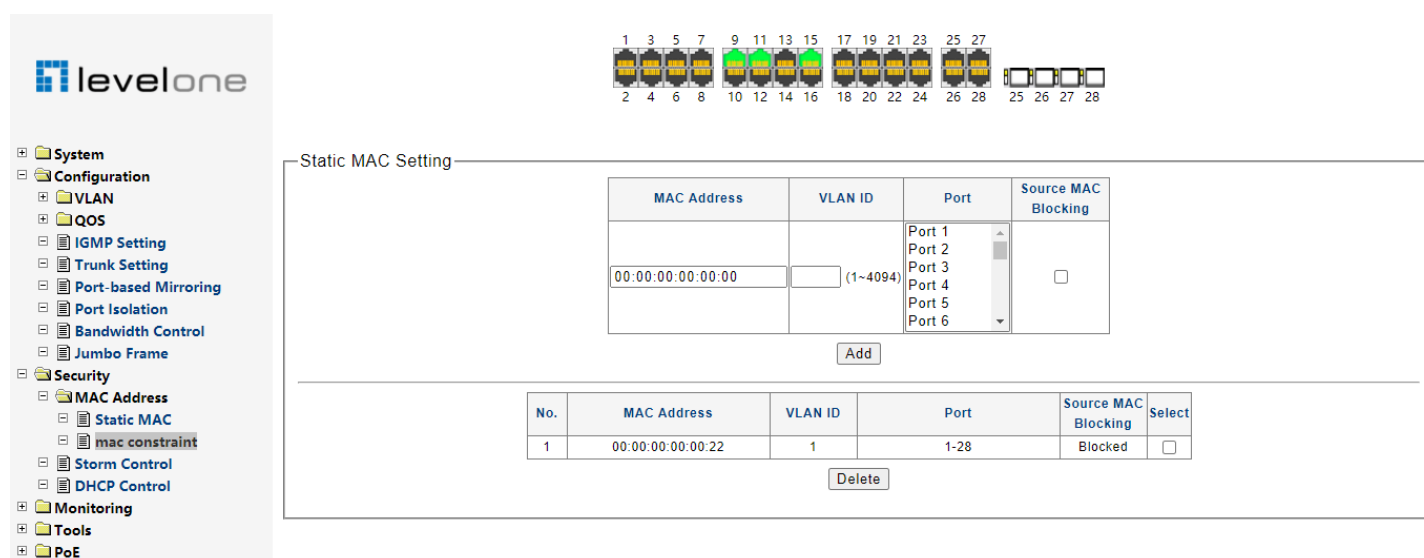


Figure 6-1-3

The above configuration indicates that mac 0000.0000.0022 is blocking in vlan1.

If it is found that the attack message is sent all the time with a certain MAC address, but the port from which the MAC is sent is unknown, you can do this.

Note: When configuring mac blocking, do not select the port number. All ports will be selected by default. E.g.

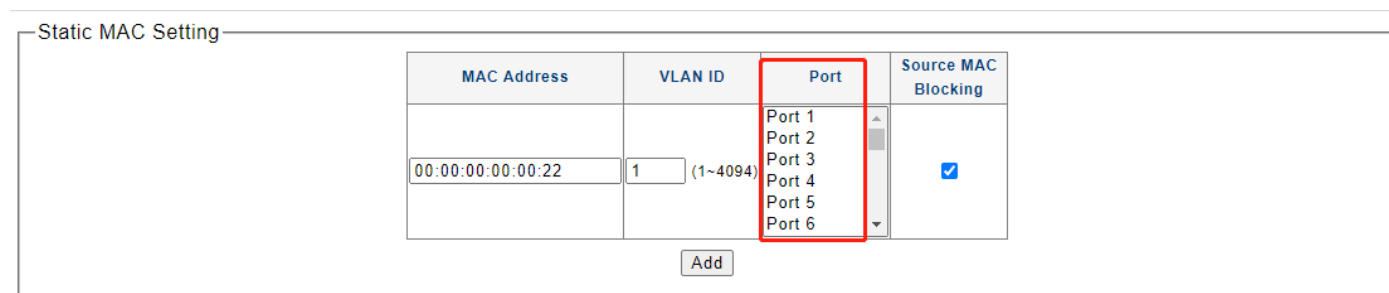


Figure 6-1-4

## 6.1.2 MAC Constraint

MAC address learning capability, If this function is enabled, the switch will not learn the MAC address on the port.

Choose the menu **Configuration→MAC Constraint** to load the following page.

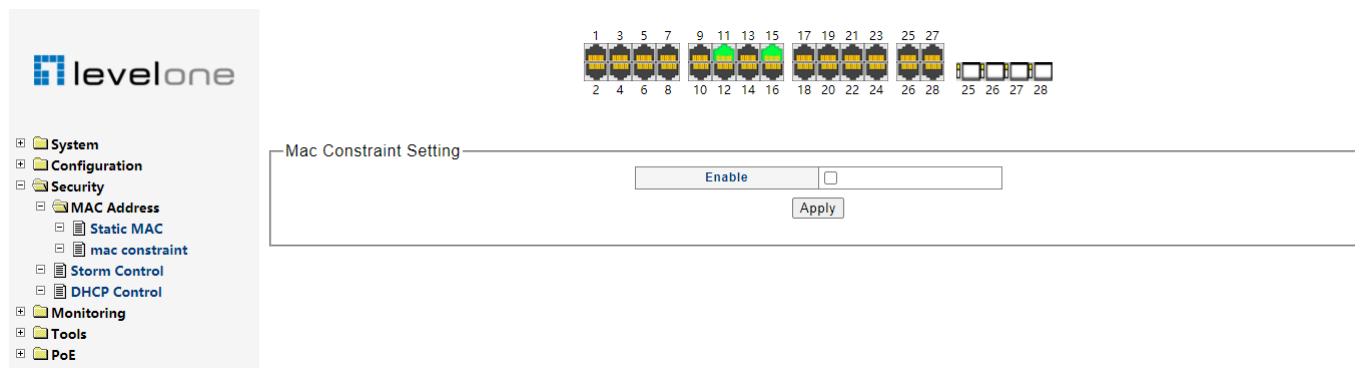


Figure 6-1-5

## 6.2 Storm Control Setting

Storm Control function allows the switch to filter Broadcast, Multicast and Unknown Unicast frame in the network. If the transmission rate of the three kind packets exceeds the set bandwidth, the packets will be automatically discarded to avoid network broadcast storm.

Choose the menu **Security→Storm Control** to load the following page.

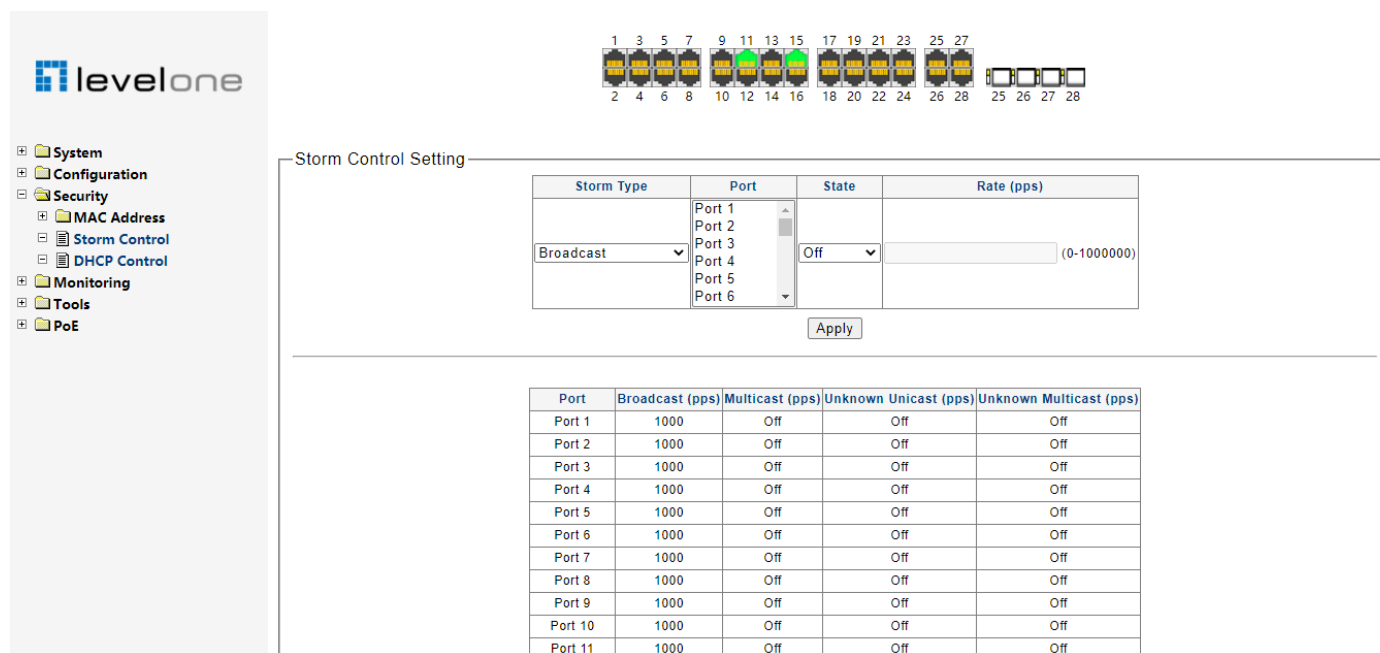


Figure 6-2-1

Storm control is used to stop broadcast, multicast or ARP request storms that may result when a loop is created. The

Destination Look Up Failure control is a method of shutting down a loop when a storm is formed because a MAC address cannot be located in the Switch’s forwarding database and it must send a packet to all ports or all ports on a VLAN.

To configure Traffic Control, select the port, you want to configure. Broadcast Storm, Multicast Storm and Unknown Unicast may be Enabled or Disabled. The Threshold value is the upper threshold at which the specified traffic control is switched on. This is the number of Broadcast, Multicast or Unknown Unicast packets, in Kbps, received by the switch that will trigger the storm traffic control measures. The Threshold value can be set from 0 to100000Kbps.

## 6.3 DHCP Snooping

### Introduction to DHCP Snooping Trusted/Untrusted Ports

When an unauthorized DHCP server exists in the network, a DHCP client may obtains an illegal IP address. To ensure that the DHCP clients obtain IP addresses from valid DHCP servers, The switches can specify a port to be a trusted port or an untrusted port by the DHCP snooping function.

- Trusted: A trusted port is connected to an authorized DHCP server directly or indirectly. It forwards DHCP messages to guarantee that DHCP clients can obtain valid IP addresses.
- Untrusted: An untrusted port is connected to an unauthorized DHCP server. The DHCP-ACK or DHCP-OFFER packets received from the port are discarded, preventing DHCP clients from receiving invalid IP addresses.

Choose the menu **Security→ DHCP Snooping** to load the following page.

By default, all ports of the switch are trusted ports. When confirming which ports are not connected to the DHCP Server, these ports should be set as DHCP Client ports, that is untrusted ports.

- System
- Configuration
- Security
  - MAC Address
  - Storm Control
  - DHCP Control
- Monitoring
- Tools
- PoE

DHCP config

| Port        | Port 1                           | Port 2                           | Port 3                           | Port 4                           | Port 5                           | Port 6                           | Port 7                           | Port 8                           | Port 9                           | Port 10                          | Port 11                          | Port 12                          | Port 13                          | Port 14                          | Port 15                          |
|-------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| DHCP Server | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |
| DHCP Client | <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"/>            | <input type="radio"/>            |

| Port        | Port 16                          | Port 17                          | Port 18                          | Port 19                          | Port 20                          | Port 21                          | Port 22                          | Port 23                          | Port 24                          | Port 25                          | Port 26                          | Port 27                          | Port 28                          |
|-------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| DHCP Server | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |
| DHCP Client | <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"/>            |

Apply

Figure 6-3-1

# Chapter7: Monitoring

## 7.1 Port Statistics

The Traffic Monitor function, monitoring the traffic of each port, is implemented on the Traffic Summary and Traffic Statistics pages.

Traffic Summary screen displays the traffic information of each port, which facilitates you to monitor the traffic and analyze the network abnormity.

Choose the menu **Monitoring→ Port Statistics** to load the following page.

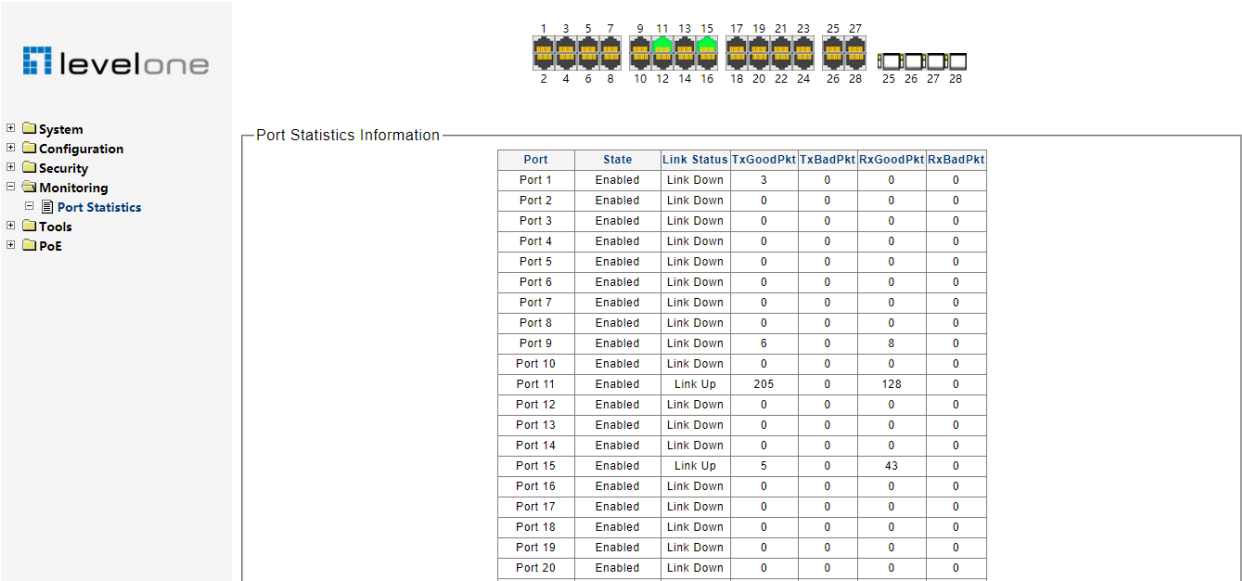


Figure 7-1-1

# Chapter8: Tools

## 8.1 Backup Configuration

On this page you can download the current configuration and save it as a file to your computer for your future configuration restore.

On this page you can upload a backup configuration file to restore your switch to this previous configuration.

Choose the menu **Tools→ HTTP Upgrade** to load the following page.



Figure 8-1-1

Click the Backup button to save the current configuration as a file to your computer. You are suggested to take this measure before upgrading.

Click the Restore button to restore the backup configuration file. **Select “Configuration Restore”, click “Select File”** button. It will take effect after the switch automatically reboots.

## 8.2 Firmware Upgrade

The switch system can be upgraded via the Web management page. To upgrade the system is to get more functions and better performance.

Choose the menu **Tools→HTTP Upgrade**, **Select “Firmware Upgrade”** , click **“Select File”** button to load the following page.



Figure 8-2-1

Don't interrupt the upgrade, to avoid damage, please don't turn off the device while upgrading.

## 8.3 Reboot

On this page you can reboot the switch and return to the login page. Please save the current configuration before rebooting to avoid losing the configuration unsaved

Choose the menu **Tools→ Reboot** to load the following page.

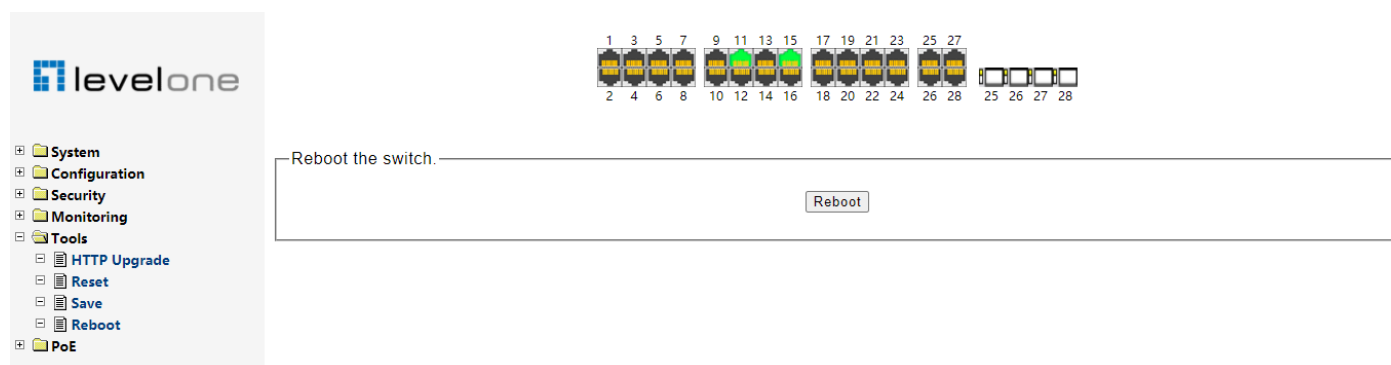


Figure 8-3-1



## 8.4 Save Configuration

When the switch is saved configuration, the settings will be immediately applied to the switching software in RAM, and will immediately take effect.

Choose the menu **Tools**→ **Save Configuration** to load the following page.

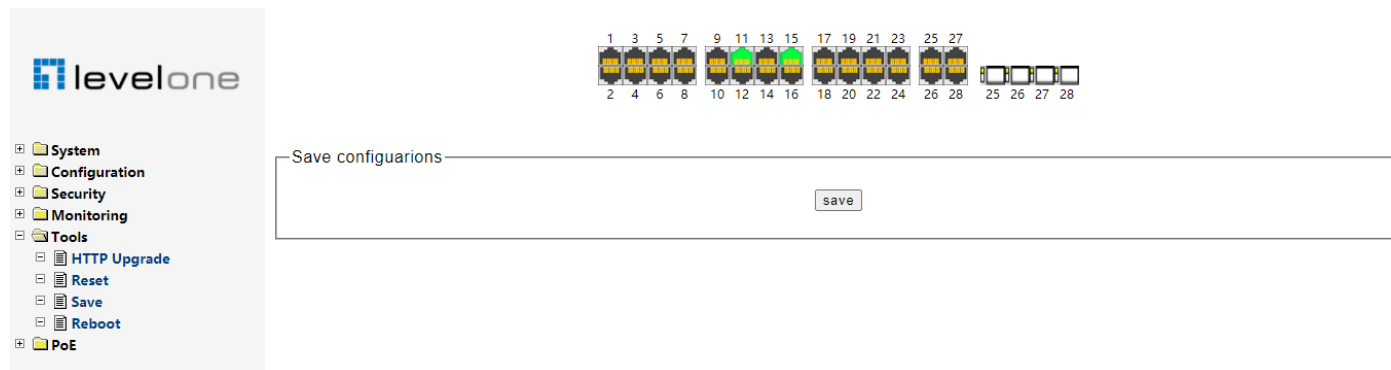


Figure 8-4-1

Click the save button, which can make parameters to be saved, your configuration will still work after restart.

## 8.5 Reset Factory Default

On this page you can reset the switch to the default. All the settings will be cleared after the switch is reset.

Choose the menu **Tools**→ **Reset Factory Default** to load the following page.

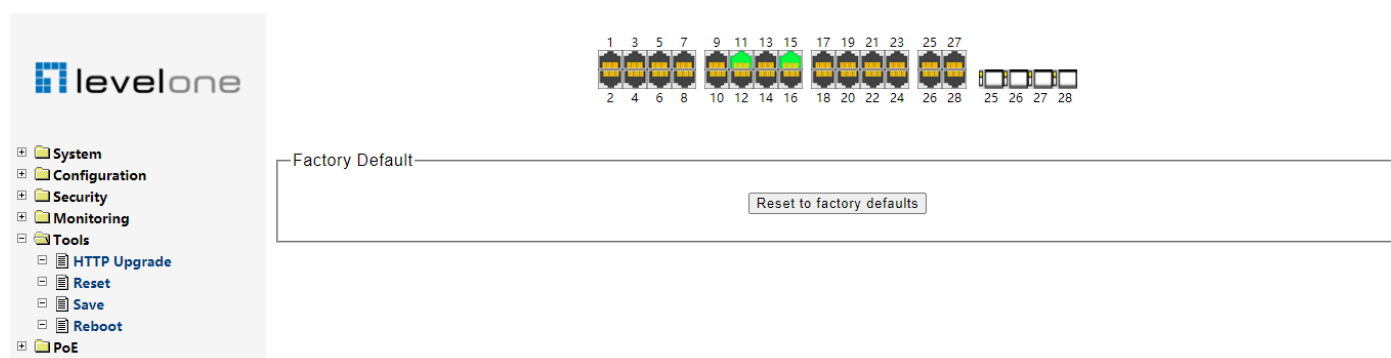


Figure 8-5-1

After the system is reset, the switch will be reset to the default and all the settings will be cleared.

# Chapter9: PoE

## 9.1 PoE Configuration

Power over Ethernet (PoE) enables a network device to supply power to terminals over twisted pair cables. The device supports IEEE 802.3af and IEEE 802.3at.

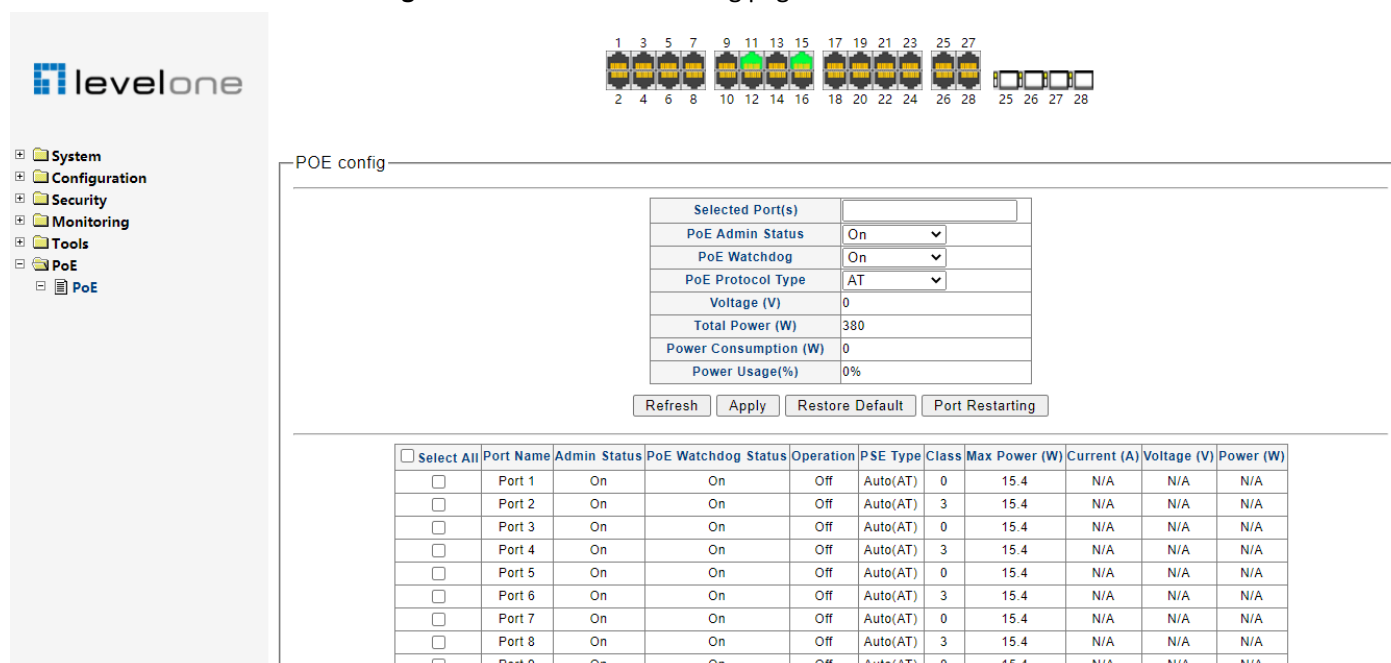
A PoE system includes the following elements:

- PoE power supply—The PoE power supply provides power for the entire PoE system.
- PSE—A power sourcing equipment (PSE) detects and classifies powered devices (PDs), supplies power to PDs, and monitors the PD power and connection status. PSEs include endpoint PSEs and midspan PSEs.

PSEs for the device are endpoint PSEs. A PSE can be a device with only one built-in PSE, or it can be a PoE-capable interface card or subcard on a device.

- PD—A PD receives power from the PSE.  
PDs include IP telephones, APs, portable chargers, POS terminals, and Web cameras.

Choose the menu **PoE→ PoE Configuration** to load the following page.



levelone

System  
Configuration  
Security  
Monitoring  
Tools  
PoE

POE config

| Selected Port(s) | PoE Admin Status | PoE Watchdog | PoE Protocol Type | Voltage (V) | Total Power (W) | Power Consumption (W) | Power Usage(%) |
|------------------|------------------|--------------|-------------------|-------------|-----------------|-----------------------|----------------|
|                  | On               | On           | AT                | 0           | 380             | 0                     | 0%             |

Refresh Apply Restore Default Port Restarting

| Select All               | Port Name | Admin Status | PoE Watchdog Status | Operation | PSE Type | Class | Max Power (W) | Current (A) | Voltage (V) | Power (W) |
|--------------------------|-----------|--------------|---------------------|-----------|----------|-------|---------------|-------------|-------------|-----------|
| <input type="checkbox"/> | Port 1    | On           | On                  | Off       | Auto(AT) | 0     | 15.4          | N/A         | N/A         | N/A       |
| <input type="checkbox"/> | Port 2    | On           | On                  | Off       | Auto(AT) | 3     | 15.4          | N/A         | N/A         | N/A       |
| <input type="checkbox"/> | Port 3    | On           | On                  | Off       | Auto(AT) | 0     | 15.4          | N/A         | N/A         | N/A       |
| <input type="checkbox"/> | Port 4    | On           | On                  | Off       | Auto(AT) | 3     | 15.4          | N/A         | N/A         | N/A       |
| <input type="checkbox"/> | Port 5    | On           | On                  | Off       | Auto(AT) | 0     | 15.4          | N/A         | N/A         | N/A       |
| <input type="checkbox"/> | Port 6    | On           | On                  | Off       | Auto(AT) | 3     | 15.4          | N/A         | N/A         | N/A       |
| <input type="checkbox"/> | Port 7    | On           | On                  | Off       | Auto(AT) | 0     | 15.4          | N/A         | N/A         | N/A       |
| <input type="checkbox"/> | Port 8    | On           | On                  | Off       | Auto(AT) | 3     | 15.4          | N/A         | N/A         | N/A       |
| <input type="checkbox"/> | Port 9    | On           | On                  | Off       | Auto(AT) | 0     | 15.4          | N/A         | N/A         | N/A       |

Figure 9-1-1

In the Port Config section, select the ports you want to configure and specify the parameters. Click Apply.

**PoE Admin Status:** Enable or disable the PoE function on corresponding ports. A port can supply power to the PD when its status is enable.

**PoE watchdog:** When the switch port communication fails, the corresponding port POE will automatically detect and restart, restore network communication by itself, and reduce manual intervention and maintenance.