

# **GS108T Smart Switch Software Administration Manual**

**NETGEAR®**

**NETGEAR, Inc.**  
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It is hereby certified that the GS108T Gigabit Smart Switch has been suppressed in accordance with the conditions set out in the BMPT-AmtsblVfg 243/1991 and Vfg 46/1992. The operation of some equipment (for example, test transmitters) in accordance with the regulations may, however, be subject to certain restrictions. Please refer to the notes in the operating instructions.

The Federal Office for Telecommunications Approvals has been notified of the placing of this equipment on the market and has been granted the right to test the series for compliance with the regulations.

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This equipment is in the first category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines that are aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when this equipment is used in a residential area or in an adjacent area thereto, radio interference may be caused to equipment such as radios and TV receivers.

## Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice

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

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

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

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- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## EU Statement of Compliance

The NETGEAR GS108T Gigabit Smart Switch is compliant with the following EU Council Directives: 89/336/EEC and LVD 73/23/EEC. Compliance is verified by testing to the following standards: EN55022 Class A, EN55024 and EN60950-1.



**Warning:** This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take appropriate measures.

## Canadian Department of Communications Radio Interference Regulations

This digital apparatus (NETGEAR GS108T Gigabit Smart Switch) does not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

## Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique (NETGEAR GS108T Gigabit Smart Switch) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.

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- Check the NETGEAR Web page at <http://www.NETGEAR.com/support>.
- Call Technical Support in North America at 1-888-NETGEAR. If you are outside North America, please refer to the phone numbers listed on the Support Information Card that was included with your switch.
- Email Technical Support at [support@NETGEAR.com](mailto:support@NETGEAR.com).
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## Internet/World Wide Web

NETGEAR maintains a World Wide Web home page that you can access at the uniform resource locator (URL) <http://www.NETGEAR.com>. A direct connection to the Internet and a Web browser such as Internet Explorer or Netscape are required.

## FCC Requirements for Operation in the United States

**FCC Information to User:** This product does not contain any user-serviceable components and is to be used with approved antennas only. Any product changes or modifications will invalidate all applicable regulatory certifications and approvals

**FCC Guidelines for Human Exposure:** This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm

between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

**FCC Declaration Of Conformity:** We, NETGEAR, Inc., 4500 Great America Parkway, Santa Clara, CA 95054, declare under our sole responsibility that the model GS108T: ProSafe™ 8 Port 10/100/1000 smart switch complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: a) This device may not cause harmful interference and b) This device must accept any interference received, including interference that may cause undesired operation.”

## Product and Publication Details

<b>Model Number:</b>	GS108T
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<b>Product Name:</b>	GS108T Gigabit Smart Switch
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# About This Manual

The *NETGEAR® GS108T Smart Switch Software Administration Manual* describes how to install, configure, operate, and troubleshoot the GS108T Gigabit Smart Switch using its included software. This book describes the software configuration procedures and explains the options available within those procedures.

## Who Should Use This Book

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The information in this manual is intended for readers with intermediate to advanced system management skills.

This document was created primarily for the system administrator who wishes to install and configure the GS108T Smart Switch in a network. It assumes that the reader has a general understanding of switch platforms and a basic knowledge of Ethernet and networking concepts. To install this switch, it is not necessary to understand and use all of its capabilities. Once basic configuration is performed, it will function in a network using its remaining factory default settings. However, a greater level of configuration—anywhere from the basic up to the maximum possible—will allow your network the full benefit of the switch's features. The Web interface simplifies this configuration at all levels.

## How to Use This Book

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This document describes configuration menu commands for the GS108T Smart Switch software. The commands can all be accessed from the Web interface.

- [Chapter 1, “Getting Started with Switch Management,”](#) describes how to use the Smart Wizard Discovery utility to set up your switch so that you can communicate with it.
- [Chapter 2, “Introduction to the Web Browser Interface,”](#) introduces the Web browser interface.
- [Chapter 3, “Managing System Settings,”](#) describes how to configure the system functions.
- [Chapter 4, “Configuring Switching,”](#) describes how to configure the switching functions.
- [Chapter 5, “Configuring QoS and Security,”](#) describes how to configure QoS and security functions.

- Chapter 6, “Monitoring, Maintenance, and Help,” describes the logs, the reset functions, the firmware upgrade procedure, and the help options.
- Appendix A, “Specifications and Default Values,” gives GS108T Smart Switch specifications and lists default feature values.
- Appendix B, “Virtual Local Area Networks (VLANs),” describes some concepts of VLANs.
- Appendix C, “Network Cabling,” gives cabling requirements and describes some details of port cabling connections.



**Note:** See the product release notes for the GS108T Smart Switch Software application level code. The release notes detail the platform-specific functionality of the Switching, SNMP, Config, and Management packages.

## Conventions, Formats, and Scope

The conventions, formats, and scope of this manual are described in the following paragraphs:

- **Typographical conventions.** This manual uses the following typographical conventions:

<i>Italics</i>	Emphasis, books
<b>Bold</b>	User input, IP addresses, GUI screen text
Fixed	Command prompt, CLI text, code
<i>Italics</i>	URL links

- **Formats.** This manual uses the following formats to highlight special messages:



**Note:** This format is used to highlight information of importance or special interest.



**Tip:** This format is used to highlight a procedure that will save time or resources.



**Warning:** Ignoring this type of note might result in a malfunction or damage to the equipment.



**Danger:** This is a safety warning. Failure to take heed of this notice might result in personal injury or death.

- **Scope.** This manual is written for the GS108T Smart Switch according to these specifications:

Product Version	GS108T Gigabit Smart Switch
Manual Publication Date	December 2007








**Note:** Product updates are available on the NETGEAR, Inc. website at <http://www.netgear.com/support>.

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## How to Use This Manual

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The HTML version of this manual includes the following:

- Buttons  and  for browsing forward or backward through the manual one page at a time.
- A  button that displays the table of contents and a  button that displays an index. Double-click a link in the table of contents or index to navigate directly to where the topic is described in the manual.
- A  button to access the full NETGEAR, Inc. online knowledge base for the product model.
- Links to PDF versions of the full manual and individual chapters.

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## How to Print This Manual

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To print this manual, choose one of the following options:

- **Printing a page from HTML.** Each page in the HTML version of the manual is dedicated to a major topic. Select File > Print from the browser menu to print the page contents.
- **Printing from PDF.** Your computer must have the free Adobe Acrobat Reader installed in order for you to view and print PDF files. The Acrobat Reader is available on the Adobe website at <http://www.adobe.com>.

- Printing a PDF chapter.
  - Click the **PDF of This Chapter** link at the top left of any page in the chapter you want to print. The PDF version of the chapter you were viewing opens in a browser window.
  - Click the print icon in the upper left of your browser window.
- Printing a PDF version of the Complete Manual.
  - Click the **Complete PDF Manual** link at the top left of any page in the manual. The PDF version of the complete manual opens in a browser window.
  - Click the print icon in the upper left of your browser window.



**Tip:** If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.

## Revision History

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Part Number	Version Number	Date	Description
202-10248-01	1.0	May 2007	Product created
202-10337-01	2.0	December 2007	Feature update and book reorganization



# Chapter 1

## Getting Started with Switch Management

This chapter provides an overview of switch management, including the methods you can choose to start managing your NETGEAR GS108T Gigabit Smart Switch. It also leads you through the steps necessary to get started, using the Smart Wizard Discovery utility. The information is discussed in the following sections:

- “System Requirements”
- “Switch Management Interface”
- “Network with a DHCP Server”
- “Network without a DHCP Server”
- “Web Access”
- “Additional Utilities”

### System Requirements

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The following hardware and software facilities are required to run the applications described in this manual:

- Network facilities:
  - Ethernet network with or without DHCP server as appropriate
  - Ethernet cable to connect the switch to a PC
- For running the Smart Wizard Discovery utility and local or remote Web management:
  - IBM-type PC with CD drive. RAM size and disk specification are not critical.
  - OS software. Microsoft Windows Vista, Windows XP, or Windows 2000.
  - Desktop computer running Microsoft Internet Explorer 5.0 or later or Netscape Navigator 6.0 or later, or equivalent.



**Note:** For complete hardware installation instructions, see the *GS108T Smart Switch Hardware Installation Guide* included on your *Resource CD*, or go to <http://www.netgear.com/support>.

## Switch Management Interface

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Your NETGEAR GS108T Gigabit Smart Switch contains an embedded Web server and management software for managing and monitoring switch functions. This switch functions as a simple switch without the management software. However, you can use the management software to configure more advanced features and consequently improve switch efficiency and the overall performance of your network.

Web-based management lets you monitor, configure, and control your switch remotely using a common Web browser, instead using expensive and complicated SNMP software products. Simply by using your Web browser, you can monitor the performance of your switch and optimize its configuration for your network. Using your browser, for example, you can set up VLANs and traffic priority and configure port trunking.

In addition, NETGEAR provides the Smart Wizard Discovery utility with this product. This program runs under Microsoft Windows XP or Windows 2000 and provides a “front end” that discovers the switches on your network segment. When you power up your switch for the first time, the Smart Wizard Discovery utility lets you configure its basic network settings without prior knowledge of IP address or subnet mask. Following such configuration, this program leads you into the Web Management Interface.

Table 1-1 shows some features of the Smart Wizard Discovery utility and Web Management Interface.

**Table 1-1. Switch Management Methods**

Management Method	Features
Smart Wizard Discovery utility	No IP address or subnet mask setup needed. Discover all switches on the network. User-friendly interface under Microsoft Windows. Firmware upgrade capability. Password change feature. Provides entry to Web configuration of switch.
Web browser	Password protection. Ideal for configuring the switch remotely. Compatible with Internet Explorer and Netscape Navigator on any platform. Extensive switch configuration possible. Configuration backup and restore.



For a more detailed discussion of the Smart Wizard Discovery utility, continue with the following section, “[Network with a DHCP Server](#),” or “[Network without a DHCP Server](#)” on page 1-4. For a detailed discussion of the Web browser interface, see [Chapter 2, “Introduction to the Web Browser Interface.”](#)”

## Network with a DHCP Server

To install the switch in a network with a DHCP server:

1. Connect the GS108T Smart Switch to a DHCP network.
2. Power on the switch by connecting its AC-DC power adapter.
3. Install the Smart Wizard Discovery utility on your computer.
4. Start the Smart Wizard Discovery utility.
5. Click **Discover** for the Smart Wizard Discovery utility to find your GS108T Gigabit Smart Switch. You should see a screen similar to the following one.

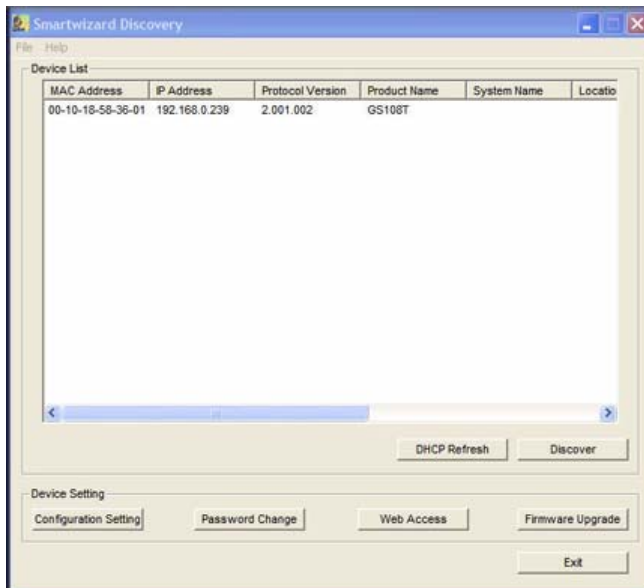


Figure 1-1

6. Make a note of the displayed IP address assigned by the DHCP server. You will need this value to access the switch directly from a Web browser (without using the Smart Wizard Discovery utility).
7. Select your switch by clicking the line that shows it. Then click the **Web Access** button. The discovery utility displays a login window similar to the following:



**Figure 1-2**

Use your Web browser to manage your switch. The default password is **password**. Then use this screen to proceed to management of the switch, as covered in [Chapter 2, “Introduction to the Web Browser Interface.”](#)

## Network without a DHCP Server

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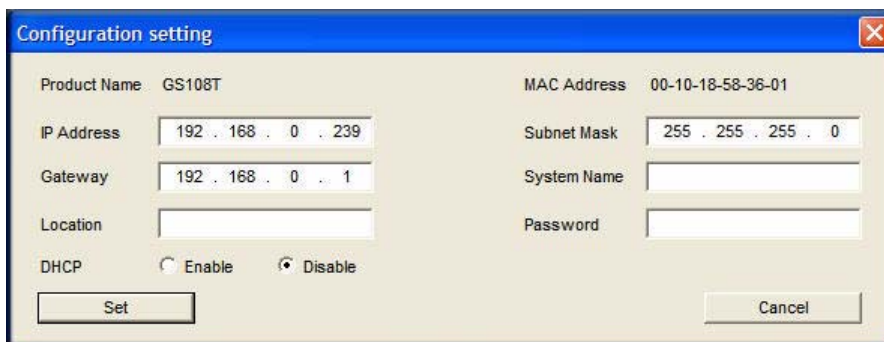
This section describes how to set up your switch in a network without a DHCP server, and is divided into the following tasks:

- Manually assign network settings for your switch.
- Configure the NIC settings on the host PC.
- Log in to the Web-based switch management utility.

## Manually Assigning Network Settings

If your network has no DHCP service, you must assign a static IP address to your switch. If you choose, you can assign it a static IP address even if your network has DHCP service. Proceed as follows:

1. Connect the GS108T Gigabit Smart Switch to your existing network.
2. Power on the switch by plugging in the AC-DC power adapter (the default IP is 192.168.0.239).
3. Install the Smart Wizard Discovery utility on your computer.
4. Start the Smart Wizard Discovery utility.
5. Click **Discover** for the Smart Wizard Discovery utility to find your GS108T Gigabit Smart Switch. You should see a screen similar to that shown in [Figure 1-1 on page 1-3](#).
6. Click **Configuration Setting**. A screen similar to the following one displays.



The screenshot shows a 'Configuration setting' dialog box with the following fields and controls:

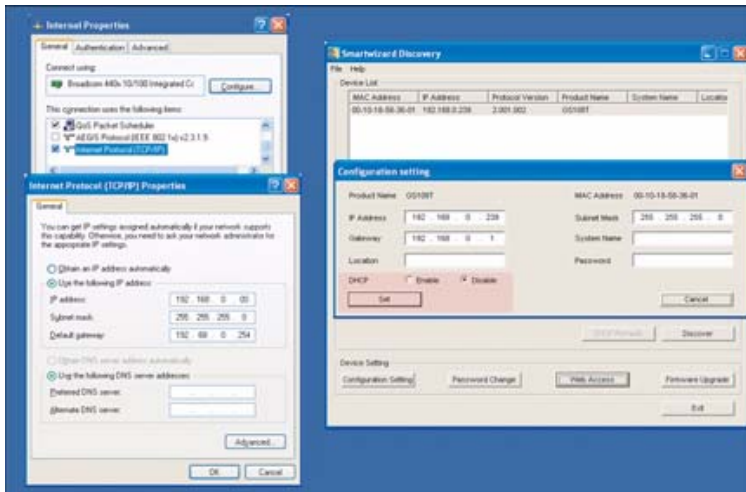
Product Name	GS108T	MAC Address	00-10-18-58-36-01
IP Address	192 . 168 . 0 . 239	Subnet Mask	255 . 255 . 255 . 0
Gateway	192 . 168 . 0 . 1	System Name	
Location		Password	
DHCP	<input type="radio"/> Enable <input checked="" type="radio"/> Disable		
<input type="button" value="Set"/>		<input type="button" value="Cancel"/>	

Figure 1-3

7. Select the **Disable** radio button to disable DHCP.
8. Enter your chosen switch IP address, gateway IP address, and subnet mask, and then type your password, and click **Set**. Ensure that your PC and the GS108T Gigabit Smart Switch are in the same subnet. Make a note of these settings for later use.

## NIC Setting on the Host That Accesses the GS108T Gigabit Smart Switch

You enter the settings of your network interface card (NIC) under the MS Windows OS in Windows screens similar to the following one. For comparison, the settings screens of the switch are also shown, although they do not appear in the Windows view.

**Figure 1-4**

You need Windows administrator privileges to change these settings.

1. On your PC, access the MS Windows operating system TCP/IP Properties.
2. Set the IP address and subnet mask appropriately. The subnet mask value should be identical to that set in the switch. The PC IP address must be different from that of the switch but must be in the same subnet.
3. Click **Web Access** in the Smart Wizard Discovery utility to enable the management screens described in the following section.

## Web Access

For Web access, you do either of the following:

- Using the Smart Wizard Discovery utility, click Web Access (see [“Network with a DHCP Server”](#) or [“Network without a DHCP Server”](#)).
- Access the switch directly, without using the Smart Wizard Discovery utility.

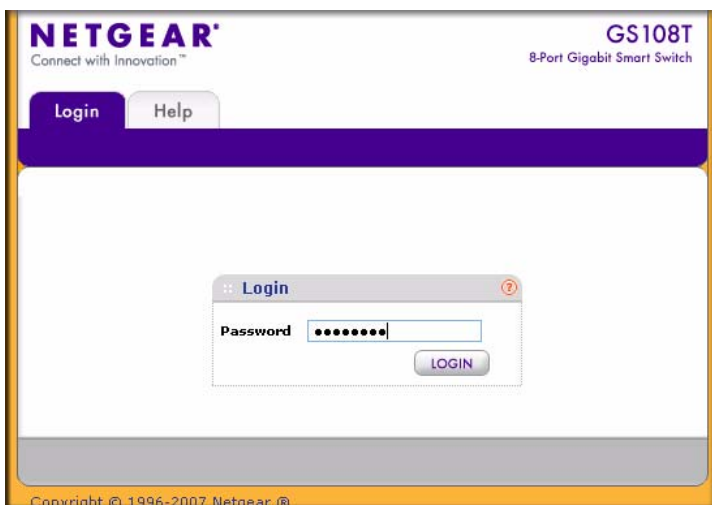
You must work from the same network segment that contains the switch (that is, the subnet mask values of switch and PC host must be the same), and you must point your browser using the switch IP address. If you used the Smart Wizard Discovery utility to set up IP address and subnet mask, either with or without DHCP server, use that IP address in your browser window.

If you are starting with an “out-of-the-box” switch and are not using the Smart Wizard Discovery utility, you must initially configure your host PC to be on a network segment to match the default settings of the switch, which are as follows:

- IP address: 192.168.0.239
- Subnet mask: 255.255.255.0

Later, you might want to change the network settings to match those of your network (this procedure is described in [“IP Configuration” on page 3-3](#)). Your host PC network settings must then also be set back to match your network.

Clicking **Web Access** on the Smart Wizard Discovery utility or accessing the switch directly displays the following screen.



**Figure 1-5**

Use this screen to proceed to management of the switch, as covered in [Chapter 2, “Introduction to the Web Browser Interface.”](#)

## Additional Utilities

Alternatively, from the main screen shown in [Figure 1-1 on page 1-3](#) you can access additional functions as described in the following sections:

- [“Password Change”](#)
- [“Firmware Upgrade”](#)

## Password Change

You can set a new password of up to 20 ASCII characters.

1. Click **Password Change** in the Switch Setting section. The Password Change screen displays. You can set a new password.
2. Enter the old password.
3. Enter the new password, and enter it again to confirm it.
4. Click **Set** to enable the new password.

## Firmware Upgrade



**Note:** You can also upgrade the firmware using the File Download screen of the switch (see “[File Download](#)” on page 6-20).

If you click **Firmware Upgrade** in the main screen (see [Figure 1-1](#) on page 1-3), after you have selected the switch to upgrade, the following screen displays:

Progress	Status	Product Name	IP Address
		GS108T	192.168.0.239

Upgrade Configuration

Product Name:

Product IP Address:

Product Assigned Firmware:

Upgrade Password:

Upgrade State: |

**Figure 1-6**

The application software for the GS108T Smart Switch is upgradeable, so you can take advantage of improvements to your switch and additional features as they become available. The upgrade procedure and the required equipment are described as follows. This procedure assumes that you have downloaded or otherwise obtained the firmware upgrade and that you have it available as a binary file on your computer. For information about downloading firmware, see “[File Download](#)” on page 6-20.” This procedure uses the TFTP protocol to implement the transfer from computer to switch.

1. Enter the following values into the appropriate places in the form:
  - **Firmware Path.** The location of the new firmware. If you do not know the location, you can click **Browse** to locate the file.
  - **Password.** Enter your password; the default password is **password**.
  - **Upgrade State.** Shows upgrading in progress.
2. Click **Apply**.
3. Click **Start Upgrade** to begin loading the upgrade. The system software is automatically loaded to all members of a switch stack. When the process is complete, the switch automatically reboots.

## Exit

Click **Exit** in the Switch Setting section to close the Smart Wizard Discovery utility.






# Chapter 2

## Introduction to the Web Browser Interface

This section introduces the browser interface that lets you configure and manage your NETGEAR GS108T Gigabit Smart Switch. Your GS108T Smart Switch provides a built-in browser interface that lets you configure and manage it remotely using a standard Web browser such as Microsoft Internet Explorer or Netscape Navigator. Online help is also provided for many of the basic functions and features of the switch.



**Note:** When a screen displays, click the help icon  for additional information about the screen settings.

This section introduces the areas of the browser interface and includes the following topics:

- [“Logging In to the NETGEAR Home Page”](#)
- [“Navigation Tabs”](#)

### Logging In to the NETGEAR Home Page

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Begin your overview of the GS108T Smart Switch browser interface by logging in:

1. Start the application, either through the Smart Wizard Discovery utility or directly by entering the switch’s IP address, as described in [Chapter 1, “Getting Started with Switch Management.”](#)
2. Press Enter. The Login screen displays.



Figure 2-1

3. Enter the password (the factory default is **password**), and click **Login**. The first screen of the GS108T Smart Switch browser interface is displayed.

## Navigation Tabs

Logging in displays the browser interface.

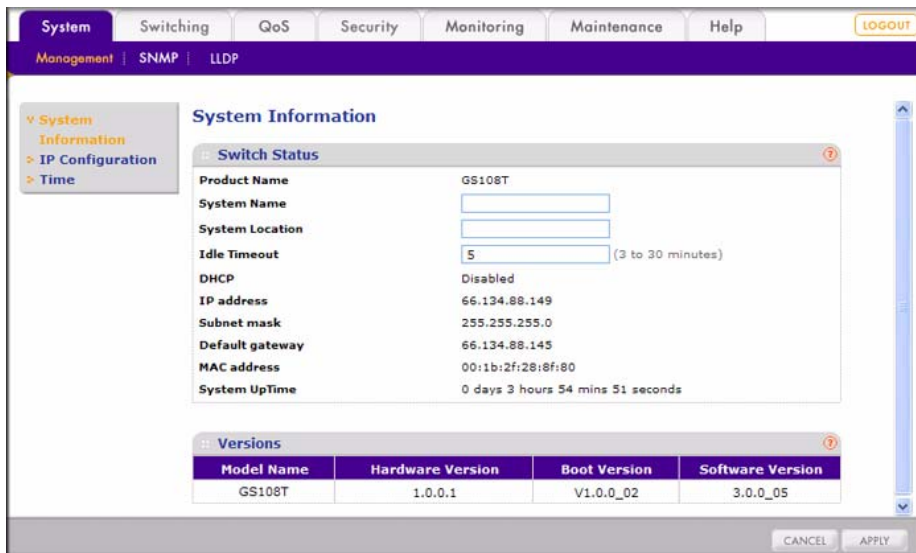


Figure 2-2

The navigation tabs across the top provide access to all the configuration functions of the switch, and remain constant. The menu items in the blue bar change according to the navigation tab that is selected.

For further description of the functions, see the appropriate section of this manual:

- [Chapter 3, “Managing System Settings,”](#) describes how to configure the system functions.
- [Chapter 4, “Configuring Switching,”](#) describes how to configure the switching functions.
- [Chapter 5, “Configuring QoS and Security,”](#) describes how to configure the QoS and security functions.
- [Chapter 6, “Monitoring, Maintenance, and Help,”](#) describes how to display statistics, how to reset the switch, how to upload and download files such as firmware, and how to obtain further help.

Click the Logout button to log out of the browser interface.



# Chapter 3

## Managing System Settings

### Using the System Tab

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The navigation tabs on the top of the home page include a System tab that lets you manage your GS108T Gigabit Smart Switch using features under the following main menu commands and subcommands:

- “Management”
  - “System Information”
  - “IP Configuration”
  - “Time”
- “SNMP”
  - “SNMP V1/V2”
- “LLDP”
  - “Basic—LLDP Configuration”
  - “Advanced—LLDP Configuration”
  - “Advanced—LLDP Port Settings”
  - “Advanced—Local Information”
  - “Advanced—Neighbors Information”

The sections that follow in this chapter cover these features and tell you how to set them in the GS108T Smart Switch.

### Management

---

This section describes how to display the switch status and specify some basic switch information, how to configure the system IP address source, and how to configure the system clock source.

## System Information

The System Information screen displays the system settings and lets you to change some of the configurable settings of the switch:

1. Select System > Management > System Information. A screen similar to the following displays.

System Information			
<b>Switch Status</b>			
Product Name	GS108T		
System Name	<input type="text"/>		
System Location	<input type="text"/>		
Idle Timeout	<input type="text" value="5"/>	(3 to 30 minutes)	
DHCP	Disabled		
IP address	66.134.88.149		
Subnet mask	255.255.255.0		
Default gateway	66.134.88.145		
MAC address	00:1b:2f:28:8f:80		
System UpTime	0 days 3 hours 54 mins 51 seconds		
<b>Versions</b>			
Model Name	Hardware Version	Boot Version	Software Version
GS108T	1.0.0.1	V1.0.0_02	3.0.0_05

Figure 3-1

2. View the basic system information under Switch Status. You can also change some of the configurable fields of the switch:
  - **Product Name.** Shows the switch model name.
  - **System Name.** This is a configurable field. You can assign a system name for the switch. This name lets you track your switch.
  - **System Location.** This is a configurable field. You can assign a location name for the switch. This field assists you in keeping track of which switch you are connected to when you are connected to your switch remotely.
  - **Idle Timeout.** This is a configurable field. You can assign a duration for login time-out. Users are automatically logged out when the login session remains idle after the specified duration. This allows other users to access the switch if one forgets to log out.
  - **DHCP.** Shows the enabled or disabled state of DHCP client functionality.

- **IP Address.** Shows the IP address of the switch.
  - **Subnet mask.** Shows the subnet mask of the IP address.
  - **Default gateway.** Shows the IP address of the gateway for the remote manager.
  - **MAC address.** Shows the MAC address of the switch.
  - **System UpTime.** Shows the switch up time after bootup.
3. Click **Apply** if you have made any change to the System Name, System Location, or Idle Timeout setting.
  4. View the system hardware and software version information under the Versions heading:
    - **Model Name.** Shows the switch model name.
    - **Hardware Version.** Shows the switch hardware version.
    - **Boot Version.** Shows the boot code version of the switch.
    - **Software Version.** Shows the software version of the switch.

## IP Configuration

The IP Configuration screen lets you set the system IP address source and optional management VLAN:

1. Select System > Management > IP Configuration. A screen similar to the following displays.

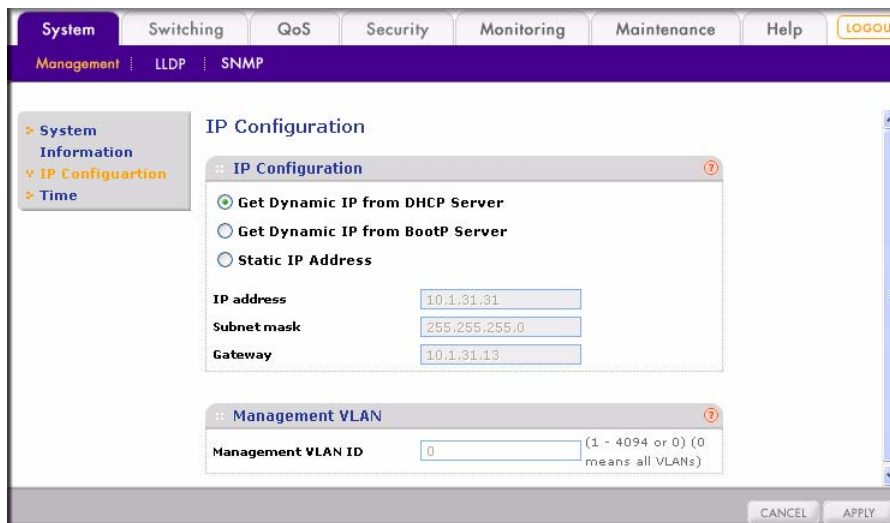


Figure 3-2

2. Select the appropriate radio button for your IP configuration:
  - **Get Dynamic IP from DHCP Server.** Specifies that the switch must obtain the IP address through a DHCP server.
  - **Get Dynamic IP from BootP Server.** Specifies that the switch must obtain the IP address through a BootP server.
  - **Static IP Address.** Specifies that the IP address, subnet mask, and default gateway must be manually configured. Enter this information in the fields below this radio button.
3. Select the management VLAN ID (the default is 0 for all VLANs).

The management VLAN is used to establish an IP connection to the switch from a workstation that is connected to a port in the VLAN. If not specified, the active management VLAN ID is 0 (default), which allows an IP connection to be established through any port.

When the management VLAN is configured, an IP connection can be made only through a port that is part of the management VLAN. It is also mandatory that the port VLAN ID (PVID) of the port to be connected in that management VLAN be the same as the management VLAN ID.

- Only one management VLAN can be active at a time.
- When a new management VLAN is configured, connectivity through the existing management VLAN is lost.
- The management station should be reconnected to the port in the new management VLAN.



**Note:** Make sure that the VLAN to be configured as the management VLAN exists. And make sure that the PVID of at least one port that is a port of the VLAN is the same as the management VLAN ID.

4. Click **Apply** to confirm any settings changes.

## Time

Simple Network Time Protocol (SNTP) synchronizes time across the network.

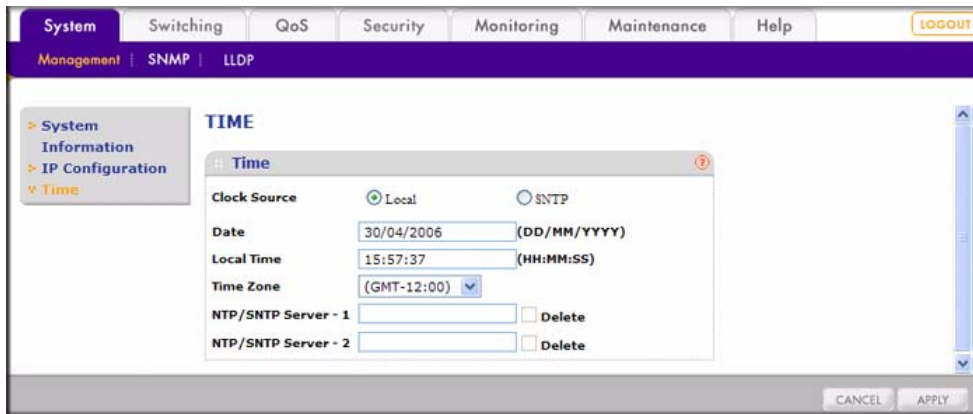
- The time interval at which the switch polls for time is called the *polling time* and is set to 30 minutes. As long as the NTP/SNTP server is reachable, the switch polls for time every 30 minutes and updates the system time.



- The time-out period is the time duration for which the switch waits for a reply from the server. Time-out is set to 15 seconds. If two NTP/SNTP servers are specified and neither one is available, then the total time-out is 30 seconds.

You can specify whether to set the system time manually or with an SNTP server:

- Select System > Management > Time. A screen similar to the following displays.



**Figure 3-3**

- Select a Clock Source:
  - Local.** Date and time are calculated through a local clock source that is based on CPU cycles. Go to [step 3](#).
  - SNTP.** Date and time are selected through an SNTP server. Go to [step 5](#)
- When setting the date and time through a local clock source, enter the following:
  - Date.** Specify the date to which the switch is set in the DD/MM/YYYY format.
  - Local Time.** Specify the switch time in the HH:MM:SS format.
- Time Zone.** Select the local time zone in which the switch is operating.
- When setting the date and time through an SNTP server, enter the following settings:
  - In the **NTP Server IP - 1** field, specify the IP address of the primary NTP/SNTP server for the switch to use when synchronizing time.
  - In the **NTP Server IP - 2** field, specify the IP address of alternate NTP/SNTP server for the switch to use when synchronizing time.
- Click **Apply** to confirm any settings changes.

## SNMP

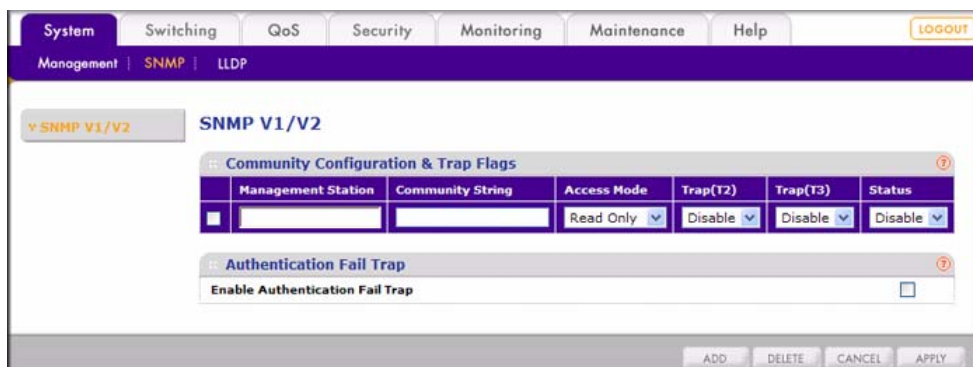
The SNMP screen lets you specify a Simple Network Management Protocol (SNMP) management station and related SNMP settings, and set an authentication fail trap.

### SNMP V1/V2

The SNMP V1/V2 screen lets you limit the IP addresses that can access the management information base (MIB) of the switch and to which the switch sends the traps. The switch responds only to requests from management stations that have their IP address in the management station list. You can also select the traps that the switch sends to the management station after a trap event.

The setting of a management station is not active until you set the **Status** field to **Enable**. To configure management stations:

1. Select System > SNMP > SNMP V1/V2. A screen similar to the following displays.



**Figure 3-4**

2. Under Community Configuration & Trap Flags, view or specify the SNMP settings for up to four management stations:
  - **Management Station.** Sets the community's management station IP address.
  - **Community String.** Sets the community string. The community string provides an authentication mechanism to the SNMP protocol. The switch processes requests from the management station only if the community string in the request packet matches the community string that is specified in the **Community String** field.
  - **Access Mode.** Sets the access privilege (Read Only or Read Write) state of the management station.
  - **Trap (T2).** Enables the switch to generate an SNMP trap when it reboots.

- **Trap (T3).** Enables the switch to generate an SNMP trap when one of its ports changes its link status.
  - **Status.** Enables or disables the management station.
3. If you have added a management station, click **Add**. If you have selected one or more management stations for removal, click **Remove**. If you have made any changes to an existing management station, click **Apply**.
  4. Under Authentication Fail Trap, select the **Enable Authentication Fail Trap** check box to enable the switch to generate an SNMP trap for all management stations when a computer attempts to gain access to the switch through SNMP but the computer's IP address is not in the SNMP management station table.
  5. If you have made changes to the **Enable Authentication Fail Trap** check box, click **Apply**.

## LLDP

---

Link Layer Discovery Protocol (LLDP) is a one-way protocol that provides the following capabilities:

- An LLDP agent can transmit information about the capabilities and current status of the switch associated with its MAC Service Access Point (MSAP) identifier.
- An LLDP agent can also receive information about the capabilities and current status of the switch associated with a remote MSAP identifier.

LLDP agents do not solicit information from other LLDP agents using LLDP.

### Basic—LLDP Configuration

The Basic LLDP Configuration screen lets you to enable or disable LLDP and configure the basic LLDP settings:

1. Select System > LLDP > Basic > LLDP Configuration. A screen similar to the following displays.

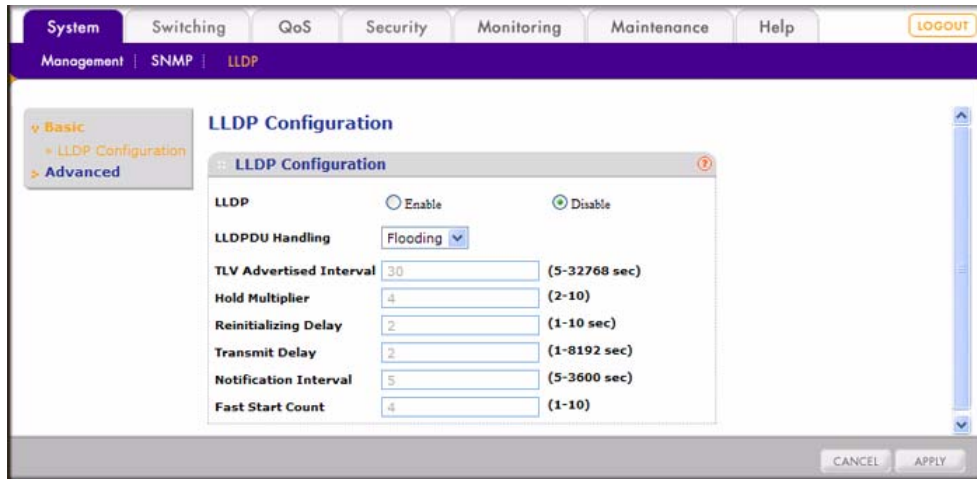


Figure 3-5

2. Select a radio button to enable or disable LLDP:
  - **Disable.** LLDP is disabled (default).
  - **Enable.** LLDP is enabled.
3. When LLDP is disabled, select how LLDP packets are processed from the **LLDPDU Handling** drop-down list:
  - **Flooding.** LLDPDU packet flooding is enabled. LLDP packets that are received from another LLDP device are flooded, that is, the packets are forwarded to all devices that are attached to the switch.
  - **Filtering.** LLDPDU packet filtering is enabled. LLDP packets that are received from another LLDP device are dropped.
4. When LLDP is enabled, the following configurable LLDP settings are displayed:
  - **TLV Advertised Interval** (5–32768 sec). The interval at which LLDP frames are transmitted on behalf of this LLDP agent. The default value is 30 seconds.
  - **Hold Multiplier** (2–10). A multiplier to the advertised interval. The result is the time-to-live (TTL) value for the information that is advertised. The default value is 4.
  - **Reinitializing Delay** (1–10 sec). The minimum delay period from the time a port becomes disabled until its reinitialization. The default value is 2 seconds.
  - **Transmit Delay** (1–8192 sec). The delay between successive LLDP frame transmissions that are initiated by a value or status changes in the local system. The default value is 2 seconds.

- **Notification Interval** (5–3600 sec). The interval at which notifications are generated when remote MSAP information changes. The default value is 5 seconds.
- **Fast Start Count** (2–10). The number of successive LLDP frame transmissions for one complete fast-start interval. The default value is 4.

5. Click **Apply** to confirm any settings changes.

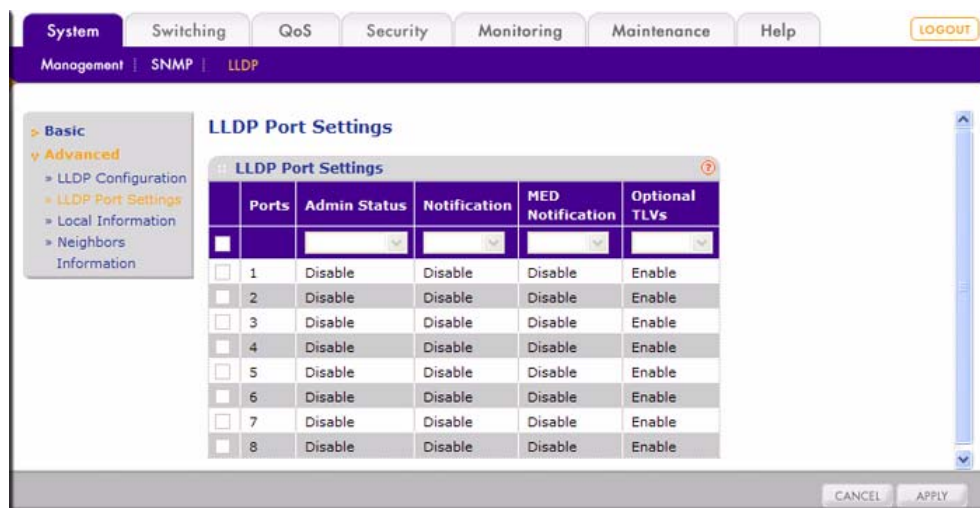
## Advanced—LLDP Configuration

The Advanced LLDP Configuration screen is identical to the Basic LLDP Configuration screen. See the previous section.

## Advanced—LLDP Port Settings

When LLDP is enabled, you can view the LLDP port settings in the LLDP Port Settings screen:

1. Select System > LLDP > Advanced > LLDP Port Settings. A screen similar to the following displays.



**Figure 3-6**

2. You can make changes to the LLDP settings for an individual port, for a group of ports, or for all ports simultaneously:
  - To change the LLDP settings for an individual port, select the check box to the left of its port number, and then select the LLDP port settings.

- To change the LLDP settings for a group of ports, select the check boxes to the left of their port numbers, and then select the LLDP port settings.
- To change the LLDP settings for all ports simultaneously, select the check box at the top of the column of check boxes, and then select the LLDP port settings.

The following information about the LLDP configuration for a port is displayed:

- **Ports.** Shows the port number.
  - **Admin Status.** The administratively assigned status of the local LLDP agent. The possible field values are:
    - **TX Only.** Specifies that transmission of local LLDP information only is enabled.
    - **RX Only.** Specifies that reception of remote LLDP information only is enabled.
    - **TX and RX.** Specifies that both transmission and reception of LLDP information are enabled.
    - **Disable.** Specifies that both transmission and reception of LLDP information are disabled.
  - **Notification.** Specifies whether or not transmission notifications are enabled.
  - **MED Notification.** Specifies whether or not Media Endpoint Discovery (MED) transmission notifications are enabled.
  - **Optional TLVs.** Specifies whether or not the transmission of threshold limit values (TLVs) is enabled.
3. Click **Apply** to confirm any settings changes.

## Advanced—Local Information

When LDDP is enabled, you can view the LLDP local information in the Local Information screen, which is also referred to as the LLDP Local Device Information screen:

Select System > LLDP > Advanced > LLDP Port Settings. A screen similar to the following displays.

The screenshot displays the 'LLDP Local Device Information' screen. The interface includes a top navigation bar with tabs for System, Switching, QoS, Security, Monitoring, Maintenance, and Help, along with a LOGOUT button. Below this is a sub-navigation bar for Management, SNMP, and LLDP. A left-hand menu shows a tree structure with 'Basic' and 'Advanced' sections, where 'Advanced' is expanded to show 'LLDP Configuration', 'LLDP Port Settings', 'Local Information', and 'Neighbors Information'. The main content area is titled 'LLDP Local Device Information' and contains two sections: 'Device Information' and 'Port Information'.

**Device Information**

Chassis ID SubType	MAC
Chassis ID	0:1b:2f:28:8f:80
System Name	N/A
System Description	Smart Switch
System Capabilities	Bridge
Enabled Capabilities	Bridge
MED Device Type	N/A

**Management Addresses**

Address Sub-type	Address	Interface Sub-type	Interface Number	OID
1	66.134.88.149	1	0	1.0.0.0.3.0.0.0.6


**Port Information**

Port	Port ID SubType	Port ID	Port Description
1	Interface Name	e1	PORT-ID#1
2	Interface Name	e2	PORT-ID#2
3	Interface Name	e3	PORT-ID#3
4	Interface Name	e4	PORT-ID#4
5	Interface Name	e5	PORT-ID#5
6	Interface Name	e6	PORT-ID#6
7	Interface Name	e7	PORT-ID#7
8	Interface Name	e8	PORT-ID#8

A 'REFRESH' button is located at the bottom right of the screen.

Figure 3-7

Under Device Information, the following LLDP local information is displayed:

	<b>Note:</b> When LLDP is disabled, all local information fields display N/A.
---	---

- **Chassis ID SubType.** Shows the basis for the chassis ID entity.
- **Chassis ID.** Shows the identifier for the particular chassis in the system.
- **System Name.** Shows the administratively assigned system name.
- **System Description.** Shows a textual description of the network entity, including the full name and version identification of the system's hardware type.
- **System Capabilities.** Shows the primary functions of the system.
- **Enabled Capabilities.** Shows which of the primary functions are enabled.
- **MED Device Type.** Shows whether the device is a MED device.
- **Management Address.** Shows the address that is associated with the LLDP agent that can be used to reach higher-layer entities to assist discovery by network management.

**Table 3-1. Management Address**

Item	Description
Address Sub-type	Shows the type of address that is listed in the management address field.
Address	Shows the management IP address.
Interface Sub-type	Shows the numbering method used for defining the interface number.
Interface Number	Shows the specific address associated with the management address.
OID	Shows the type of hardware component or protocol entity that is associated with the management address.

Under Port Information, the following LLDP port information is displayed:

- **Port.** Shows the local port number.
- **Port ID SubType.** Shows the basis for the identifier that is listed in the Port ID field.
- **Port ID.** Shows the identifier for the port from which the LLDPDU was transmitted.
- **Port Description.** Shows the port's description.



Under Port Information, click a port number in the Port column. A screen similar to the following displays.

**Local Port Information**

**MSAP Details**

Port ID SubType	Interface Name
Port ID	e1

**802.1 Set Details**

PVID	1
------	---

**802.3 Set Details**

Auto-Negotiation	Supported And Enabled
Aggregator Status	Can be Aggregated but currently not in aggregation
Aggregator Id	0
Max Frame Size	1518

**MED Set Details**

Capabilities	LLDP-MED Capabilities, Network Policy, Location Identification, Extended Power via MDI - PD
Device Type	Network Connectivity
Location Format	Coordinate based LCI
Location ID	To Be Implemented
Power Type	Unknown
Power Source	N/A
Power Priority	N/A
Power Value	N/A

**Network Policies**

Application Type	Unknown Policy	Tagged	Vlan ID	L2 Priority	DSCP
N/A	N/A	N/A	N/A	N/A	N/A

**Figure 3-8**

The following LLDP local port information is displayed:

**Table 3-2. MSAP Details**

Item	Description
Port ID SubType	The basis for the identifier that is listed in the Port ID field.
Port ID	Identifier for the port from which LLDPDU was transmitted.

**Table 3-3. 802.1 Set Details**

Item	Description
PVID	The Port VLAN ID.

**Table 3-4. 802.3 Set Details**

Item	Description
Auto-Negotiation	If autonegotiation supported and enabled in both the systems, there should be no speed difference.
Aggregator Status	Whether the port through which LLDPDU is transmitted is aggregated or not.
Aggregator Id	Port ID information for the aggregated port.
Maximum Frame Size	Maximum size of a frame that can be transmitted.

**Table 3-5. MED Set Details**

Item	Description
Capabilities	LLDP-MED capabilities are specific to LLDP-MED devices. Advertisement of this TLV by endpoints enables LLDP-MED-capable network connectivity devices to determine support of LLDP-MED by endpoints that they are connecting to.
Device Type	A specific type of LLDP-MED device, which can be either a network connectivity device or a specific class of endpoint device.
Location Format	Shows the specific Location ID data format being delivered in the Location ID field.
Location ID	Three Location ID data formats are defined: <ul style="list-style-type: none"><li>• Coordinate-based LCI data format</li><li>• Civic Address LCI data format</li><li>• ECS ELIN data format</li></ul>
Power Type	Shows whether LLDP-MED device transmitting the LLDPDU is a Power Sourcing Entity (PSE) or Power Device (PD).
Power Source	The power source being utilized by a PSE or PD device.
Power Priority	The priority of the PD type device to the power being supplied by the PSE type device, or the power priority associated with the PSE type device's port that is sourcing the power through MDI.

**Table 3-5. MED Set Details (continued)**

Item	Description
Power Value	Shows the total power in watts required by a PD device from a PSE device, or the total power a PSE device is capable of sourcing over a maximum-length cable based on its current configuration.
Network Policies	<p>Network policy is associated with multiple sets of application types supported on a given port.</p> <ul style="list-style-type: none"> <li>• <b>Application Type.</b> Integer value indicating the primary function of the applications defined for this network policy, advertised by an endpoint or network connectivity device.</li> <li>• <b>Unknown Policy.</b> Shows that an endpoint device wants to explicitly advertise that this policy is required by the device but is currently unknown.</li> <li>• <b>Tagged.</b> Shows whether the specified application type is using a tagged or an untagged VLAN.</li> <li>• <b>VLAN ID.</b> Contains the VLAN identifier (VID) for the port.</li> <li>• <b>L2 Priority.</b> Shows the Layer 2 priority to be used for the specified application type.</li> <li>• <b>DSCP.</b> Contains the DSCP value to be used to provide Diffserv node behavior for the specified application type.</li> </ul>

## Advanced—Neighbors Information

When there are local LLDP neighbors, you can view the remote information in the Neighbors Information screen:

Select System > LLDP > Advanced > Neighbors Information. A screen similar to the following displays.

**Figure 3-9**

Under Neighbors Information, the following information is displayed:

- **MSAP Entry.** Shows the MSAP identifier from which the LLDPDU was transmitted.
- **Local Port.** Shows the local port on which the LLDPDU was received.

- **Chassis ID SubType.** Shows the basis for the chassis ID that is listed in the Chassis ID field.
- **Chassis ID.** Shows the chassis ID of the system from which the LLDPDU was transmitted.
- **Port ID SubType.** Shows the basis for the identifier that is listed in the Port ID field.
- **Port ID.** Shows the port from which the LLDPDU was transmitted.

# Chapter 4

## Configuring Switching

### Using the Switching Tab

---

The navigation tabs on the top of the home page include a Switching tab that lets you manage your GS108T Gigabit Smart Switch using features under the following main menu commands and subcommands:

- “Ports”
  - “Port Configuration”
- “LAG”
  - “Basic—LAG Configuration”
  - “Basic—LAG Membership”
  - “Advanced—LAG Configuration”
  - “Advanced—LAG Membership”
  - “Advanced—LACP Configuration”
  - “Advanced—LACP Port Configuration”
- “VLAN”
  - “Basic—VLAN Configuration”
  - “Advanced—VLAN Configuration”
  - “Advanced—VLAN Membership”
  - “Advanced—Port PVID Configuration”
- “STP”
  - “Basic—RSTP Configuration”
  - “Advanced—RSTP Configuration”
  - “Advanced—Port Configuration”
- “Multicast”
  - “IGMP Snooping”
  - “Static Multicasting”
  - “Multicast Group Membership”

- “Switch Configuration”
  - “Jumbo Frame Configuration”
- “Address Table”
  - “Static Address”
  - “Dynamic Address”

The sections that follow in this chapter cover these features and tell you how to configure them in the GS108T Smart Switch.

## Ports

You can define speed, duplexing, and flow control operation for a port when autonegotiation is off. When autonegotiation is on, those data are negotiated from the link partner. Otherwise, you can enable or disable ports to control packet forwarding.

### Port Configuration

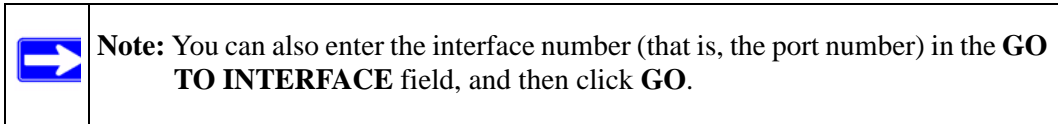
The Port Configuration screen lets you to define the port switching settings:

1. Select Switching > Ports > Port Configuration. A screen similar to the following displays.

	Interface	Port Description	Link Status	Port Speed	Duplex Mode	Flow Control	Default Priority
<input type="checkbox"/>				Auto	Full	Enable	0
<input type="checkbox"/>	g1	Port ID#1	Up	Auto	Full	Enable	0
<input type="checkbox"/>	g2	Port ID#2	Down	100M	Full	Enable	4
<input type="checkbox"/>	g3	Port ID#3	Up	100M	Half	Disable	5
<input type="checkbox"/>	g4	Port ID#4	Up	Auto	Full	Enable	1
<input type="checkbox"/>	g5	Port ID#5	Down	Auto	Full	Enable	0
<input type="checkbox"/>	g6	Port ID#6	Down	Auto	Full	Enable	5
<input type="checkbox"/>	g7	Port ID#7	Down	Auto	Full	Enable	0
<input type="checkbox"/>	g8	Port ID#8	Down	100M	Full	Disable	1

Figure 4-1

2. You can make changes to the port switching settings for an individual port, for a group of ports, or for all ports simultaneously:
- To change the port switching settings for an individual port, select the check box to the left of its port number, and then select the port switching settings.



- To change the port switching settings for a group of ports, select the check boxes to the left of their port numbers, and then select the port switching settings.
- To change the port switching settings for all ports simultaneously, select the check box at the top of the column of check boxes, and then select the port switching settings.

The following port switching settings are displayed for all ports. Except for the Interface and Link Status fields, all fields are configurable.

- Interface.** Shows the port number.
- Port Description.** Specifies the optional port description.
- Link Status.** Shows whether the link is up or down.
- Port Speed.** Specifies the speed for the port. The possible fields values are:
  - 100M.** Specifies that the port speed is 100 Mbps.
  - 10M.** Specifies that the port speed is 10 Mbps.
  - Auto.** Specifies that autonegotiation mode is enabled. Select this mode when you want the port speed to function at 1000 Mbps.
  - Disable.** Specifies that the port speed is disabled.
- Duplex Mode.** Specifies the duplex mode. The possible fields values are:
  - Full.** Specifies that full-duplex mode is enabled.
  - Half.** Specifies that half-duplex mode is enabled. This mode can be enabled only when the port speed is 10 Mbps or 100 Mbps.
- Flow Control.** Specifies whether flow control support is enabled or disabled:
  - Enable.** Specifies that flow control is enabled. If the port is oversubscribed, it sends a pause frame or a jam packet. If the port receives a pause frame, it halts for a certain period before sending out a frame.
  - Disable.** Specifies that flow control is disabled.

- **Default Priority.** Specifies the packet priority for packets arriving at the port without tagging. The possible fields values are: 0–7. If packet arrives with a tag or priority tag, the priority is retrieved from the priority field of the tag.

3. Click **Apply** to confirm any settings changes.

## LAG

Two types of link aggregation groups (LAGs) are supported:

- **Static Trunking.** Ports are grouped manually.
- **Link Aggregation Control Protocol (LACP).** Part of IEEE specification (802.3ad) that allows several physical ports to be bundled together to form a single logical channel. Link aggregation allows one or more links to be aggregated together to form a LAG, such that a MAC client can treat the LAG as if it were a single link. Link aggregation can be used on 10-Mbps, 100-Mbps, or 1000-Mbps Ethernet full-duplex ports.

**Example:** A network administrator could combine a group of five 100-Mbps ports into a logical link that will function as a single 500-Mbps port (the actual throughput, however, will be less than the total sum of the links).

## Basic—LAG Configuration

The Basic LAG Configuration screen lets you define the status and administration settings for up to two available LAGs. However, you first have to define the members of the LAGs. See “[Basic—LAG Membership](#)” on page 4-5. To configure LAG:

1. Select Switching > LAG > Basic > LAG Configuration. A screen similar to the following displays.

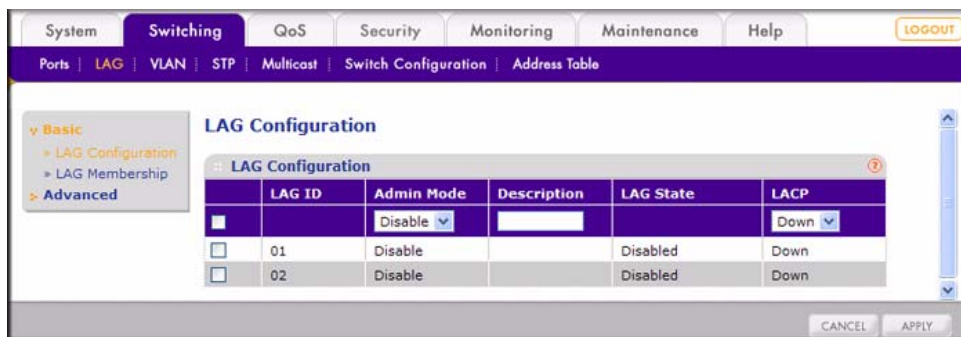


Figure 4-2



2. You can make changes to the LAG settings for an individual LAG or for both LAGs simultaneously:
  - To change the LAG settings for an individual LAG, select the check box to the left of its LAG ID, and then select the LAG settings.
  - To change the LAG settings for both LAGs simultaneously, select the check box at the top of the column of check boxes, and then select the LAG settings.

The following LAG settings are displayed for both LAGs. Except for the LAG ID and LAG State fields, all fields are configurable.

- **LAG ID.** Shows the LAG ID.
- **Admin Mode.** Specifies the LAG administrative mode. The possible fields values are:
  - **Enable.** The LAG administrative mode is enabled.
  - **Disable.** The LAG administrative mode is disabled.
- **LAG Description:** Specifies the optional LAG description.
- **LAG State.** Shows whether the LAG is enabled or disabled.
- **LACP.** Specifies whether LACP enabled or disabled for the LAG. The possible fields values are:
  - **Up.** LACP is enabled. (If the administrative mode is disabled, LACP cannot be up.) This implies that static trunking is disabled.
  - **Down.** LACP is disabled. This implies that static trunking is enabled.

3. Click **Apply** to confirm any settings changes.



**Note:** In order for you to successfully apply a LAG configuration, all members of the trunk must be selected before you enable the LAG configuration, must have the same speed and duplex modem, and must be either linked or unlinked.

## Basic—LAG Membership

The Basic LAG Membership screen lets you define the ports that are aggregated together to form a single LAG. There are certain requirements for a LAG:

- Each port can belong to only one LAG.
- Each LAG can have up to four ports.
- Ports in a LAG must have the same speed and be in the same VLAN group.

To configure LAG membership:

1. Select Switching > LAG > Basic > LAG Membership. A screen similar to the following displays.



Figure 4-3

2. From the LAG ID drop-down list, select **1** or **2**.
3. Click **Unit 1**. A screen similar to the following displays.

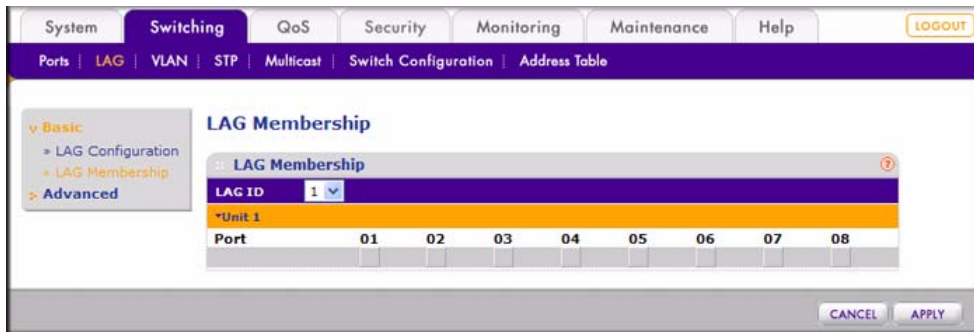


Figure 4-4

4. Select up to four ports for membership in the LAG by selecting the check boxes below the port numbers.
5. Click **Apply** to confirm any settings changes.

## Advanced—LAG Configuration

The Advanced LAG Configuration screen is identical to the Basic LAG Configuration screen. See [“Basic—LAG Configuration” on page 4-4](#).

## Advanced—LAG Membership

The Advanced LAG Membership screen is identical to the Basic LAG Membership screen. See [“Basic—LAG Membership” on page 4-5](#).

## Advanced—LACP Configuration

The LACP Configuration screen lets you set the LACP system priority, which specifies the device's link aggregation priority relative to the devices at the other ends of the links on which link aggregation is enabled. To configure LACP:

1. Select Switching > LAG > Advanced > LACP Configuration. A screen similar to the following displays.

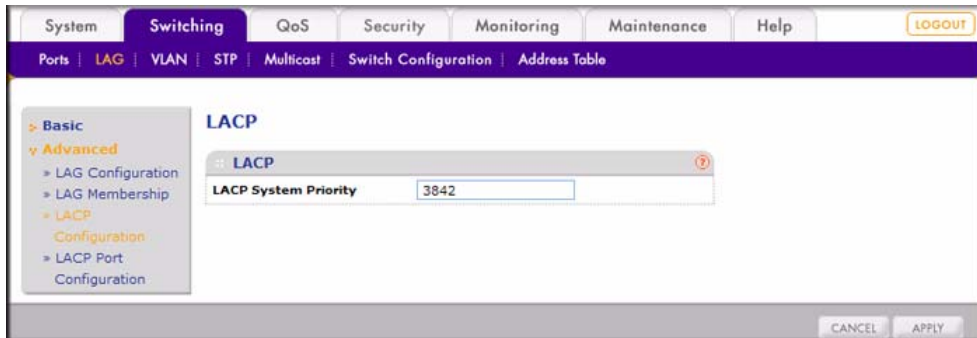


Figure 4-5

The LACP System Setting field is the only configurable field in this screen:

- **LACP System Setting.** LACP Port priority ranges from 0 to 65536. A higher value indicates a lower priority. The default value is randomly selected.

2. Click **Apply** to confirm any settings changes.

## Advanced—LACP Port Configuration

The LACP Port Configuration screen, which is also referred to as the LACP Port Priority screen, lets you set the LACP port priority and time-out value:

1. Select Switching > LAG > Advanced > LACP Port Configuration. A screen similar to the following displays.

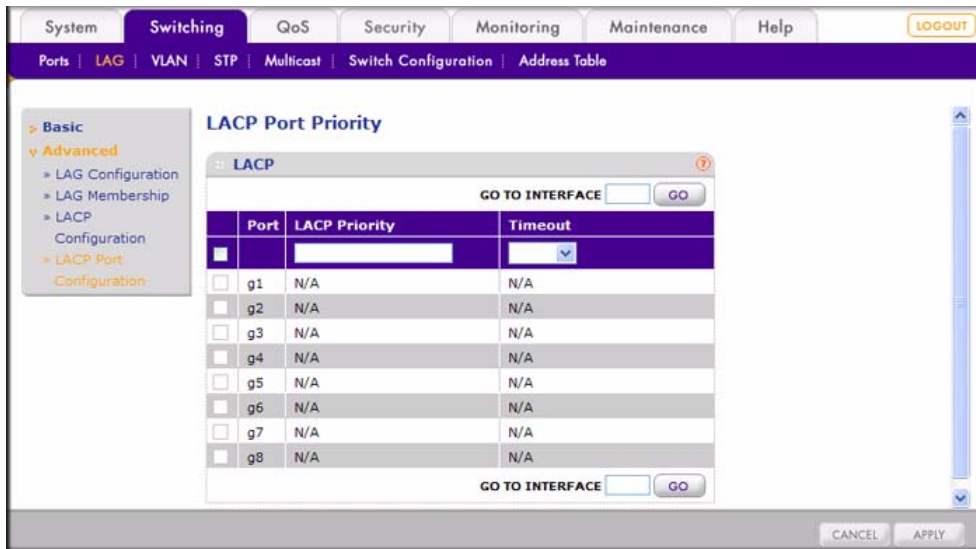


Figure 4-6

2. You can make changes to the LACP port priority settings for an individual port, for a group of ports, or for all ports simultaneously:
  - To change the LACP port priority settings for an individual port, select the check box to the left of its port number, and then select the LACP port priority settings.

➔

**Note:** You can also enter the interface number (that is, the port number) in the **GO TO INTERFACE** field, and then click **GO**.

- To change the LACP port priority settings for a group of ports, select the check boxes to the left of their port numbers, and then select the LACP port priority settings.
- To change the LACP port priority settings for all ports simultaneously, select the check box at the top of the column of check boxes, and then select the LACP port priority settings.

The following information about the LACP priority for a port is displayed. Both the LACP Priority and Timeout fields are configurable.

- **Port.** Shows the port number.
- **LACP Priority.** Specifies the port priority value in a range from 1 to 65335.

- **Timeout.** Specifies the administrative LACP time-out. The possible field values are:
    - **Long.** Specifies a long time-out value.
    - **Short.** Specifies a short time-out value.
3. Click **Apply** to confirm any settings changes.

## VLAN

---

A virtual local area network (VLAN) is a way to electronically separate ports on the same switch (from a single broadcast domain) into separate broadcast domains so that broadcast packets are not sent to all the ports on a single switch. When you use a VLAN, users can be grouped by logical function instead of physical location. The GS108T Smart Switch supports IEEE 802.1Q VLANs and port-based VLANs, but not combination of both:

- **IEEE 802.1Q VLANs**

The settings on the IEEE 802.1Q VLAN screen control the VLAN membership of each port for transmitting packets. Also, these settings determine if transmitted packets from each port are tagged with the VLAN ID and other information. The switch supports 64 tag-based VLANs.

By default, every port is a member of VLAN 1, and so they have a port VLAN ID (PVID) of 1.

- **Port-based VLANs**

Single or multiple ports are grouped into a smaller virtual network, which is independent of the other ports. The switch supports 8 port-based VLANs. Any user-assigned VLAN cannot have member ports that belong to different port groups.

## Basic—VLAN Configuration

The Basic VLAN Configuration screen lets you select the VLAN type and create VLANs. You can select to create either IEEE 802.1Q VLANs or port-based VLANs. The screen functions differently for IEEE 802.1Q VLANs than it does for port-based VLANs.

### IEEE 802.1Q VLAN Configuration

To configure the IEEE 802.1Q VLAN type:

1. Select Switching > VLAN > Basic > VLAN Configuration. A screen similar to the following displays.

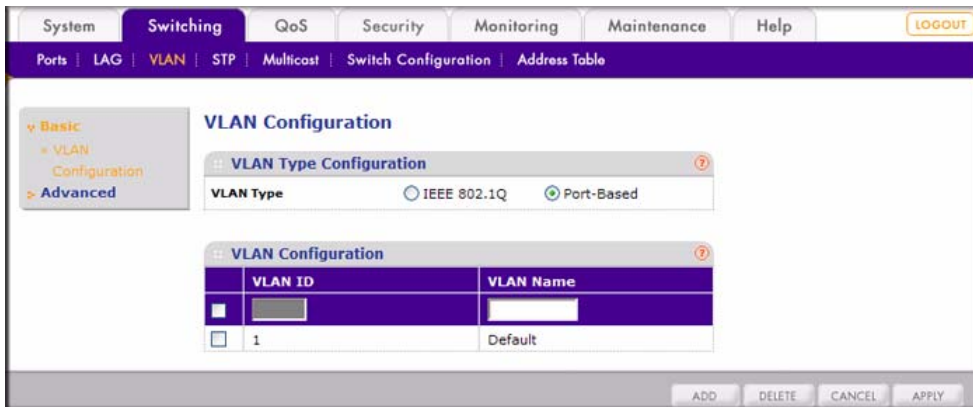


Figure 4-7

2. Select the **IEEE 802.1Q** radio button to specify the IEEE 802.1Q VLAN type.



**Warning:** Changing the VLAN type erases all existing VLAN settings, static multicast groups, and trusted MAC addresses.

3. The Warning screen displays. Click **OK**.

The following information about the VLAN configuration is displayed. Both the VLAN ID and VLAN Name fields are configurable:

- **VLAN ID.** Specifies a VLAN ID from 1 to 4094.
- **VLAN Name.** Specifies the optional VLAN description.

4. Perform one of the following actions:

To add a VLAN:

- a. Enter a number in the **VLAN ID** field.
- b. Enter a name in the **VLAN Name** field.
- c. Click **Add**.

To delete a VLAN:

- a. Select the check box to the left of the VLAN ID that you want to remove.
- b. Click **Delete**.

To change a VLAN name:

- a. Select the check box to the left of the VLAN ID that you want to change.
- b. Enter a new name in the **VLAN Name** field.
- c. Click **Apply**.

## Port-Based VLAN Configuration

To configure the port-based VLAN type:

1. Select Switching > VLAN > Basic > VLAN Configuration. A screen similar to the following displays.

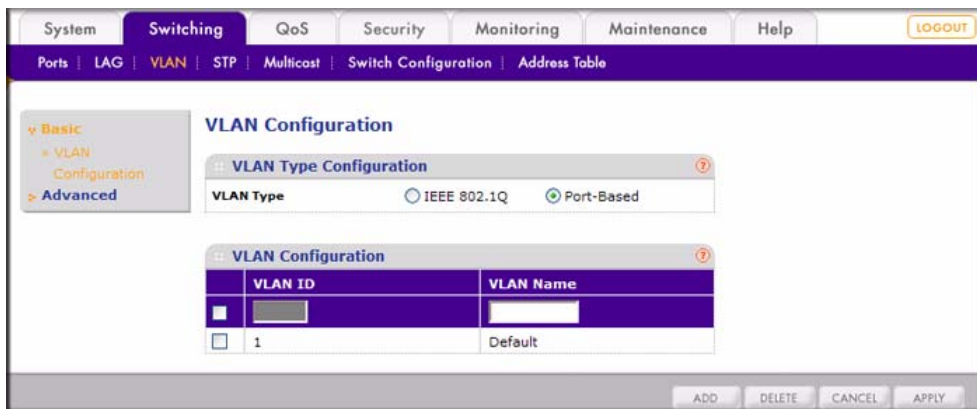



Figure 4-8

2. Select the **Port-Based** radio button to specify the port-based VLAN type.

	<p><b>Warning:</b> Changing the VLAN type erases all existing VLAN settings, static multicast groups, and trusted MAC addresses.</p>
---	--

3. The Warning screen displays. Click **OK**.
4. In the **VLAN Name** field, enter an optional VLAN name.

**5. Perform one of the following actions:**

- To add a VLAN:
  - Select the check box to the left of one of the VLAN IDs.
  - Enter a VLAN name in the **VLAN Name** field.
  - Click **Add**.
- To delete a VLAN:
  - Select the check box to the left of the VLAN ID that you want to remove.
  - Click **Delete**.
- To change a VLAN name:
  - Select the check box to the left of the VLAN ID that you want to change.
  - Enter a new name in the **VLAN Name** field.
  - Click **Apply**.

## Advanced—VLAN Configuration

The Advanced VLAN Configuration screen is identical to the Basic VLAN Configuration screen. See the previous section.

## Advanced—VLAN Membership

The VLAN Membership screen lets you set the VLAN membership of each port. The screen functions differently for port-based VLANs than it does for IEEE 802.1Q VLANs.

### IEEE 802.1Q VLAN Membership



**Note:** By default, every port is a member of VLAN 1, which has a port VLAN ID (PVID) of 1.

To configure VLAN membership for IEEE 802.1Q VLANs:

1. Select Switching > VLAN > Basic > VLAN Membership. A screen similar to the following displays.



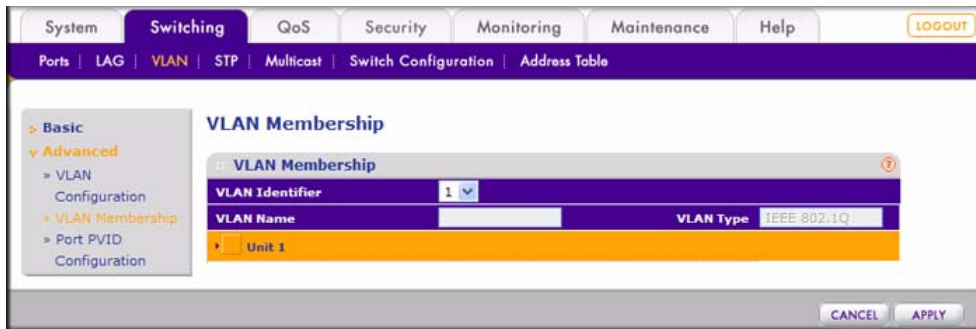


Figure 4-9

2. From the **VLAN Identifier** drop-down list, select the number that represents the VLAN you want to view or modify.

You can either assign the same tag setting to or remove it from all ports in the VLAN in [step 3](#), or assign a tag setting to or remove it from each individual port in the VLAN in [step 4](#). These steps are mutually exclusive.

3. To assign the same tag setting to or remove it from all ports in the VLAN, toggle the check box to the left of Unit 1. The tag setting determines if packets that are transmitted from each port are tagged with the VLAN ID and other information. The possible tag settings are:
  - **T**. Specifies that the egress (outgoing) packet is tagged for all ports.
  - **U**. Specifies that the egress packet is untagged for all ports.
  - Empty. Specifies that none of the ports are part of the VLAN.
4. To assign a tag setting to or remove it from an individual port in the VLAN:
  - a. Click **Unit 1**. A screen similar to the following displays.

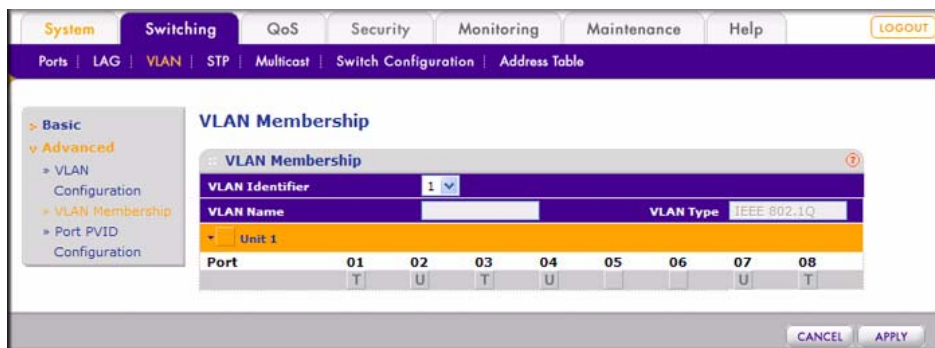


Figure 4-10





**Figure 4-12**

- b. To assign a port to or remove it from the VLAN, select the check box under an individual port number.
5. Click **Apply** to confirm any settings changes.



**Note:** When the port-based VLAN type is configured, an ingress (incoming) packet with an IEEE 802.1Q tag is ignored and preserved.

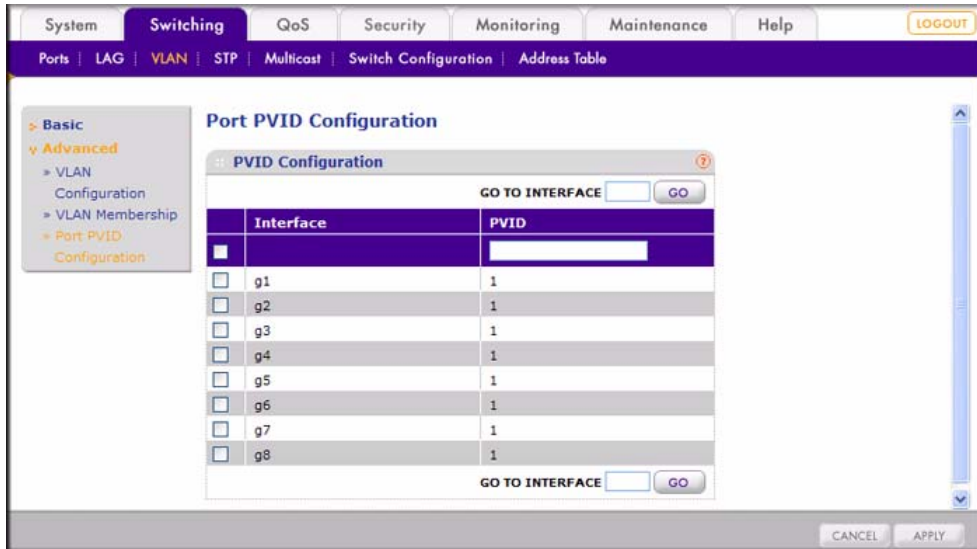
## Advanced—Port PVID Configuration

The Port PVID Configuration screen lets you assign a port VLAN ID (PVID) to an interface. There are certain requirements for a PVID:

- All ports must have a defined PVID.
- If no other value is specified, the default VLAN PVID is used.
- If you want to change the port's default PVID, you must first create a VLAN group that includes the port.

To configure PVIDs:

1. Select Switching > VLAN > Advanced > Port PVID Configuration. A screen similar to the following displays.



**Figure 4-13**

2. You can make changes to the port PVID settings for an individual port or for a group of ports:
  - To change the port PVID setting for an individual port, select the check box to the left of its port number, and then enter an existing VLAN ID in the **PVID** field.



**Note:** You can also enter the interface number (that is, the port number) in the **GO TO INTERFACE** field, and then click **GO**.

- To change the port PVID settings for a group of ports, select the check boxes to the left of their port numbers, and then enter an existing VLAN ID in the **PVID** fields.

The following information about the port PVID settings is displayed:

- **PVID.** Specifies the ID of an existing VLAN.

3. Click **Apply** to confirm any settings changes.

## STP

The Rapid Spanning Tree Protocol (RSTP) provides rapid convergence of the spanning tree by assigning port roles and by determining the active topology. The RSTP builds upon the IEEE 802.1D STP protocol to select the switch with the highest switch priority as the root switch. Reconfiguration of the spanning tree can occur in less than 1 second.

### Basic—RSTP Configuration

The Basic RSTP Configuration screen lets you enable RSTP:

1. Select Switching > STP > Basic > RSTP Configuration. A screen similar to the following displays.

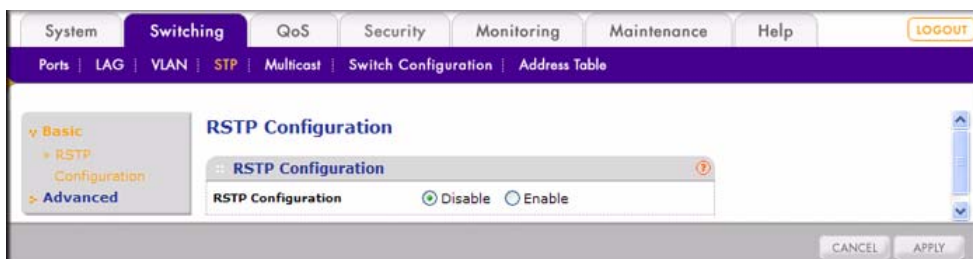


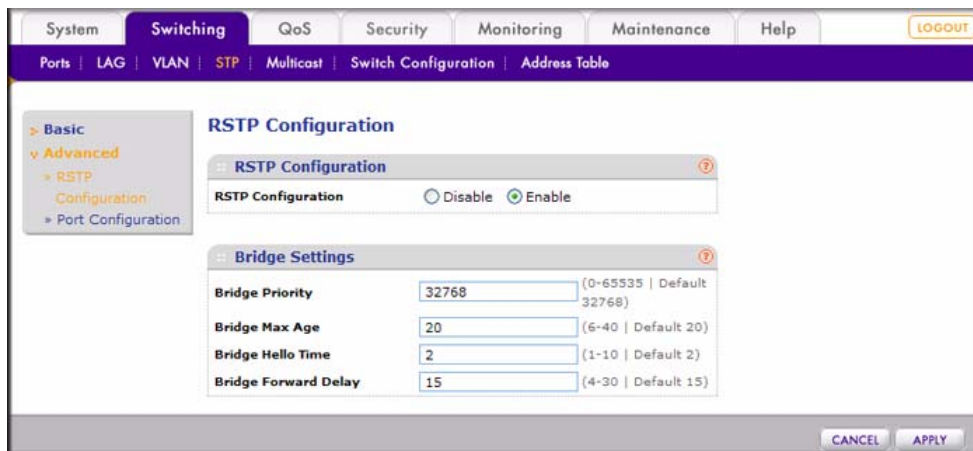
Figure 4-14

2. Select a radio button to enable or disable RSTP:
  - **Disable.** RSTP is disabled. This is the default setting.
  - **Enable.** RSTP is enabled.
3. Click **Apply** to confirm any settings changes.

### Advanced—RSTP Configuration

In addition to the function of the Basic RSTP Configuration screen, The Advanced RSTP Configuration screen lets you view and modify the bridge settings:

1. Select Switching > STP > Advanced > RSTP Configuration. A screen similar to the following displays.

**Figure 4-15**

- Under Bridge Settings, view or modify the bridge settings. The following configurable fields are displayed with their possible ranges and default values:
  - **Bridge Priority.** Specifies the priority of the current bridge. After exchanging bridge protocol data units (BPDUs) with other STP-enabled devices, the device with the lowest priority value becomes the root bridge.
  - **Bridge Max Age.** Specifies the maximum age of the current bridge in seconds. This is the maximum age of the STP information that is learned from the network before it is discarded.
  - **Bridge Hello Time.** Specifies the period in seconds that the switch waits before sending configuration PDUs when it is the root of the spanning tree or trying to become the root.
  - **Bridge Forward Delay.** Indicates the period in seconds that the port stays in each of the listening and learning states that precedes the forward state. This period is also used to age all dynamic entries in the forwarding databases when a topology change has been detected and is underway.
- Click **Apply** to confirm any settings changes.

## Advanced—Port Configuration

The Port Configuration screen, also referred to as the Rapid Spanning Tree Port Configuration screen, lets you view and modify the RSTP settings:

- Select Switching > STP > Advanced > Port Configuration. A screen similar to the following displays.

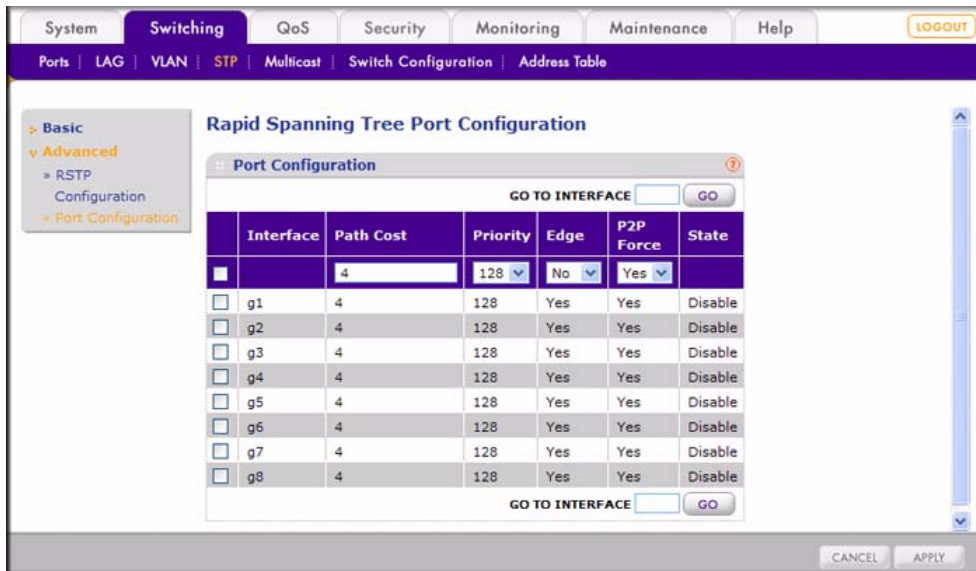


Figure 4-16

2. You can make changes to the RSTP port settings for an individual port, for a group of ports, or for all ports simultaneously:
  - To change the RSTP port settings for an individual port, select the check box to the left of its port number, and then select the RSTP port settings.



**Note:** You can also enter the interface number (that is, the port number) in the **GO TO INTERFACE** field, and then click **GO**.

- To change the RSTP port settings for a group of ports, select the check boxes to the left of their port numbers, and then select the RSTP port settings.
- To change the RSTP port settings for all ports simultaneously, select the check box at the top of the column of check boxes, and then select the RSTP port settings.

The following RSTP port information is displayed. Except for the Interface and State fields, all fields are configurable:

- **Interface.** Shows the port number.
- **Path Cost.** Specifies the cost of the port. Cost means the contribution of this port to the cost of paths toward the spanning tree root that include this port. The switch uses this value to determine which port is the forwarding port. If all other factors are equal, the path with the lowest cost to the root bridge is the active path. The possible values are between 1 and 65535.
- **Priority.** Specifies the priority of the port. This is the value of the priority field contained in the first octet of the port ID. The port with the lowest number has the highest priority. The possible values are 0, 16, 32, 48, 64, 80, 96, 112, 128, 144, 160, 176, 192, 208, 224, and 240.
- **Edge.** Specifies whether the port is the edge port. Once configured as an edge port, the port immediately transitions to the forwarding state. The possible values are:
  - **Yes.** Specifies that the port is the edge port.
  - **No.** Specifies that the port is not the edge port.
- **P2P Force.** Specifies whether the port is a point-to-point link. If you connect a port to another port though a point-to-point link and the local port becomes a designated port, it negotiates a rapid transition with the other port to ensure a loop-free topology. The possible values are:
  - **Yes.** Specifies that the port is a point-to-point link.
  - **No.** Specifies that the port is not a point-to-point link.
- **State.** Shows the RSTP port status.

3. Click **Apply** to confirm any settings changes.

## Multicast

---

You can configure IGMP snooping, static multicasting, and multicast group membership.

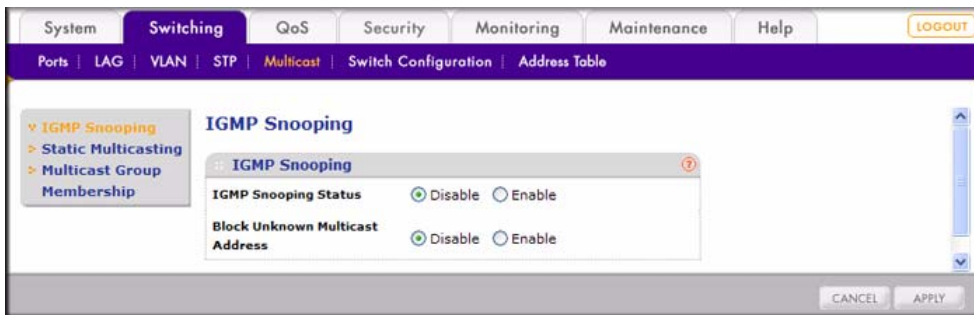
### IGMP Snooping

IGMP specifies how a host can register to a router to receive specific multicast traffic. Configure the switch to use IGMP snooping in subnets that receive IGMP queries from either IGMP or the IGMP snooping querier. IGMP snooping constrains multicast traffic at Layer 2 by configuring Layer 2 LAN ports dynamically to forward multicast traffic only to those ports that want to receive it. IGMP is a standard defined in RFC1112 for IGMPv1 and in RFC2236 for IGMPv2.



To configure IGMP snooping:

1. Select Switching > Multicast > IGMP Snooping. A screen similar to the following displays.



**Figure 4-17**

2. Select a radio button to enable or disable IGMP snooping:
  - **Disable.** IGMP snooping is disabled. This is the default setting.
  - **Enable.** IGMP snooping is enabled.

When you enable IGMP snooping, the screen expands to display fields in which you can specify how IGMP leave packets are processed. See [step 4](#).

3. Select a radio button to enable or disable blocking of unknown multicast addresses:
  - **Disable.** Blocking of unknown multicast addresses is disabled. This is the default setting.
  - **Enable.** Blocking of unknown multicast addresses is enabled.
4. When you enable IGMP snooping, the screen expands to display fields in which you can specify how IGMP leave packets are processed. In addition, dynamic multicast information is displayed. Select a radio button to specify how IGMP leave packets are processed:
  - **Disable.** Specifies that an incoming IGMP leave packet is forwarded to the multicast router, that is, the incoming IGMP leave packet is not blocked. When the multicast router receives the packet, it closes the channel.
  - **Enable.** Specifies that an incoming IGMP leave packet is filtered (also referred to as blocked) and, therefore, not forwarded to the multicast router. This is the default setting.

Under Dynamic Multicast, the following information is displayed:

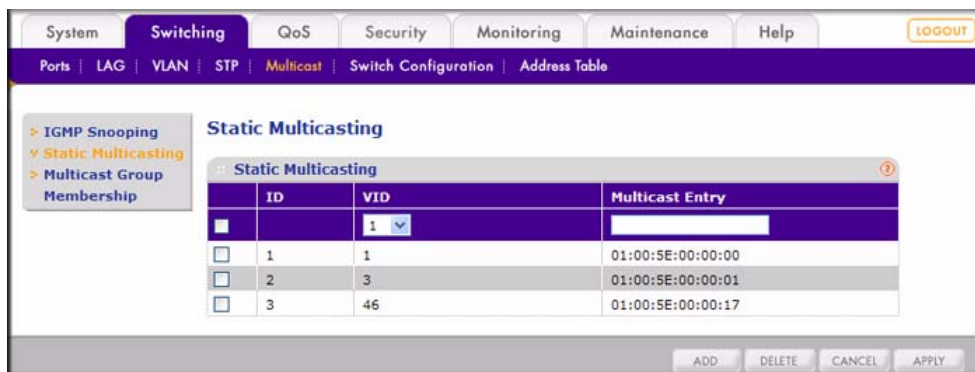
- **ID.** Shows the dynamic multicast entry ID.
- **VID.** Shows the VLAN ID.

- **Multicast Entry.** Shows the Layer 2 group multicast address.
  - **Port Members.** Shows the membership that is associated with the group.
5. Click **Apply** to confirm any settings changes.

## Static Multicasting

Static multicast addressing provides a way to add or delete static multicast addresses that are related to a VLAN. To configure static multicasting:

1. Select Switching > Multicast > Static Multicasting. A screen similar to the following displays.



**Figure 4-18**

2. The following information about static multicasting is displayed. Both the VID and Multicast Entry fields are configurable:
  - **ID.** Shows the static multicast ID.
  - **VID.** Specifies the VLAN ID (VID). Select an existing VID from the drop-down list.
  - **Multicast Entry.** Specifies the Layer 2 multicast address. Enter a multicast address in the 01:00:5E:XX:XX:XX format.
3. Perform one of the following actions:
 

To add a multicast entry:

  - a. Select a VID.
  - b. Enter the Layer 2 multicast address.
  - c. Click **Add**.

To delete a static multicast ID:

- a. Select the check box to the left of the static multicast ID that you want to remove.
- b. Click **Delete**.

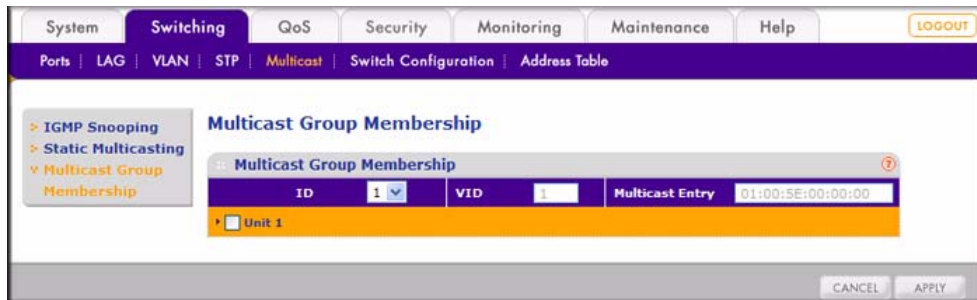
To change a Layer 2 multicast address:

- a. Select the VID of the static multicast ID that you want to change.
- b. Enter the new Layer 2 multicast address.
- c. Click **Apply**.

## Multicast Group Membership

To configure members for a multicast group:

1. Select Switching > Multicast > Multicast Group Membership. A screen similar to the following displays.



**Figure 4-19**

2. From the ID drop-down list, select the static multicast ID that represents the multicast group that you want to view or modify. When you make your selection, the VID field and Multicast Entry fields change automatically.

You can either assign all ports to or remove them from the static group in [step 3](#), or assign individual ports to or remove them from the static multicast group in [step 4](#). These steps are mutually exclusive.

3. To assign all ports to or remove them from the static multicast group, select the check box to the left of Unit 1.
4. To assign individual ports to or remove them from the static multicast group:
  - a. Click **Unit 1**. A screen similar to the following displays.



Figure 4-20

- b. To assign a port to or remove it from the static multicast group, select the check box under an individual port number.
5. Click **Apply** to confirm any settings changes.

## Switch Configuration

The Switch Configuration menu lets you to enable or disable the Jumbo Frame support. The default frame size is 1518 bytes. When jumbo frame support is enabled, the frame size can vary from 64 to 9,728 bytes.

### Jumbo Frame Configuration

To configure jumbo frame support:

1. Select Switching > Switch Configuration > Jumbo Frame Configuration. A screen similar to the following displays.



Figure 4-21

2. Select a radio button to enable or disable jumbo frames:
  - **Disable.** Jumbo frames are disabled. This is the default setting.
  - **Enable.** Jumbo frames are enabled.
3. Click **Apply** to confirm any settings changes.

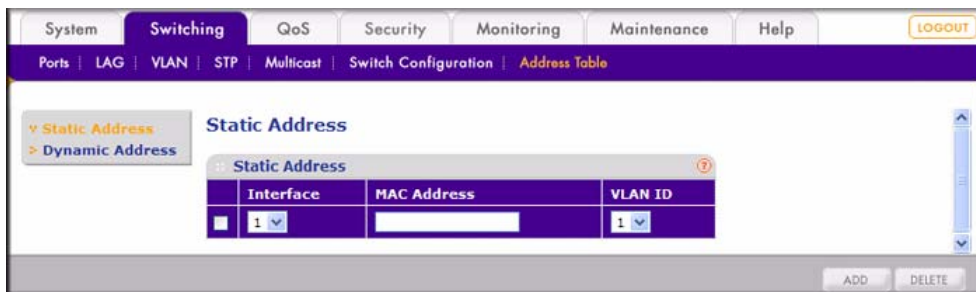
## Address Table

The Static Address table lists all the MAC addresses that you can specify. These addresses enable the switch to forward traffic from these MAC addresses. The maximum number of trusted MAC addresses is 256 per system. All source MAC addresses are trusted when the Trusted MAC list is empty. For information about the Trusted MAC list, see [“Trusted MAC” on page 5-21](#). If the list includes MAC addresses, any incoming traffic with a source MAC address that is not included in the trusted MAC table is dropped.

### Static Address

To configure a static MAC address:

1. Select Switching > Address Table > Static Address. A screen similar to the following one displays.



**Figure 4-22**

2. The following static MAC address information is displayed. All fields are configurable:
  - **Interface.** Specifies the interface (port) number to which the entry refers.
  - **MAC Address.** Specifies the MAC address to which the entry refers.
  - **VLAN ID.** Specifies the VLAN ID to which the entry refers.

### 3. Perform one of the following actions:

To add a static entry:

- a. Select an interface from the drop-down list.
- b. Enter a MAC address.
- c. Select a VLAN ID from the drop-down list.
- d. Click **Add**.

To delete a static entry:

- a. Select the check box to the left of the static address that you want to remove.
- b. Click **Delete**.

## Dynamic Address

The Dynamic Address screen lets you to query the dynamically assigned MAC addresses by port, VLAN ID, and MAC address. Static MAC addresses might also be shown in the table entries that are returned by the query. To query the table:

1. Select Switching > Address Table > Dynamic Address. A screen similar to the following one displays.

The screenshot shows the 'Dynamic Address' configuration page. The navigation bar includes 'System', 'Switching', 'QoS', 'Security', 'Monitoring', 'Maintenance', and 'Help'. The 'Switching' menu is expanded to show 'Ports', 'LAG', 'VLAN', 'STP', 'Multicast', 'Switch Configuration', and 'Address Table'. The 'Address Table' sub-menu is selected, and the 'Dynamic Address' option is highlighted. The main content area has a left sidebar with 'Static Address' and 'Dynamic Address' options. The 'Dynamic Address' section contains a 'Table Entry Query' form with three input fields: 'Port' (set to 1), 'VLAN ID' (with a range of 1-4094), and 'MAC Address' (with an example 00:00:01:DE:27:04). Below the query section is a 'Table Entries' section displaying a table with three rows of data.

ID	Port	MAC Address	VLAN ID	Dynamic/Static
1	3	00:1B:2F:28:8F:80	1	Static
2	1	00:1B:2F:2D:EF:E2	1	Dynamic
3	1	00:E0:EB:7B:2F:8B	1	Dynamic

Figure 4-23

2. Select a check box to specify how the table is to be queried. The possible field types are:
  - **Port.** Specifies the interface for which the table is queried. Select an interface from the drop-down list.
  - **VLAN ID.** Specifies the VLAN ID for which the table is queried. Enter an existing VLAN ID.
  - **MAC Address.** Specifies the MAC address for which the table is queried. Enter an existing MAC address.
3. Click **Apply** to query the table entries. The information that is returned from the query is displayed as follows:
  - **ID.** Shows the table entry ID.
  - **Port.** Shows the interface to which the address is assigned.
  - **MAC Address.** Shows the MAC address to which the address is assigned.
  - **VLAN ID.** Shows the VLAN ID to which the address is assigned.
  - **Dynamic/Static.** Shows whether the entry is dynamic or static.





# Chapter 5

## Configuring QoS and Security

This chapter describes how to use the QoS tab and the Security tab:

- [“Using the QoS Tab”](#)
- [“Using the Security Tab”](#)

### Using the QoS Tab

---

The navigation tabs on the top of the home page include a QoS tab that lets you manage your GS108T Gigabit Smart Switch using features under the following main menu commands and subcommands:

- [“CoS”](#)
  - [“Basic—QoS Global Configuration”](#)
  - [“Basic—Rate Limit”](#)
  - [“Advanced—801.1p to Queue Mapping”](#)
  - [“Advanced—DSCP Priority Mapping”](#)

The sections that follow in this chapter cover these features and tell you how to configure them in the GS108T Smart Switch.

### CoS

---

The class of service (CoS) menu lets you classify specific traffic at the Layer 2 level by manipulating the CoS bits, thereby allowing you to configure quality of service (QoS).

#### Basic—QoS Global Configuration

There are two possible priority tag settings for the QoS; that is, there are two QoS modes:

- **802.1p-based.** The eight priority tags that are specified in IEEE 802.1p are p0 to p7. The QoS setting lets you map each of the eight priority levels to one of four internal hardware priority queues: High, Normal, Low, and Lowest.

- **DSCP-based.** The six most significant bits of the DiffServ field are called the Differentiated Services Code Point (DSCP) bits. You can map the DSCP value to one of the eight priority levels (p0 to P7) of IEEE 802.1p. Then, you can assign the IEEE 802.1p priority level to one of the four internal hardware queues.

The switch empties the four hardware priority queues in order, beginning with the highest priority queue to the lowest priority queue. Each hardware queue transmits all of the packets in its buffer before permitting the next lower priority to transmit its packets.

To configure the QoS mode:

1. Select QoS > CoS > Basic > QoS Global Configuration. A screen similar to the following displays.

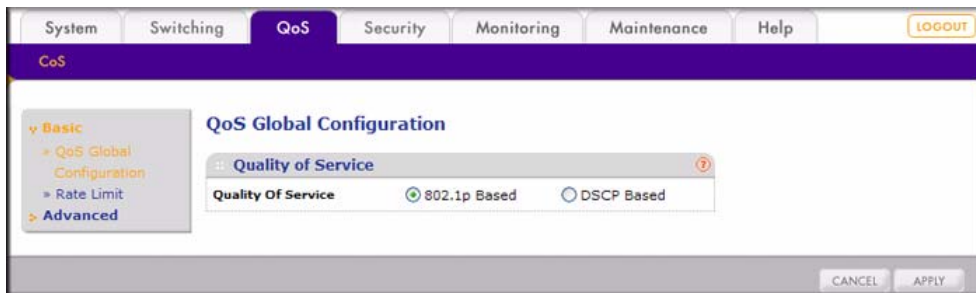


Figure 5-1

2. Select the **802.1p Based** or the **DSCP Based** radio button to determine the QoS mode.
3. Click **Apply** to confirm any settings changes.

## Basic—Rate Limit

The Rate Limit screen, which is also referred to as the Rate Control Setting screen, lets you control the bandwidth of ingress (incoming) and egress (outgoing) traffic for a specific port. To assign bandwidth limits:

1. Select QoS > CoS > Basic > Rate Limit. A screen similar to the following displays.

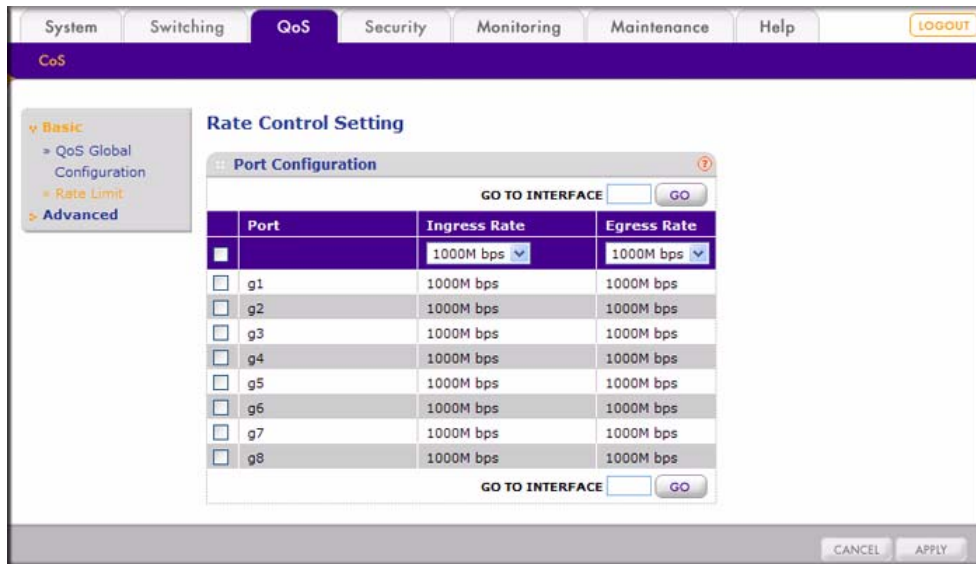



Figure 5-2

2. You can make changes to the bandwidth limits for an individual port, for a group of ports, or for all ports simultaneously:
  - To change the bandwidth limits for an individual port, select the check box to the left of its port number, and then select bandwidth limits.

 **Note:** You can also enter the interface number (that is, the port number) in the **GO TO INTERFACE** field, and then click **GO**.

- To change the bandwidth limits for a group of ports, select the check boxes to the left of their port numbers, and then select the bandwidth limits.
- To change the bandwidth limits for all ports simultaneously, select the check box at the top of the column of check boxes, and then select the bandwidth limits.

The following port configuration information is displayed. All fields are configurable:

- **Port.** Specifies the port number.
- **Ingress Rate.** Specifies the rate limitation of incoming traffic in this port. The possible values in bits per second (bps) are:
  - 512K bps, 2M bps, 4M bps, 10M bps, 20M bps, 40M bps, 60M bps, 100M bps, 200M bps, 400M bps, and 1000M bps.

- **Egress Rate.** Specifies the rate limitation of outgoing traffic in this port. The possible values in bps are:
  - 512K bps, 2M bps, 4M bps, 10M bps, 20M bps, 40M bps, 60M bps, 100M bps, 200M bps, 400M bps, and 1000M bps.

3. Click **Apply** to confirm any settings changes.

## Advanced—801.1p to Queue Mapping

The 802.1p to Queue Mapping screen lets you map priority values to the four hardware traffic queues:

1. Select QoS > CoS > Advanced > 801.1p to Queue Mapping. A screen similar to the following displays.

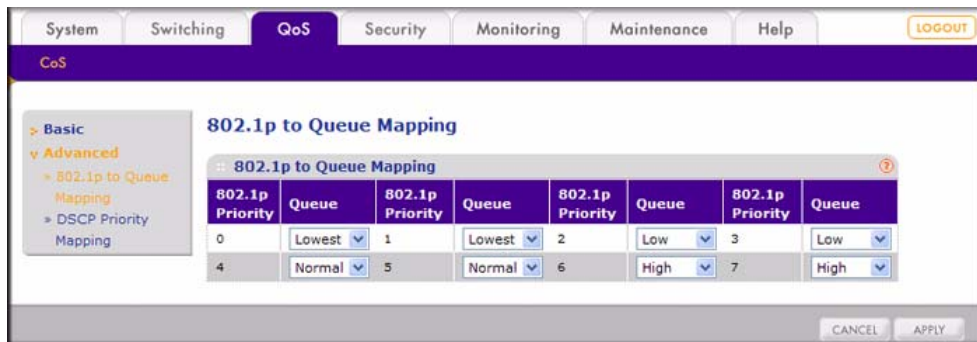


Figure 5-3

2. Assign a hardware priority queue to each 802.1p priority tag (p0 to p7). The possible values are for the Queue field are Lowest, Low, Normal, and High.
3. Click **Apply** to confirm any settings changes.

## Advanced—DSCP Priority Mapping

The DSCP Priority Mapping screen lets you assign priorities to DSCP values:

1. Select QoS > CoS > Advanced > DSCP Priority Mapping. A screen similar to the following displays.

**DSCP to Priority Mapping**

**Class Selector (CS) PHB**

DSCP	Priority	DSCP	Priority	DSCP	Priority	DSCP	Priority
CS 1 (000000)	0	CS 2 (001000)	0	CS 3 (010000)	0	CS 4 (011000)	0
CS 5 (100000)	0	CS 6 (101000)	0	CS 7 (110000)	0	CS 8 (111000)	0

**Assured Forwarding (AF) PHB**

DSCP	Priority	DSCP	Priority	DSCP	Priority	DSCP	Priority
AF 11 (001010)	0	AF 21 (010010)	0	AF 31 (011010)	0	AF 41 (100010)	0
AF 12 (001100)	0	AF 22 (010100)	0	AF 32 (011100)	0	AF 42 (100100)	0
AF 13 (001110)	0	AF 23 (010110)	0	AF 33 (011110)	0	AF 43 (100110)	0

**Expedited Forwarding (EF) PHB**

DSCP	Priority
EF (101110)	0

**Other DSCP Values (Local/Experimental Use)**

DSCP	Priority	DSCP	Priority	DSCP	Priority	DSCP	Priority
1 (000001)	0	2 (000010)	0	3 (000011)	0	4 (000100)	0
5 (000101)	0	6 (000110)	0	7 (000111)	0	9 (001001)	0
11 (001011)	0	13 (001101)	0	15 (001111)	0	17 (010001)	0
19 (010011)	0	21 (010101)	0	23 (010111)	0	25 (011001)	0
27 (011011)	0	29 (011101)	0	31 (011111)	0	33 (100001)	0
35 (100011)	0	37 (100101)	0	39 (100111)	0	41 (101001)	0
42 (101010)	0	43 (101011)	0	44 (101100)	0	45 (101101)	0
47 (101111)	0	49 (110001)	0	50 (110010)	0	51 (110011)	0
52 (110100)	0	53 (110101)	0	54 (110110)	0	55 (110111)	0
57 (111001)	0	58 (111010)	0	59 (111011)	0	60 (111100)	0
61 (111101)	0	62 (111110)	0	63 (111111)	0		

CANCEL APPLY

Figure 5-4

- Assign a priority from 0 to 7 to a DSCP value by using the **Priority** drop-down lists. The following DSCP values are configurable:
  - CS.** Class Selector (CS) Per-Hop Behavior (PHB) values.
  - AF.** Assured Forwarding (AF) PHB values.
  - EF.** Expedited Forwarding PHB value.
  - Other DCSP Values.** DSCP values for local or experimental use.
- Click **Apply** to confirm any settings changes.

## Using the Security Tab

---

The navigation tabs on the top of the home page include a Security tab that lets you manage your GS108T Gigabit Smart Switch using features under the following main menu commands and subcommands:

- “Management Security”
  - “User Configuration—Change Password”
  - “RADIUS”
  - “Authentication Type”
- “Port Authentication”
  - “Basic—802.1x Configuration”
  - “Advanced—802.1x Configuration”
  - “Advanced—Port Authentication”
- “Traffic Control”
  - “Storm Control”
  - “Port Security”
- “Access”
  - “IP Access List”
  - “Trusted MAC”

The sections that follow in this chapter cover these features and tell you how to configure them in the GS108T Smart Switch.

## Management Security

---

The Management Security menu lets you to manage your user configuration, RADIUS servers, and authentication type.

### User Configuration—Change Password

The User Configuration setting lets you to change the password for the switch.

To change the password:

1. Select Security > Management Security > User Configuration > Change Password. A screen similar to the following displays.

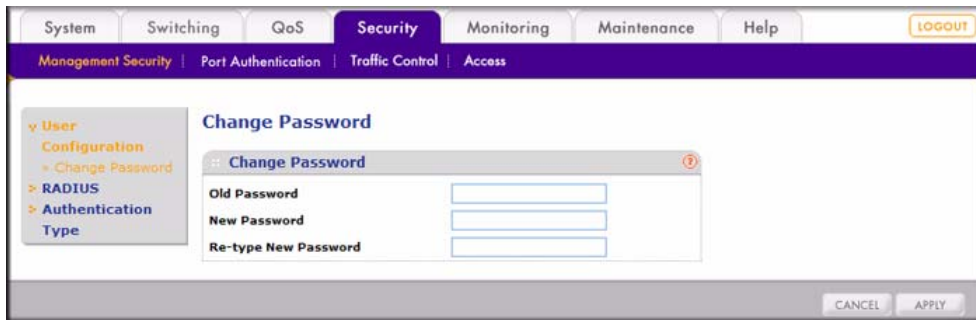



Figure 5-5

2. Specify the new password:
  - a. **Old Password.** Enter the current password to access the switch.
  - b. **New Password.** Enter the new password to access the switch. The maximum length of password is 15 characters. All printable characters are allowed.

	<p><b>Note:</b> It is good practice to select a password that is more than eight characters long and is a combination of numbers and letters. Names and simple words can be easy to guess. If you forget your password, you can always press the Factory Reset button on the switch, and the password will return to the default value of <b>password</b>.</p>
---	--

- c. **Confirm New Password.** Re-enter the new password.
3. Click **Apply** to update the password.

## RADIUS

The RADIUS server refers to Remote Authentication Dial-In User Service (RADIUS), defined in RFC2865. The server is used by ISPs to authenticate a user name and password before authorizing use of the network. You can configure both a primary server and a backup server:

1. Select **Security > Management Security > RADIUS**. A screen similar to the following displays.



Figure 5-6

2. The following fields are displayed, all of which are configurable:
  - **Host IP Address.** Specifies the IP address of the RADIUS server.
  - **Authentication Port.** Specifies the User Datagram Protocol (UDP) port number of the Extensible Authentication Protocol (EAP) over LANs (EAPOL) control frame. The default UDP port number is 1812, but other numbers can be used if the RADIUS server can recognize them.
  - **Number of Retries.** Specifies the number of times the switch sends the RADIUS request to the server before giving up.
  - **Timeout for Reply.** Specifies the number of seconds the switch waits for the RADIUS server to respond before resending the request.
  - **Dead Time.** Specifies the number of minutes a RADIUS server; that is not responding to authentication requests is to be skipped, thus avoiding the wait for the request to time out before trying the configured backup server.
  - **Key String.** Specifies the string used by the RADIUS server as a password to identify EAPOL control frames.
  - **Usage Type.** Specifies the usage of the RADIUS server. The possible field values are:
    - **Login.** The RADIUS server is used for logging in to the switch.
    - **802.1x.** The RADIUS server is used for dot1x authentication.
    - **All.** The RADIUS server is used for both logging in and dot1x authentication.
  - **Active Server.** Specifies the RADIUS server (Primary or Backup) to which these settings apply.



### 3. Perform one of the following actions:

To add a RADIUS server:

- a. Define all fields that are listed in [step 2](#).
- b. Click **Add**.

To delete a RADIUS server:

- a. Select the check box to the left of the host IP address of the RADIUS server that you want to remove.
- b. Click **Delete**.

To change the authentication fields of a RADIUS server:

- a. Select the check box to the left of the host IP address of the RADIUS server for which you want to make changes.
- b. Make changes to the authentication fields.
- c. Click **Apply**.

## Authentication Type

The Authentication Type screen lets you specify the order in which authentication is performed:

1. Select Security > Management Security > Authentication Type. A screen similar to the following displays.

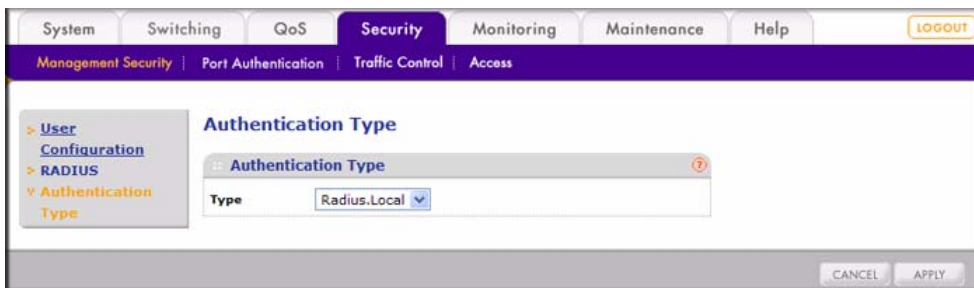


Figure 5-7

2. Select the authentication type from the drop-down list. The possible field values are:
  - **Local.** Specifies that authentication occurs locally.
  - **RADIUS.** Specifies that authentication occurs at the RADIUS server.
  - **RADIUS. None.** Specifies that no authentication type is applied. A user is allowed to log in without any authentication.
  - **RADIUS. Local.** Specifies that authentication occurs only on a local RADIUS server.

The authentication procedure shows the order in which authentication is performed. If the first authentication type is not available, the second authentication type is used.

**Example:** If **RADIUS, Local** is selected, the RADIUS server is used to authenticate a user. If the RADIUS server is unavailable, or there is no RADIUS server on the network, then authentication is done locally.

3. Click **Apply** to confirm any settings changes.

## Port Authentication

---

The Port Authentication menu lets you configure various levels of port authentication to control network access.

### Basic—802.1x Configuration

The 802.1x Configuration screen lets you configure port authentication settings and guest VLANs, and lets you specify whether port authentication is applied to a port:

1. Select Security > Port Authentication > Basic > 802.1x Configuration. A screen similar to the following displays.

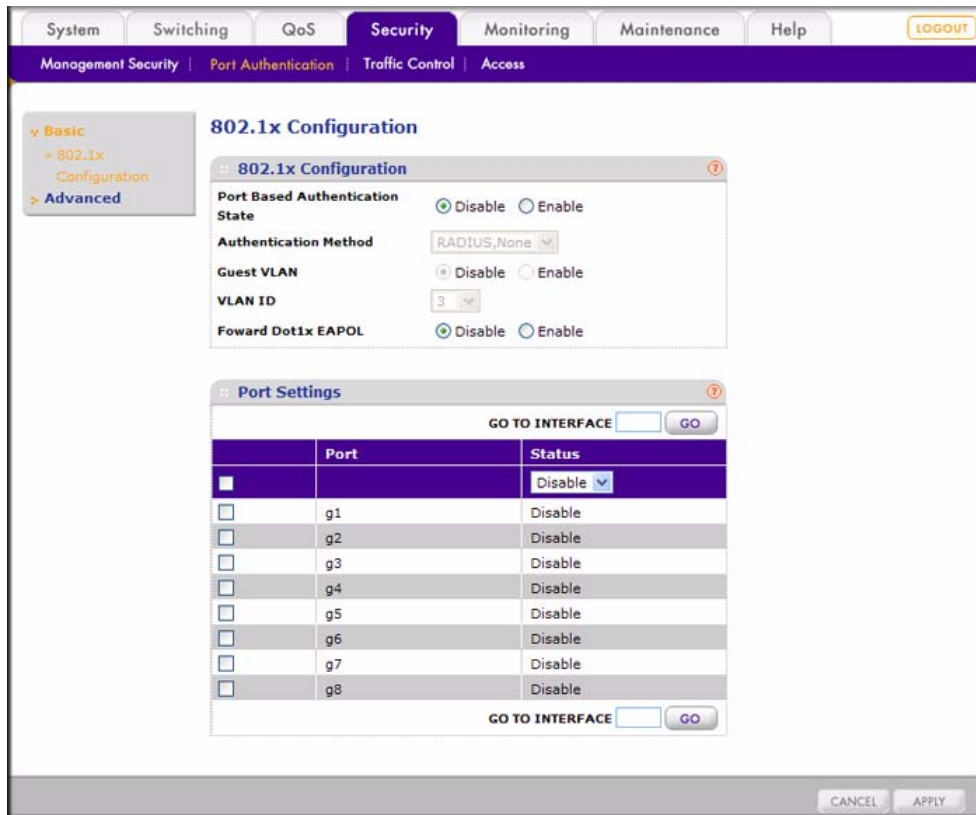


Figure 5-8

2. Under 802.1x Configuration, the following fields are displayed, all of which are configurable:
  - **Port Based Authentication State.** Specifies whether port authentication is enabled on the device. Select one of the following radio buttons:
    - **Disable.** Specifies that port-based authentication is disabled.
    - **Enable.** Specifies that port-based authentication is enabled.
  - **Authentication Method.** Specifies the authentication method that is used for port authentication. Port authentication must be enabled to select an authentication method from the drop-down list. The possible field values are:
    - **RADIUS, None.** Specifies that port authentication occurs through the RADIUS server. However, if the port is not authenticated, then no authentication method is used, and the session is permitted.

- **RADIUS.** Specifies that port authentication occurs through the RADIUS server.
  - **None.** Specifies that no authentication method is used to authenticate the port.
  - **Guest VLAN:** Specifies whether a guest VLAN is enabled on the device. At least one VLAN must exist to select one of the following radio buttons:
    - **Disable.** Specifies that a guest VLAN cannot be used for unauthorized ports. This is the default value.
    - **Enable.** Specifies that a guest VLAN can be used for unauthorized ports. If a guest VLAN is enabled, the unauthorized port automatically joins the VLAN selected in the VLAN List field.
  - **VLAN List.** Specifies a VLAN. Select an existing VLAN for the guest VLAN from the drop-down list.
  - **Forward DOT1x EAPOL.** When the port-based authentication state is disabled, you can enable or disable flooding EAPOL. Select one of the following radio buttons:
    - **Disable.** Specifies that EAPOL flooding is disabled. This is the default value.
    - **Enable.** Specifies that EAPOL flooding is enabled.
3. Click **Apply** to confirm any settings changes to the 802.1x configuration.
  4. Under Port Settings, you can make changes to the port authentication setting for an individual port, for a group of ports, or for all ports simultaneously:
    - To change the port authentication setting for an individual port, select the check box to the left of its port number, and then select the authentication status.



**Note:** You can also enter the interface number (that is, the port number) in the **GO TO INTERFACE** field, and then click **GO**.

- To change the port authentication setting for a group of ports, select the check boxes to the left of their port numbers, and then select the authentication status.
- To change the port authentication setting for all ports simultaneously, select the check box at the top of the column of check boxes, and then select the authentication status.

The following port authentication settings are displayed. Only the Status field is configurable:

- **Port.** Shows the port number.
- **Status.** Specifies whether port authentication is enabled or disabled for the port. The possible field values are:

- **Disable.** Specifies that port authentication is disabled for the port. No authentication process is required for the port; traffic can be forwarded normally. This is the default value.
- **Enable.** Specifies that port authentication is enabled for the port. The port must be authorized by a RADIUS server to forward traffic. No traffic is forwarded if the port is unauthorized.

5. Click **Apply** to confirm any settings changes to the port authentication settings.

## Advanced—802.1x Configuration

The Advanced 802.1x Configuration screen is identical to the Basic 802.1x Configuration screen. See the previous section.

## Advanced—Port Authentication

The Advanced Port Authentication screen lets you configure global settings for port-based authentication:

1. Select Security > Port Authentication > Advanced > Port Authentication. A screen similar to the following displays. (Because the online screen is very wide, it is divided in a left screen and right screen in this manual.)

The following figure displays the left side of the Advanced Port Authentication screen:

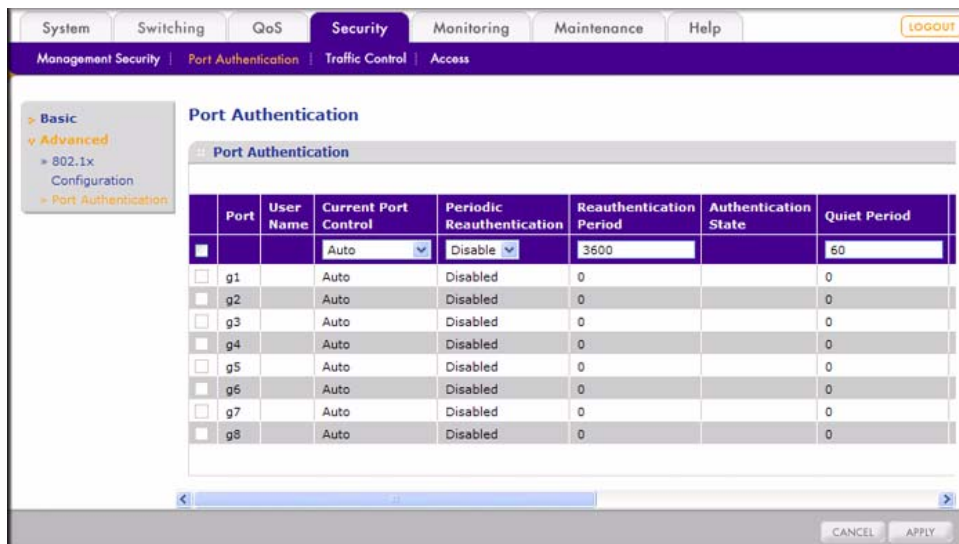


Figure 5-9

The following figure displays the right side of the Advanced Port Authentication screen:

Quiet Period	Resending EAP	Max EAP Requests	Supplicant Timeout	Server Timeout	Termination Cause
60	30	2	30	30	
<input type="checkbox"/>	0	0	0	0	NotTerminatedYet
<input type="checkbox"/>	0	0	0	0	NotTerminatedYet
<input type="checkbox"/>	0	0	0	0	NotTerminatedYet
<input type="checkbox"/>	0	0	0	0	NotTerminatedYet
<input type="checkbox"/>	0	0	0	0	NotTerminatedYet
<input type="checkbox"/>	0	0	0	0	NotTerminatedYet
<input type="checkbox"/>	0	0	0	0	NotTerminatedYet
<input type="checkbox"/>	0	0	0	0	NotTerminatedYet

**Figure 5-10**

2. You can make changes to the port authentication setting for an individual port, for a group of ports, or for all ports simultaneously:
  - To change the port authentication settings for an individual port, select the check box to the left of its port number, and then select the global settings.

➔

**Note:** You can also enter the interface number (that is, the port number) in the **GO TO INTERFACE** field, and then click **GO**.

- To change the port authentication settings for a group of ports, select the check boxes to the left of their port numbers, and then select the global settings.
- To change the port authentication settings for all ports simultaneously, select the check box at the top of the column of check boxes, and then select the global settings.

The following fields are displayed. Except for the Port, User Name, Authentication State, and Termination Cause, all fields are configurable:

- **Port.** Shows an interface on which port-based authentication is enabled.
- **User Name.** Shows the supplicant user name.

- **Current Port Control.** Specifies the current port authorization state. The possible field values are:
    - **Auto.** Specifies that the port control is automatic and that a single client with the proper credentials has been authenticated through the port.
    - **Unauthorized.** Specifies that either the port control is forced unauthorized control, or that the port control is automatic but that a client has not (yet) been authenticated through the port. When the port control is forced unauthorized control, even a client with proper credentials cannot be authorized.
    - **Authorized.** Specifies that the port control is forced authorized control, and that clients with the proper credentials have full port access.
  - **Periodic Reauthentication.** Permits immediate port reauthentication. The possible field values are:
    - **Disable.** Specifies that port reauthentication is disabled.
    - **Enable.** Specifies that port reauthentication is enabled. This is the default value.
  - **Reauthentication Period.** Specifies the time span (in seconds) in which the selected port is reauthenticated. The default is 3600 seconds.
  - **Authenticator State.** Shows the current authenticator state.
  - **Quiet Period.** Specifies the number of seconds that the device remains in the quiet state following a failed authentication exchange. The possible field range is 0–65,535. The default is 60 seconds.
  - **Resending EAP.** Specifies the amount of time (in seconds) that elapses before EAP requests are resent. The default is 30 seconds.
  - **Max EAP Requests.** Specifies the total number of EAP requests sent. If a response is not received after the defined period, the authentication process is restarted. The default is 2 retries.
  - **Supplicant Timeout.** Specifies the amount of time (in seconds) that elapses before EAP requests are resent to the supplicant. The default is 30 seconds.
  - **Server Timeout.** Specifies the amount of time (in seconds) that elapses before the device resends a request to the authentication server. The default is 30 seconds.
  - **Termination Cause.** Shows the reason for which the port authentication was terminated.
3. Click **Apply** to confirm any settings changes.

## Traffic Control

The Traffic Control menu lets you to configure storm control and port learning settings. When storm control is enabled, ports are not disrupted by a flood of traffic (a storm) that otherwise might degrade network performance.

### Storm Control

The Storm Control screen lets you assign storm rate limitations to the entire system:

1. Select Security > Traffic Control > Storm Control. A screen similar to the following displays.

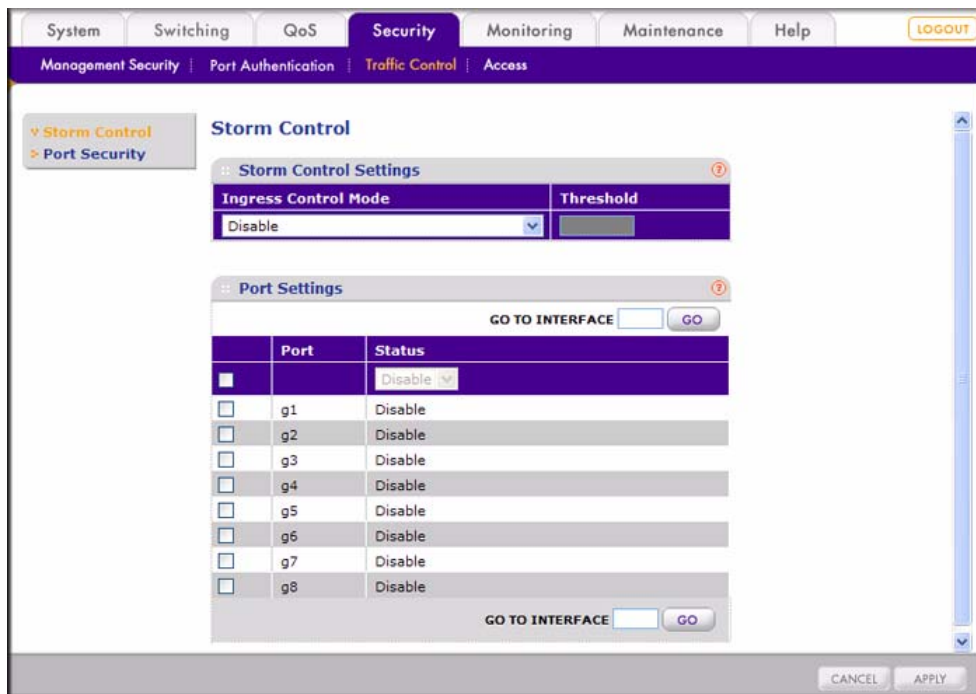


Figure 5-11



2. Under Storm Control Settings, the following fields are displayed, both of which are configurable:
  - **Ingress Control Mode.** Specifies the type of the packet storm. The possible field values are:
    - **Disable.** Specifies that storm control is disabled. This is the default value.
    - **Unknown Unicast, Multicast, and Broadcast.** Specifies that storm control is enabled for unknown unicast, multicast, and broadcast packets.
    - **Multicast and Broadcast.** Specifies that storm control is enabled for multicast and broadcast packets.
    - **Broadcast Only.** Specifies that storm control is enabled for broadcast packets only.
  - **Threshold.** Specifies the threshold rate limit in Kbps for storm control. The valid range is from 64 to 1048576 Kbps.
3. Click **Apply** to confirm any changes to the storm control configuration.
4. You can make changes to the storm control port setting for an individual port, for a group of ports, or for all ports simultaneously:
  - To change the storm control port setting for an individual port, select the check box to the left of its port number, and then select the setting.



**Note:** You can also enter the interface number (that is, the port number) in the **GO TO INTERFACE** field, and then click **GO**.

- To change the storm control port setting for a group of ports, select the check boxes to the left of their port numbers, and then select the setting.
- To change the storm control port setting for all ports simultaneously, select the check box at the top of the column of check boxes, and then select the setting.

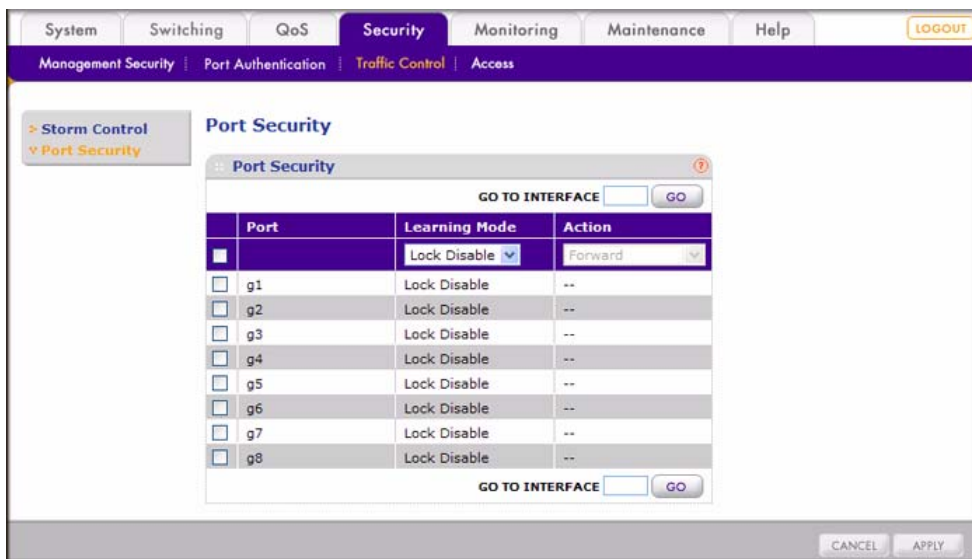
The following fields are displayed. Only the Status field is configurable:

- **Port.** Shows the port number.
  - **Status.** Specifies whether storm control is enabled on the port. The possible field values are:
    - **Disable.** Specifies that storm control is disabled on the port. This is the default value.
    - **Enable.** Specifies that storm control is enabled on the port.
5. Click **Apply** to confirm any settings changes to the storm control port settings.

## Port Security

The Port Security screen lets you to configure port learning for unknown source MAC address packets. If the learning mode is disabled, you can specify an action that must be taken for unknown source MAC address packets. To configure port security:

1. Select Security > Traffic Control > Port Security. A screen similar to the following displays.



**Figure 5-12**

2. You can make changes to the port security setting for an individual port, for a group of ports, or for all ports simultaneously:
  - To change the port security setting for an individual port, select the check box to the left of its port number, and then select the learning mode and action.



**Note:** You can also enter the interface number (that is, the port number) in the **GO TO INTERFACE** field, and then click **GO**.

- To change the port security setting for a group of ports, select the check boxes to the left of their port numbers, and then select the learning mode and action.
- To change the port security setting for all ports simultaneously, select the check box at the top of the column of check boxes, and then select the learning mode and action.

The following fields are displayed. Except for the Port field, all fields are configurable:

- **Port.** Shows the port number.
- **Learning Mode.** Specifies whether the learning mode is enabled on the port. The possible field values are:
  - **Lock Disable.** Specifies that the learning mode is enabled on the port, allowing unknown source MAC address packets to be learned. This is the default value.
  - **Lock Enable.** Specifies that the learning mode is disabled on the port.
- **Action.** Specifies the action that must be taken for unknown source MAC address packets. This field is available only when port learning is disabled. The possible field values are:
  - **Forward.** Specifies that unknown source MAC address packets must be forwarded.
  - **Discard.** Specifies that unknown source MAC address packets must be discarded.
  - **Limited Learning.** Specifies that unknown source MAC address packets must be dynamically learned, but with a limit of 16 MAC addresses. After 16 MAC addresses, learning stops.

3. Click **Apply** to confirm any settings changes.

## Access

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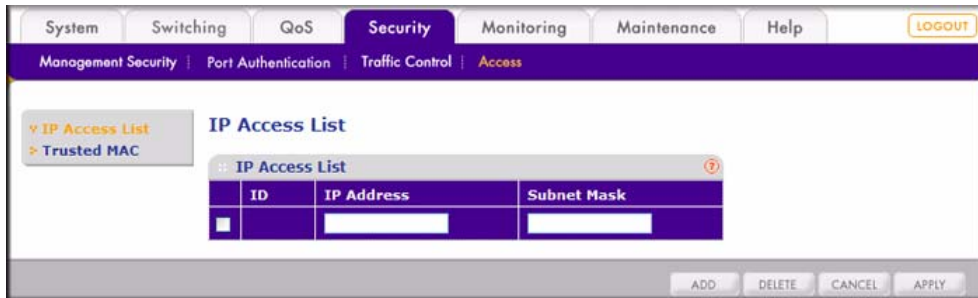
The Access menu lets you set up IP access lists and trusted source MAC addresses.

### IP Access List

The IP Access List screen lets you limit the IP addresses that can access the management portion of the switch. The switch responds only to requests from computers with an IP address in the list, so include your IP address and corresponding subnet mask to set this feature.

To configure your IP Access list:

1. Select Security > Access > IP Access List. A screen similar to the following one displays.

**Figure 5-13**

2. The following fields are displayed. Except for the ID field, all fields are configurable:

- **ID.** Shows the identifier for the IP access list.
- **IP Address.** Specifies the IP address for the IP access list.
- **Subnet Mask.** Specifies the subnet mask for the IP access list.

3. Perform one of the following actions:

To add an IP access list:

- a. Enter an IP address.
- b. Enter a subnet mask.
- c. Click **Add**.

To delete an IP access list:

- a. Select the check box to the left of the ID for the IP access list that you want to remove.
- b. Click **Delete**.

To change the subnet mask for an IP access list:

- a. Select the check box to the left of the ID for the IP access list that you want to change.
- b. Change the subnet mask.
- c. Click **Apply**.

## Trusted MAC

A trusted MAC address protects the switch from an untrusted intruder that attempts to invade the system. Only the source address (SA) of the packet in the trusted MAC table can be switched to the destination port. You can add a total of 100 trusted MAC addresses. MAC addresses are port based. All source MAC addresses are trusted when the Trusted MAC list is empty.

The filter settings that determine whether a source MAC address is trusted depend on the VLAN configuration:

- When the VLAN is in IEEE 802.1Q mode (see “IEEE 802.1Q VLANs” on page 4-9), the filter settings are the port, VLAN ID, and source MAC address.
- When the VLAN is in port-based mode (see “Port-based VLANs” on page 4-9), the filter settings are the port and source MAC address.

To configure trusted MAC addresses:

1. Select Security > Access > Trusted MAC. A screen similar to the following one displays.



**Figure 5-14**

2. The following fields are displayed. Except for the ID fields, all fields are configurable:
  - **ID.** Shows the identifier for the MAC address.
  - **Interface.** Specifies the interface to which the MAC address is assigned. Select an interface from the drop-down list.
  - **MAC Address.** Specifies the trusted MAC address. Enter a MAC address in the XX:XX:XX:XX:XX:XX format.
  - **VLAN ID.** Specifies the VLAN ID to which the MAC address is assigned. Select a VLAN ID from the drop-down list. This field is configurable only when the VLAN is in IEEE 802.1Q mode.

**3.** Perform one of the following actions:

To add a trusted MAC address:

- a.** Select an interface from the drop-down list.
- b.** Enter a MAC address.
- c.** When the VLAN is in IEEE 802.1Q mode, select a VLAN ID from the drop-down list.
- d.** Click **Add**.

To delete a trusted MAC address:

- a.** Select the check box to the left of the ID for the trusted MAC address that you want to remove.
- b.** Click **Delete**.

To change a trusted MAC address:

- a.** Select the check box to the left of the ID for the trusted MAC address that you want to change.
- b.** Change the interface or VLAN ID.
- c.** Click **Apply**.

# Chapter 6

## Monitoring, Maintenance, and Help

This chapter describes how to use the Monitoring tab, the Maintenance tab, and the Help tab.

- [“Using the Monitoring Tab”](#)
- [“Using the Maintenance Tab”](#)
- [“Using the Help Tab”](#)

### Using the Monitoring Tab

---

The navigation tabs on the top of the home page include a Monitoring tab that lets you manage your GS108T Gigabit Smart Switch using features under the following main menu commands and subcommands:

- [“Ports”](#)
  - [“Port Statistics”](#)
  - [“EAP Statistics”](#)
  - [“802.1x Accounting Statistics”](#)
- [“Mirroring”](#)
  - [“Port Mirroring”](#)
- [“Log”](#)
  - [“Configuration”](#)
  - [“Memory Logs”](#)
  - [“Flash Logs”](#)
  - [“Server Logs”](#)
- [“LLDP”](#)
  - [“Statistics”](#)

The sections that follow in this chapter cover these features and tell you how to configure them in the GS108T Smart Switch.

## Ports

The Ports menu lets you display the statistics for individual ports and for all ports. You can display the internal traffic counters, information about processed EAP packets, and information about processed IEEE 802.1x packets.

### Port Statistics

The Port Statistics screen displays information from each port's internal counters:

1. Select Monitoring > Ports > Port Statistics. A screen similar to the following displays. (Because the online screen is very tall, it is divided in a top screen and bottom screen in this manual.)

The following figure displays the top of the Port Statistics screen:

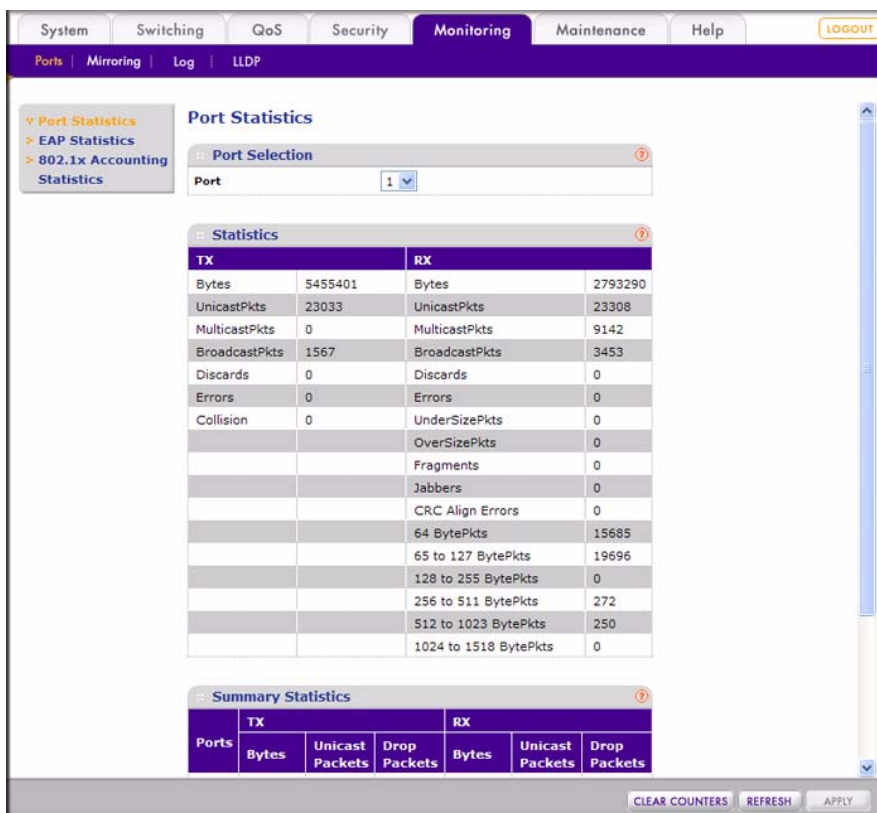


Figure 6-1



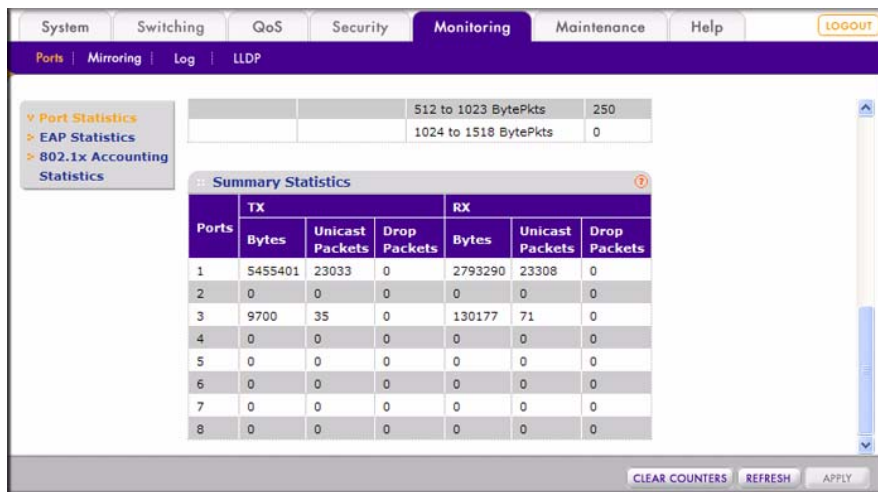
2. Under Port Selection, select a port from the **Port** drop-down list.
3. Click **Apply**.

Under Statistics, the following information is shown for the selected port:

- TX statistics for packets transmitted from the port:
  - **Bytes**. Shows the number of transmitted bytes.
  - **UnicastPkts**. Shows the number of transmitted unicast packets.
  - **MulticastPkts**. Shows the number of transmitted multicast packets.
  - **BroadcastPkts**. Shows the number of transmitted broadcast packets.
  - **Discards**. Shows the number of discarded packets.
  - **Errors**. Shows the number of excessive collision packets.
  - **Collision**. Shows the number of collision packets.
- RX statistics for packets received on the port:
  - **Bytes**. Shows the number of received bytes.
  - **UnicastPkts**. Shows the number of received unicast packets.
  - **MulticastPkts**. Shows the number of received multicast packets.
  - **BroadcastPkts**. Shows the number of received broadcast packets.
  - **Discards**. Shows the number of discarded packets.
  - **Errors**. Shows the number of undersized packets, fragmented packets, packets with an invalid frame check sequence (FCS), and oversized packets with a proper FCS.
  - **UndersizePkts**. Shows the number of received packets with a length less than the minimum packet size.
  - **OversizePkts**. Shows the number of received packets with a length more than the maximum packet size.
  - **Fragments**. Shows the number of received packets (length 10–63 bytes) with an invalid FCS or alignment error.
  - **Jabbers**. Shows the number of received packets with an invalid FCS or code error that exceed the maximum counter size up to the maximum received frame length.
  - **CRCAAlignErr**. Shows the number of received packets with an invalid FCS for which the lengths are between 64 bytes and the maximum counter size.
  - **64 BytePkts**. Shows the number of transmitted packets with a packet length less than or equal to 64 bytes.
  - **65 to 127 BytePkts**. Shows the number of transmitted packets with a packet length between (and including) 65 and 127 bytes.

- **128 to 255 BytePkts.** Shows the number of transmitted packets with a packet length between (and including) 128 and 255 bytes.
- **256 to 511 BytePkts.** Shows the number of transmitted packets with a packet length between (and including) 256 and 511 bytes.
- **512 to 1023 BytePkts.** Shows the number of transmitted packets with a packet length between (and including) 512 and 1023 bytes.
- **1024 to 1518 BytePkts.** Shows the number of transmitted packets with a packet length between (and including) 1024 and 1518 bytes.

The following figure displays the bottom of the Port Statistics screen:



**Figure 6-2**

Under Summary Statistics, the following information is shown for all ports (1–8):

- TX statistics for packets transmitted from the ports:
  - **Bytes.** Shows the number of transmitted bytes.
  - **Unicast Packets.** Shows the number of transmitted unicast packets.
  - **Drop Packets.** Shows the number of transmitted packets that were dropped by the global memory buffer pool (GBP) or by a backpressure discard condition. (In this situation, a backpressure discard condition occurs when the switch does not transmit packets to a congested port.)

- RX statistics for packets received on the ports:
    - **Bytes.** Shows the number of received bytes.
    - **Unicast Packets.** Shows the number of received unicast packets.
    - **Drop Packets.** Shows the number of received packets that were dropped by the global memory buffer pool (GBP) or by a backpressure discard condition. (In this situation, a backpressure discard condition occurs when packets are not forwarded to a congested port of the switch.)
4. Perform one of the following optional actions:
- To reset all counters to zero, click **Clear Counters**.
  - To retrieve the current count from the switch and update the screen, click **Refresh**.

## EAP Statistics

The EAP Statistics screen displays information about Extensible Authentication Protocol (EAP) packets that were processed on a specific port:

1. Select Monitoring > Ports > EAP Statistics. A screen similar to the following displays.

EAP Statistics	
Frames Receive	0
Frames Transmit	0
Start Frames Receive	0
Log off Frames Receive	0
Respond ID Frames Receive	0
Respond Frames Receive	0
Request ID Frames Transmit	0
Request Frames Transmit	0
Invalid Frames Receive	0
Length Error Frames Receive	0
Last Frame version	0
Last Frame Source	

Figure 6-3

2. Under Port Selection, the following fields are displayed, both of which are configurable:

- **Port.** Specifies the port for which the EAP statistics are to be shown. Select a port from the drop-down list.
- **Refresh Rate.** Specifies the period that passes before the EAP statistics are refreshed. The possible field values are:
  - **15 Sec.** Specifies that the EAP statistics are refreshed every 15 seconds.
  - **30 Sec.** Specifies that the EAP statistics are refreshed every 30 seconds.
  - **60 Sec.** Specifies that the EAP statistics are refreshed every 60 seconds.
  - **No Refresh.** Specifies that the EAP statistics are not refreshed.

3. Click **Apply**.

Under EAP Statistics, the following information is shown for the selected port:

- **Frames Receive.** Specifies the number of received valid EAP over LANs (EAPOL) frames.
- **Frames Transmit.** Specifies the number of transmitted EAPOL frames.
- **Start Frames Receive.** Specifies the number of received EAPOL start frames.
- **Log off Frames Receive.** Specifies the number of received EAPOL logoff frames.
- **Respond ID Frames Receive.** Specifies the number of received EAP respond ID frames.
- **Respond Frames Receive.** Specifies the number of received valid EAP response frames.
- **Request ID Frames Transmit.** Specifies the number of transmitted EAP request ID frames.
- **Request Frames Transmit.** Specifies the number of transmitted EAP request frames.
- **Invalid Frames Receive.** Specifies the number of received unrecognized EAPOL frames.
- **Length Error Frames Receive.** Specifies the number of received EAPOL frames with an invalid packet body length.
- **Last Frame Version.** Specifies the protocol version number attached to the most recently received EAPOL frame.
- **Last Frame Source.** Specifies the source MAC address attached to the most recently received EAPOL frame.

4. To retrieve the current count from the switch and update the screen, click **Refresh** (optional).

## 802.1x Accounting Statistics

The 802.1x Accounting Statistics screen displays information about IEEE 802.1x packets that were processed on a specific port:

1. Select Monitoring > Ports > 802.1x Accounting Statistics. A screen similar to the following displays.

	Octet Received	Octet Transmit	Authentication Method	Time	Terminate Cause	User Name
g1	0	0		0	NotTerminatedYet	
g2	0	0		0	NotTerminatedYet	
g3	0	0		0	NotTerminatedYet	
g4	0	0		0	NotTerminatedYet	
g5	0	0		0	NotTerminatedYet	
g6	0	0		0	NotTerminatedYet	
g7	0	0		0	NotTerminatedYet	
g8	0	0		0	NotTerminatedYet	

**Figure 6-4**

Under 802.1x Statistics, the following information is shown for all ports (1–8):

- **Octet Received.** Shows the number of bytes received on the port.
  - **Octet Transmit.** Shows the number of bytes transmitted from the port.
  - **Authentication Method.** Shows the authentication method used for port authentication.
  - **Time.** Shows the time elapsed since the session is established.
  - **Terminate Cause.** Shows the reason for which the port authentication was terminated.
  - **User Name.** Shows the session user name.
2. To retrieve the current count from the switch and update the screen, click **Refresh** (optional).

## Mirroring

The Mirroring menu lets you mirror the incoming (ingress) and outgoing (egress) traffic of one or more ports (the source ports) to a predefined destination port.

### Port Mirroring

To configure port mirroring:

1. Select Monitoring > Mirroring > Port Mirroring. A screen similar to the following displays.

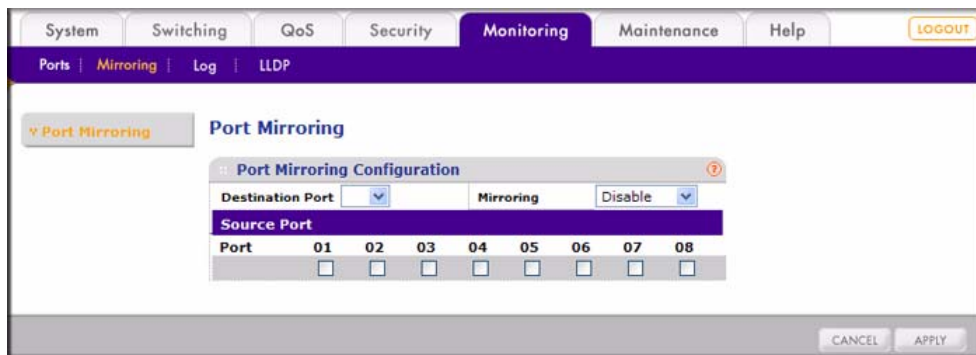


Figure 6-5

2. Under Port Mirroring Configuration, the following fields are displayed. All fields are configurable:
  - **Destination Port.** Specifies the port to which the traffic is mirrored. Select a port (1–8) from the drop-down list.
  - **Mirroring.** Specifies how the traffic is mirrored. Select one of the following values from the drop-down list:
    - **Disable.** Specifies that port mirroring is disabled globally.
    - **Tx Only.** Specifies that only egress traffic is mirrored to the destination port.
    - **Rx only.** Specifies that only ingress traffic is mirrored to the destination port.
    - **Tx and Rx.** Specifies that both egress and ingress traffic are mirrored to the destination port.
  - **Source Port.** Specify one or more ports to be mirrored by selecting the check boxes under the individual ports. The port that you selected as the destination port cannot be mirrored.
3. Click **Apply** to confirm any settings changes.

## Log

Logs are used to record various events in the system. The Log menu lets you display memory, flash, and server logs, and lets you configure what type of events are logged. Three types of media are provided for saving the logs:

- The RAM medium uses a fixed block of memory to store logs. This medium is volatile, that is, the logs are cleared after a system reboot.
- The flash medium uses one or more sectors of flash memory to store logs. This medium is nonvolatile but relatively slow.
- The server medium is a remote host with a BSD syslogd compliant daemon running. This medium uses the User Datagram Protocol (UDP) to send log messages to the remote server.

## Configuration

The Configuration screen, also referred to as the Logs Configuration screen, lets you control how many and what type of log messages are recorded for the RAM and flash logs for later reference. See [“Server Logs” on page 6-13](#) for information about how to configure the server logs. To specify the log configuration:

1. Select Monitoring > Log > Configuration. A screen similar to the following displays.

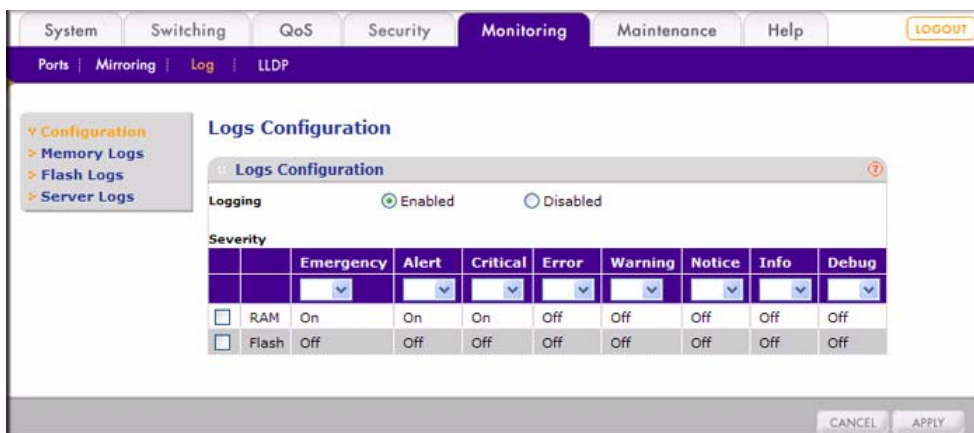


Figure 6-6

2. Under Logs Configuration, the following fields are displayed. All fields are configurable:
- **Logging.** Specifies whether RAM and flash logging is enabled on the device. Select one of the following radio buttons:
    - **Enable.** Specifies that RAM and flash logging is enabled.
    - **Disable.** Specifies that RAM and flash logging is disabled.
  - **RAM.** Select the check box to set the severity levels for RAM.
  - **Flash.** Select the check box to set the severity levels for RAM.
  - **Emergency.** Specifies whether emergency messages are logged. Select one of the following values from the drop-down list:
    - **On.** Specifies that emergency messages are logged.
    - **Off.** Specifies that emergency messages are not logged.
  - **Alert.** Specifies whether alerts are logged. Select one of the following values from the drop-down list:
    - **On.** Specifies that alerts are logged.
    - **Off.** Specifies that alerts are not logged.
  - **Critical.** Specifies whether critical messages are logged. Select one of the following values from the drop-down list:
    - **On.** Specifies that critical messages are logged.
    - **Off.** Specifies that critical messages are not logged.
  - **Error.** Specifies whether error messages are logged. Select one of the following values from the drop-down list:
    - **On.** Specifies that error messages are logged.
    - **Off.** Specifies that error messages are not logged.
  - **Warning.** Specifies whether warnings are logged. Select one of the following values from the drop-down list:
    - **On.** Specifies that warnings are logged.
    - **Off.** Specifies that warnings are not logged.
  - **Notice.** Specifies whether notifications are logged. Select one of the following values from the drop-down list:
    - **On.** Specifies that notifications are logged.
    - **Off.** Specifies that notifications are not logged.

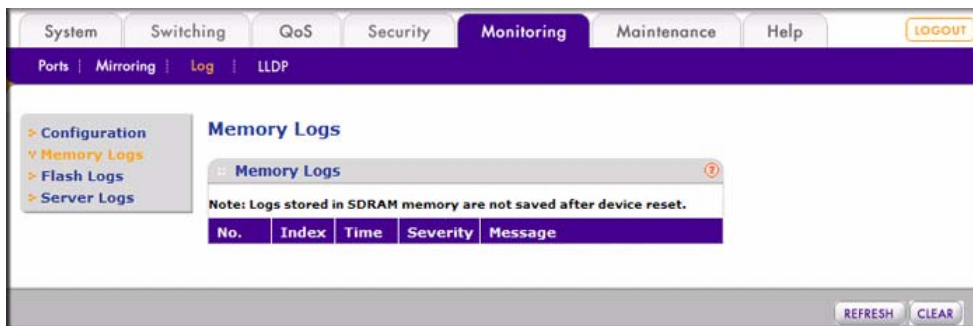


- **Info.** Specifies whether informational messages are logged. Select one of the following values from the drop-down list:
    - **On.** Specifies that informational messages are logged.
    - **Off.** Specifies that informational messages are not logged.
  - **Debug.** Specifies whether debug messages are logged. Select one of the following values from the drop-down list:
    - **On.** Specifies that debug messages are logged.
    - **Off.** Specifies that debug messages are not logged.
3. Click **Apply** to confirm any settings changes.

## Memory Logs

The Memory Logs screen displays the messages that are logged in the RAM memory in the way that you specified in the previous section:

1. Select Monitoring > Log > Memory Logs. A screen similar to the following displays.



**Figure 6-7**

Under Memory Logs, the following fields are displayed:

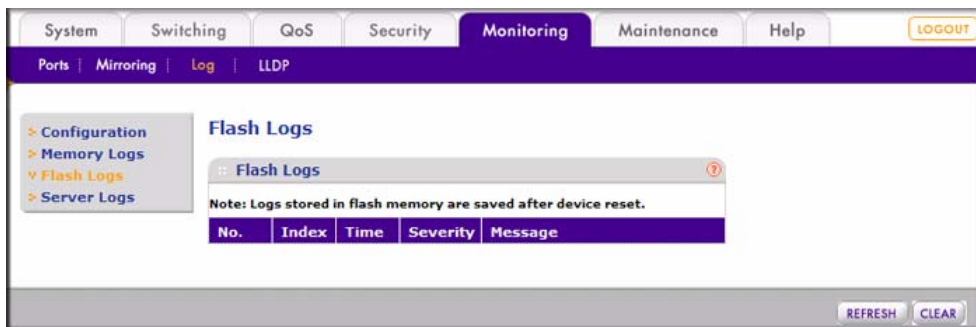
- **No.** Shows the entry number for the log.
- **Index.** Shows the global sequence number for the log.
- **Time.** Shows the time when the log is recorded.
- **Level.** Shows the severity of the log.
- **Message.** Shows the detailed description of the log entry.

2. Perform one of the following optional actions:
  - To retrieve the current count from the switch and update the screen, click **Refresh**.
  - To reset the log, click **Clear**.

## Flash Logs

The Flash Logs screen displays the messages that are logged in the flash memory in the way that you have specified in “[Configuration](#)” on page 6-9:

1. Select Monitoring > Log > Flash Logs. A screen similar to the following displays.



**Figure 6-8**

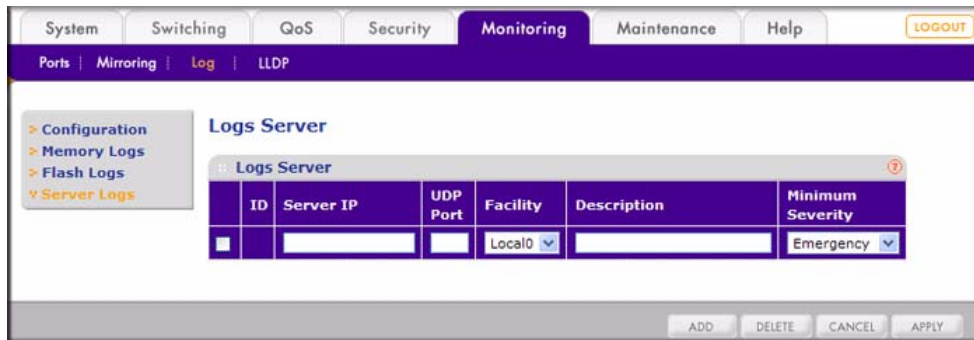
Under Flash Logs, the following fields are displayed:

- **No.** Shows the entry number for the log.
  - **Index.** Shows the global sequence number for the log.
  - **Time.** Shows the time when the log is recorded.
  - **Level.** Shows the severity of the log.
  - **Message.** Shows the detailed description of the log entry.
2. Perform one of the following optional actions:
    - To retrieve the current count from the switch and update the screen, click **Refresh**.
    - To reset the log, click **Clear**.

## Server Logs

The server medium is a remote host with a BSD syslogd compliant daemon running. This medium uses the User Datagram Protocol (UDP) to send log messages to the remote server. The Server Logs screen lets you control how many and what type of log messages are recorded for the server logs for later reference. To configure the server logs:

1. Select Monitoring > Log > Server Logs. A screen similar to the following displays.



**Figure 6-9**

2. Under Logs Server, the following fields are displayed. Except for the ID field, all fields are configurable.
  - **ID.** Shows the ID of the server log given by the system.
  - **Server.** Specifies the IP address of the remote server. Enter a valid IP address.
  - **UDP Port.** Specifies the number of the UDP port to connect with the server. Enter a valid UDP port number.
  - **Facility.** Specifies the type of facility. From the drop-down list, select one of the eight facility types (local0–local7).
  - **Description.** Specifies the description of server log. The limit is 256 characters.
  - **Minimum Severity.** Specifies the log level. All levels of severity above this minimum severity level that you select from the drop-down list are included for logging. The possible field values are:
    - **Emergency.** Specifies that all messages are logged.
    - **Alert.** Specifies that all messages are logged except for emergency messages.
    - **Critical.** Specifies that all messages are logged except for emergency messages and alerts.
    - **Error.** Specifies that error messages, warnings, notifications, informational messages, and debug messages are logged.

- **Warning.** Specifies that warnings, notifications, informational messages, and debug messages are logged.
- **Notice.** Specifies that notifications, informational messages, and debug messages are logged.
- **Information.** Specifies that informational messages and debug messages are logged.
- **Debug.** Specifies that debug messages only are logged.

**3.** Perform one of the following actions:

To add a remote log server:

- a.** Enter the server IP address.
- b.** Enter a UDP port.
- c.** Select a facility from the drop-down list.
- d.** Enter a description.
- e.** Select the minimum severity level from the drop-down list.
- f.** Click **Add**.

To delete a remote log server:

- a.** Select the check box to the left of the ID for the remote log server address that you want to remove.
- b.** Click **Delete**.

To change the configuration for a remote log server:

- a.** Select the check box to the left of the ID for the remote log server address that you want to change.
- b.** Change the fields.
- c.** Click **Apply**.

## LLDP

The Link Layer Discovery Protocol (LLDP) menu lets you display the LLDP statistics:

### Statistics

To display the LLDP statistics:

1. Select Monitoring > LLDP > Statistics. A screen similar to the following displays.

Statistics	
Total Inserts	N/A
Total Deletes	N/A
Total Drops	N/A
Total Ageouts	N/A

Port	Tx Frames	Rx Frames Discarded	Rx Frames Errors	Rx Frames Total	Rx Frames TLVs Discarded	Rx Frames TLVs UnRecognized	Rx Frames Ageouts
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Figure 6-10**

Under Statistics, the following fields are displayed:

- **Total Inserts.** Shows the total number of inserts.
- **Total Deletes.** Shows the total number of deletes.
- **Total Drops.** Shows the total number of dropped LLDP frames.
- **Total Ageouts.** Shows the total number of LLDP age-outs.

Under Port Statistics, the following fields are displayed:

- **Port.** Shows the port number.
  - **Tx Frames.** Shows the total number of transmitted LLDP frames on a port.
  - **Rx Frames Discarded.** Shows the total number of received and discarded LLDP frames on a port.
  - **Rx Frames Errors.** Shows the total number of received error LLDP frames on a port.
  - **Rx Frames Total.** Shows the total number of received LLDP frames on a port.
  - **Rx Frames TLVs Discarded.** Shows the total number of discarded threshold limit values (TLVs) in received LLDP frames on a port.
  - **Rx Frames TLVs Unrecognized.** Shows the total number of unrecognized TLVs in received LLDP frames on a port.
  - **Rx Frames Ageouts.** Shows the total number of ageouts of received LLDP frames on a port.
2. Perform one of the following optional actions:
- To reset the log, click **Clear Counters**.
  - To retrieve the current count from the switch and update the screen, click **Refresh**.

## Using the Maintenance Tab

---

The navigation tabs on the top of the home page include a Maintenance tab that lets you manage your GS108T Gigabit Smart Switch using features under the following main menu commands and subcommands:

- “Reset”
  - “Device Reboot”
  - “Factory Default”
- “Upload”
  - “File Upload”
- “Download”
  - “File Download”

The sections that follow in this chapter cover these features and tell you how to configure them in the GS108T Smart Switch.

## Reset

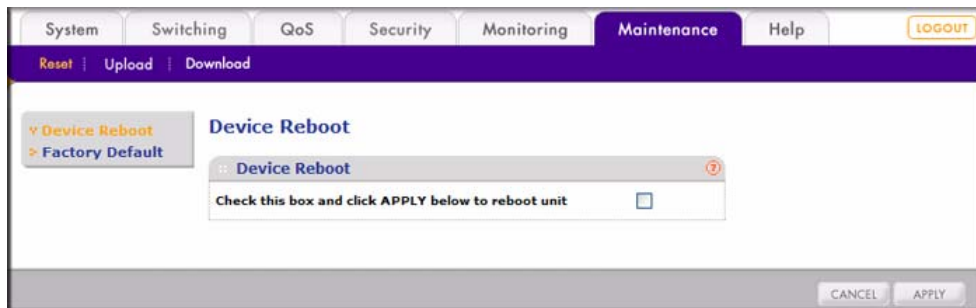
The Reset menu lets you reset the switch with its current configuration or its factory default values.

### Device Reboot

The Device Reboot screen lets you restart the switch with its current configuration.

To reset and restart the switch:

1. Select Maintenance > Reset > Device Reboot. A screen similar to the following displays.



**Figure 6-11**

2. Under Device Reboot, select the check box.
3. Click **Apply** to restart the switch.

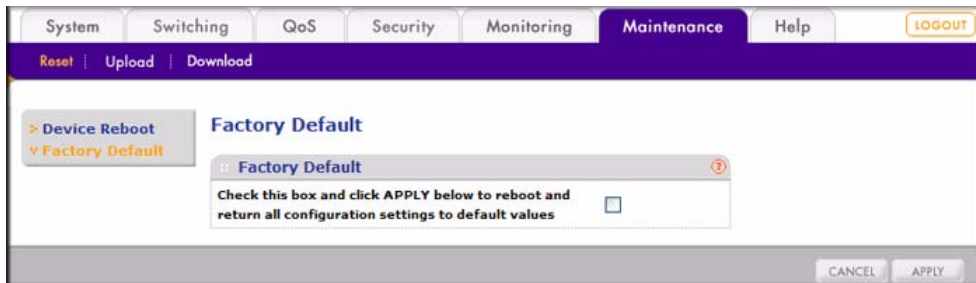


**Note:** You can also use the Reset button on the front panel of the Smart Switch to reset the switch to its current configuration.

## Factory Default

The Factory Default screen lets you reset the switch to its factory default values:

1. Select Maintenance > Reset > Factory Default. A screen similar to the following displays.



**Figure 6-12**

2. Under Factory Default, select the check box.

	<b>Warning:</b> If there is no DHCP server on the network, the IP address becomes 192.168.0.239.
--	--

	<b>Warning:</b> The password returns to the factory default password.
--	---

3. Click **Apply** to restart the switch.

	<b>Note:</b> You can also use the Factory Defaults button on the front panel of the Smart Switch to reset the switch to its factory default values.
--	---



## Upload

The Upload menu lets you upload the current firmware and configuration switch files to a TFTP server or HTTP host so that you can back up the switch.

### File Upload

You can upload files either to a TFTP server or to an HTTP host.

To upload files:

1. Select Maintenance > Reset > File Upload. A screen similar to the following displays.

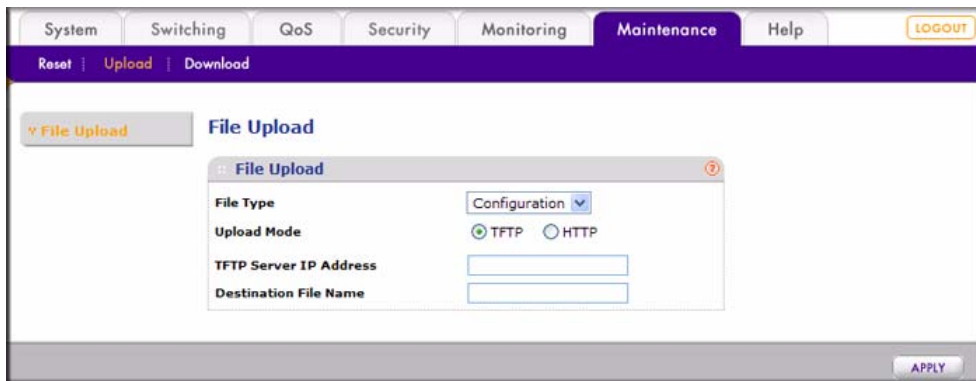


Figure 6-13

2. Under File Upload, select the **TFTP** or **HTTP** radio button:
  - If you select the TFTP radio button to upload files to a TFTP server, complete the following fields:
    - **File Type**. Specifies either the firmware or the configuration file. Select one from the drop-down list.
    - **TFTP Server IP Address**. Specifies the IP address of the TFTP server.
    - **Destination File Name**. Specifies the name of the firmware or configuration destination file in the TFTP server.

Go to [step 3](#).

- If you select the HTTP radio button to upload files to an HTTP host, a screen similar to the following displays.

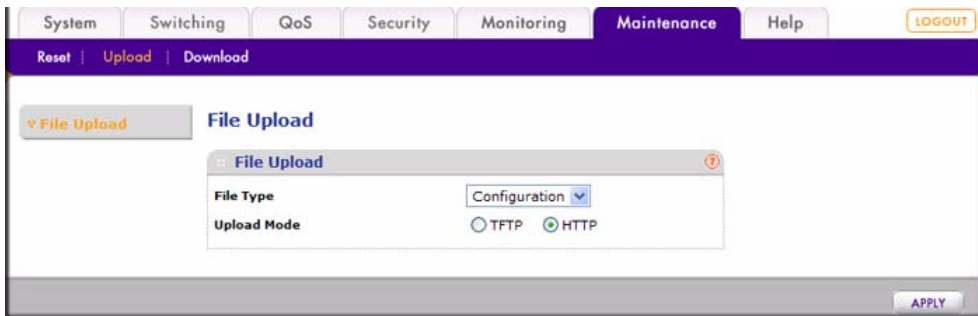


Figure 6-14

From the **File Type** drop-down list, select either the firmware or the configuration file.

3. Click **Apply** to start the upload.

## Download

Download the firmware and configuration switch files from a TFTP server or HTTP host to the switch so that you can restore or update the switch.

### File Download

You can download files either from a TFTP server or from an HTTP host.



**Note:** You can also update the firmware using the in the Smart Wizard Discovery utility (see [“Firmware Upgrade”](#) on page 1-8).

To download files:

1. Select Maintenance > Download > File Download. A screen similar to the following displays.

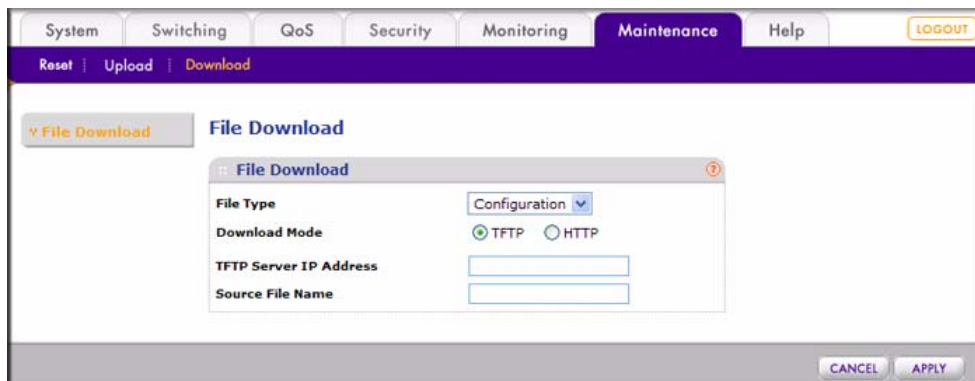
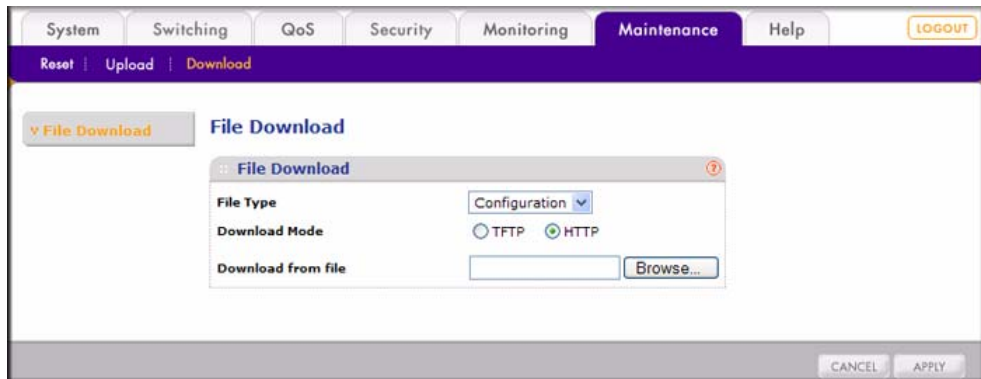


Figure 6-15

2. Under File Download, select the **TFTP** or **HTTP** radio button:
  - If you select the TFTP radio button to download files from a TFTP server, complete the following fields:
    - **File Type.** Specifies either the firmware, configuration, or boot code file. Select one from the drop-down list.
    - **TFTP Server IP Address.** Specifies the IP address of the TFTP server.
    - **Source File Name.** Specifies the name of the firmware or configuration source file in the TFTP server.

Go to [step 3](#).

  - If you select the HTTP radio button to download files from an HTTP host, a screen similar to the following displays.



**Figure 6-16**

Enter the following field:

- **File Type.** Specifies either the firmware, configuration, or boot code file. Select one from the drop-down list.
- **Download from file.** Specifies the location and name of the firmware or configuration source file in the HTTP server. Click Browse to select the file.

3. Click **Apply** to start the download.

## Using the Help Tab

---

The navigation tabs on the top of the home page include a Help tab that lets you manage your GS108T Gigabit Smart Switch using features under the following main menu commands and subcommands:

- [“Online Help”](#)
  - [“Support”](#)
  - [“User Guide”](#)

The sections that follow in this chapter cover these features and tell you how to configure them in the GS108T Smart Switch.

## Online Help

The Online Help menu lets you connect to the NETGEAR web site and access the user guide.

### Support

To connect to the NETGEAR web site:

1. Select Maintenance > Online Help > Support. A screen similar to the following displays.

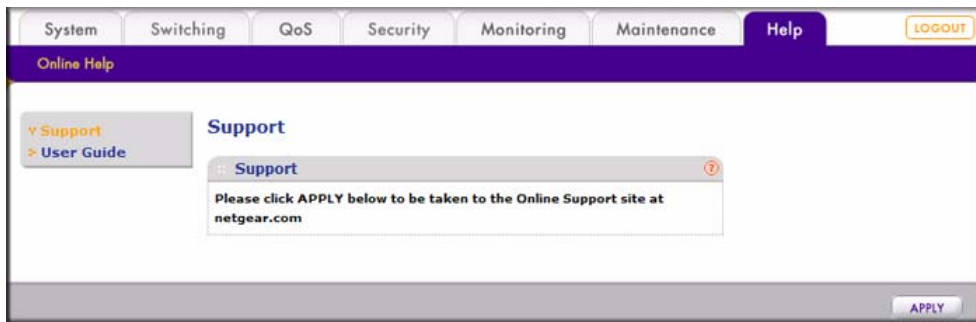


Figure 6-17

2. To go to the NETGEAR web site, click **Apply**.

### User Guide

To access the user guide (which is the guide you are now reading) online:

1. Select Maintenance > Online Help > User Guide. A screen similar to the following displays.

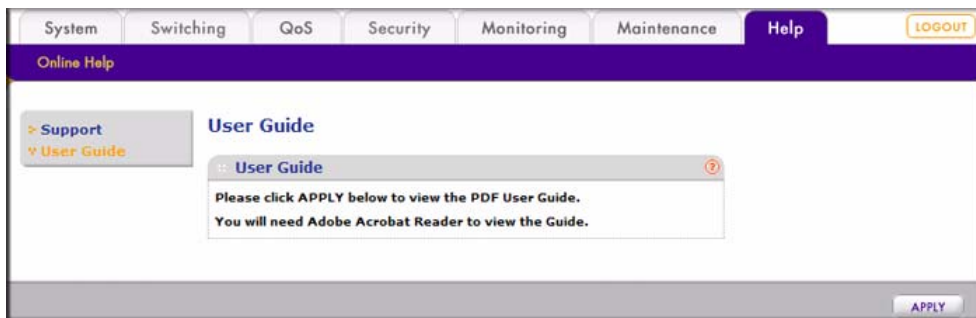


Figure 6-18

2. To access a PDF of the user guide, click **Apply**. The user guide is also referred to as the *Software Administration Manual*.

# Appendix A

## Specifications and Default Values

### GS108T Gigabit Smart Switch Specifications

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The GS108T Gigabit Smart Switch conforms to the TCP/IP, UDP, HTTP, ICMP, TFTP, DHCP, 802.1D, 802.1p, and 802.1Q standards.

**Table A-1. GS108T Gigabit Smart Switch Specifications**

Feature	Value
Interfaces	8G (P01–P08)
PoE	N/A
Flash memory size	2 MB
SRAM size and type	16 MB DDR

**Table A-2. Switch Performance**

Feature	Value
Switching capacity	8 x 2 Gbps
Forwarding method	Store and Forward
Packet forwarding rate	10M:14,880 pps / 100M:148,809 pps / 1G:1,488,095 pps
MAC addresses	4K
Packet RAM buffer capacity	128 K-bytes

## GS108T Gigabit Smart Switch Features and Defaults

**Table A-3. Port Characteristics**

Feature	Sets Supported	Default
Autonegotiation / static speed / duplex	8 (per port)	Autonegotiation
Auto MDI/MDIX	N/A	Enabled
802.3x flow control / back pressure	8 (per-port)	Enabled
Port mirroring	1	Disabled
Port trunking (aggregation)	2	Disabled
802.1D spanning tree	1	Disabled
802.1w RSTP	1	Disabled
IGMP snooping	1	Disabled
Static 802.1Q tagging	256	VID = 1 MemberPorts = [1–8]
Port based private VLAN	8 X 1	MemberPorts[1] = [1–8]
Learning process	N/A	N/A

**Table A-4. Quality Of Service**

Feature	Sets Supported	Default
Number of queues	N/A	N/A
Port based	8 (per port)	Normal for all ports
802.1p	1	Disabled
DSCP	1	Disabled

**Table A-5. Security**

Feature	Sets Supported	Default
IP access list	10	All IP addresses allowed
Password control access	1	Idle timeout = 5 mins. Password = "password"



**Table A-5. Security (continued)**

Feature	Sets Supported	Default
Trust MacAddress filter	256	Disabled
Port MAC lock down	8 (per port)	Disabled
Management VLAN	1	0

**Table A-6. Traffic Control**

Feature	Sets Supported	Default
Rate control	8 (per port)	Disabled
Storm control	8 (per port)	Disabled
Jumbo frame	1 (per system)	Disabled

**Table A-7. System Setup**

Feature	Sets Supported	Default
DHCP / Manual IP	1	192.168.0.239
System name configuration	1	NULL
Configuration save/restore	1	N/A
Firmware upgrade	1	N/A
Factory reset	1	N/A

**Table A-8. Other Features**

Feature	Sets Supported	Default
Static multicast entry	64	Disabled
Filter multicast control	1	Disabled

**Table A-9. Management**

Feature	Sets Supported	Default
SNMPv1/V2c	4	Disabled
MIB support	1	Disabled

**Table A-9. Management (continued)**

<b>Feature</b>	<b>Sets Supported</b>	<b>Default</b>
Smart Wizard	N/A	Enabled
Statistics	31 (per port)	N/A

# Appendix B

## Virtual Local Area Networks (VLANs)

A local area network (LAN) can generally be defined as a broadcast domain. Hubs, bridges, or switches in the same physical segment or segments connect all end node devices. End nodes can communicate with each other without the need for a router. Routers connect LANs together, routing the traffic to the appropriate port.

A virtual LAN (VLAN) is a local area network with a definition that maps workstations on some basis other than geographic location (for example, by department, type of user, or primary application). To enable traffic to flow between VLANs, traffic must go through a router, just as if the VLANs were on two separate LANs.

A VLAN is a group of PCs, servers, and other network resources that behave as if they were connected to a single network segment—even though they might not be. For example, all marketing personnel might be spread throughout a building. Yet if they are all assigned to a single VLAN, they can share resources and bandwidth as if they were connected to the same segment. The resources of other departments can be invisible to the marketing VLAN members, accessible to all, or accessible only to specified individuals, depending on how the IT manager has set up the VLANs.

VLANs have a number of advantages:

- It is easy to do network segmentation. Users that communicate most frequently with each other can be grouped into common VLANs, regardless of physical location. Each group's traffic is contained largely within the VLAN, reducing extraneous traffic and improving the efficiency of the whole network.
- They are easy to manage. The addition of nodes, as well as moves and other changes, can be dealt with quickly and conveniently from a management interface rather than from the wiring closet.
- They provide increased performance. VLANs free up bandwidth by limiting node-to-node and broadcast traffic throughout the network.
- They ensure enhanced network security. VLANs create virtual boundaries that can be crossed only through a router. So standard, router-based security measures can be used to restrict access to each VLAN.

## IEEE 802.1Q VLANs

---

Packets received by the switch are treated in the following way:

- When an untagged packet enters a port, it is automatically tagged with the port's default VLAN ID tag number. Each port has a default VLAN ID setting that is user configurable (the default setting is 1). The default VLAN ID setting for each port can be changed in the VLAN Membership screen. See [“Advanced—VLAN Membership” on page 4-12](#).
- When a tagged packet enters a port, the tag for that packet is unaffected by the default VLAN ID setting. The packet proceeds to the VLAN specified by its VLAN ID (VID) tag number.
- If the port through which the packet entered does not have membership with the VLAN specified by the VLAN ID tag, the packet is dropped.
- If the port is a member of the VLAN specified by the packet's VLAN ID, the packet can be sent to other ports with the same VLAN ID.
- Packets leaving the switch are either tagged or untagged, depending on the setting for that port's VLAN membership properties. A U for a given port means that packets leaving the switch from that port are untagged. Inversely, a T for a given port means that packets leaving the switch from that port are tagged with the VLAN ID that is associated with the port.

The example given in this section comprises numerous steps to illustrate a wide range of configurations to help provide an understanding of tagged VLANs.

### IEEE 802.1Q VLAN Example Configuration

This example demonstrates several scenarios of VLAN use and describes how the switch handles tagged and untagged traffic.

In this example, you create two new VLANs, you change the port membership for default VLAN 1, and you assign port members to the two new VLANs:

1. In the Basic VLAN Configuration screen (see [“Basic—VLAN Configuration” on page 4-9](#)), create the following VLANs:
  - A VLAN with VID 10.
  - A VLAN with VID 20.
2. In the VLAN Membership screen (see [“Advanced—VLAN Membership” on page 4-12](#)) specify the VLAN membership as follows:
  - For the default VLAN with VID 1, specify the following members: port 7 (U) and port 8 (U).

- For the VLAN with VID 10, specify the following members: port 1 (U), port 2 (U), and port 3 (T).
  - For the VLAN with VID 20, specify the following members: port 4 (U), port 5 (T), and port 6 (U).
3. With the VLAN configuration that you set up, the following situations produce results as described:
- If an untagged packet enters port 1, the switch tags it with VID 10. The packet has access to port 2 and port 3. The outgoing packet is stripped of its tag to leave port 2 as an untagged packet. For port 3, the outgoing packet leaves as a tagged packet with VID 10.
  - If a tagged packet with VID 10 enters port 3, the packet has access to port 1 and port 2. If the packet leaves port 1 or port 2, it is stripped of its tag to leave the switch as an untagged packet.
  - If an untagged packet enters port 4, the switch tags it with VID 20. The packet has access to port 5 and port 6. The outgoing packet is stripped of its tag to become an untagged packet as it leaves port 6. For port 5, the outgoing packet leaves as a tagged packet with VID 20.

## Port-Based VLANs

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Port-based VLANs help to confine broadcast traffic to the switch ports. This switch allows up to eight port-based VLAN groups. Any one port can belong to different VLAN groups. The default VLAN group is a port-based VLAN that has all ports belonging to VLAN 1.

Packets received by the switch are treated in the following way:

- When a packet enters a port, it can proceed only to ports with the same VLAN membership as the ingress port.
- If a port on the switch does not have a common VLAN membership with the source port, the packet is dropped.

## Port-Based VLAN Example Configuration

This example demonstrates how the port-based VLANs work to meet your needs.

In this example, you create four new VLANs, you change the port membership for default VLAN 1, and you assign port members to the four new VLANs:

1. In the Basic VLAN Configuration screen (see [“Basic—VLAN Configuration” on page 4-9](#)), create the following VLANs, each with a defined description:
  - A VLAN with VID 1. Enter the following description: IT.
  - A VLAN with VID 2. Enter the following description: Sales.
  - A VLAN with VID 3. Enter the following description: Market.
  - A VLAN with VID 4. Enter the following description: Account.
2. In the VLAN Membership screen (see [“Advanced—VLAN Membership” on page 4-12](#)) specify the VLAN membership as follows:
  - For the default VLAN with VID 1 (IT), remove all members except for port 7 and port 8. (All ports were automatically assigned to the default VLAN.)
  - For the VLAN with VID 2 (Sales), specify the following members: port 1, port 2, port 3, and port 8.
  - For the VLAN with VID 3 (Market), specify the following members: port 2, port 3, port 4, and port 8.
  - For the VLAN with VID 4 (Account), specify the following members: port 5, port 6, and port 8.

In this example, the specified VLANs and ports have the following functions:

- For the VLAN with VID 1, port 7 is used by the IT department to monitor and control activities on all other VLANs.
- For the VLAN with VID 2, port 1 is used by the Sales department, port 2 connects to the file archives, and port connects to the printer server.
- For the VLAN with VID 3: port 4 is used by the Marketing department, port 2 connects to the file archives, and port connects to the printer server. The file archives and the printer server are shared with the Sales department,
- For the VLAN with VID 4: port 5 and port 6 are used by the for Accounting department. Its work is kept secret from other departments except for the IT department.
- For all VLANs: port 8 provides Gigabit speed for an e-mail server and an Internet connection and is accessible to all departments.

3. With the VLAN configuration that you set up, the following situations produce results as described:
  - If a packet comes in on port 1, it can go to ports 1, 2, 3, and 8, as these ports are the only ports in the VLAN with VID 1. A Sales person who uses port 1 can access the Internet, send and receive e-mail, and access the file archives and print server, but cannot access ports that are assigned to the Marketing and Accounting departments.
  - If a Marketing person sends a broadcast message, the Sales and Accounting departments are not affected by the message, because it does not go out on their ports. Only the Marketing department and the IT group receive the broadcast message.
  - If an IT person sends a broadcast message, everyone receives it.





# Appendix C

## Network Cabling

This appendix provides specifications for cables used with a NETGEAR GS108T Gigabit Smart Switch.

### Fast Ethernet Cable Guidelines

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Fast Ethernet uses UTP cable, as specified in the IEEE 802.3u standard for 100BASE-TX. The specification requires Category 5 UTP cable consisting of either two-pair or four-pair twisted, insulated copper conductors bound in a single plastic sheath. Category 5 cable is certified up to 100 MHz bandwidth. 100BASE-TX operation uses one pair of wires for transmission and the other pair for receiving and for collision detection.

When installing Category 5 UTP cabling, use the following guidelines to ensure that your cables perform to the following specifications:

- **Certification.** Ensure that your Category 5 UTP cable has completed the Underwriters' Laboratories (UL) or Electronic Testing Laboratories (ETL) certification process.
- **Termination method.** To minimize cross-talk noise, maintain the twist ratio of the cable up to the point of termination; untwist at any RJ-45 plug or patch panel should not exceed 0.5 inch (1.5 cm).

### Category 5 Cable

---

Category 5 distributed cable that meets ANSI/EIA/TIA-568-A building wiring standards can be a maximum of 328 feet (ft.) or 100 meters (m) in length, divided as follows:

- 20 ft. (6 m) between the hub and the patch panel (if used)
- 295 ft. (90 m) from the wiring closet to the wall outlet
- 10 ft. (3 m) from the wall outlet to the desktop device

The patch panel and other connecting hardware must meet the requirements for 100 Mbps operation (Category 5). Only 0.5 inch (1.5 cm) of untwist in the wire pair is allowed at any termination point.

## Category 5 Cable Specifications

Ensure that the fiber cable is crossed over to guarantee link.

[Table C-1](#) lists the electrical requirements of Category 5 UTP cable.

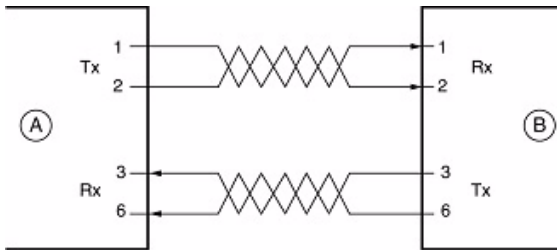
**Table C-1. Electrical Requirements of Category 5 Cable**

Specifications	Category 5 Cable Requirements
Number of pairs	Four
Impedance	100 $\pm$ 15%
Mutual capacitance at 1 KHz	5.6 nF per 100 m
Maximum attenuation (dB per 100 m, at 20° C)	At 4 MHz: 8.2 At 31 MHz: 11.7 At 100 MHz: 22.0
NEXT loss (dB minimum)	At 16 MHz: 44 At 31 MHz: 39 At 100 MHz: 32

## Twisted Pair Cables

For two devices to communicate, the transmitter of each device must be connected to the receiver of the other device. The crossover function is usually implemented internally as part of the circuitry in the device. Computers and workstation adapter cards are usually media-dependent interface ports, called MDI or uplink ports. Most repeaters and switch ports are configured as media-dependent interfaces with built-in crossover ports, called MDI-X or normal ports. Auto Uplink technology automatically senses which connection, MDI or MDI-X, is needed and makes the right connection.

Figure C-1 illustrates straight-through twisted-pair cable.



Key:

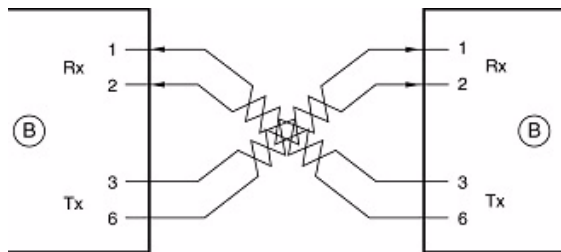
A = UPLINK OR MDI PORT (as on a PC)

B = Normal or MDI-X port (as on a hub or switch)

1, 2, 3, 6 = Pin numbers

**Figure C-1**

Figure C-2 illustrates crossover twisted-pair cable.



Key:

B = Normal or MDI-X port (as on a hub or switch)

1, 2, 3, 6 = Pin numbers

**Figure C-2**

## Patch Panels and Cables

If you are using patch panels, make sure that they meet the 100BASE-TX requirements. Use Category 5 UTP cable for all patch cables and work area cables to ensure that your UTP patch cable rating meets or exceeds the distribution cable rating.

To wire patch panels, you need two Category 5 UTP cables with an RJ-45 plug at each end, as shown in [Figure C-3](#).

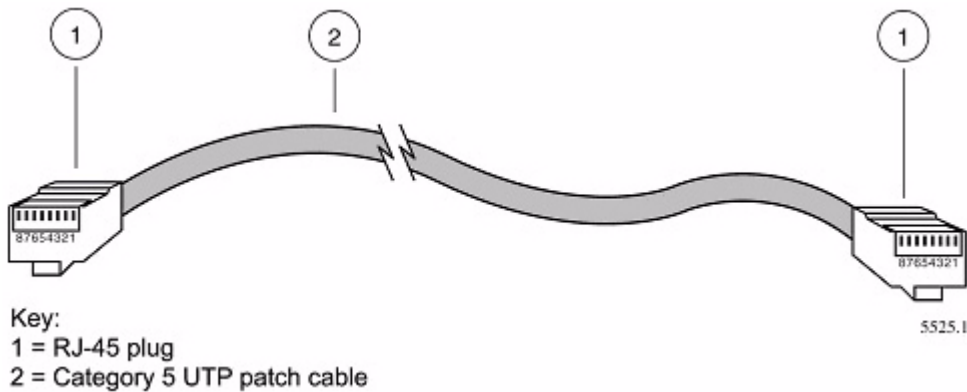


Figure C-3



**Note:** Flat “silver satin” telephone cable might have the same RJ-45 plug. However, using telephone cable results in excessive collisions, causing the attached port to be partitioned or disconnected from the network.

## Using 1000BASE-T Gigabit Ethernet over Category 5 Cable

When you use the new 1000BASE-T standard, you must consider the limitations of cable installations and the steps necessary to ensure optimum performance. The most important components in your cabling system are patch panel connections, twists of the pairs at connector transition points, the jacket around the twisted-pair cable, bundling of multiple pairs on horizontal runs, and punch down blocks. All of these factors affect the performance of 1000BASE-T technology if not correctly implemented. The following sections are designed to act as a guide to correct cabling for 1000BASE-T.

### Cabling

The 1000BASE-T product is designed to operate over Category 5 cabling. To further enhance operation, the cabling standards have been amended. The latest standard is Category 5e, which defines a higher level of link performance than is available with Category 5 cable.

If installing new cable, NETGEAR recommends using Category 5e cable, since it costs about the same as Category 5 cable. If using the existing cable, be sure to have the cable plant tested by a professional who can verify that it meets or exceeds either ANSI/EIA/TIA-568-A:1995 or ISO/IEC 11801:1995 Category 5 specifications.

## Length

The maximum distance limitation between two pieces of equipment is 100 m, as per the original Ethernet specification. The end-to-end link is called the “channel.”

TSB-67 defines the basic link, which is the portion of the link that is part of the building infrastructure. This excludes patch and equipment cords. The maximum basic link length is 295 feet (90 m).

## Return Loss

Return loss measures the amount of reflected signal energy resulting from impedance changes in the cabling link. The nature of 1000BASE-T renders this measurement very important; if too much energy is reflected back onto the receiver, the device does not perform optimally.

Unlike 10BASE-T and 100BASE-TX, which use only two of the four pairs of wires within the Category 5 cable, 1000BASE-T uses all four pairs of the twisted pair. Make sure all wires are tested—this is important.

Factors that affect the return loss are:

- The number of transition points, as there is a connection through an RJ-45 to another connector, a patch panel, or device at each transition point.
- Removing the jacket that surrounds the four pairs of twisted cable. NETGEAR strongly recommends that, when RJ-45 connections are made, this is minimized to 1 1/4 inch (32 mm).
- Untwisting any pair of the twisted-pair cabling. It is important that any untwisting be minimized to 3/8 inch (10 mm) for RJ-45 connections.
- Cabling or bundling of multiple Category 5 cables. This is regulated by ANSI/EIA/TIA-568A-3. If not correctly implemented, this can adversely affect all cabling settings.

## Near End Cross Talk

Near End Cross Talk (NEXT) is a measure of the signal coupling from one wire to another, within a cable assembly, or among cables within a bundle. NEXT measures the amount of cross-talk disturbance energy that is detected at the near end of the link—the end where the transmitter is

located. NEXT measures the amount of energy that is “returned” to the sender end. The factors that affect NEXT and cross talk are exactly the same as outlined in the “[Return Loss](#)” section. The cross-talk performance is directly related to the quality of the cable installation.

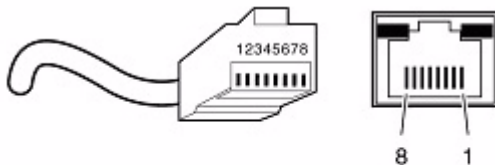
## Patch Cables

When installing your equipment, replace old patch panel cables that do not meet Category 5e specifications. As pointed out in the “[Near End Cross Talk](#)” section, this near end piece of cable is critical for successful operation.

## RJ-45 Plug and RJ-45 Connectors

In a Fast Ethernet network, it is important that all 100BASE-T certified Category 5 cabling use RJ-45 plugs. The RJ-45 plug accepts 4-pair UTP or shielded twisted-pair (STP) 100-ohm cable and connects into the RJ-45 connector. The RJ-45 connector is used to connect stations, hubs, and switches through UTP cable; it supports 10 Mbps, 100 Mbps, or 1000 Mbps data transmission.

[Figure C-4](#) shows an RJ-45 plug and RJ-45 connector with built-in LEDs.



Key:  
1 to 8 = pin numbers

**Figure C-4**

[Table C-2](#) lists the pin assignments for the 10/100 Mbps RJ-45 plug and the RJ-45 connector.

**Table C-2. 10/100 Mbps RJ-45 Plug and RJ-45 Connector Pin Assignments**

Pin	Normal Assignment on Ports 1 to 8	Uplink Assignment on Port 8
1	Input receive data +	Output transmit data +
2	Input receive data –	Output transmit data –
3	Output transmit data +	Input receive data +

**Table C-2. 10/100 Mbps RJ-45 Plug and RJ-45 Connector Pin Assignments (continued)**

Pin	Normal Assignment on Ports 1 to 8	Uplink Assignment on Port 8
6	Output transmit data –	Input receive data –
4, 5, 7, 8	Internal termination, not used for data transmission	

Table C-3 lists the pin assignments for the 100/1000 Mbps RJ-45 plug and the RJ-45 connector.

**Table C-3. 100/1000 Mbps RJ-45 Plug and RJ-45 Connector Pin Assignments**

Pin	Channel	Description
1 2	A	Rx/Tx data + Rx/Tx data
3 6	B	Rx/Tx data + Rx/Tx data
4 5	C	Rx/Tx data + Rx/Tx data
7 8	D	Rx/Tx data + Rx/Tx data

## Conclusion

For optimum performance of your 1000BASE-T product, it is important to fully qualify your cable installation and ensure that it meets or exceeds ANSI/EIA/TIA-568-A:1995 or ISO/IEC 11801:1995 Category 5 specifications. Install Category 5e cable where possible, including patch panel cables. Minimize transition points, jacket removal, and untwisted lengths. Cable bundles must be correctly installed to meet the requirements in ANSI/EIA/TIA-568A-3.





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