HP ProLiant BL e-Class C-GbE Interconnect Switch Web-based Interface Reference Guide

February 2003 (First Edition)
Part Number 322859-001

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About This Guide

This reference guide can be used when configuring the interconnect switch using the Web-based interface

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.

Technician Notes

WARNING: Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create conditions that are hazardous.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Disconnect power from the system by unplugging all power cords from the power supplies.**
- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**

CAUTION: To properly ventilate the system, you must provide at least 7.6 cm (3.0 in.) of clearance at the front and back of the server.

CAUTION: The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

NOTE: Any indications of component replacement or printed wiring board modifications may void any warranty.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- *HP ProLiant BL e-Class C-GbE Interconnect Switch User Guide*
- *HP ProLiant BL e-Class C-GbE Interconnect Switch Command Line Interface Reference Guide*
- *HP ProLiant BL e-Class C-GbE Interconnect Switch Menu-driven Interface Reference Guide*
- *Service Quick Reference Guide*
- Service training guides
- Service advisories and bulletins
- QuickFind information services
- Insight Manager software

Telephone Numbers

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For HP technical support:

- In the United States and Canada, call 1-800-652-6672.
- Outside the United States and Canada, refer to

  www.hp.com

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Overview

Introduction

The ProLiant BL e-Class C-GbE Interconnect Switch provides two console management interfaces and a Web-based management interface. The command line interface (CLI) and menu-driven interface allow you to set up and control the switch modules using either the serial or Ethernet ports on the switch. The embedded Web-based (HTML) interface allows users to manage each switch module from anywhere on the network through a standard browser, such as Netscape Navigator or Microsoft® Internet Explorer. The Web browser acts as a universal access tool and can communicate directly with the switch modules using the HTTP protocol.

NOTE: Your browser window may differ compared with the screen shots in this guide.

The Web-based management interface and the console management interfaces are different ways to access and configure the same internal switching software. All settings encountered in Web-based management are the same as those found in the console management program.

This guide describes how to use the Web-based interface to access the switch modules, change their settings, and monitor their operation.

Additional Information

Additional information about installing and configuring the interconnect switch is available in the following guides, which are located on the ProLiant BL e-Class C-GbE Interconnect Switch Management System Utilities and User Documentation CD.

- *HP ProLiant BL e-Class C-GbE Interconnect Switch User Guide*
- *HP ProLiant BL e-Class C-GbE Interconnect Switch Command Line Interface Reference Guide*
- *HP ProLiant BL e-Class C-GbE Interconnect Switch Menu-driven Interface Reference Guide*

Accessing the Switch Modules

Before you can connect to a switch module using the Web-based interface, you must set up the IP address. By default, if there is a DHCP server on the network, a switch module obtains the IP address automatically. You can locate the IP address by accessing the switch module through the Integrated Administrator. The IP address displays on the switch module logon screen.

If there is no DHCP server on the network, access each switch module through the Integrated Administrator and configure the IP address.

NOTE: The Integrated Administrator must be configured before you can use it to access and configure the interconnect switch. For information on how to configure the Integrated Administrator, refer to the "Configuring the Integrated Administrator" section in the *HP ProLiant BL e-Class C-GbE Interconnect Switch User Guide*.

Access the switch modules from the Integrated Administrator command line interface, using one of the following methods:

- If you have already logged into the Integrated Administrator as the "Administrator," you can connect to either switch module console by typing one of the following commands:

  `connect switch a` to access Switch A

  or

  `connect switch b` to access Switch B

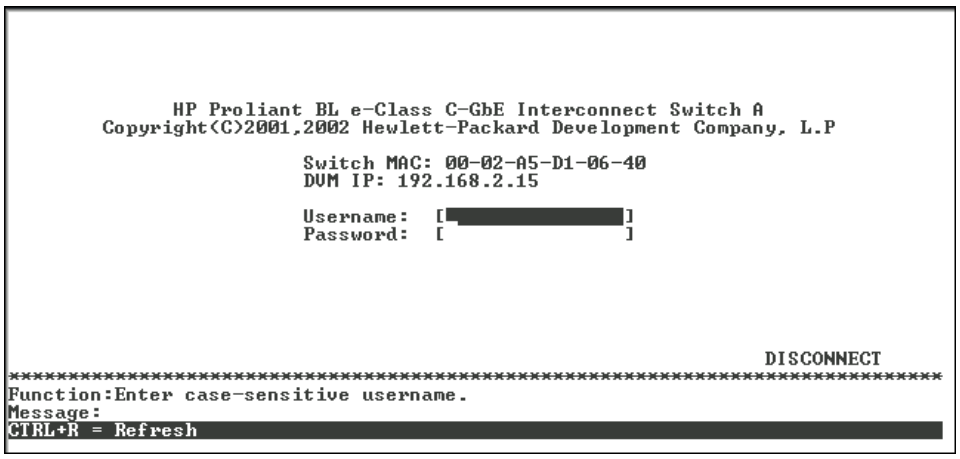
- If you have **not** logged on to the Integrated Administrator, you can type one of two special logon accounts to access the switch module consoles directly, depending on whether you want to access Switch A or Switch B. At the login prompt type in both the user name and password as either:

  `switcha`

  or

  `switchb`

  The logon screen for Switch A or Switch B will now be displayed.



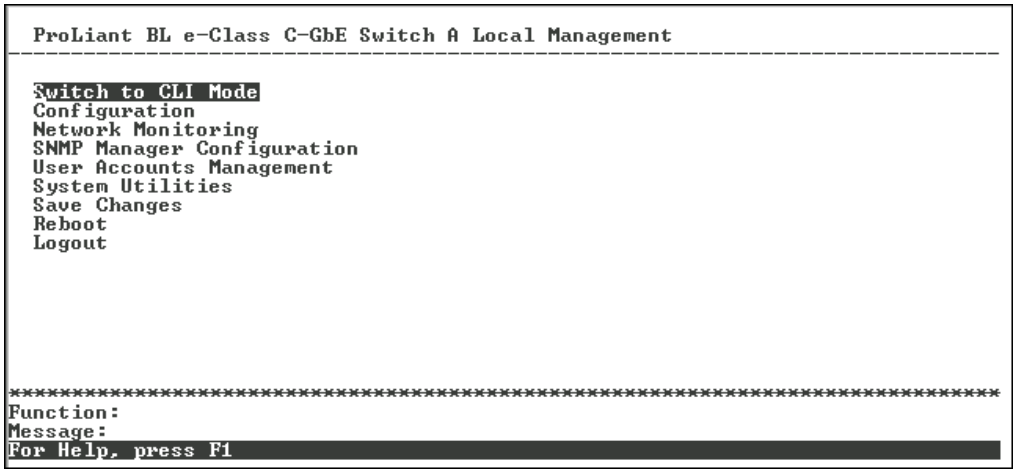
The interconnect switch logon screen displays the name of the switch module (Switch A or Switch B), the MAC address, and the IP address for the switch module.

If the IP address displays, use this address to access the switch module through your Web-based browser. Refer to the "Connecting using the Web-based Interface" section later in this chapter.

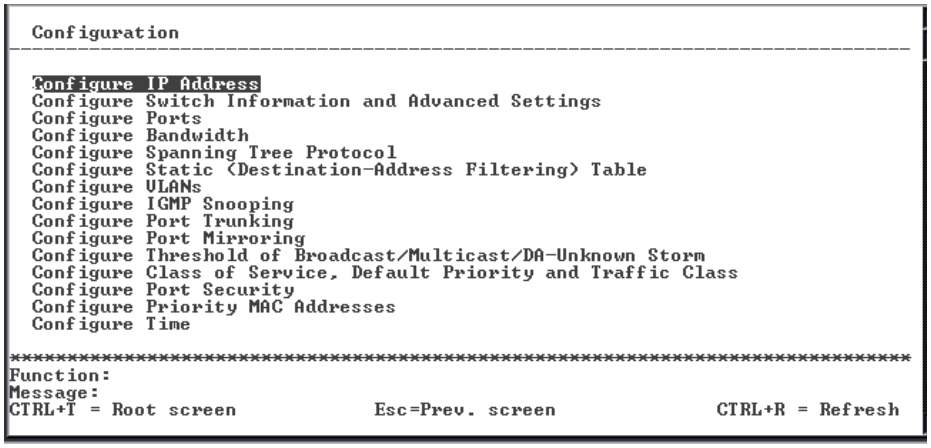
If the IP address does not display on the logon screen

1. Leave the **Username** field blank and press the **Tab** key.
2. Leave the **Password** field blank and press the **Enter** key. The main menu for the switch module is displayed.

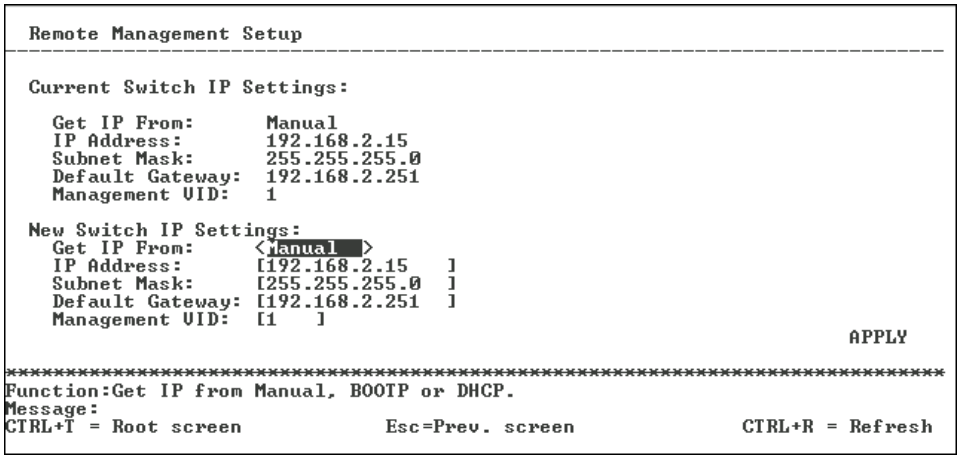
IMPORTANT: The interconnect switch does not have any initial user names or passwords set. HP recommends that after logging on, you create at least one Root-level user as the switch administrator. (Refer to Table 2-1 in Chapter 2 for an explanation of user privileges.) If you forget your password after it has been set up, call HP Customer Support for assistance.



3. Highlight **Configuration** on the main menu.
4. Press the **Enter** key. The **Configuration** menu is displayed.



5. Highlight **Configure IP Address** from the **Configuration** menu.
6. Press the **Enter** key. The **Remote Management Setup** screen is displayed.



The **Remote Management Setup** screen lets you specify how the switch module will be assigned an IP address. The fields listed under the **Current Switch IP Settings** heading are those that are currently being used by the switch module.

7. Toggle the **Get IP From** field to select from **Manual, BOOTP,** or **DHCP.** This action selects how the switch module will be assigned an IP address.

   — **BOOTP**—The switch module sends out a BOOTP broadcast request. The BOOTP protocol allows IP addresses, network masks, and default gateways to be assigned by a central BOOTP server. If this option is set, the switch module first looks for a BOOTP server to provide it with this information.

   — **DHCP**—The switch module sends out a DHCP broadcast request. The DHCP protocol allows IP addresses, network masks, and default gateways to be assigned by a DHCP server. If this option is set, the switch module first looks for a DHCP server to provide it with this information.

   — **Manual**—This option allows the entry of an IP address, subnet mask, and default gateway for the switch module. The data in these fields should be of the form *xxx.xxx.xxx.xxx*, where each *xxx* is a number between 0 and 255. This address should be a unique address on the network assigned for use by the Network Administrator. The fields that require entries under this option include:

      — **Subnet Mask**—A Bitmask that determines the extent of the subnet that the switch module is on. The value should be 255.0.0.0 for a Class A network, 255.255.0.0 for a Class B network, and 255.255.255.0 for a Class C network, but custom subnet masks are allowed.

      — **Default Gateway**—An IP address that determines where packets with a destination address outside the current subnet should be sent. This is usually the address of a router or a host acting as an IP gateway. If your network is not part of an intranet, or you do not want the switch module to be accessible outside your local network, you can leave this field blank.

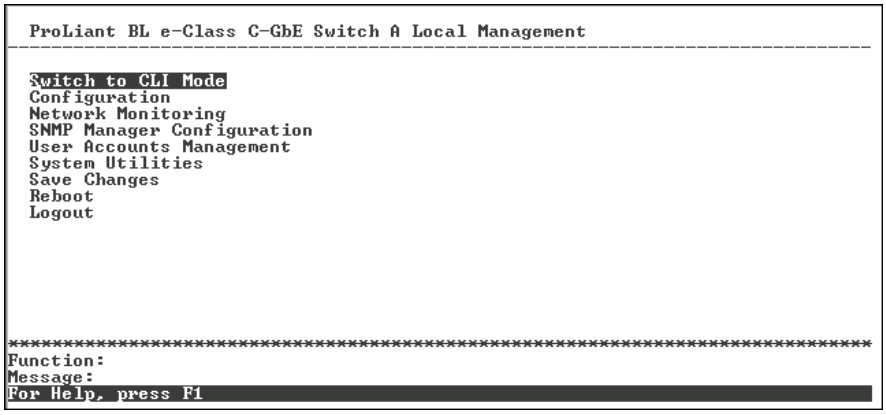
   If you select **Manual,** type the appropriate data into the **IP Address, Subnet Mask,** and **Default Gateway** fields.

8. Type the VLAN ID (VID) of a VLAN that will have access to the Telnet manager in the **Management VID** field. This ID will be the VID of the VLAN on which a management station is located. Management of the switch module using Telnet or SNMP will be isolated to this VLAN.

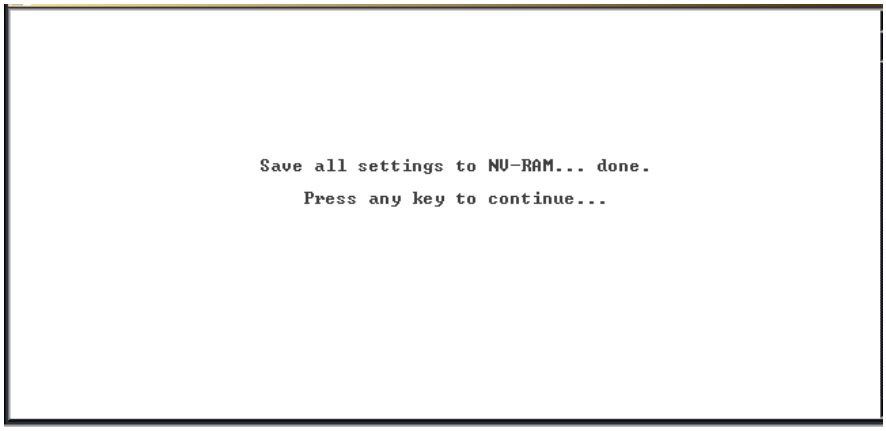
9. Highlight **APPLY** and press the **Enter** key to make the change effective.

   IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the main menu.

10. Press the **ESC** key until you return to the main menu.



11. Highlight **Save Changes** on the main menu.
12. Press the **Enter** key. The following screen is displayed to verify that your new settings have been saved to NVRAM.



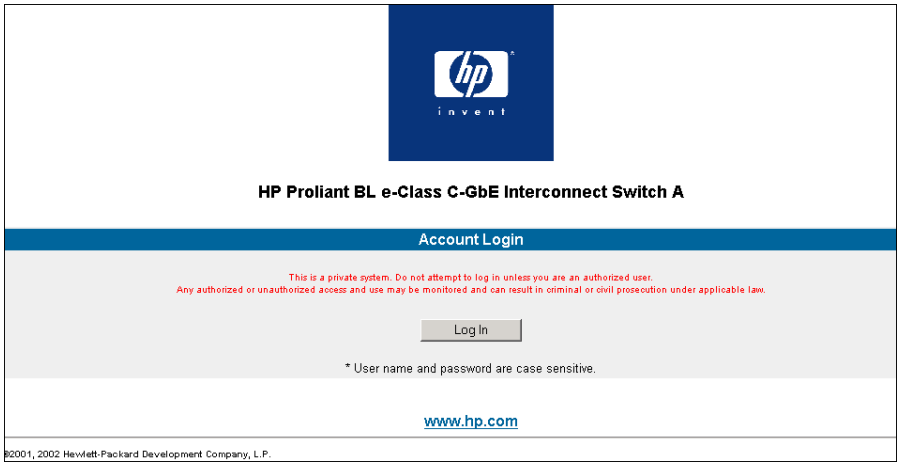
After the configuration settings have been saved to NVRAM, they become the default settings for the switch module. These settings are then used every time the GbE Interconnect Switch is rebooted.

Connecting using the Web-based Interface

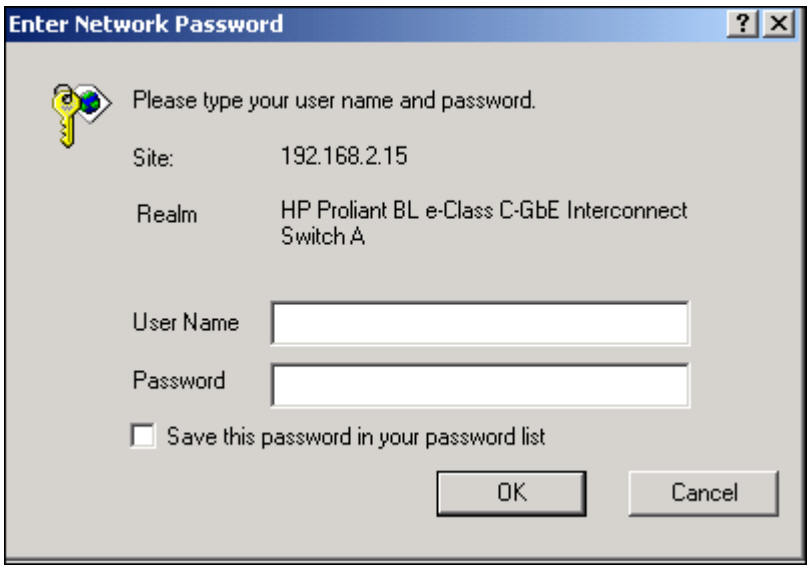
Once the IP address has been set on the switch module, you can use the Web-based interface to connect to the switch module.

To connect to a switch module using the Web-based interface:

1. Start a Web browser, for example, Microsoft Internet Explorer version 5.5 or higher or Netscape Navigator version 6.1 or higher.
2. Type the IP address you have defined for the switch module in the browser address bar. The URL in the address bar should read something like: http://10.24.22.8.
3. Press the **Enter** key. The **Account Login** screen is displayed.



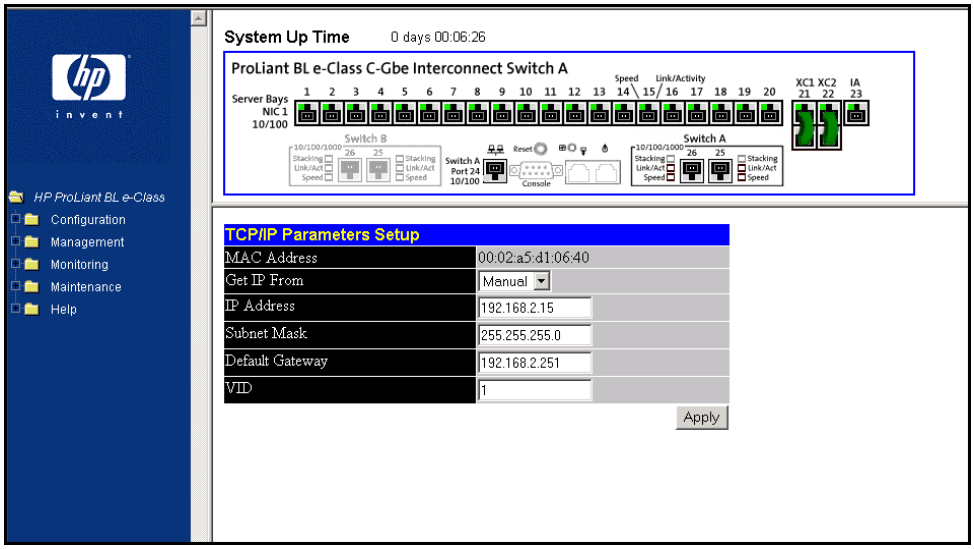
4. Press **Log in**. The **Enter Network Password** dialog box for the switch module is displayed.



IMPORTANT: The switch module does not have any initial user names or passwords set. HP recommends that after logging on, you create at least one Root-level user as the switch administrator. (Refer to Table 2-1 in Chapter 2, for an explanation of user privileges.) If you forget your password after it has been set up, call HP Customer Support for assistance.

5. Click **OK** at the **Enter Network Password** dialog box. No initial user name or password is set for the first user. The main page in the Web-based management module is displayed.

   The main page displays the main menu, an active graphic of the switch module, and the **TCP/IP Parameters Setup** window.



   The active graphic of the switch module allows you to monitor the switch module status. Graphical LEDs display current link speed and activity. Graphical RJ-45 connectors allow you to display statistics for individual ports. In addition the current time displays, once it is configured on the switch module.

   Refer to the section “Configuring the Switch Module Date and Time” for information on how to set the date and time. Refer to the section, “Monitoring the Switch Module Using the Active Switch Graphic,” for detailed information about the active graphic.

   The **TCP/IP Parameters Setup** window is used to determine whether the interconnect switch should get its IP address settings from the user (Manual), a BOOTP server, or a DHCP server. Refer to the section “Configuring the Remote Management IP Interface Settings.”

6. Click the small square hyperlink to the left of the folder icons to display a list of additional menus used to configure, manage, monitor, and maintain the switch module.

Configuring the Switch Modules

In addition to setting the IP address for each switch module, you will also want to

- Set up users, passwords, and access privileges
- Change default SNMP community strings for read/write and read-only

For information on how to configure these and other interconnect switch features, refer to Chapter 2.

2

Configuring the Switch Modules using the Web-based Interface

Overview

This chapter describes how to configure the switch modules from the Web-based interface

Saving Changes

The switch module has two types of memory: dynamic RAM and non-volatile RAM (NVRAM). Restarting the switch module erases all configuration settings in RAM and reloads the stored settings from NVRAM. Thus, it is necessary to save all configuration setting changes to NVRAM before rebooting the switch module.

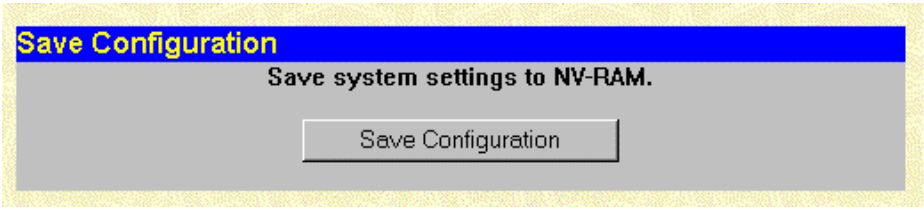
After the configuration settings have been saved to NVRAM, they become the current runtime settings for the switch module. These settings are then used every time the switch module is rebooted.

Configuration changes on a screen are made effective by clicking **Apply**. The settings are then immediately applied to the switching software in RAM.

To make your configuration changes permanent, save them to NVRAM using the **Save Changes** option on the **Maintenance** menu before rebooting the system.

To retain any configuration changes permanently:

1. Open the **Maintenance** folder on the main menu.
2. Click **Save Changes.** The **Save Configuration** window is displayed.



3. Click **Save Configuration** to save all the changes made in the current session to the switch module's NVRAM memory. A message box is displayed telling you that the save is complete.
4. Click **OK.** After the switch module configuration settings have been saved to NVRAM, they become the default settings for the switch module. These settings are used every time the switch module is rebooted.

IMPORTANT: After saving your final configuration, HP highly recommends that you save the switch module configuration image to TFTP server storage. Refer to the section, "Uploading a Configuration File to TFTP Server," in this chapter.

Managing User Accounts

After logging on to the switch module for the first time, you must set up at least one user account with Root privileges. You can set up a maximum of eight users on a switch module. You can set up a maximum of eight users on a switch module.

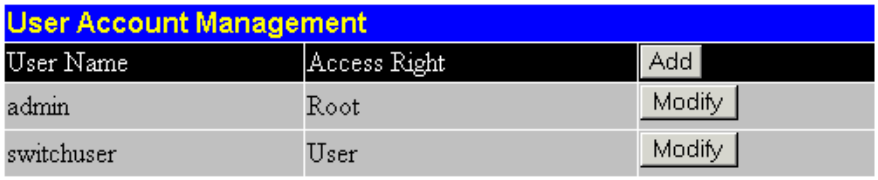
The following table summarizes the user access rights.

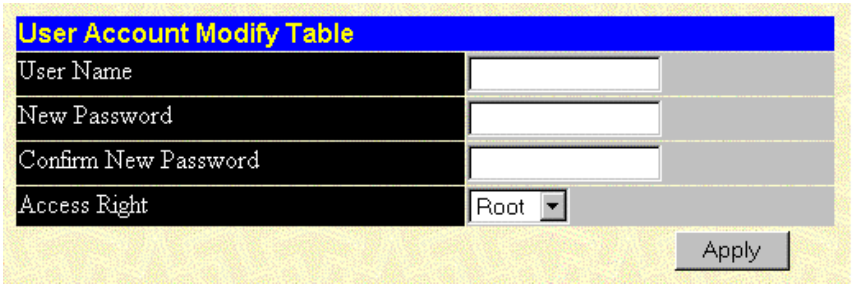
Table 2-1: User Access Rights

Privilege	Root	User+	User
Configuration	Yes	Read-only	Read-only
Network Monitoring	Yes	Read-only	Read-only
Community Strings and Trap Stations	Yes	Read-only	Read-only
Update Firmware and Configuration Files	Yes	No	No
System Utilities	Yes	Ping-only	Ping-only
Factory Reset	Yes	No	No
Reboot Switch	Yes	Yes	No
Add/Update/Delete User Accounts	Yes	No	No
View User Accounts	Yes	No	No

To create a new user account:

1. Click the small square to the left of the **Management** folder on the main menu. The Management menus are displayed.
2. Click **User Accounts.** The following window is displayed.





The **User Account Management** window displays all current users for the switch module their current access level. The **User Account Modify Table** allows you to enter user account information.

The following information is displayed on the **User Account Management** window:

— **User Name**—Displays all current users for the switch module.

— **Access Right**—Displays the current access level assigned to each corresponding user. The available options are **User, User+,** or **Root.** A **Root** user has full read/write access, while a **User** has read only access. A **User+** has the same privileges as a **User,** but with the added ability to restart the switch module.

— **Add**—Click this to add a new user.

— **Modify**—Click this modify the existing user's account information.

3. Click **Add** on the **User Account Management** window.
4. On the **User Account Modify Table**, type the user name in the **User Name** field.
5. Type the user's password in the **New Password** field.
6. Type the new password a second time in the **Confirm Password** field.
7. Click the drop-down arrow in the **Access Right** field to select the access level. The three access levels are **User, User+,** and **Root.** A **Root** user has full read/write access, while a **User** has read-only access. A **User+** has the same privileges as a **User,** but with the added ability to restart the switch module.

8. Click **Apply.**

IMPORTANT: To save the configuration settings permanently, you must enter them into the non-volatile RAM (NVRAM) using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes" for more information.

Configuring the Remote Management IP Interface Settings

Each switch module must be assigned its own IP address, which is used for communication with an SNMP network manager or other TCP/IP application (for example Web or TFTP). The factory default is set for the switch module to automatically obtain the IP address using DHCP service from a DHCP server on the attached network. You can also manually change the default switch IP address to meet the specification of your networking address scheme. If you select the manual mode and do not assign the IP address, the system assigns a default IP address for Switch A as 10.90.90.90 and for Switch B as 10.90.90.91. The system also assigns a default subnet mask of 255.0.0.0.

The switch module IP interface is also assigned a unique MAC address by the factory. This MAC address cannot be changed and can be found on the initial boot console screen and Logon screen, or by accessing basic switch information. Refer to the "Displaying Basic Switch Module Information" section later in this chapter.

In addition, you can

- Set an IP address for a default gateway. This becomes necessary when the network management station is located on a different IP network from the switch module, making it necessary for management packets to go through a router to reach the network manager, and vice-versa.
- Set a list of up to eight secure IP addresses of network management stations that are allowed to manage the interconnect switch. Only those network management stations can access the switch management inerfaces once set.
- Set a management VLAN ID (VID) for the IP interface so that the interconnect switch can be accessed from the designated management VLAN.
- Change the default SNMP community strings in the switch module and set the access rights of these community strings.

Setting the Remote Management IP Interface Settings

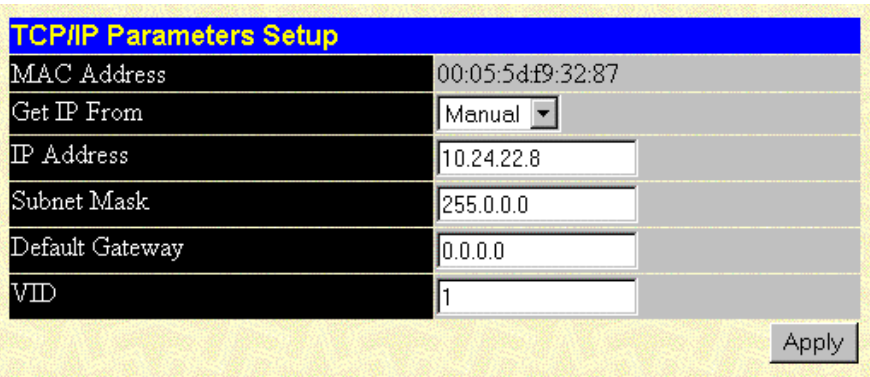
To access and manage the interconnect switch from an SNMP-based Network Management System, or by using the Telnet protocol or the Web, you must first configure the remote management IP interface parameters.

The IP address can be assigned by one of the following methods:

- **Manual**—This option allows you to manually configure an IP address, subnet mask, and default gateway for the switch module.
- **BOOTP**—This option configures the switch to send out a BOOTP broadcast request for IP information. The BOOTP protocol allows IP addresses, network masks, and default gateways to be assigned by a central BOOTP server attached to the same network to which the interconnect switch is connected.
- **DHCP**—This option configures the switch to send out a DHCP broadcast request. The DHCP protocol allows IP addresses, network masks, and default gateways to be assigned by a DHCP server attached to the same network to which the interconnect switch is connected. DHCP protocol is the factory default mode.

To configure the remote management IP interface settings:

1. Select **IP Address** from the **Configuration** menu. The following screen is displayed.



The **TCP/IP Parameters Setup** window is used to determine whether the switch module should get its IP address settings from the user (Manual), a BOOTP server, or a DHCP server.

The window displays the following information:

— **MAC Address**—The Ethernet address for the device, also known as the physical address

— **Get IP From**—The choices for how the switch module receives its IP address settings: Manual, BOOTP, and DHCP

— **IP Address**—The host address for the device on the TCP/IP network

— **Subnet Mask**—The address mask that controls subnetting on your TCP/IP network

— **Default Gateway**—The IP address of the device, usually a router, that handles connections to other subnets or other TCP/IP networks

— **VID**—The VLAN ID (VID) number for the switch management port

2. Select **Manual, BOOTP,** or **DHCP** in the **Get IP From** field:

   — If you select **Manual,** type the **IP Address, Subnet Mask,** and **Default Gateway** of the switch module.

   — If you select **BOOTP,** you do not need to configure any IP parameters because a BOOTP server automatically assigns IP configuration parameters to the GbE Interconnect Switch.

   — If you select **DHCP,** you do not need to configure any IP parameters because a DHCP server automatically assigns IP configuration parameters to the GbE Interconnect Switch.

3. Type the VLAN ID for the switch management port in the **VID** field.

4. Click **Apply** to activate the new settings.

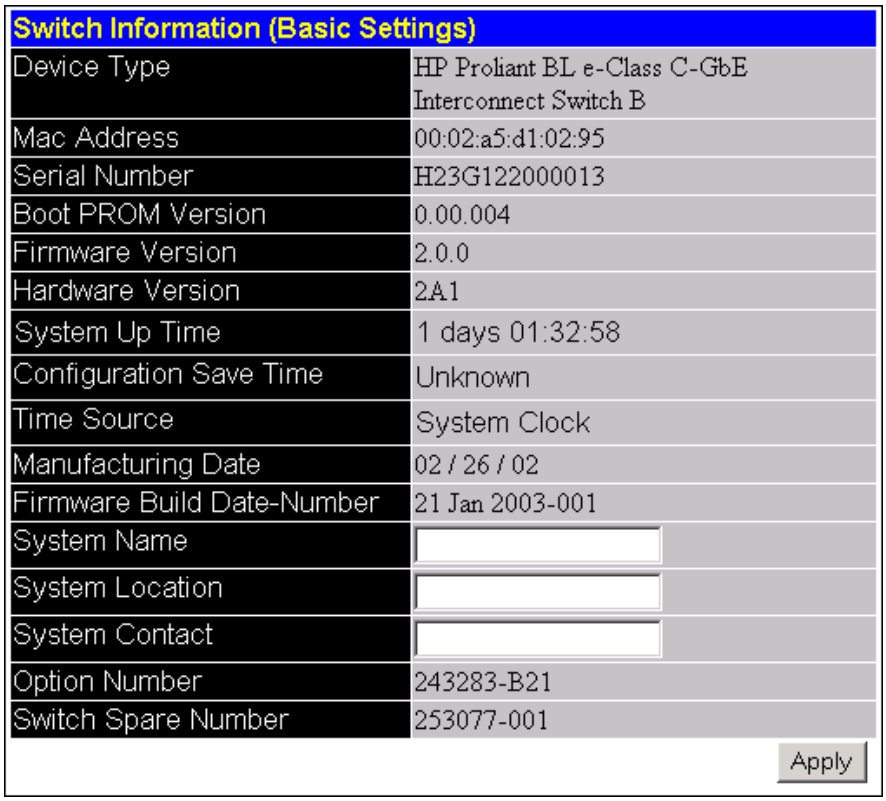
IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, “Saving Changes,” earlier in this chapter.

Displaying Basic Switch Module Information

You can quickly and easily obtain basic information about the switch module including: the type of switch and the MAC address (assigned by the factory and unchangeable) for that switch module. In addition, the boot PROM and firmware version numbers are displayed. This information is helpful in monitoring PROM and firmware updates.

To display and configure basic switch module information:

1. Select **Switch Information** from the **Configuration** menu. The following screen is displayed.



The **Switch Information (Basic Settings)** window displays the following information:

— **Device Type**—Displays the name of the switch module.

— **MAC Address**—Identifies the Ethernet address for the switch module.

— **Serial Number**—Identifies the switch module serial number.

— **Boot PROM Version**— Identifies the version number of Boot PROM code installed on the interconnect switch.

— **Firmware Version**—Identifies the version number of the firmware installed on the switch module. This information can be updated by using the **Update Firmware** window in the **Reset and Update** section.

— **Hardware Version**—Identifies the version number of the interconnect switch hardware build.

— **System Up Time**— Identifies the time the switch booted up, if the current time has been set on the switch module. If the current time has never been set up on the interconnect switch, this field identifies the time since the switch module was booted up.

- **Configuration Save Time**—Displays the time the current settings were saved to the configuration file. If the current time has never been set up on the interconnect switch, "Unknown" will be displayed.
- **Time Source**—Displays how the switch module obtains the current time: Primary SNTP Server, Secondary SNTP Server, or System Clock.
- **Manufacturing Date**—Displays the manufacture date of the switch module.
- **Firmware Build Date-Number**—Displays the firmware build date and build number.
- **System Name**—Displays a user-configured name for the switch module.
- **System Location**—Displays a user-configured description for the physical location of the switch module.
- **System Contact**—Displays the user-configured name of the person to contact if there are any problems or questions with the system. You may also want to include a phone number or extension.
- **Option Number**—Displays the option number for the switch module and Interconnect Module combination.
- **Switch Spare Number**—Displays the spare part number for the switch module.
- **Module Spare Number**—This field is not applicable.

2. To complete the switch module information, type the system name in the **System Name** field.
3. Type the physical location of the switch module in the **System Location** field.
4. Type the name of the contact person responsible for the switch module (and telephone number or other contact information) in the **System Contact** field.
5. Click **Apply.**

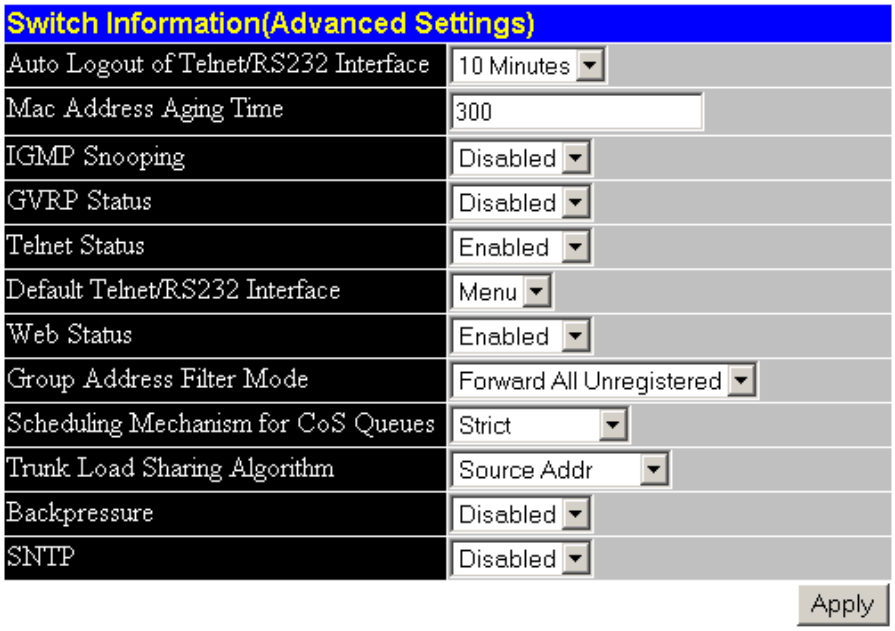
IMPORTANT: To save the configuration settings permanently, they must be entered into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring Advanced Switch Module Features

You can configure advanced switch features including global settings for IGMP snooping, GVRP, Telnet status, Web status, SNTP, and others.

To configure advanced switch module features:

1. Select **Advanced Settings** from the **Configuration** menu. The following screen is displayed.



You can change the following parameters:

— **Auto Logout of Telnet/RS232 Interface**—Select the time that the RS-232 console and Telnet management interface can be idle before the switch module automatically logs-out the user: **2 minutes, 5 minutes, 10 minutes, 15 minutes,** and **Never.** Never indicates never timing out. The default is 10 minutes.

— **MAC Address Aging Time**—Select the length of time a learned MAC address remains in the forwarding table without being seen as a source (that is, how long a learned MAC address is allowed to remain idle before deleting from the address table). The aging time can be set to any value between 1 and 1,000,000 seconds.

The switch module enters into its forwarding table the mapping between the MAC address of the device and the Ethernet port to which the device is attached. This information is used to forward packets. This reduces the traffic congestion on the network, because packets are forwarded to the destination port only, instead of being forwarded to all ports.

The MAC address aging timer prunes the forwarding table addresses entries that are no longer used. Dynamic forwarding table entries, which are made up of MAC addresses and their associated port numbers, are deleted from the table if they are not seen within the aging timeout. The aging time can be from 10 to 1,000,000 seconds with a default value of 300 seconds. A very long aging time can result in dynamic forwarding table entries that are out-of-date or no longer are used.

If the aging time is too short, however, many entries may be aged out too soon. This will result in a high percentage of received packets whose destination addresses cannot be found in the forwarding table. In this case the switch module will broadcast the packet to all ports, negating many of the benefits of having a switch.

Static forwarding entries are not affected by the aging time.

— **IGMP Snooping**—Select to enable or disable Internet Group Management Protocol (IGMP) Snooping. IGMP Snooping enables the switch module to register IGMP packets being forwarded through the switch module in order to obtain multicast membership information from them, such as which ports are attached to which multicast group members. For additional information, refer to the "Configuring IGMP Snooping" section later in this chapter.

— **GVRP Status**—Select to enable or disable GARP VLAN Registration Protocol (GVRP) on the switch module. GVRP allows dynamic propagation of VLAN registration information across the GVRP-enabled switches on the same network. For additional information, refer to the "Setting the Port VLAN ID for a Port" section later in this chapter.

— **Telnet Status**—Select to enable or disable access to the switch module over the network using the Telnet protocol.

— **Default Telnet/RS232 Interface**— Set either the CLI or menu-driven interface as the default Telnet/RS232 interface.

— **Web Status**—Select to enable or disable management of the switch module over the Web.

— **Group Address Filter Mode**—Select one of the forwarding or filtering options to set the IGMP group address filter mode for forwarding multicast packets.

— **Scheduling Mechanism for CoS Queues**—Select one of the **Class of Service** queue scheduling options. If you select **Strict,** then when the highest priority queue is full, those packets will be the first to be forwarded. If you select **RoundRobin,** the forwarding is based on the settings made on the **Class of Service Configuration** screen. For more information, refer to the "Configuring the Class of Service, Default Port Priority, and Traffic Class" section later in this chapter.

— **Trunk Load Sharing Algorithm**—Select one of the port trunk load sharing options, **Source Addr, Destination Addr,** or **Both,** to determine if load balancing decisions will be made based on the source MAC address, destination MAC address, or both addresses.

— **Backpressure**— Select **Enabled** or **Disabled** to initiate or terminate backpressure flow control in and out of the switch module. When backpressure is enabled and there is incoming traffic congestion on a 10/100 port, the receiving port sends a request to the transmitting port. The transmitting port acknowledges the request and stops sending packets for a random amount of time, before it starts sending again.

— **SNTP**—Simple Network Time Protocol (SNTP) allows the system to get the accurate time through the network. When SNTP is enabled, the interconnect switch sends a request to a primary SNTP server in each period of a specified polling interval asking for the Greenwich Mean Time (GMT). If the primary SNTP server is not available, the request is sent to a secondary SNTP server. For additional information, refer to the "Configuring Switch Module Date and Time" section later in this chapter.

2. After making your choices in **Advanced Settings,** click **Apply.**

IMPORTANT: To save the configuration settings permanently, they must be entered into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring Port Settings

This section describes how to configure the following port settings: port name, state, speed/duplex, and flow control. Refer to the "Configuring Port Security" section later in this chapter for information on how to set the port security parameters.

The speed-duplex parameter for each port can be set to 1000M/Full, 100M/Full, 100M/Half, 10M/Full, 10M/Half, or Auto. The Auto setting allows the port to automatically determine the fastest settings that the device the port is connected to can handle.

IMPORTANT: In the forced 100M/Full, 100M/Half, 10M/Full, and 10M/Half modes, auto MDI-X is disabled and a cross-over cable must be used.

To configure port settings:

1. Select **Port Configuration** from the **Configuration** menu. The following screen is displayed.

Port Settings

Port	Port Name	State	Speed/Duplex	Flow Control	Apply
Port 1	Server1_Port1	Enabled	Auto	On	Apply

The Port Information Table

Port	Type	VLan Name	Port Name	State	Speed/Duplex	Flow Control	Connection
1	Server	DEFAULT_VLAN	Server1_Port1	Enabled	AUTO	On	100M/Full/802.3x
2	Server	DEFAULT_VLAN	Server2_Port1	Enabled	AUTO	On	100M/Full/802.3x
3	Server	DEFAULT_VLAN	Server3_Port1	Enabled	AUTO	On	100M/Full/802.3x
4	Server	DEFAULT_VLAN	Server4_Port1	Enabled	AUTO	On	100M/Full/802.3x
5	Server	DEFAULT_VLAN	Server5_Port1	Enabled	AUTO	On	100M/Full/802.3x
6	Server	DEFAULT_VLAN	Server6_Port1	Enabled	AUTO	On	100M/Full/802.3x
7	Server	DEFAULT_VLAN	Server7_Port1	Enabled	AUTO	On	100M/Full/802.3x
8	Server	DEFAULT_VLAN	Server8_Port1	Enabled	AUTO	On	100M/Full/802.3x
9	Server	DEFAULT_VLAN	Server9_Port1	Enabled	AUTO	On	100M/Full/802.3x
10	Server	DEFAULT_VLAN	Server10_Port1	Enabled	AUTO	On	100M/Full/802.3x
11	Server	DEFAULT_VLAN	Server11_Port1	Enabled	AUTO	On	100M/Full/802.3x
12	Server	DEFAULT_VLAN	Server12_Port1	Enabled	AUTO	On	100M/Full/802.3x
13	Server	DEFAULT_VLAN	Server13_Port1	Enabled	AUTO	On	100M/Full/802.3x
14	Server	DEFAULT_VLAN	Server14_Port1	Enabled	AUTO	On	100M/Full/802.3x
15	Server	DEFAULT_VLAN	Server15_Port1	Enabled	AUTO	On	100M/Full/802.3x
16	Server	DEFAULT_VLAN	Server16_Port1	Enabled	AUTO	On	100M/Full/802.3x
17	Server	DEFAULT_VLAN	Server17_Port1	Enabled	AUTO	On	100M/Full/802.3x
18	Server	DEFAULT_VLAN	Server18_Port1	Enabled	AUTO	On	100M/Full/802.3x
19	Server	DEFAULT_VLAN	Server19_Port1	Enabled	AUTO	On	100M/Full/802.3x
20	Server	DEFAULT_VLAN	Server20_Port1	Enabled	AUTO	On	100M/Full/802.3x
21	XConnect	DEFAULT_VLAN	XConnect1	Enabled	100M/FULL	Off	100M/Full/None
22	XConnect	DEFAULT_VLAN	XConnect2	Enabled	100M/FULL	Off	100M/Full/None
23	IA NIC	DEFAULT_VLAN	IA Mgmt Module	Enabled	AUTO	On	100M/Full/None
24	Uplink	DEFAULT_VLAN	Mgmt Uplink	Enabled	AUTO	On	---
25	D Uplink	DEFAULT_VLAN	SwitchA_UpLink1	Enabled	AUTO	On	---
26	D Uplink	DEFAULT_VLAN	SwitchA_UpLink2	Enabled	AUTO	On	---

2. Select the port you want to configure in the **Port** field. The port name displays in the **Port Name** field.
3. Select **Enabled** or **Disabled** in the **State** field. If you selec1t **Disabled,** devices connected to that port cannot use the switch module, and the switch module purges their addresses from its address table after the MAC address aging time elapses.
4. Configure the **Speed/Duplex** setting for the port:
   - — Select **Auto** to allow the port to select the best transmission speed, duplex mode, and flow control settings based on the capabilities of the device at the other end. The other selections allow you to force the port to operate in the specified manner.
   - — Select **100M/FULL** for port operation at 100 Mb/s and full duplex.
   - — Select **100M/HALF** for port operation at 100 Mb/s and half duplex.
   - — Select **10M/FULL** for port operation at 10 Mb/s and full duplex.

— Select **10M/HALF** for port operation at 10 Mb/s and half duplex.

5. Configure the **Flow Control** setting for the port:
   — Select **On** for flow control.
   — Select **Off** for no flow control.
6. Click **Apply.**

IMPORTANT: To save the configuration settings permanently, you must enter them into the NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring Port Mirroring

The switch module allows you to copy frames transmitted and received on a port (source) and redirect the copies to another port (target). You can attach a monitoring device to the mirrored (target) port, such as a sniffer or an RMON probe, to view details about the packets passing through the source port. This setting is useful for network monitoring and troubleshooting purposes.

The following configuration rules apply to any port mirroring configuration:

- A target mirror port cannot be configured as a trunk member.
- VLAN configuration settings for any ports configured for mirroring cannot be changed.
- The source and target ports should be members of the same VLAN.

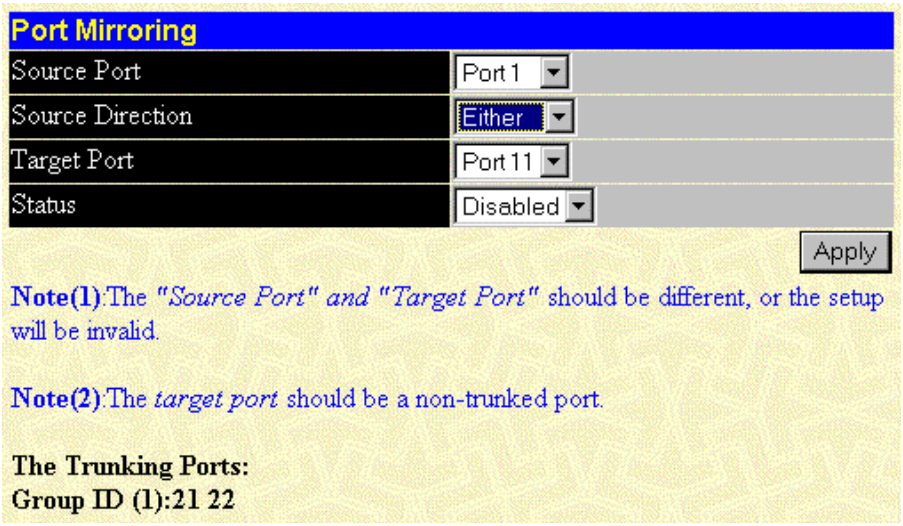
The direction of traffic on the source port can be one of the following:

- Ingress traffic (received packets) on the source port
- Egress traffic (transmitted packets) on the source port
- Ingress and egress traffic on the source port

IMPORTANT: You cannot mirror a fast port onto a slower port. For example, if you try to mirror the traffic from a 1000-Mb/s port onto a 100-Mb/s port, you can cause throughput problems. The port from which you are copying frames must support an equal or lower speed than the port to which you are sending the copies. Also, the target port cannot be a member of a trunk group.

To configure port mirroring:

1. Select **Port Mirroring** from the **Configuration** menu. The following screen is displayed



2. Select the **Source Port** from which you want to copy frames.
3. Select the **Source Direction,** either **Ingress, Egress,** or **Either.**
4. Select the **Target Port** that receives the copies from the source port. This is the port where you would connect a monitoring/troubleshooting device, such as a sniffer or an RMON probe.
5. Select **Enabled** in the **Status** field.
6. Click **Apply.**

IMPORTANT: To save the configuration settings permanently, you must enter them into the NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring Port Trunking

This section describes how to configure port trunking. For information on how to set the trunk load sharing algorithm parameter, refer to the "Configuring Advanced Switch Module Features" section earlier in this chapter.

Port trunking allows several ports to be grouped together to act as a single link. This provides a bandwidth that is a multiple of a single link bandwidth. Port trunking is most commonly used to link a bandwidth-intensive network device or devices, such as a server, to the backbone of a network.

The switch module allows the creation of up to six port trunk groups, each group consisting of up to eight links (ports). HP recommends that the trunk ports be members of the same VLAN. Only similar type ports can be members of port trunks. A combination of Fast Ethernet (FE) and Gigabit (GE) ports cannot be members of the same port trunk.

The configuration of the lowest numbered port in the group becomes the configuration for all of the ports in the trunk group. This port is called the master port of the trunk group, and all configuration options, including the VLAN configuration, which can be applied to the master port, are applied to the entire port trunking group.

Load balancing is automatically applied to the ports in the trunked group, based on the setting of the trunk load-sharing algorithm, and a link failure within the group causes the network traffic to be directed to the remaining links in the group.

Spanning Tree Protocol treats a port trunking group as a single link on the switch module level. STP uses the port parameters of the master port in the calculation of port cost and in determining the state of the port trunking group. If two redundant port trunking groups are configured on the switch module, STP blocks one entire group, similar to STP blocking a link in case of two redundant links.

Considerations when Creating a Port Trunking Group

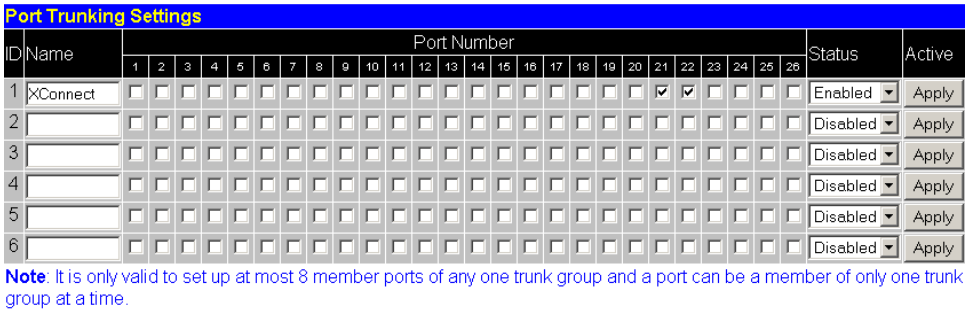
When creating a port trunking group, consider the following rules that determine how the port trunk reacts in network topology:

- The first port of the port trunk is implicitly configured to be the master logical port. This is the reference port used in configuration commands. It can be thought of as the logical port representing the entire port group.
- When using a port trunk, always reference the master logical port of the group when configuring or viewing VLANs.
- VLANs configured to use other ports in the port trunk will have those ports deleted from the VLAN when the port trunk becomes enabled.
- The Spanning Tree algorithm views port trunk as a single Spanning Tree port. The Spanning Tree port is represented by the master logical port.
- If the VLAN settings of the master logical port are changed, the VLAN settings of all members of that port trunk are changed similarly.
- If the IGMP snooping configuration for any port trunk member is changed, the IGMP snooping settings for all port trunk members are changed.
- The port trunk takes precedence over any other setting. That is, the settings of trunked ports are the same as the master port settings.
- When any trunked port becomes a non-trunked port, all of the port configurations are reset to default settings.

Refer to Appendix G in the *HP ProLiant e-Class C-GbE Interconnect Switch User Guide* for additional information on port trunking.

To configure port trunking:

1. Select **Port Trunking** from the **Configuration** menu. The following screen is displayed.



2. Type a user-assigned name in the **Name** field.
3. In the **Member Ports** area, check the ports that will compose the port trunk.
4. Change the **State** field to **Enabled**.
5. Click **Apply.**

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring IGMP Snooping

This section describes how to configure IGMP snooping on a VLAN ID. For information on how to set IGMP globally on the switch module and how to set the IGMP filter mode for processing multicast packets, refer to the "Setting Advanced Switch Module Features" section earlier in this chapter.

Internet Group Management Protocol (IGMP) snooping, when enabled and configured properly, manages multicast traffic through a switch module. IP multicast traffic is forwarded based on multicast group membership information registered by the switch module. The switch module can use IGMP snooping to configure ports dynamically, so that IP multicast traffic is forwarded only to those ports associated with IP multicast hosts, based on membership information.

IGMP snooping allows the switch module to recognize IGMP queries and reports sent between network stations or devices and an IGMP host that belongs to a specific multicast group. When enabled for IGMP snooping, the switch module can open or close a port to a specific device based on IGMP messages passing through the module. This feature further limits unnecessary broadcasts. The switch module can be configured to make queries using either IGMP version 1 or version 2.

When IGMP snooping is enabled globally on the switch module, you can enable or disable individual VLANs for IGMP snooping.

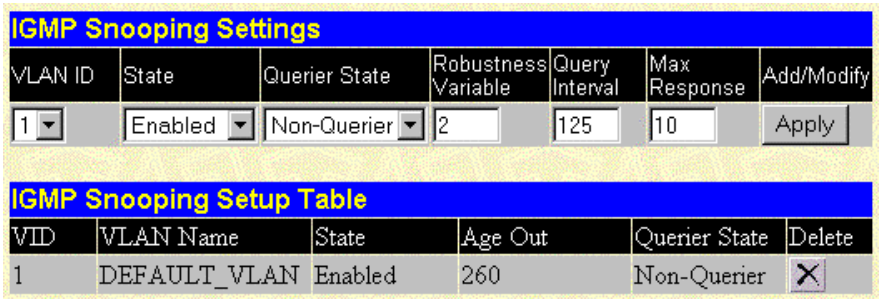
When IGMP snooping is enabled, any port receiving IGMP response packets will forward them to the CPU, and the CPU sets this port as a member of the corresponding multicast address.

The switch module supports three multicast group address filtering modes for making forwarding decisions regarding multicast packets.

- **Forward all group addresses**—All multicast packets destined for all group MAC addresses are forwarded according to the VLAN rules.
- **Forward all unregistered group addresses**—All multicast packets with group MAC address registration entries existing in the multicast table (both static multicast and group multicast created by IGMP snooping) are forwarded to member ports. If the group MAC address does not exist in the multicast table, packets are forwarded according to the VLAN rules.
- **Filter all unregistered group addresses**—All multicast packets with group MAC addresses are forwarded only if such forwarding is explicitly permitted by a group address entry in the multicast table. If the group MAC address exists in the multicast table, then the packets are forwarded using the port member list for that entry. If the group MAC address does not exist in the multicast table, the packets are dropped.

To configure IGMP snooping:

1. Select **IGMP Snooping** from the **Configuration** menu. The following screen is displayed.



2. Select a VID number in the **VLAN ID** field.
3. Select **Enabled** in the **State** field.
4. In the **Querier State** field, select the IGMP version that will be used by the IGMP interface when making queries. Select from **Non-Querier, V1-Querier,** and **V2-Querier**.
5. In the **Robustness Variable** field, type a value between 1 and 255. Larger values are specified for subnets that are expected to lose larger numbers of packets. The default is 2. The robustness variable is a tuning variable that allows you to configure the acceptable number of packets that may be lost.
6. In the **Query Interval** field, type a value between 1 and 65,500 seconds to specify the length of time between sending IGMP queries. The default is 125 seconds.
7. In the **Max Response** field, type the maximum amount of time allowed before sending an IGMP response report. The range is 1 to 25 seconds.

8. Click **Apply.**

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring Spanning Tree Protocol Settings

IEEE 802.1D Spanning Tree Protocol (STP) allows for the blocking of links between switches to avoid loops within the network. When multiple links between the switches are detected, a primary link is established. Duplicated links are blocked from use and become standby links. The protocol allows for the duplicate links to be used in the event of a failure of the primary link. Once STP is configured and enabled, primary links are established and duplicated links are blocked and put into standby automatically. The reactivation of the blocked links (at the time of a primary link failure) is also accomplished automatically, without operator intervention.

STP communicates between switches on the network using Bridge Protocol Data Units (BPDUs). Each BPDU contains the following information:

- The unique identifier of the switch that the transmitting switch currently believes is the root switch
- The path cost to the root from the transmitting port
- The port identifier of the transmitting port

The switch sends BPDUs to communicate and construct the spanning-tree topology. All switches connected to the LAN on which the packet is transmitted will receive the BPDU. BPDUs are not directly forwarded by the switch, but the receiving switch uses the information in the frame to calculate a BPDU, and if the topology changes, initiates a BPDU transmission.

The communication between switches via BPDUs results in the following:

- One switch is elected as the root switch.
- The shortest distance to the root switch is calculated for each switch.
- A designated switch is selected. This is the switch closest to the root switch through which packets will be forwarded to the root.
- A port for each switch is selected. This is the port providing the best path from the switch to the root switch.
- Ports included in the STP are selected.

Spanning Tree Protocol (STP) can be enabled or disabled at the switch level. Only one spanning tree domain per switch module is supported. You can configure ports to participate in that spanning tree domain, by enabling or disabling the STP function on a per port basis. Ports can also be configured in STP bypass mode (fast forward mode) that allows the port to skip the initial STP states (listening and learning) before enabling it in the forwarding state.

IMPORTANT: The interconnect switch supports mono-Spanning Tree Protocol. Multiple Spanning Tree domains are not supported.

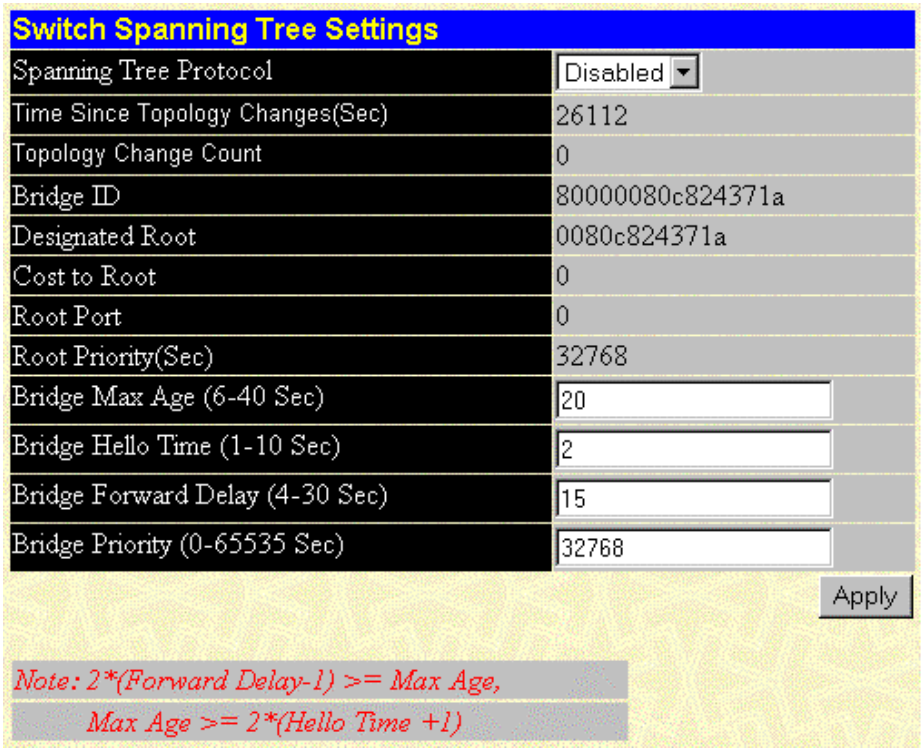
NOTE: Refer to Appendix D in the *HP ProLiant BL e-Class C-GbE Interconnect Switch User Guide* for more information on Spanning Tree Protocol.

Setting Spanning Tree Parameters on the Switch Module Level

IMPORTANT: The factory default settings should cover the majority of installations. HP recommends that you keep the default settings as set at the factory unless it is absolutely necessary to change them.

To set STP parameters on the switch level:

1. Select **STP Switch Settings** from the **Spanning Tree** menu. The following screen is displayed.



The **Switch Spanning Tree Settings** screen allows you to configure STP parameters and displays STP status information, including:

— **Spanning Tree Protocol**—Select to enable or disable the STP setting.

— **Time Since Topology Changes (Sec)**—Displays the number of seconds since the last change in topology occurred that caused the spanning tree algorithm to be recalculated.

— **Topology Change Count**—Displays the number of times there has been a change in topology since the last reboot of the current bridge.

- **Bridge ID**—Displays the ID of the bridge (switch) used only for spanning tree functions. The ID is made up of the bridge priority and bridge MAC address.
- **Designated Root**—Displays the current elected root bridge. The root bridge has a bridge ID lower than the other bridges.
- **Cost to Root**—Displays the summation of all path costs between the current bridge and the root bridge via the root port.
- **Root Port**—Displays the port on the current bridge that has the best path to reach the designated root bridge.
- **Root Priority (Sec)**—Displays the priority of the current designated root bridge.
- **Bridge Max Age (6–40 Sec)**—Type the maximum age. The range is 6 to 40 seconds. When the maximum age is reached, if a Bridge Protocol Data Unit (BPDU) has still not been received from the Root Bridge, your switch module will start sending its own BPDU to all other switches for permission to become the Root Bridge. If your switch module has the lowest bridge identifier, it will become the Root Bridge.
- **Bridge Hello Time (1–10 Sec)**—Type the hello time. The range is 1 to 10 seconds. This time is the interval between two transmissions of BPDU packets sent by the Root Bridge to tell all other switches that it is indeed the Root Bridge. If you set a hello time for your switch module and it is not the Root Bridge, the default hello time will be used until your switch module becomes the Root Bridge.
- **Bridge Forward Delay (4–30 Sec)**—Type the forward delay time. The range is 4 to 30 seconds. This interval is the time any port on the switch module spends in the listening state while moving from the blocking state to the forwarding state.
- **Bridge Priority (0–65535 Sec)**—Type the bridge priority. A priority for the switch module can be set from 0 to 65,535. Zero indicates the highest priority. The priority number is used in the voting process between switches on the network to determine which switch will be the root switch. A low number indicates a high priority, and a higher probability that this switch module will be elected as the root switch.

2. Click **Apply** after making changes to the settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, “Saving Changes,” earlier in this chapter.

Setting Spanning Tree Parameters on the Port Level

Once STP is enabled on the switch module, you can configure ports to participate in the spanning tree domain, by enabling or disabling the STP function on a per port basis. Ports can also be configured in STP bypass mode (fast forward mode) that allows the port to skip the initial STP states (listening and learning) before enabling it in the forwarding state.

To enable STP on the port level:

1. Select **STP Port Settings** from the **Spanning Tree** menu. The following screen is displayed.

STP Port Settings

From	To	State	Cost(1~65535)	Priority(0~255)	ByPass	Apply
Port 1	Port 1	Disabled	19	128	No	Apply

The STP Port Information

Port	Connection	STP Status	Cost	Priority	ByPass	Port State
1	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
2	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
3	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
4	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
5	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
6	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
7	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
8	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
9	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
10	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
11	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
12	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
13	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
14	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
15	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
16	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
17	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
18	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
19	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
20	100M/Full/802.3x	Enabled	19	128	Yes	Forwarding
21	100M/Full/None	Enabled	19	128	No	Forwarding
22	100M/Full/None	Enabled	19	128	No	Forwarding
23	100M/Full/None	Enabled	19	128	Yes	Forwarding
24	---	Enabled	19	128	No	Disabled
25	---	Enabled	4	128	No	Disabled
26	---	Enabled	4	128	No	Disabled

2. Select the first port to be configured in the **From** field.
3. Select the last port to be configured in the **To** field.
4. In the **State** field, select the STP state for the port, either **Enabled** or **Disabled.**
5. In the **Cost (1–65535)** field, type a port cost between 1 and 65,535. The lower the cost, the greater the probability that the port will be chosen as the designated port to forward packets.
6. In the **Priority (0–255)** field, type a port priority from 0 to 255. The lower the priority, the greater the probability that the port will be chosen as the root port.

7. In the **ByPass** field, select **Yes** or **No.** The bypass sets the forward delay timer to zero, thus bypassing the waiting time before the listening state. (This procedure is also known as fast forward.)
8. Click **Apply** after making changes to the settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring Static (Destination Address) Filtering Table

The interconnect switch uses a filtering database to segment the network and control communications between segments. It can also filter packets off the network for intrusion control. Static filtering entries can be made by MAC address.

Each port on the switch module is a unique collision domain and the interconnect switch filters (discards) packets whose destination lies on the same port as where it originated. This keeps local packets from disrupting communications on other parts of the network.

For intrusion control, whenever an interconnect switch encounters a packet originating from or destined to a MAC address entered into the filter table, the interconnect switch will discard the packet.

Some filtering is done automatically by the switch module, including:

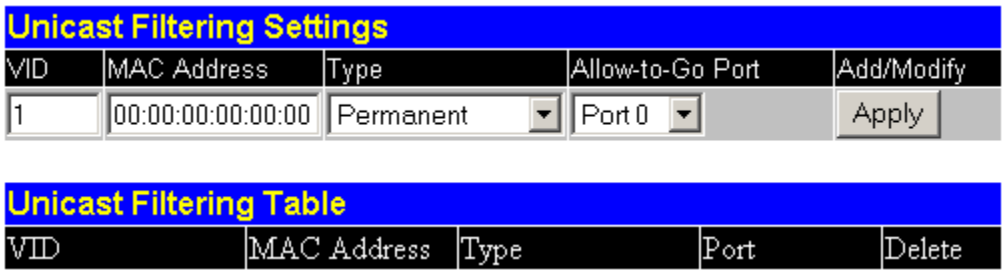
- Dynamic filtering, which is automatic learning and aging of MAC addresses and their location on the network. Filtering occurs to keep local traffic confined to its segment.
- Filtering done by the Spanning Tree Protocol that can filter packets based on topology, making sure that the signal loops do not occur.
- Filtering done for VLAN integrity. Packets from a member of a VLAN destined for a device on another VLAN will be filtered.

Some filtering requires the manual entry of information into a filtering table. This includes MAC address filtering, which is the manual entry of specific MAC addresses to be filtered from the network. Packets sent from one manually entered MAC address can be filtered from the network. The entry may be specified as source, destination, or both.

Adding Unicast Filter Actions

To add unicast filter actions:

1. Select **Unicast Filtering** from the **Static Filtering Table** menu. The following screen is displayed.



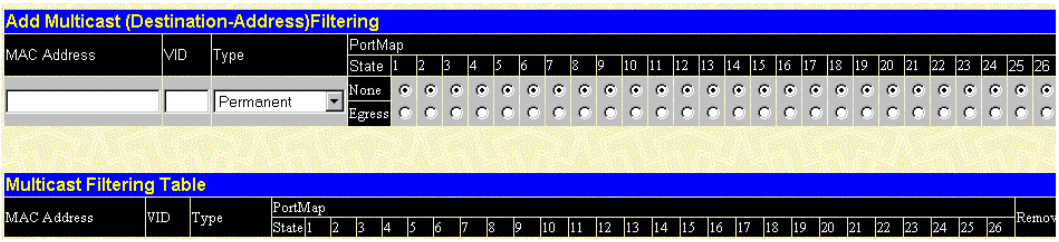
2. In the **VID** field, type the VID number of the VLAN to which the MAC address belongs.
3. In the **MAC Address** field, type the MAC address from which packets will be statically filtered.
4. In the **Type** field, select the filter type, either **Permanent** or **DeleteOnReset.**
5. In the **Allow-to-Go-Port** field, select the port on which the MAC address resides.
6. Click **Apply** after making changes to the settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Adding Multicast Filtering

To add multicast filter actions:

1. Select **Multicast Filtering** from the **Static Filtering Table** menu. The following screen is displayed.



2. In the **MAC Address** field, type the MAC address of the static source of multicast packets.
3. In the **VID** field, type the VID number of the VLAN to which the MAC address belongs.
4. In the **Type** field, select the filter type, either **Permanent** or **DeleteOnReset.**
5. In the **Port Map** field, select the ports that will be members of the static multicast group and ports that have no restrictions from joining dynamically.

6. Click **Apply** after making changes to the settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring VLANs

A Virtual Local Area Network (VLAN) is a network topology configured according to a logical scheme rather than the physical layout. VLANs can be used to combine any collection of physical LAN segments into an autonomous user group that appears as a single LAN. VLANs also logically segment the network into different broadcast domains so that logical packets are forwarded only between ports within that VLAN. Typically, a VLAN corresponds to a particular subnet, although not necessarily. VLANs can enhance performance by conserving bandwidth, and improve security by limiting traffic to specific domains.

The switch module supports only port-based IEEE 802.1Q tag-capable VLANs.

VLAN membership for each port can be set as follows:

- **Egress Port**—This is a port on the interconnect switch that belongs to at least one VLAN. By default all ports are egress members of DEFAULT_VLAN.
  - **Untagged Member**—Ports that are untagged members of a VLAN participate in the VLAN, but no tag is associated to the packet when leaving that port. Untagged member ports can only be a member of one VLAN at a time.
  - **Tagged Member**—Ports with tagging enabled will insert the IEEE 802.1Q tag with the VID number into all packets that flow out of it. Tagged member ports can be members of multiple VLANs at a time, as packets are tagged with the VLAN ID from which they originated. Tagged member ports link IEEE 802.1Q trunks that work as inter-switch connections to forward packets belonging to multiple VLANs, to which those tagged member ports belong. If a packet has been tagged, the port does not alter the packet, thus keeping the VLAN information intact. The VLAN information in the tag can then be used by other 802.1Q compliant devices on the network to make packet-forwarding decisions.
- **Forbidden Non-member**—These ports are not a member of the VLAN and are also forbidden from joining a VLAN dynamically when GVRP is enabled.

If ingress filtering is enabled for a port, the interconnect switch examines the VLAN information in the packet header (if present) and decides whether or not to forward the packet. The VID should match the PVID of that port, otherwise, that incoming packet is discarded.

Packets cannot cross VLANs. If a member of one VLAN wants to connect to another VLAN, it must do so through a router.

Default VLAN

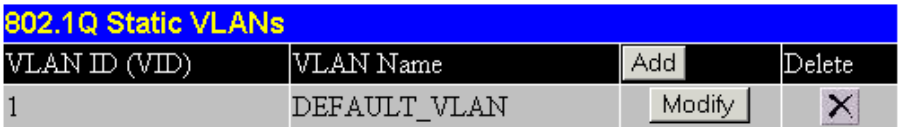
The switch module reserves one VLAN, VID 1, also called DEFAULT_VLAN. The factory default setting assigns all ports on the switch module to the default VLAN. As new VLANs are configured, their respective member ports are removed from the default VLAN.

Characteristics of DEFAULT_VLAN include:

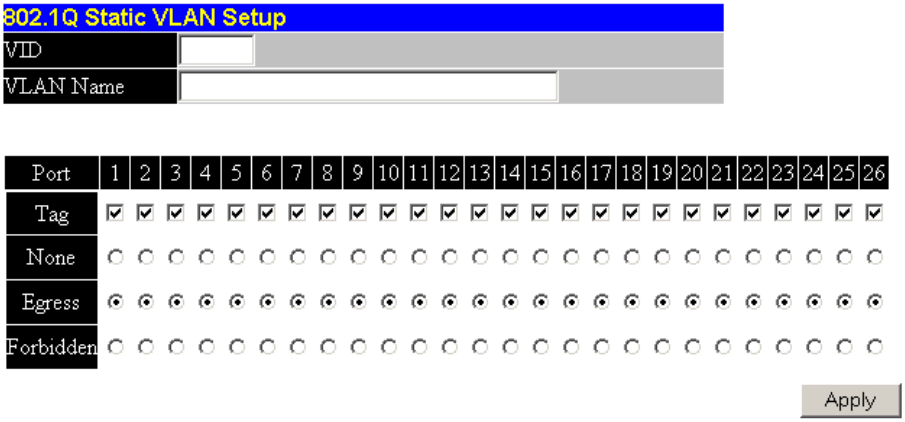
- DEFAULT_VLAN is an IEEE 802.1Q Static VLAN with VID equal to 1.
- DEFAULT_VLAN cannot be deleted.
- The VID cannot be changed. The VID that is equal to 1 is reserved for DEFAULT_VLAN.
- The VLAN name can be changed to any other valid VLAN name.
- You cannot delete a port from DEFAULT_VLAN, unless it is a member of another 802.1Q VLAN.
- You cannot forbid a port from DEFAULT_VLAN, unless it is a member of another 802.1Q VLAN.
- If a port is deleted from the only 802.1Q VLAN of which it is a member, then it will automatically become a member of DEFAULT_VLAN as an untagged, egress port.
- If a port is assigned to a user-created 802.1Q VLAN, and is **not** a tagged egress port member of DEFAULT_VLAN (in other words, it is an untagged egress port), then it will be deleted automatically from DEFAULT_VLAN.
- A tagged egress port of DEFAULT_VLAN will not be deleted from DEFAULT_VLAN, when it is assigned to another user-created 802.1Q VLAN.

To configure a VLAN:

1. Select **Static VLAN Entry** from the **VLAN** menu. The following screen is displayed



The **802.1Q Static VLANs** window allows you to create or delete entries to the 802.1Q Static VLAN table. To add an entry to this table, click **Add** and then fill in the appropriate information in the following window. To modify an entry, click **Modify** beside the appropriate VID. To delete an entry, click the icon in the **Delete** column.



2. Type the VLAN ID number of the VLAN you want to add in the **VID** field. The range is 1 to 4094. This field is grayed out in the **Modify** mode.
3. Type the name of the VLAN that is being created in the **VLAN Name** field.
4. In the **Tag** field, click the check box to designate the port as tagging. Leave the box unchecked for untagging.
5. In the **None** field, select the radio button to specify that the port is **not** a static member of the VLAN, and has no restrictions for joining the VLAN dynamically through GVRP.
6. In the **Egress** field, select the radio button to specify that the port is a static member of the VLAN. Egress member ports transmit traffic for the VLAN.
7. In the **Forbidden** field, select the radio button to specify the port is not a member of the VLAN, and is forbidden from dynamically becoming a member of the VLAN.
8. Click **Apply** to let the changes take effect.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Setting the Port VLAN ID for a Port

Port VLAN ID (PVID) is a classification mechanism that associates a port with a specific VLAN and is used to make forwarding decisions for untagged packets received by the port. For example, if Port 2 is assigned a PVID of 3, then all untagged packets received on Port 2 will be assigned to VLAN 3. This number is generally the same as the VID number assigned to the port.

Characteristics of a PVID include:

- By default, the PVID of all ports is the same as the VID of DEFAULT_VLAN, which is equal to 1.
- When a user creates an untagged 802.1Q VLAN and assigns a port, the PVID will be changed to the VID of that 802.1Q VLAN.
- For a tagged port, the PVID will be the same as the VID of the IEEE 802.1Q VLAN to which this port was first assigned.

- If the first IEEE 802.1Q VLAN to which the tagged port is assigned is deleted, the PVID will change to that of the second IEEE 802.1Q VLAN to which the port was assigned.
- The PVID of a port can only be set to a VID of a VLAN for which the port is already a member.

GARP VLAN Registration Protocol (GVRP) is a Generic Attribute Registration Protocol (GARP) application that provides 802.1Q-compliant VLAN pruning and dynamic VLAN creation on 802.1Q tagged ports.

GVRP updates dynamic VLAN registration entries and communicates the new VLAN registration information across the network. This feature allows stations to physically move to other switch module ports and keep their original VLAN settings, without having to reconfigure the VLAN settings on the switch module.

With GVRP, the switch module can

- Exchange VLAN configuration information with other GVRP switches.
- Prune unnecessary broadcast and unknown unicast traffic.
- Dynamically create and manage VLANs on switches connected through 802.1Q tagged ports.

The switch module provides options to enable or disable GVRP capability. If an 802.1Q tagged VLAN is enabled, but the GVRP is disabled, the only VLAN feature is static VLAN registration entries. HP recommends backing up static VLAN register entries to the configuration file.

Enabling Ingress Filtering on a Per Port Basis

If ingress filtering is enabled for a port, the interconnect switch will examine the VLAN information in the packet header (if present) and decide whether or not to forward the packet. The VID should match the PVID of that port, otherwise, that incoming packet is discarded.

If the packet is tagged with VLAN information, the ingress port will first determine if the ingress port itself is a member of the tagged VLAN.

- If the ingress port is not a member of the tagged VLAN, the packet is dropped.
- If the ingress port is a member of the 802.1Q VLAN, the interconnect switch then determines if the destination port is a member of the 802.1Q VLAN, the packet is forwarded and the destination port transmits it to its attached network segment.

If the packet is not tagged with VLAN information, the ingress port tags the packet with its own PVID as a VID (if the port is a tagging port). The interconnect switch then determines if the destination port is a member of the same VLAN (has the same VID) as the ingress port.

- If the destination port is not a member of the same VLAN, the packet is dropped.
- If the destination port is a member of the same VLAN, the packet is forwarded and the destination port transmits it on its attached network segment.

Ingress filtering is used to conserve bandwidth within the interconnect switch by dropping packets that are not on the same VLAN as the ingress port at the point of reception. This eliminates the subsequent processing of packets that will just be dropped by the destination port.

To set the port VLAN ID (PVID) and enable GVRP for a port:

1. Select **Port VLAN ID (PVID)** from the **VLANs** menu. The following screen is displayed.

802.1Q Port Settings

From	To	PVID	Ingress	GVRP	Apply
Port 1	Port 1	1	Off	Off	Apply

802.1Q Port Table

Port	PVID	Ingress	GVRP
1	1	Off	Off
2	1	Off	Off
3	1	Off	Off
4	1	Off	Off
5	1	Off	Off
6	1	Off	Off
7	1	Off	Off
8	1	Off	Off
9	1	Off	Off
10	1	Off	Off
11	1	Off	Off
12	1	Off	Off
13	1	Off	Off
14	1	Off	Off
15	1	Off	Off
16	1	Off	Off
17	1	Off	Off
18	1	Off	Off
19	1	Off	Off
20	1	Off	Off
21	1	Off	Off
22	1	Off	Off
23	1	Off	Off
24	1	Off	Off

The **802.1Q Port Settings** window allows you to assign a Port VLAN ID (PVID) number, enable or disable the ingress filtering check, and enable or disable GVRP for individual ports. Ingress filtering means that a receiving port will check to see if the port is a member of the VLAN ID in the packet before forwarding the packet.

2. In the **From** and **To** fields, select the range of ports to be included in the settings.

3. In the **PVID** field, type the PVID. This tuning variable allows for subnetworks that are expected to lose a large number of packets. The PVID is used by the port to tag outgoing, untagged packets and to make filtering decisions about incoming packets. If the port is specified as tagging, and an untagged packet is forwarded to the port for transmission, the port will add an 802.1Q tag using the PVID to write the VID in the tag. When the packet arrives at its destination, the receiving device uses the PVID to make VLAN forwarding decisions. If the port receives a packet, and ingress filtering is enabled, the port compares the VID of the incoming packet to its PVID. If the two are unequal, the port drops the packet. If the two are equal, the port receives the packet.
4. In the **Ingress Filter** field, select **Off** or **On** to specify that the port checks the VID of incoming packets against its VID or PVID. If the two are equal, the port receives the packet. It the two are unequal, the port drops the packet. This setting is used to limit traffic to a single VLAN.
5. In the **GVRP** field, select **Off** or **On** to enable or disable GARP VLAN Registration Protocol.
6. Click **Apply** after making changes to the settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, “Saving Changes,” earlier in this chapter.

Configuring Bandwidth

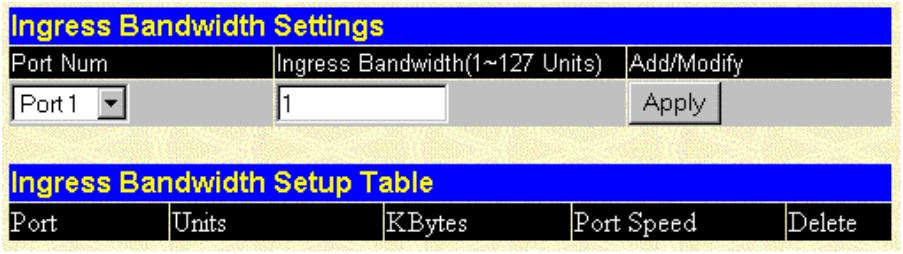
The GbE Interconnect Switch allows you to set a bandwidth limitation that restricts the ingress (receiving) and egress (transmitting) packet rate for each port. If the packet rate exceeds the allowed bandwidth rate, the excess packets will be dropped.

Bandwidth is configured in 1 to 127 units. Each unit is 117,481 bytes per second (around 0.94 Mb/s) for ports 1-26 and 939,850 bytes (about 7.52 Mb/s) for optional ports.

Configuring the Restart Ingress Bandwidth Settings

To configure the restart ingress bandwidth settings for a port:

1. Select **Restart Ingress Bandwidth** from the **Port Bandwidth** menu. The following screen is displayed.



2. Select the desired port in the **Port Num** field.
3. Type a number between 1 and 127 in the **Ingress Bandwidth (1–127 Units)** field.
4. Click **Apply.**
5. Select **Restart System** from the **Maintenance** menu.
6. Select **Yes** to save the settings.
7. Click **Restart.** The system reboots and saves your settings.

NOTE: To delete an entry, click the icon in the **Delete** column on the **Ingress Bandwidth Setup Table.**

Displaying the Current Ingress Bandwidth Table

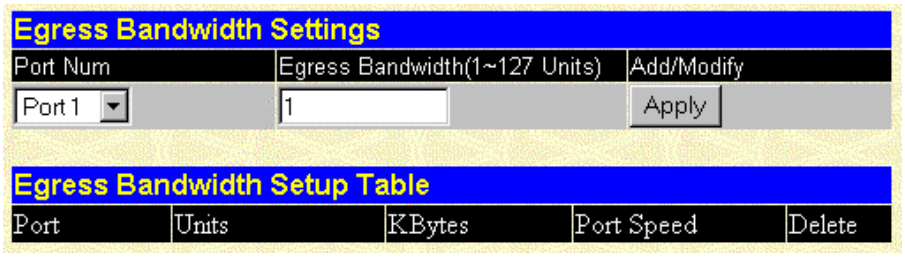
To display the current ingress bandwidth table, select **Current Ingress Bandwidth** from the **Port Bandwidth** menu. The following screen is displayed.

Current Ingress Bandwidth Table is a read-only screen displaying current ingress bandwidth information.

Configuring the Restart Egress Bandwidth Settings

To configure egress bandwidth for a specific port:

1. Select **Restart Egress Bandwidth** from the **Port Bandwidth** menu. The following screen is displayed.



2. Select the desired port in the **Port Num** field**.**
3. Type a number between 1 and 127 in the **Egress Bandwidth (1–127 Units)** field.
4. Click **Apply** to save the change or addition.
5. Select **Restart System** from the **Maintenance** menu.
6. Select **Yes** to save the settings.
7. Click **Restart.** The system reboots and saves your settings.

NOTE: To delete an entry, click the icon in the **Delete** column on the **Egress Bandwidth Setup Table.**

Displaying the Current Egress Bandwidth Table

To display the current egress bandwidth table, select **Current Egress Bandwidth** from the **Port Bandwidth** menu. The following screen is displayed.

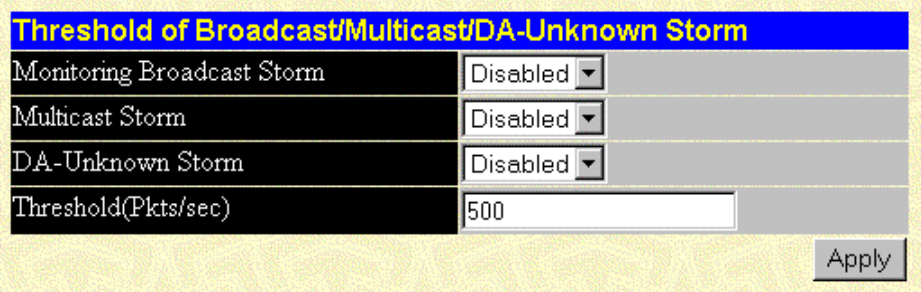
Current Egress Bandwidth Table is a read-only screen displaying current egress bandwidth information.

Configuring the Thresholds of Broadcast, Multicast, and DA-Unknown Storm Prevention or Monitoring

The switch module allows you to set the threshold (in packets per second) for three types of storms: broadcast, multicast, and one where the packet destination address (DA) is unknown. The higher the threshold, the more packets the switch module can accept per second. If the threshold is exceeded, any additional packets received are dropped. Entering a low value means packets have a greater chance to exceed the threshold and be dropped from the switch module.

To configure the thresholds of broadcast, multicast, and unknown storm prevention or monitoring:

1. Select **Threshold of Broadcast** from the **Configuration** menu. The following screen is displayed.



2. Select **Enabled** for the appropriate option.
3. Type a threshold value in the **Threshold(Pkts/sec)** field.
4. Click **Apply** to save the changes.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring Class of Service, Default Port Priority, and Traffic Class

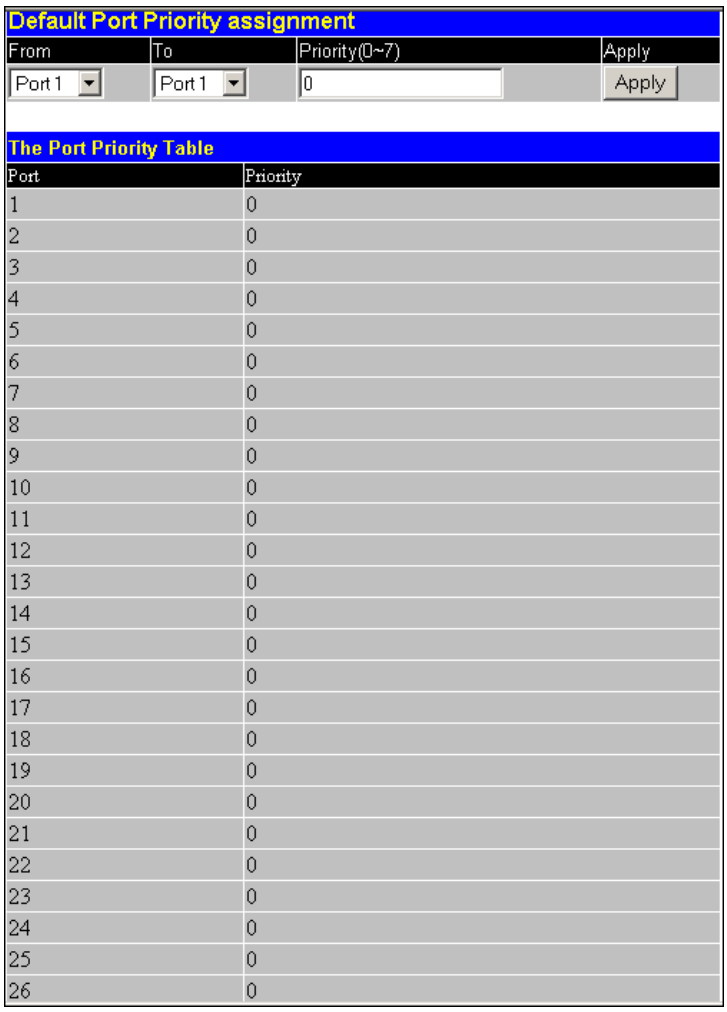
This section describes how to configure class of service, default port priority, and traffic class. For information on how to set the class of service queue options, refer to the "Configuring Advanced Switch Module Features" section earlier in this chapter.

Class of Service (CoS) for packet prioritization allows you to set priority levels on the switch module for forwarding packets based on the priority setting information in the packets. The switch module supports four classes (0-3) of traffic (buffers or queues) for implementing priority and allows eight priority levels (0-7) to be mapped to the four classes. Traffic from a specific server port can be given priority over packets from other devices according to the range of priority levels.

Setting Port Priority

To set the port priority:

1. Select **Port Priority** from the **Configuration** menu. The following screen is displayed.



Default Port Priority assignment

From	To	Priority(0~7)	Apply
Port 1	Port 1	0	Apply

The Port Priority Table

Port	Priority
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0
26	0

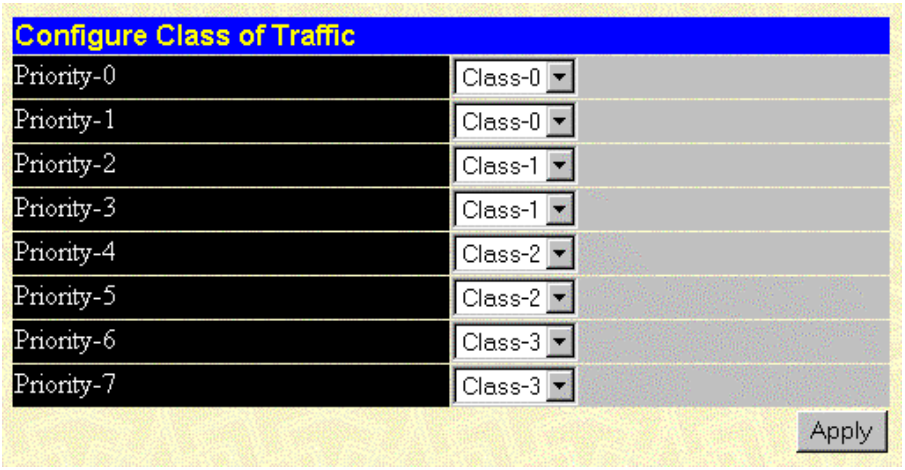
2. Select the appropriate port in the **From** and **To** fields.
3. Type the priority in the **Priority (0–7)** field.
4. Click **Apply** to save the changes.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, “Saving Changes,” earlier in this chapter.

Setting Traffic Class

To set the traffic class:

1. Select **Class of Traffic** from the **Configuration** menu. The following screen is displayed.



The **Configure Class of Traffic** window allows you to configure traffic class priority by specifying the class value, from 0 to 3, of the eight levels of priority of the switch module.

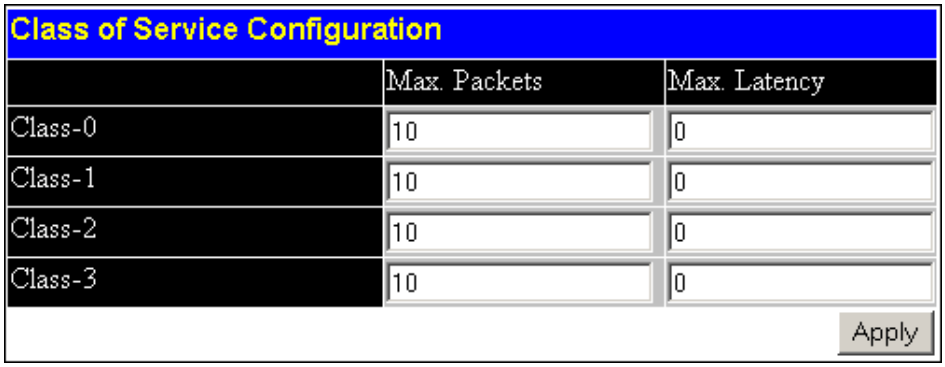
2. Select the class value for each priority.
3. Click **Apply** to save the changes.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Setting Class of Service

To set the class of service:

1. Select **Class of Service** from the **Configuration** menu. The following screen is displayed..



   The **Class of Service Configuration** window allows you to set the maximum number of packets and the maximum allowable time a packet stays in the Class of Service (CoS) queue.

2. In the **Max. Packets** field, type a value between 0 and 255. The Class of Service scheduling algorithm starts from the highest CoS for a given port, sends the maximum number of packets, then moves on to the next lower CoS. Entering zero instructs the switch module to continue processing packets until there are no more packets in the CoS transaction queue.

3. In the **Max. Latency** field, type the maximum allowable time a packet stays in the CoS queue. The packets in this queue are not delayed more than the maximum allowable latency entered in this field. The timer is disabled when this field is set to zero. Each unit of this timer is equal to 16 microseconds.

4. Click **Apply** after making changes to the settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, “Saving Changes,” earlier in this chapter.

Configuring Port Security

To configure port security for a port or range of ports:

1. Select **Port Security** from the **Configuration** menu. The following screen is displayed.

Port Security Settings

From	To	Admin State	Max.Address	Mode	Apply
Port 1	Port 1	Disabled	1	DeleteOnReset	Apply

Port Security Table

Port	Admin State	Max.Learning Addr	Lock Address Mode
1	Disabled	1	DeleteOnReset
2	Disabled	1	DeleteOnReset
3	Disabled	1	DeleteOnReset
4	Disabled	1	DeleteOnReset
5	Disabled	1	DeleteOnReset
6	Disabled	1	DeleteOnReset
7	Disabled	1	DeleteOnReset
8	Disabled	1	DeleteOnReset
9	Disabled	1	DeleteOnReset
10	Disabled	1	DeleteOnReset
11	Disabled	1	DeleteOnReset
12	Disabled	1	DeleteOnReset
13	Disabled	1	DeleteOnReset
14	Disabled	1	DeleteOnReset
15	Disabled	1	DeleteOnReset
16	Disabled	1	DeleteOnReset
17	Disabled	1	DeleteOnReset
18	Disabled	1	DeleteOnReset
19	Disabled	1	DeleteOnReset
20	Disabled	1	DeleteOnReset
21	Disabled	1	DeleteOnReset
22	Disabled	1	DeleteOnReset
23	Disabled	1	DeleteOnReset
24	Disabled	1	DeleteOnReset
25	Disabled	1	DeleteOnReset
26	Disabled	1	DeleteOnReset

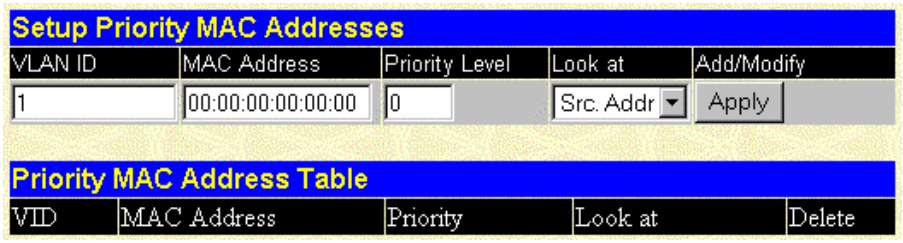
2. Select the range of ports in the **From** and **To** fields.
3. Select **Enabled** in the **Admin State** field.
4. Type the maximum number of addresses in the **Max. Address** field.
5. Select the **Mode** that you want, either **DeleteOnTimeout** or **DeleteOnReset.**
6. Click **Apply** to apply your settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, “Saving Changes,” earlier in this chapter.

Configuring Priority MAC Addresses

To set the priority level for a MAC address:

1. Select **Priority MAC Address** from the **Configuration** menu. The following screens are displayed.



2. Type the VLAN ID in the **VLAN ID** field.
3. Type the MAC address for which priority on the switch module is to be established in the **MAC Address** field.
4. Type the priority level for the MAC address in the **Priority Level** field. The range is from 0 to 7, with 0 being the highest priority.
5. In the **Look at** field, select the state under which the priority will be active. The options are:
   - **Dst. Addr**—Packets with the selected MAC address as their destination will be given the selected priority.
   - **Src. Addr**—Packets with the selected MAC address as their source will be given the selected priority.
   - **Either**—All packets with the selected MAC address will be given the selected priority.
6. Click **Apply** to apply the changes.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, “Saving Changes,” earlier in this chapter.

Configuring Switch Module Date and Time

The switch module can maintain the current date and time. This information displays on the management interfaces and is used to record the date and time of interconnect switch events in the history log.

When a new switch module is first booted up, the firmware clock starts at zero (0) and counts the seconds since bootup. In order for the clock to display the real date and time, you must either

- Manually set the date and time on the interconnect switch, or
- Enable Simple Network Time Protocol (SNTP) on the switch module, and then set the SNTP parameters.

SNTP allows the switch to synchronize its real time to the network time. When SNTP is enabled, the switch module sends a request to a primary SNTP server in each period of a specified polling interval asking for the Greenwich Mean Time (GMT). If the primary SNTP server is not available, the request is sent to a secondary SNTP server.

When SNTP is enabled, the following events cause the switch module to request the date and time through SNTP:

- The polling interval time expires.
- Changes are made to the configuration settings for Daylight Saving Time, time zone, SNTP Server 1 or Server 2, or polling interval .
- SNTP state is changed from disabled to enabled

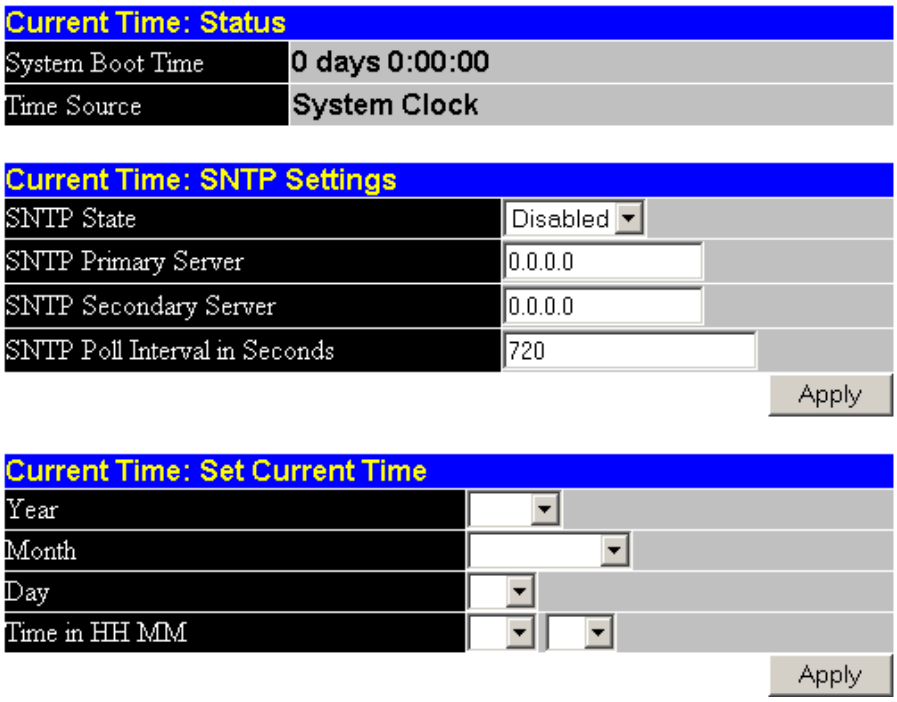
IMPORTANT: If the system clock is set and power is lost to the interconnect switch, manual time settings are reset to factory defaults when the interconnect switch is powered on. If this occurs, manually reset the date and time. If SNTP is configured, losing power has no effect, so no manual resetting of time is required.

Setting the Current Time or Enabling SNTP

To set the current time or enable SNTP:

1. Select **Time Settings** from the **Configuration** menu.

2. Select **Current Time Settings**. The following screen is displayed.



The **Current Time** screen allows you to set the current time and date, enable SNMP, and set the SNMP parameters. The screen is divided into the following three sections:

- **Current Time: Status** displays the following:
  - **System Boot Time**—The date and time when the last boot occurred
  - **Time Source**—The method in which the switch module gets the current time information: System Clock, Primary SNTP Server, or Secondary SNTP Server
- **Current Time: SNTP Settings** allows you to configure SNTP service:
  - **SNTP State**—Select **Disabled** or **Enabled**. The default is disabled.
  - **SNTP Primary Server**—Type the IP address for the primary SNTP server.
  - **SNTP Secondary Server**— Type the IP address for the secondary SNTP server, or leave as 0.0.0.0 to disable.
  - **SNTP Poll Interval in Seconds**—Type the polling interval (in seconds) for requesting the time from the server. A number from 30 to 99999 is allowed. The default is 720.
- **Current Time: Set Current Time** allows you to manually set the current date and time. This screen is grayed out if SNTP state is enabled. To manually set the date and time, enter the following:
  - **Year**—Select the current year.
  - **Month**—Select the current month.
  - **Day**—Select of the current day of the month.

— **Time in HH MM**—Select the current time in hh mm format. Leading zeros (0) are not required.

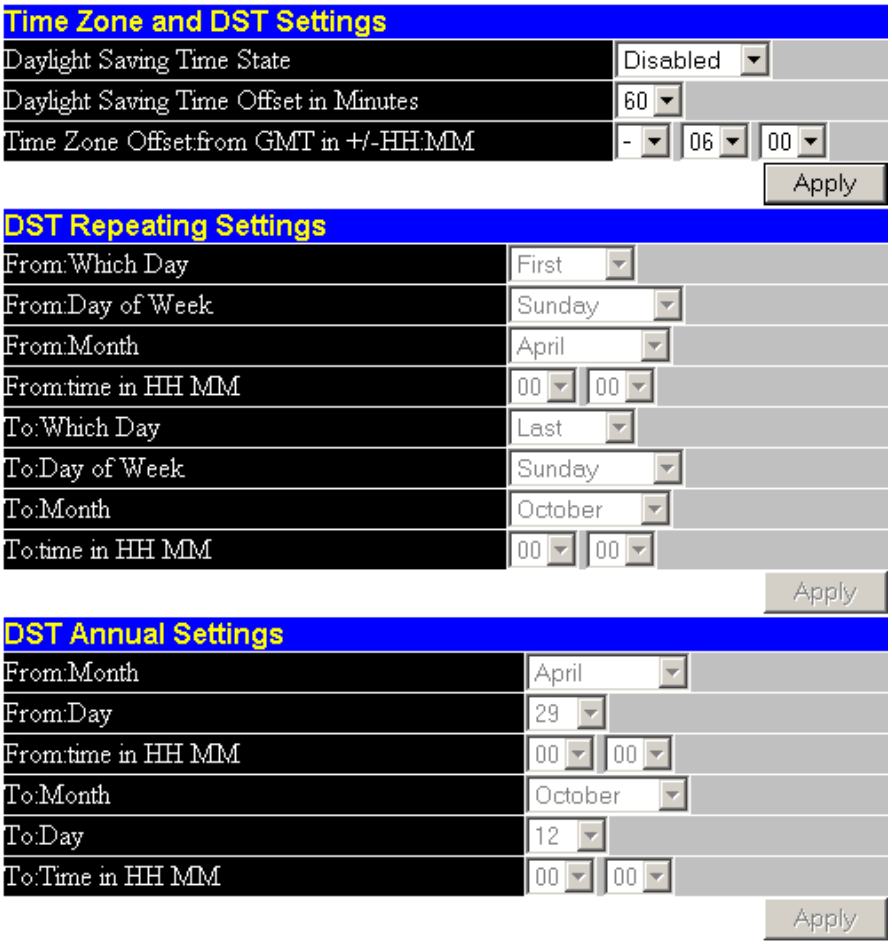
3. Click **Apply** after making changes to the settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Setting the Time Zone and Daylight Saving Time

To set the time zone and daylight saving time (DST):

1. Select **Time Settings** from the **Configuration** menu.
2. Select **Time Zone and DST**. The following screen is displayed:



The **Time Zone and DST** screen allows you to set the time zone and daylight saving time information. The screen is divided into the following three sections:

- **Time Zone and DST Settings** allows you to configure the following:
  - **Daylight Saving Time State**—Select **Disabled**, **Repeating,** or **Annual** to set if and how daylight saving time will be determined. Repeating allows you to set specific days of the week and month, for example the first Sunday in April through the fourth Sunday in October. Annual allow you to set specific dates for the year, for example April 3 through October 27.
  - **Daylight Saving Time Offset in Minutes**— Select the number of minutes that the daylight saving time is offset from the current time. Valid values are 00 to 60.
  - **Time Zone Offset: from GMT in +/- HH:MM**—Select the number of hours before or after Greenwich Mean Time (GMT) that your time zone represents.
- **DST Repeating Settings** allows you to configure when the daylight saving time offset will take effect and when its effect will be cancelled. These values only take effect if the DST status is set to Repeating.

  To set when the repeating offset will take effect, complete the following:
  - **From: Which Day**—Select from First, Second, Third, and Fourth.
  - **From: Day of Week**—Select the day of the week.
  - **From: Month**—Select the month.
  - **From: Time in HH MM**—Select the time in hh mm format.

  To set when the offset will be cancelled, complete the following:
  - **To: Which Day**—Select from First, Second, Third, and Fourth.
  - **To: Day of Week**—Select the day of the week.
  - **To: Month**—Select the month.
  - **To: Time in HH MM**—Select the time in hh mm format.
- **DST Annual Settings** allows you to configure when the daylight saving time offset will take effect and when its effect will be cancelled. These values only take effect if the DST status is set to Annual.

  Complete the following fields for when the annual offset will take effect:
  - **From: Month**—Select the month.
  - **From: Day**—Select the day of the month.
  - **From: Time in HH MM**—Select the time in hh mm format.

  Complete the following fields for when the offset will be cancelled:
  - **To: Month**—Select the month.
  - **To: Day**—Select the day of the month.
  - **To: Time in HH MM**—Select the time in hh mm format.

3. Click **Apply** after making changes to the settings.

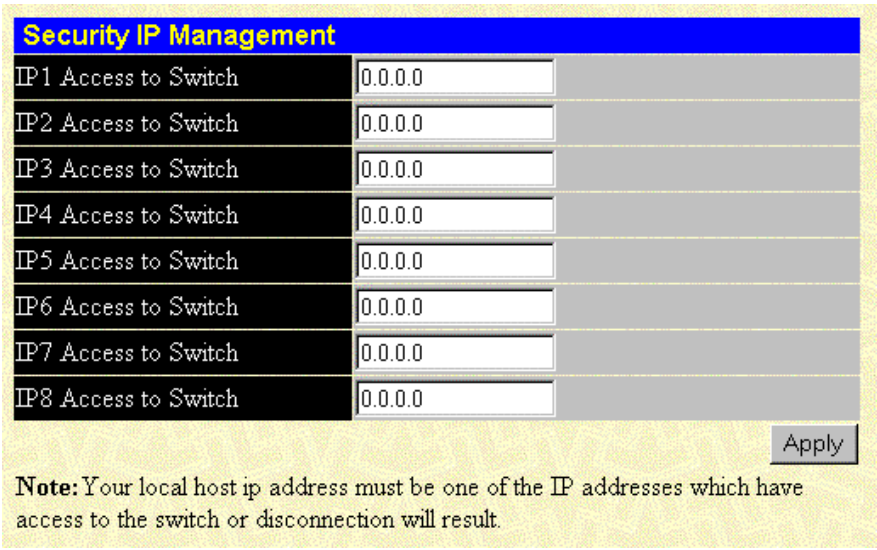
IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring the Security IP

You can enter a list of IP addresses that are allowed to access the switch by means of SNMP, Telnet, and the Web.

To specify which IP addresses are allowed to access the switch module:

1. Select **Security IP** from the **Management** menu. The following screen is displayed.



2. Type the appropriate IP addresses.
3. Click **Apply.**

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring SNMP Manager

Simple Network Management Protocol (SNMP) is an Open Systems Interconnection (OSI) Layer 7 (the application layer) protocol for remotely monitoring and configuring network devices. SNMP enables network management stations to read and modify the settings of gateways, routers, switches, and other network devices. SNMP can be used to perform many of the same functions as a directly connected console, or can be used within an integrated network management software package such as Insight Manager 7.

SNMP performs the following functions:

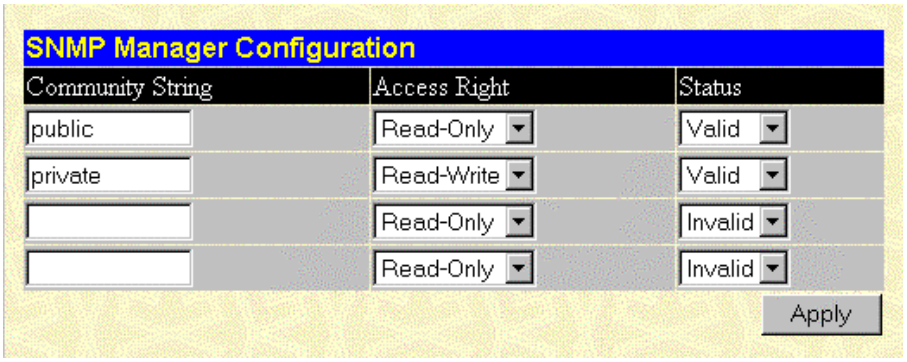
- Sends and receives SNMP packets through the IP protocol
- Collects information about the status and current configuration of network devices
- Modifies the configuration of network devices

The switch module has software, called an agent, that processes SNMP requests. The user program that makes the requests and collects the responses runs on the management station (a designated computer on the network). The SNMP agent and the user program both use the UDP/IP protocol to exchange packets.

The authentication protocol ensures that both the switch SNMP agent and the remote user SNMP application program discard packets from unauthorized users. SNMP (version 1) implements a form of security by requiring that each request include a "community string." A community string is an arbitrary string of characters used as a "password" to control access to the switch module.

To configure SNMP Manager parameters:

1. Select **SNMP Manager** from the **Management** menu. The following screen is displayed.



2. In the **Community String** field, type a user-defined SNMP community string.
3. In the **Access Right** field, select the access right of **Read-Only** or **Read-Write**.
4. In the **Status** field, set the status of the current community string to **Valid** or **Invalid.**
5. Click **Apply** after making changes to the settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter.

Configuring Trap Manager

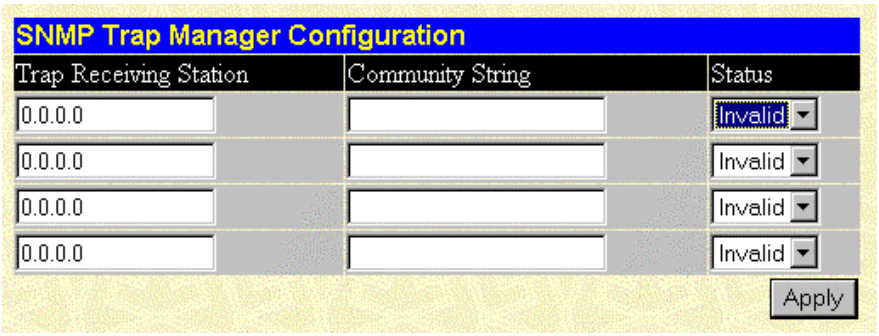
Traps are messages that alert you of events that occur on the switch module. The events can be as serious as a reboot (someone accidentally reset the interconnect switch), or less serious like a configuration file update. The switch module generates traps and sends them to the network manager (trap recipient).

Trap recipients are special users of the network who are given certain rights and access in overseeing the maintenance of the network. Trap recipients will receive traps sent from the switch module, and they may take certain actions to avoid future failure or breakdown of the network.

You can specify which network managers, may receive traps from the interconnect switch by entering a list of the IP addresses of authorized network managers. Up to four trap-recipient IP addresses and four corresponding SNMP community strings can be entered.

To configure the Trap Manager:

1. Select **Trap Manager** from the **Management** menu. The following screen is displayed.



   The **SNMP Trap Manager Configuration** window allows you to set the trap receiving station, which runs a network management application to receive and store traps.

2. In the **Trap Receiving Station** field, type the IP address of the trap receiving station.
3. In the **Community String** field, type a user-defined SNMP community string.
4. In the **Status** field, set the trap receiving station status to **Valid** or **Invalid.**
5. Click **Apply** after making changes to the settings.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, “Saving Changes,” earlier in this chapter.

Monitoring Switch Module Functions

The Web-based monitoring screens allow you to monitor the following switch module functions:

- Port Utilization
- Packets—Received (RX), UMB-cast (RX), Transmitted (TX)
- Errors—Received (RX) and Transmitted (TX)
- Size—Packet Size
- Trunk Utilization
- MAC Address Table
- IGMP Snooping Table
- Dynamic Group Registration
- VLAN Status Table

Monitoring the Switch Module using the Active Switch Graphic

At the top of the main page, an active graphic of the switch module displays.

You can monitor the switch module status using the following:

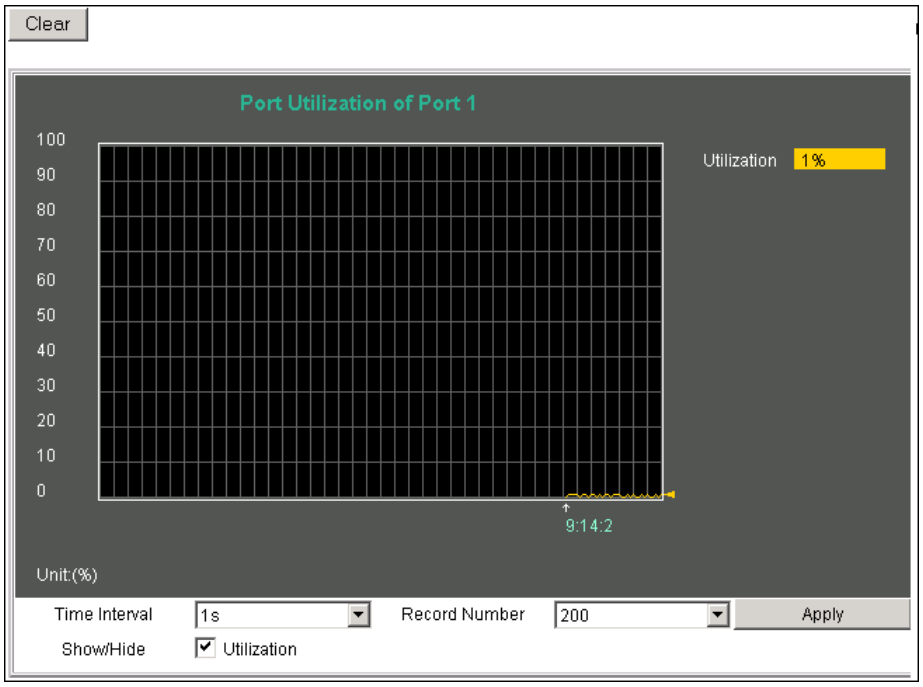
- Graphical LEDs display current link speed and activity.
- RJ-45 connectors labeled 1 through 20 represent NIC 1 (on Switch A) or NIC 2 (on Switch B) of server bays 1 through 20.
- RJ-45 connectors labeled 21 and 22 on Switch A and Switch B represent cross-connect ports.
- RJ-45 connector labeled 23 on Switch A represents the port connected to the Integrated Administrator.
- RJ-45 connector labeled Mgmt represents the Integrated Administrator Management connector (Switch A port 24 – 10/100 Ethernet).
- RJ-45 connectors labeled UpLink1 and UpLink2 represent Gigabit Ethernet Port 25 and Port 26 of the switch module.

IMPORTANT:

- RJ-45 connectors that are grayed out on the graphic of the current switch module belong to the other switch module.
- Pointing on an RJ-45 connector that belongs to this switch module displays the port number.
- Selecting an RJ-45 connector that belongs to this switch module displays the port statistics.

Monitoring Port Utilization

When you select **Port Utilization** from the **Monitoring** menu, the following screen is displayed.



The **Port Utilization** window shows the percentage of the total available bandwidth being used on a specified port. The following information is displayed:

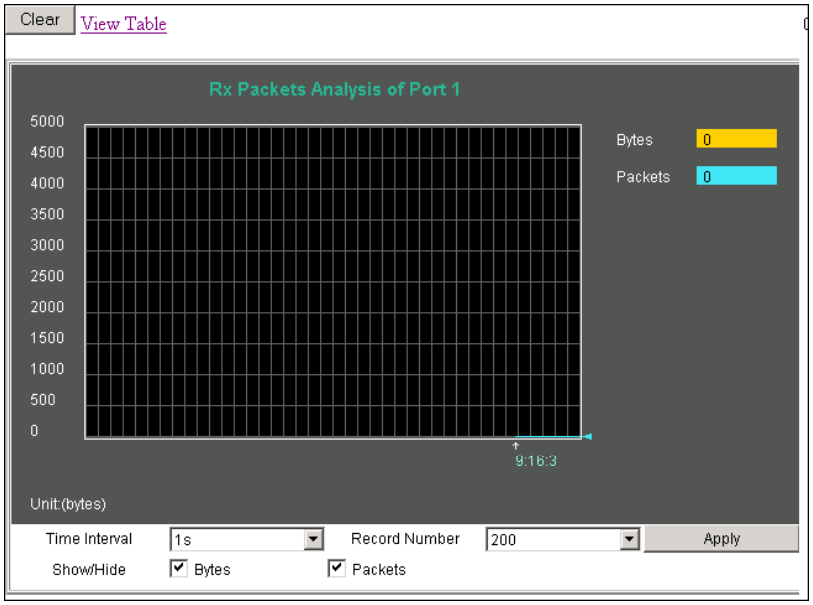
- **Utilization**—Displays the percentage of the total bandwidth being used on the specified port.
- **Time Interval**—Select the frequency at which the information on the screen is refreshed. The default is two seconds.
- **Record Number**—Select the number of polling attempts. The default is 200.
- **Show/Hide**—Select to show or hide the line graph for utilization.
- **Apply**—Select to apply any changes made to the **Time Interval**, **Record Number, and Show/Hide** fields.
- **Clear**—Select to reset the counters.

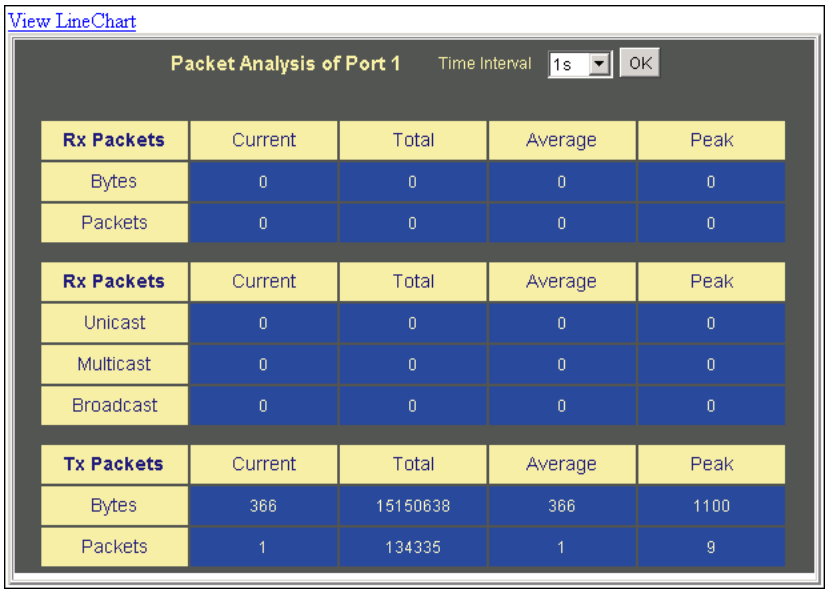
Monitoring Port Packet Analysis

The Web manager allows various packet statistics to be viewed as either a line graph or a table. You can select the type of graphic to display by clicking **View Table** or **View Line Chart.**

Monitoring Received (RX) Packets

To monitor received packets, select **Received (RX) Packets** from the **Packets** menu. The following screens are displayed.





Rx Packets	Current	Total	Average	Peak
Bytes	0	0	0	0
Packets	0	0	0	0

Rx Packets	Current	Total	Average	Peak
Unicast	0	0	0	0
Multicast	0	0	0	0
Broadcast	0	0	0	0

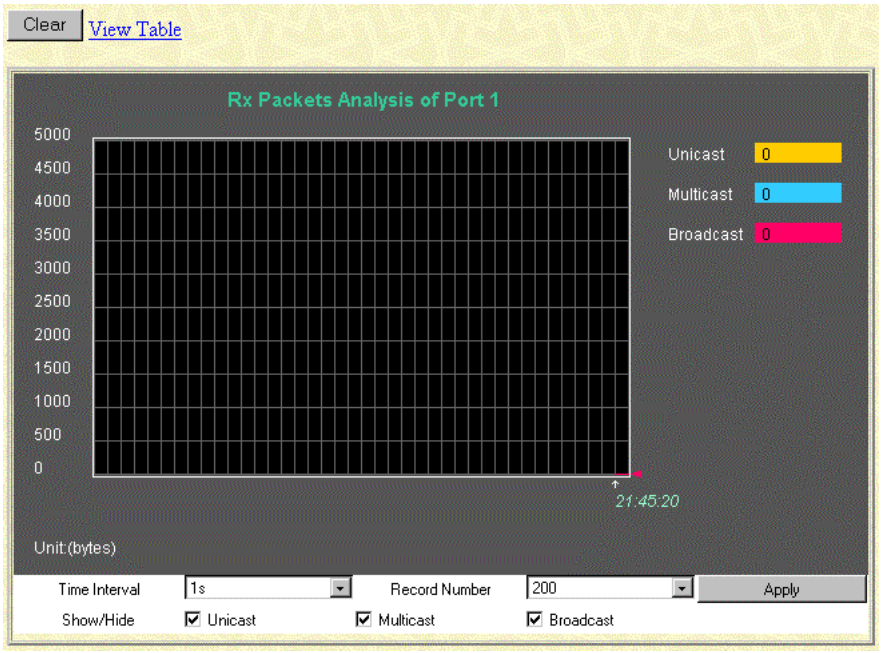
Tx Packets	Current	Total	Average	Peak
Bytes	366	15150638	366	1100
Packets	1	134335	1	9

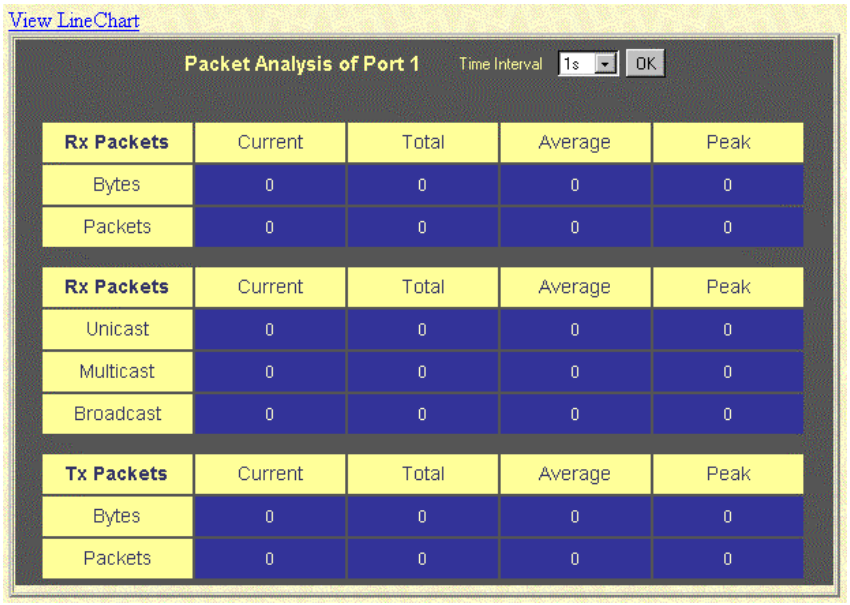
The **Rx Packets Analysis** window displays the number of bytes and packets received on the port. The following information is displayed:

- **Time Interval**—Select the frequency at which the information on the screen is refreshed. The setting is between 1s and 60s, where "s" stands for seconds. The default value is one second.
- **Record Number**—Select the number of times that the switch module will be polled. The setting can be between 20 and 200. The default value is 20.
- **Bytes**—Counts the number of bytes received on the port.
- **Packets**—Counts the number of packets received on the port.
- **Unicast**—Counts the total number of packets that were received by a unicast address.
- **Multicast**—Counts the total number of packets that were received by a multicast address.
- **Broadcast**—Counts the total number of packets that were received by a broadcast address.
- **Show/Hide**—Select to display or hide bytes and packets information.
- **Apply**—Select to apply any changes made to the **Time Interval**, **Record Number, and Show/Hide** fields.
- **Clear**—Select to reset the counters.

Monitoring Unicast, Multicast, and Broadcast (RX) Packets

To monitor unicast, multicast, and broadcast (UMB) packets, select **UMB-cast (RX) Packets** from the **Packets** menu. The following screens are displayed.





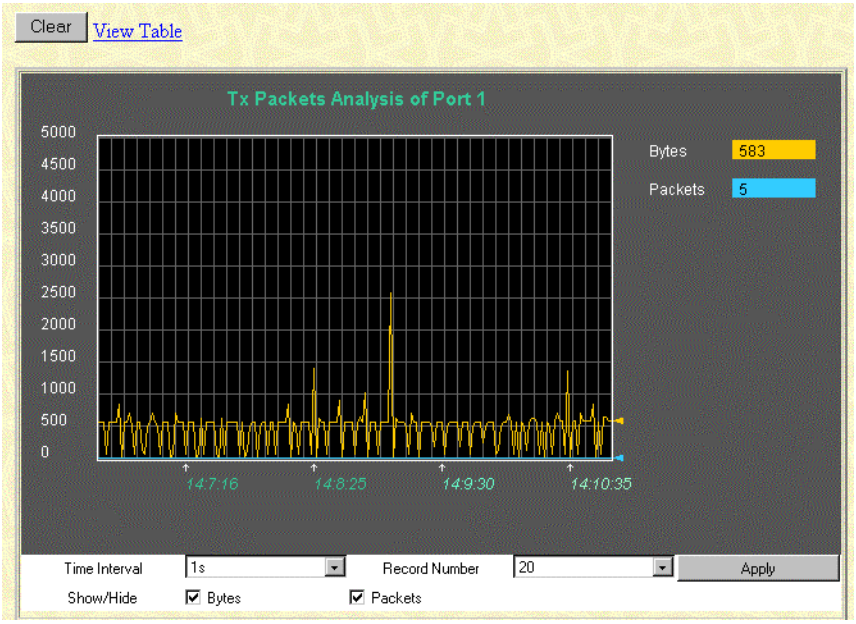
The **UMB-cast (RX) Packets** window displays the number of good bytes and packets that were received by a unicast, multicast, or broadcast address. The following information is displayed:

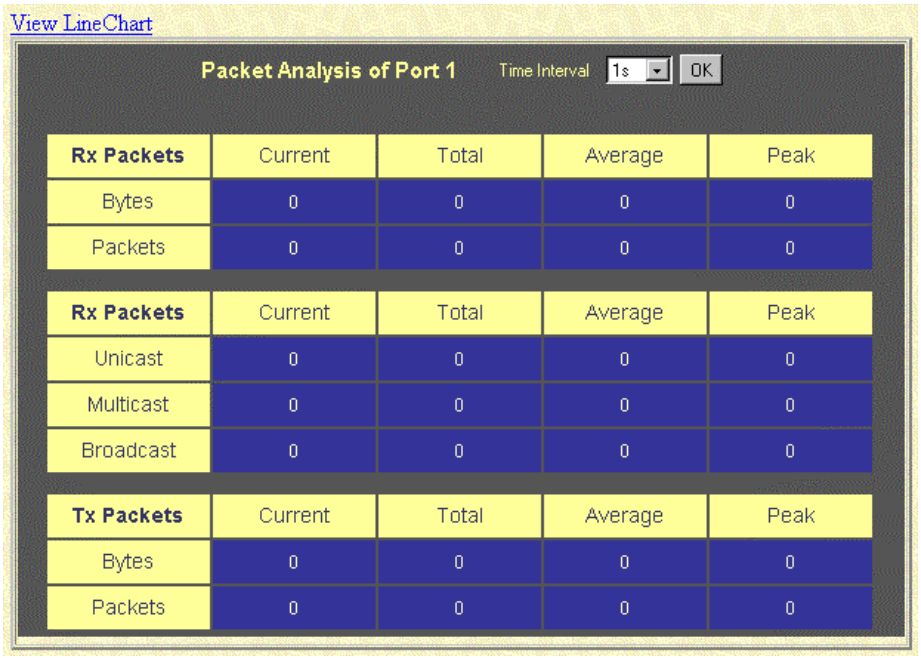
- **Time Interval**—Select the frequency at which the information on the screen is refreshed. The setting can be between 1s and 60s, where "s" stands for seconds.

- **Record Number**—Select the number of times the switch module will be polled. The setting can be between 20 and 200.
- **Bytes**—Counts the number of bytes received on the port.
- **Packets**—Counts the number of packets received on the port.
- **Unicast**—Counts the total number of good packets that were received by a unicast address.
- **Multicast**—Counts the total number of good packets that were received by a multicast address.
- **Broadcast**—Counts the total number of good packets that were received by a broadcast address.
- **Show/Hide**—Select to display or hide unicast, multicast, or broadcast packets.
- **Apply**—Select to apply any changes made to the **Time Interval**, **Record Number,** and **Show/Hide** fields.
- **Clear**—Select to reset the counters.

Monitoring Transmitted (TX) Packets

To monitor transmitted packets, select **Transmitted (TX) Packets** from the **Packets** menu. The following screens are displayed.





The **Tx Packets Analysis** window displays the number of bytes and packets successfully sent from the port. The following information is displayed:

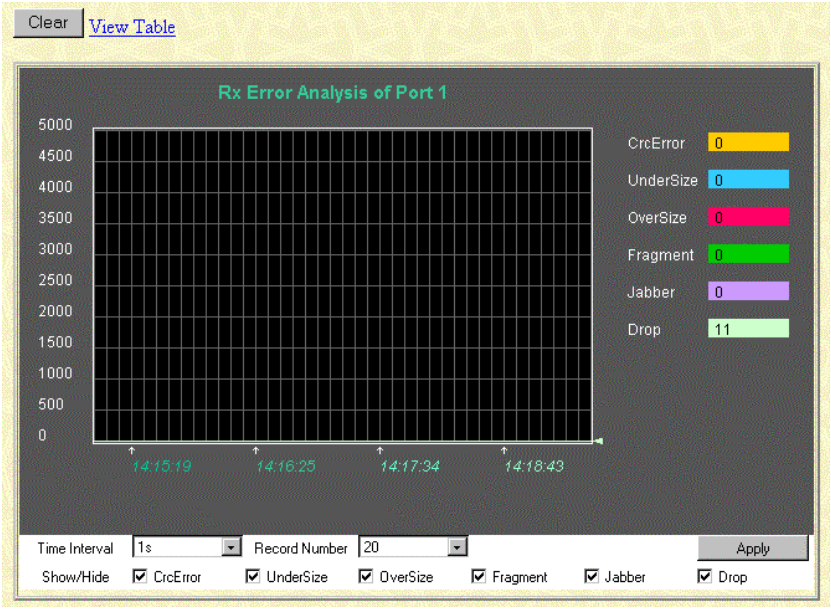
- **Time Interval**—Select the frequency at which the information on the screen is refreshed. The setting can be between 1s and 60s, where "s" stands for seconds. The default value is one second.
- **Record Number**—Select the number of times the switch module will be polled. The setting can be between 20 and 200. The default value is 20.
- **Bytes**—Counts the number of bytes successfully sent from the port.
- **Packets**—Counts the number of packets successfully sent from the port.
- **Show/Hide**—Select to display or hide bytes and packets information.
- **Apply**—Select to apply any changes made to the **Time Interval**, **Record Number,** and **Show/Hide** fields.
- **Clear**—Select to reset the counters.

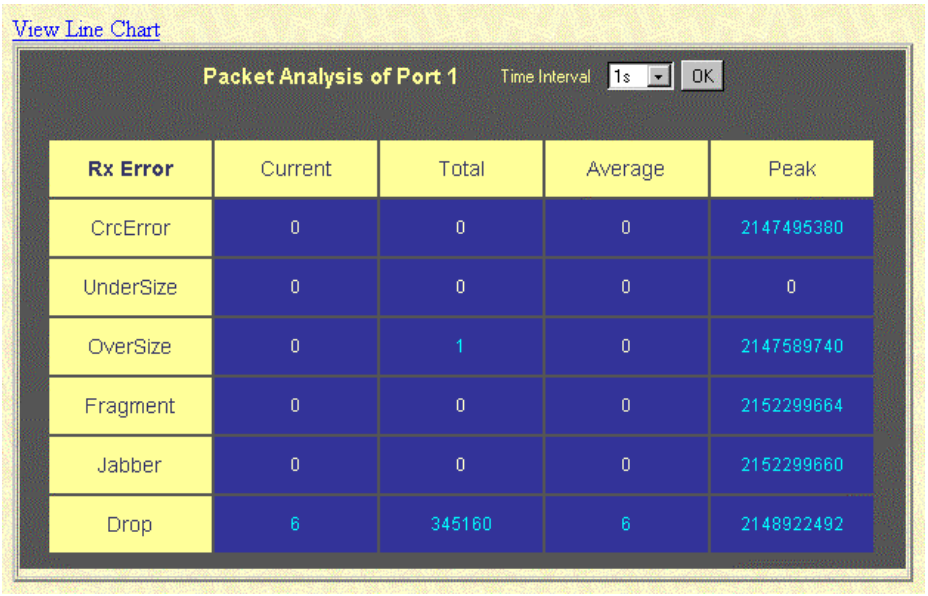
Monitoring Port Error Packets

The Web manager allows port error statistics compiled by the management agent of the switch module to be viewed as either a line graph or a table. You can select the type of graphic to display by clicking **View Table** or **View Line Chart.**

Monitoring Received (RX) Errors

To monitor received errors, select **Received (RX) Errors** from the **Errors** menu. The following screens are displayed.





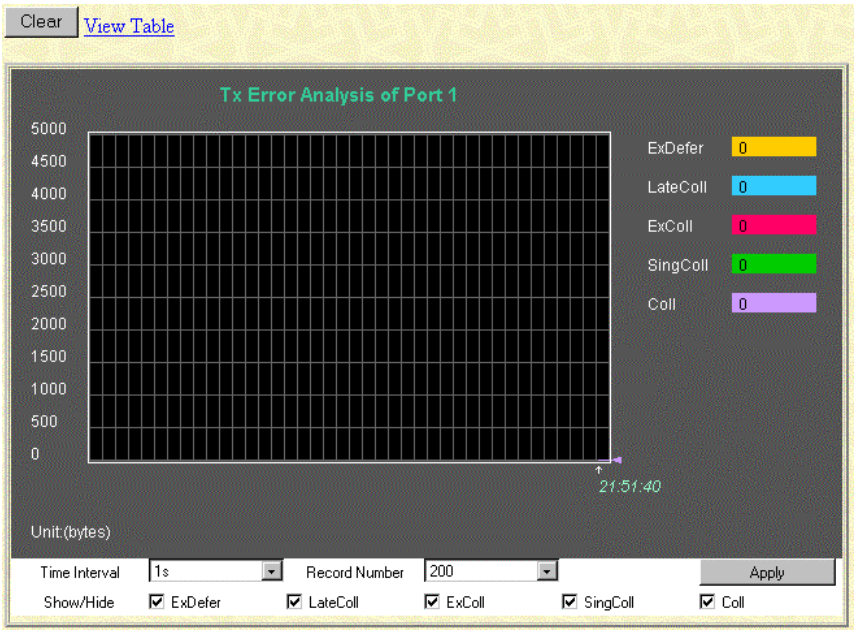
Rx Error	Current	Total	Average	Peak
CrcError	0	0	0	2147495380
UnderSize	0	0	0	0
OverSize	0	1	0	2147589740
Fragment	0	0	0	2152299664
Jabber	0	0	0	2152299660
Drop	6	345160	6	2148922492

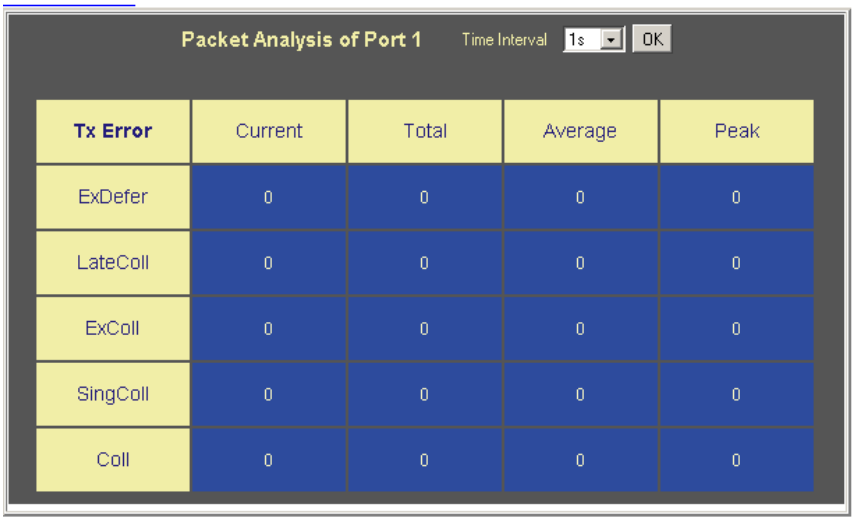
The **Rx Error Analysis** window displays the number of errors received. The following information is displayed:

- **Time Interval**—Select the frequency at which the information on the screen is refreshed. The setting can be between 1s and 60s, where "s" stands for seconds. The default value is one second.
- **Record Number**—Select the number of times the switch module will be polled. The setting can be between 20 and 200. The default value is 20.
- **CRCError**—Counts packets with Cyclic Redundancy Check (CRC) errors.
- **UnderSize**—Displays the number of frames detected that are less than the minimum permitted frame size of 64 bytes and have a good CRC. Undersized frames usually indicate collision fragments, a normal network occurrence.
- **OverSize**—Counts packets received that were longer than 1518 bytes, or if a VLAN frame, 1522 bytes, and less than the MAX_PKT_LEN. Internally, MAX_PKT_LEN is equal to 1522.
- **Fragment**—Displays the number of packets less than 64 bytes with either bad framing or an invalid CRC. These packets are normally the result of collisions.
- **Jabber**—Displays the number of frames with lengths more than the MAX_PKT_LEN bytes. Internally, MAX_PKT_LEN is equal to 1522.
- **Drop**—Displays the number of frames that were dropped by this port since the last switch module reboot.
- **Show/Hide**—Select to display or hide CrcError, UnderSize, OverSize, Fragment, Jabber, and Drop errors.
- **Apply**—Select to apply any changes made to the **Time Interval**, **Record Number,** and **Show/Hide** fields.
- **Clear**—Select to reset the counters.

Monitoring Transmitted (TX) Errors

To monitor transmitted errors, select **Transmitted (TX) Errors** from the **Errors** menu. The following screens are displayed.



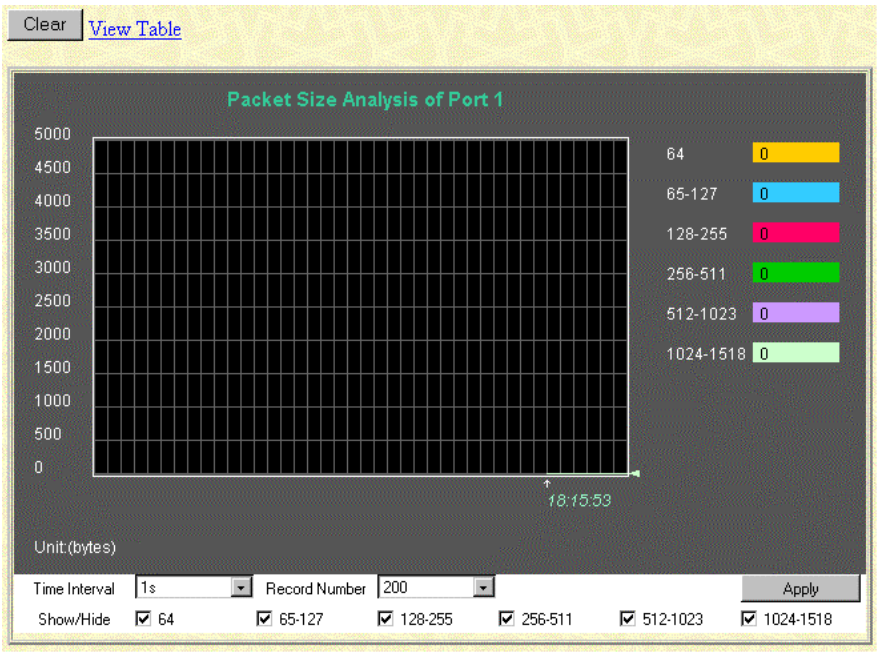


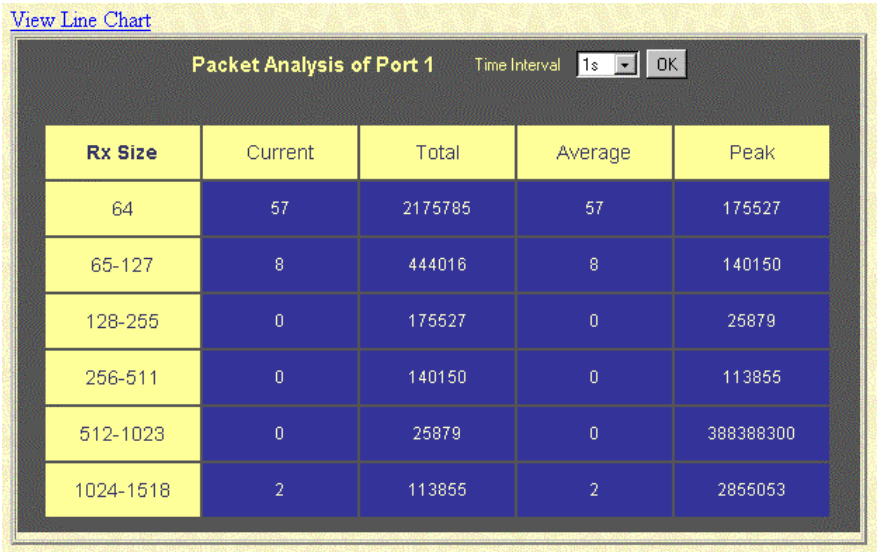
The **Tx Error Analysis** window displays the number of errors that occurred during transmission. The following information is displayed:

- **Time Interval**—Select the frequency at which the information on the screen is refreshed. The setting can be between 1s and 60s, where "s" stands for seconds. The default value is one second.
- **Record Number**—Select the number of times the switch module will be polled. This setting can be between 20 and 200. The default value is 20.
- **ExDefer**—Counts the number of frames for which the first transmission attempt on a particular interface was delayed because the medium was busy.
- **LateColl**—Counts the number of times that a collision is detected later than 512 bit-times into the transmission of a packet.
- **ExColl**—Counts the number of frames that experienced 16 collisions during transmission and were aborted.
- **SingColl**—Counts the number frames that experienced exactly one collision during transmission.
- **Coll**—Counts the number of collisions that occurred during the transmission of a frame.
- **Show/Hide**—Select to display or hide ExDefer, LateColl, CRCError, SingColl, and Coll errors.
- **Apply**—Select to apply any changes made to the **Time Interval**, **Record Number,** and **Show/Hide** fields.
- **Clear**—Select to reset the counters.

Monitoring Packet Size

To monitor packet size, select **Packet Size** from the **Size** menu. The following screens are displayed.





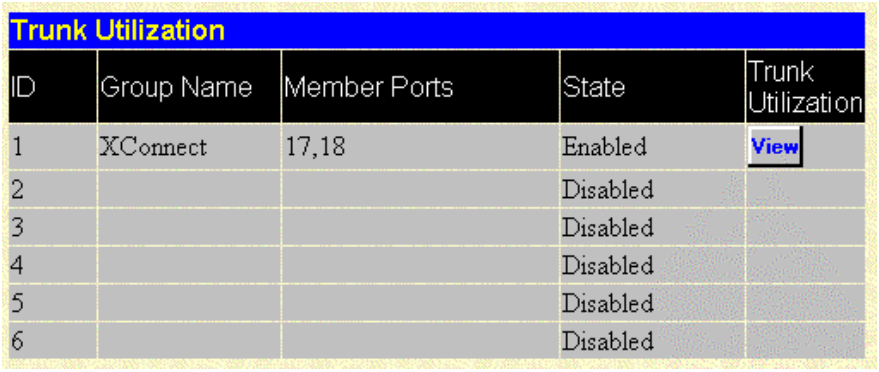
Rx Size	Current	Total	Average	Peak
64	57	2175785	57	175527
65-127	8	444016	8	140150
128-255	0	175527	0	25879
256-511	0	140150	0	113855
512-1023	0	25879	0	388388300
1024-1518	2	113855	2	2855053

The **Rx Size Analysis** window displays the number of packets received that were within a certain range of bytes in length. The following information is displayed:

- **Time Interval**—Select the frequency at which the information on the screen is refreshed. The setting can be between 1s and 60s, where "s" stands for seconds. The default value is one second.
- **Record Number**—Select the number of times the switch module will be polled. The setting can be between 20 and 200. The default value is 20.
- **64**—Displays the total number of packets (including bad packets) received that were 64 bytes in length (excluding framing bits but including FCS bytes).
- **65–127**—Displays the total number of packets (including bad packets) received that were between 65 and 127 bytes in length inclusive (excluding framing bits but including FCS bytes).
- **128–255**—Displays the total number of packets (including bad packets) received that were between 128 and 255 bytes in length inclusive (excluding framing bits but including FCS bytes).
- **256–511**—Displays the total number of packets (including bad packets) received that were between 256 and 511 bytes in length inclusive (excluding framing bits but including FCS bytes).
- **512–1023**—Displays the total number of packets (including bad packets) received that were between 512 and 1023 bytes in length inclusive (excluding framing bits but including FCS bytes).
- **1024–1518**—Displays the total number of packets (including bad packets) received that were between 1024 and 1518 bytes in length inclusive (excluding framing bits but including FCS bytes).
- **Show/Hide**—Select to display or hide received packets of the following lengths: 64, 65–127, 128–255, 256–511, 512–1023, and 1024–1518.
- **Apply**—Select to apply any changes made to the **Time Interval**, **Record Number, and Show/Hide** fields.
- **Clear**—Select to reset the counters.

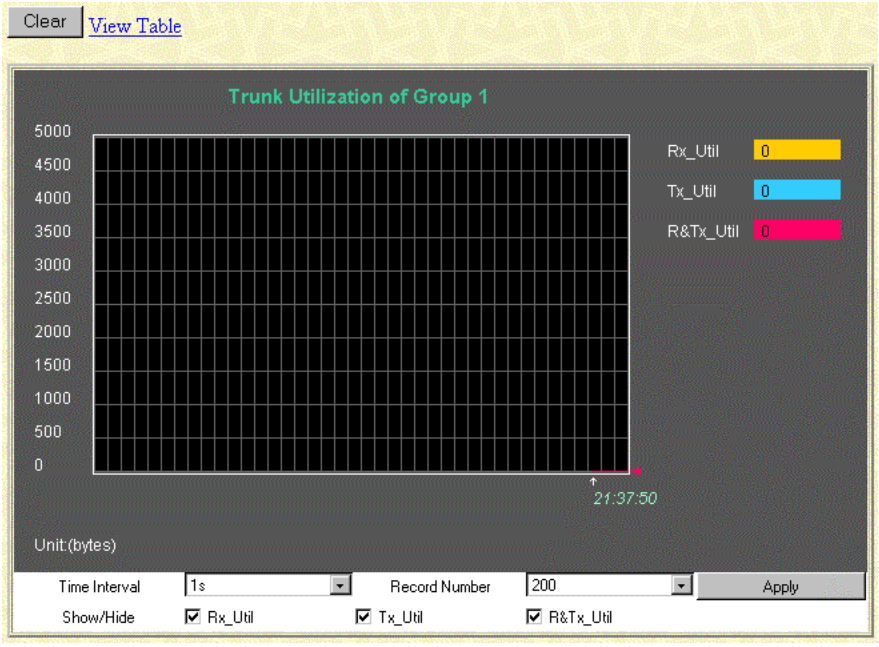
Monitoring Trunk Utilization

To monitor trunk utilization, select **Trunk Utilization** from the **Monitoring** menu. The following screens are displayed.



Trunk Utilization

ID	Group Name	Member Ports	State	Trunk Utilization
1	XConnect	17,18	Enabled	View
2			Disabled	
3			Disabled	
4			Disabled	
5			Disabled	
6			Disabled	



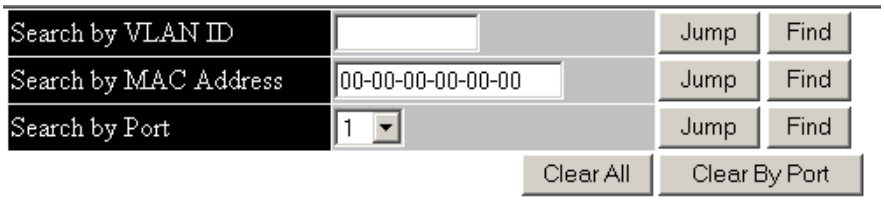
The **Trunk Utilization** window displays the port trunking groups and allows you to view graphs of three items for an individual port trunking group: the percentage of total available bandwidth being used by the group, the percentage of packets transmitted, and the percentage of packets being received per second.

The following information is displayed:

- **ID**—Identifies the group ID for the port trunking group.
- **Group Name**—Identifies the group name for the port trunking group.
- **Member Ports**—Identifies ports that are members of the trunking group.
- **State**—Identifies if the port trunking group is enabled or disabled.
- **Trunk Utilization View**—Click **View** to view a line graph for the trunk utilization
- **Rx_Util**—Displays the percentage of packets received.
- **Tx_Util**—Displays the percentage of packets received.
- **R&Tx_Util**—Displays the percentage of total available bandwidth being used by the trunking group.
- **Time Interval**—Select the frequency at which the information on the screen is refreshed. The setting can be between 1s and 60s, where "s" stands for seconds. The default value is one second.
- **Record Number**—Select the number of times the switch module will be polled. The setting can be between 20 and 200. The default value is 20.
- **Show/Hide**—Select to display or hide Rx_Util, Tx_Util, R&Tx_Util information.
- **Apply**—Select to apply any changes made to the **Time Interval**, **Record Number,** and **Show/Hide** fields.
- **Clear**—Select to reset the counters.

Monitoring MAC Address Forwarding Table

To monitor the MAC Address Forwarding Table, select **MAC Address Table** from the **Monitoring** menu. The following screens are displayed.



MAC Address Table

VID	MAC Address	Port	Learned
1	00-01-30-b8-d0-f0	21	dynamic
1	00-02-a5-07-02-43	21	dynamic
1	00-02-a5-60-f3-6a	21	dynamic
1	00-02-a5-d1-06-40	CPU	self
1	00-08-c7-4f-f5-01	21	dynamic
1	00-08-c7-6b-33-a5	21	dynamic
1	00-08-c7-91-8f-9e	21	dynamic
1	00-08-c7-cf-2c-6f	21	dynamic
1	00-08-c7-e6-42-81	21	dynamic
1	00-10-83-cf-b1-bd	21	dynamic
1	00-10-83-fd-6e-76	21	dynamic
1	00-10-a4-e7-80-68	21	dynamic
1	00-30-6e-21-6d-b9	21	dynamic
1	00-50-8b-df-75-2d	21	dynamic
1	00-50-8b-f7-ca-0f	21	dynamic
1	00-50-8b-fe-cc-20	21	dynamic
1	00-60-b0-fb-cd-01	21	dynamic
1	00-80-5f-0d-57-11	21	dynamic
1	00-80-5f-a7-11-65	21	dynamic
1	00-e0-18-c1-f4-eb	21	dynamic

Total Addresses in Table: 30 Next

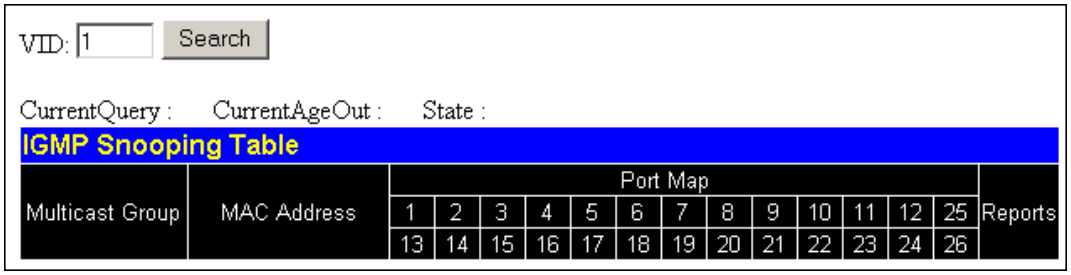
The **MAC Address Table** displays the following information:

- **Search by VLAN ID**—Type the VLAN ID you want to search for.
- **Search by MAC Address**—Type the MAC address you want to search for.
- **Search by Port**—Select the port number for which you want to search.
- **Jump**—Click this to move to a sector of the database corresponding to a user defined port, VLAN, or MAC address.
- **Find**—Click this to find the data entry.

- **Clear All**—Click this to clear all forwarding table entries.
- **Clear By Port**—Click this to clear the forwarding table entries that have the entered port number.
- **VID**—Identifies the VLAN ID of the VLAN that the port is a member of.
- **MAC Address**—Identifies the MAC address entered into the address table.
- **Port**—Identifies the port that the MAC address corresponds to.
- **Learned**—Identifies the method that the switch module used to discover the MAC address.
- **Next**—Click this to view the next page of the address table.

Monitoring IGMP Snooping Table

To monitor IGMP snooping, select **IGMP Snooping** from the **Monitoring** menu. The following screen is displayed.

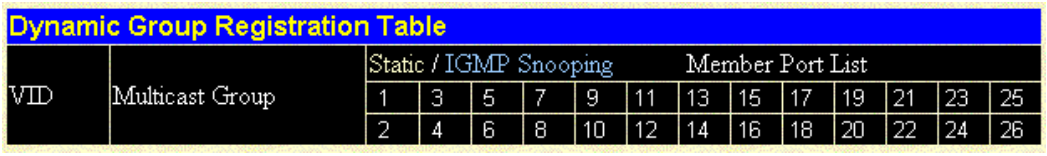


The IGMP Snooping Table is organized by VLAN ID (VID) and displays the following information:

- **VID**—Type the VLAN ID of the VLAN for which the IGMP Snooping table is to be displayed.
- **Search**—Click to search the IGMP Snooping Table for the current VID.
- **Multicast Group**—Displays the IP address of a multicast group discovered by IGMP Snooping.
- **MAC Address**—Displays the corresponding MAC address discovered by IGMP Snooping.
- **Port Map**—Displays the ports that have forwarded multicast packets.
- **Reports**—Displays the number of IGMP reports for the listed source.

Monitoring Dynamic Group Registration

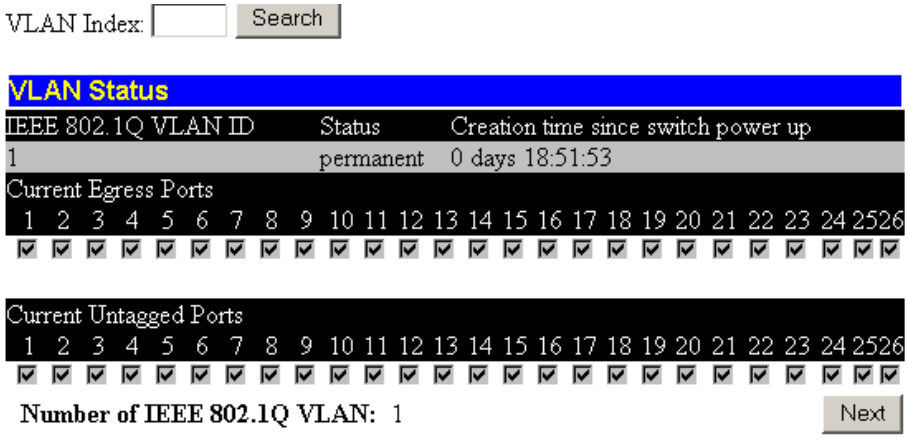
When you select **Dynamic Group Registration** from the **Monitoring** menu, the following screen is displayed.



The **Dynamic Group Registration Table** displays filtering information for VLANs that have been discovered dynamically or have been configured into the bridge by local or network management. The table specifies the set of ports that are allowed to be forwarded, based on the frames received on a VLAN for this forwarding database (FDB) and the specific group destination address for the VLAN.

Monitoring VLAN Status

When you select **VLAN Status** from the **Monitoring** menu, the following screen is displayed.



The **VLAN Status** window displays information on which VLAN ports are in egress and which are untagged.

The following information is displayed:

- **VLAN Index**—Type the VLAN ID of the VLAN for which the information is to be displayed.
- **Search**—Click to search the VLAN ID.
- **IEEE 802.1Q VLAN ID**—Displays the VLAN for which the VLAN table is displayed.
- **Status**—Displays the current status of the VID.
- **Creation time since switch power up**—Displays the hours, minutes, and seconds since the switch module was last rebooted.

- **Current Egress Ports**—Displays the current egress ports on the VLAN.
- **Current Untagged Ports**—Displays the current untagged ports on the VLAN.
- **Prev**—Click to display the previous VLAN.
- **Next**—Click to display the next VLAN.

Using System Utilities

TFTP services allow the switch module firmware to be upgraded by downloading a new firmware file from a TFTP server to the switch module. A configuration file can also be loaded into the switch module, and switch module settings can be saved to a TFTP server. In addition, the history log of the switch module can be uploaded from the switch module to a TFTP server.

Please note that TFTP server software must be running on the management station for the TFTP services to function. TFTP software is available in the interconnect switch utilities package.

The TFTP screens share the following common fields:

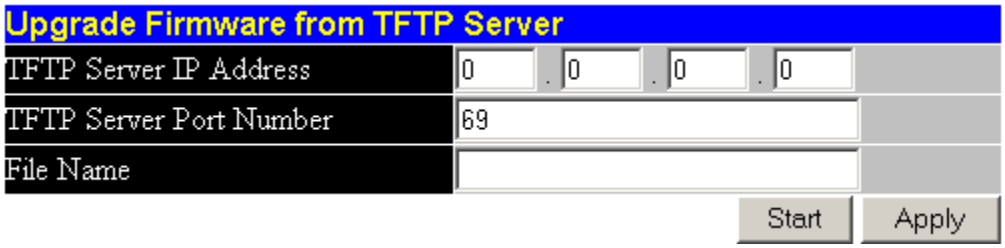
- **TFTP Server IP Address**—Identifies the IP address of the TFTP server. This server is common for all TFTP services. The default TFTP server is 0.0.0.0.
- **TFTP Server Port Address**— Identifies the port number on which the TFTP server is listening. The default is 69. The valid values are 69 and 1024-65535.
- **File Name**—Identifies the relative path based on the TFTP servers base path. The history log path and firmware file path are unique. The path for the download and upload configuration options is the same.

Upgrading Firmware

IMPORTANT: The TFTP server must be running TFTP server software to perform the file transfer. TFTP server software is included as part of the utilities package.

To upgrade the switch module firmware:

1. Select **Upgrade Firmware** from the **TFTP Services** menu. The following screen is displayed.



The **Upgrade Firmware from TFTP Server** window allows you to update the path of a new firmware file on the TFTP server.

2. Type the IP address of the TFTP Server in the **TFTP Server IP Address** field.
3. Type the TFTP server port number in the **TFTP Server Port Number** field.
4. Type the file name of the firmware file for the switch module in the **File Name** field.
5. Click **Apply** to save the TFTP server IP address, TFTP server port number, and file name into the switch module RAM.
6. Click **Start** to initiate the file transfer. The system automatically reboots after the file transfer is completed.

NOTE: A downloadable smart component, which further simplifies upgrading the switch module firmware, is available at the following website:

www.compaq.com/support/servers

Downloading a Configuration File from a TFTP Server

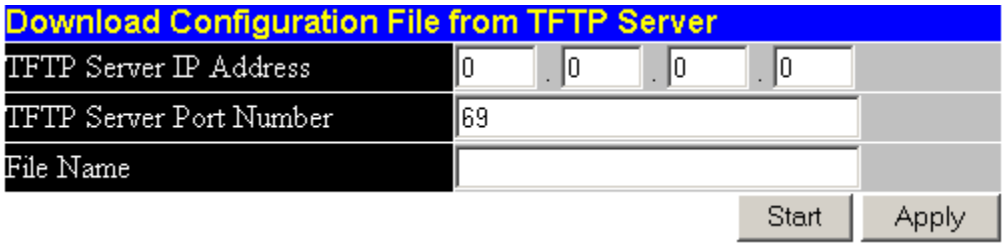
IMPORTANT: Configuration files used in the earlier version of the switch module (firmware version 1.0) are not supported by the present version (firmware version 2.0). The switch module Information window displays the firmware version.

A configuration file can be downloaded from a TFTP server to the switch module. This file is then used by the switch module to configure itself. Beginning in firmware version 2.0.0, switch firmware configuration files are specified in XML format.

Downloaded XML configuration files do not need to specify every possible parameter. Only the configuration parameters specified will be modified; others will remain unchanged.

To download a configuration file from a TFTP server:

1. Select **Download Configuration** from the **TFTP Services** menu. The following screen is displayed.



2. Type the IP address of the TFTP Server in the **TFTP Server IP Address** field.
3. Type the TFTP server port number in the **TFTP Server Port Number** field.
4. Type the file name of the configuration file for the switch module in the **File Name** field.
5. Click **Apply** to save the TFTP server IP address, TFTP server port number, and file name into the switch module RAM.
6. Click **Start** to initiate the file transfer.

NOTE: For additional information, refer to Appendix H, XML Configuration, in the *HP ProLiant e-class C-GbE Interconnect Switch User Guide*.

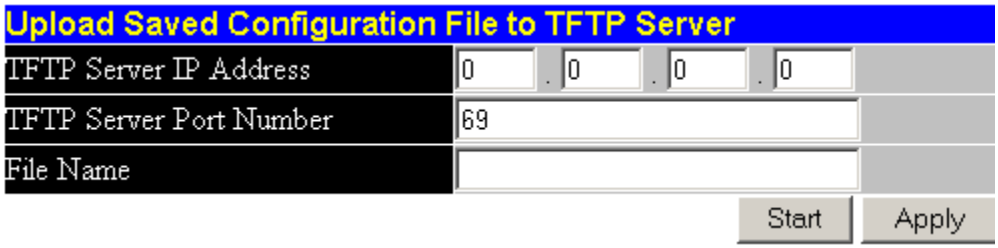
Uploading a Configuration File to TFTP Server

After saving the switch module configuration to NVRAM, HP highly recommends that you upload the configuration image to TFTP server storage.

The management agent of the switch module can upload the current switch configuration settings to a TFTP server.

To upload a configuration file to the TFTP server:

1. Select **Upload Configuration** from the **TFTP Services** menu. The following screen is displayed.



2. Type the IP address of the TFTP server in the **TFTP Server IP Address** field.
3. Type the TFTP server port number in the **TFTP Server Port Number** field.
4. Type the complete path and file name of the firmware file for the switch module in the **File Name** field.
5. Click **Apply** to save the TFTP server IP address, TFTP server port number, and file name into the switch module RAM.
6. Click **Start** to initiate the file transfer.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, "Saving Changes," earlier in this chapter. If you do not save configurations to NVRAM, the configurations you are uploading to a TFTP server will not be saved correctly.

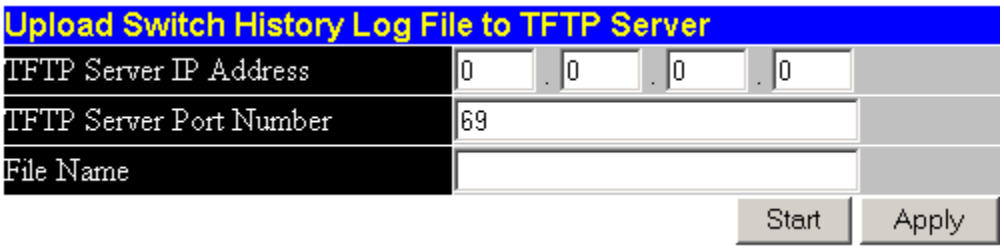
Uploading Switch History Log

The switch module management agent can upload its history log file to a TFTP server.

IMPORTANT: An empty history file on the TFTP server must exist on the server before the switch module can upload its history file.

To upload the switch history log:

1. Select **Upload Switch History Log** from the **TFTP Services Maintenance** menu. The following screen is displayed.

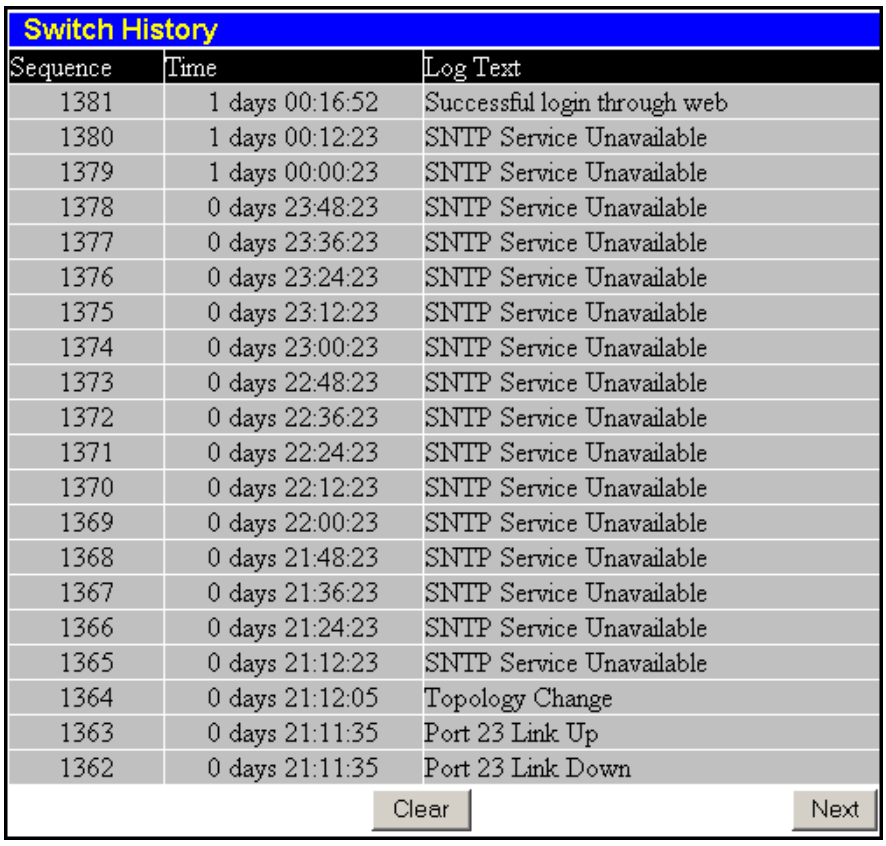


2. Type the IP address of the TFTP Server in the **TFTP Server IP Address** field.
3. Type the TFTP server port number in the **TFTP Server Port Number** field.
4. Type the complete path and file name of the firmware file for the switch module in the **File Name** field.
5. Click **Apply** to save the TFTP server IP address, TFTP server port number, and file name into the switch module RAM.
6. Click **Start** to initiate the file transfer.

Displaying Switch Module History

The switch module can record event information to its own logs, to designated SNMP trap receiving stations, and to the PC connected to the console manager.

To display switch module history, select **Switch History** from the **Maintenance** menu. The following screen is displayed.



The following information is displayed:

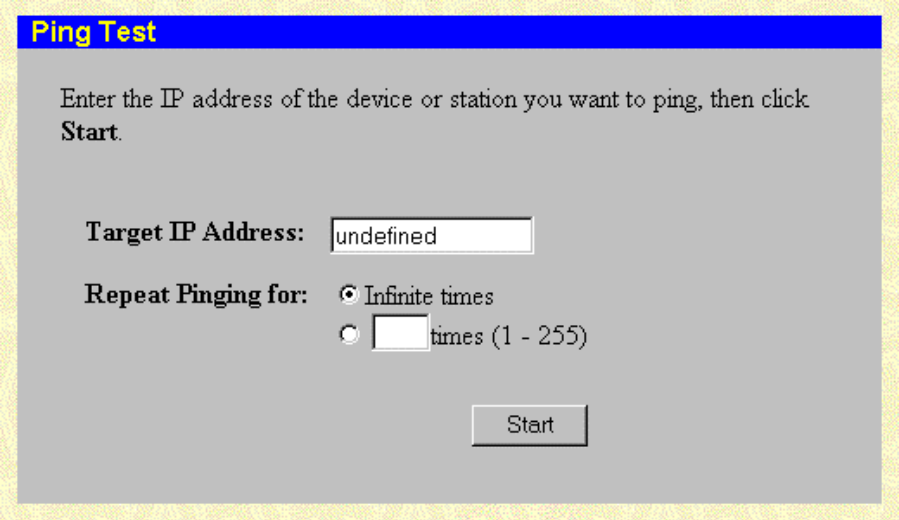
- **Sequence**—Displays a counter incremented whenever an entry to the switch module history log is made. The table displays the last entry (highest sequence number) first.
- **Time**—Displays the time of the event.
- **Log Text**—Displays text describing the event that triggered the history log entry.
- **Clear**—Clears the log.
- **Next**—Click **Next** to display all of the Switch Trap Logs.

Performing a Ping Test

The switch module can test the connection to another network device by pinging it.

To initiate the Ping program:

1. Select **Ping Test** from the **Maintenance** menu. The following screen is displayed.

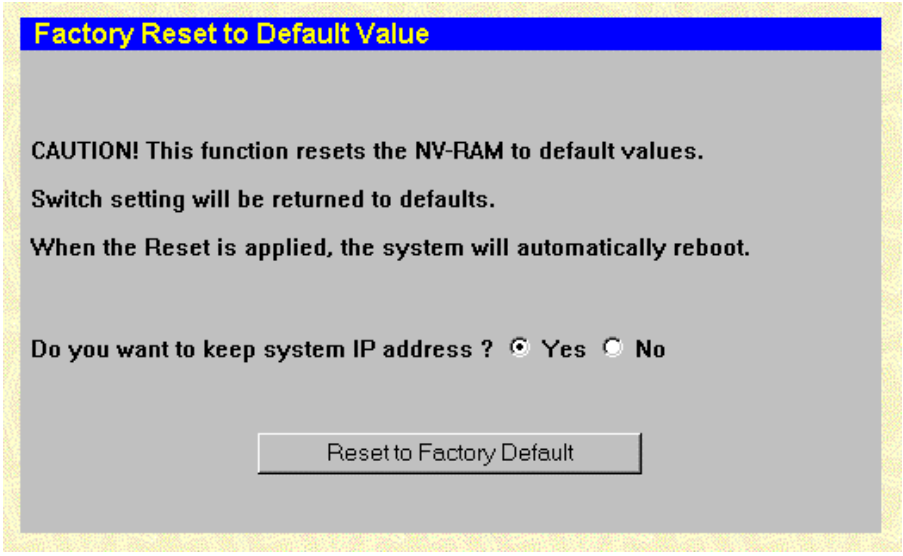


2. Type the IP address of the network device to be pinged in the **Target IP Address** field.
3. Select the number of test packets to be sent (three is usually enough) in the **Repeat Pinging for** field.
4. Click **Start** to initiate the Ping program.

Resetting the Switch Module Configuration to Factory Defaults

To reset the switch module configuration to the factory defaults:

1. Select **Factory Reset** from the **Maintenance** menu. The following screen is displayed.

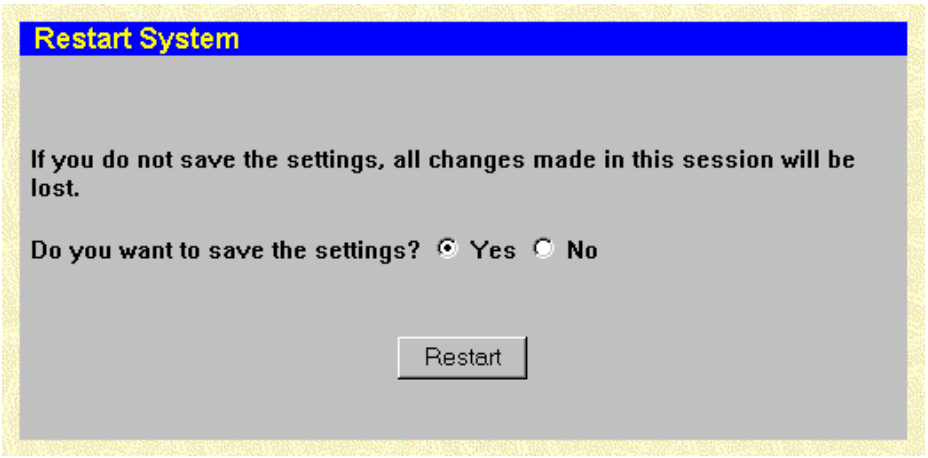


2. Select **Yes** or **No** to keep the system IP address. If you want your IP address to default from DHCP or BOOTP, select **No.**
3. Click **Reset to Factory Default** to reset the switch module.

Rebooting the Switch Module

You can perform a reboot of the switch module, which resets the system. To restart the system:

1. Select **Restart System** from the **Maintenance** menu. The following screen is displayed.



2. Select **Yes** or **No** to save the settings.
3. Click **Restart**.

Setting the Web Connection Timeout

To set the Web connection timeout interval:

1. Select **Connection Timeout** from the **Maintenance** menu. The following screen is displayed.

2. Type the desired age-out time in the **Timeout (minutes)** field.
3. Click **Apply.**

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the **Maintenance** menu. Refer to the section, “Saving Changes,” earlier in this chapter.

Logging Out

To exit the setup pages, select **Logout** on the **Maintenance** menu. The **Account Login** screen is displayed.

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