HP ProLiant BL e-Class C-GbE Interconnect Switch Menu-driven Interface Reference Guide

February 2003 (First Edition)
Part Number 322858-001

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About This Guide

This guide can be used for reference when configuring the interconnect switch through the menu-driven 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 Web-based 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. This guide discusses how to use the menu-driven interface to set up and manage the interconnect switch.

The menu-driven interface can be accessed either with an ordinary terminal (or terminal emulator) or over the network using the TCP/IP Telnet protocol. You can use the menu-driven interface to perform basic network management functions and to configure the switch modules for management using an Simple Network Management Protocol (SNMP)-based network management system.

Additional References

Additional information about installling 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 Web-based Interface Reference Guide*

Accessing the Switch Modules

After the Integrated Administrator is configured, you can access and configure the switch modules through the Integrated Administrator software. 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.*

To access the switch modules from the Integrated Administrator command line interface, use 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 using one of the following commands:

  `connect switch a` to access Switch A

  or

  `connect switch b` to access Switch B

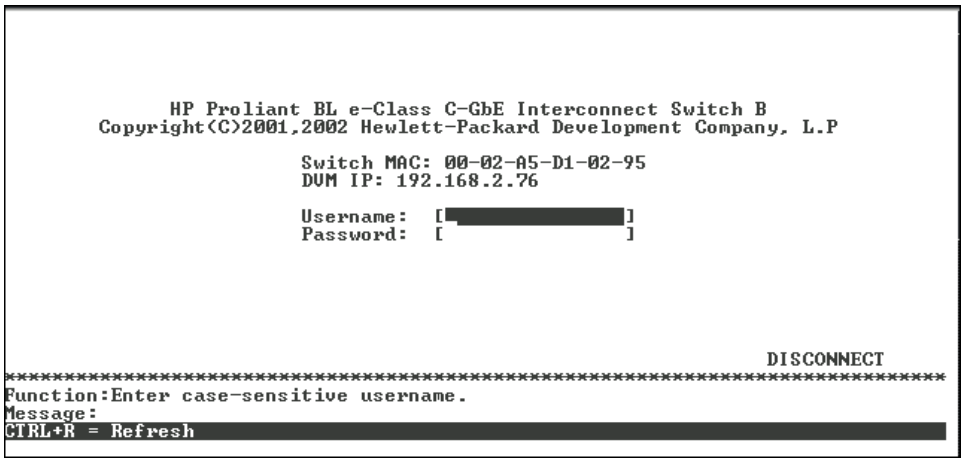
- If you have **not** logged on to the Integrated Administrator, you can use one of two special logon accounts to access the switch module consoles directly, depending on whether you want to access Switch A or Switch B. At the login prompt type in both the user name and password as either:

  `switcha`

  or

  `switchb`

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

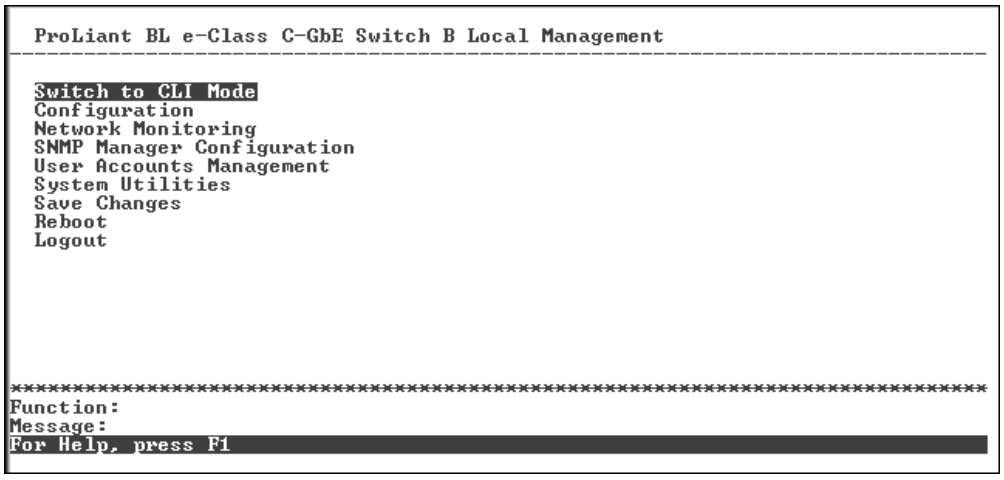


IMPORTANT: The interconnect switch does not have any initial user names or passwords set. HP recommends that after logging on, you create at least one Root-level user as the switch administrator. (Refer to Table 2-1 in Chapter 2 for an explanation of user privileges.) If you forget your password after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

To log on for the first time:

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.

   NOTE: Subsequent users will type their user name and password, then press the **Enter** key.



The main menu displays the major categories for switch management.

Moving Between the Console Management Interfaces

The menu-driven interface is the factory default setting. To access the command line interface (CLI) from the menu-driven interface, highlight the **Switch to CLI Mode** option on the main menu and then press the **Enter** key. The command line prompt for the CLI will display.

To access the menu-driven interface from the CLI, type the following command at the command line prompt and press the **Enter** key:

```
menu
```

Using the Menu-driven Interface

The menu-driven interface provides many features that make configuring the switch module and navigating through the system easy.

Navigation Features

Use the features in Table 1-1 to navigate through the screens.

Table 1-1: Menu-driven interface Navigation

To	Action
Toggle between the field options	Highlight items in <angle brackets>, and then press the spacebar.
Enter data in a field	Highlight the item in [square brackets], and then type in the new data.
Execute a command	Highlight the command displayed in UPPERCASE letters, and then press the **Enter** key.
Move between fields on a screen	Press the **Page Up** and **Page Down** keys, the left and right arrow keys, the **Tab** key, or the **Backspace** key.
Display the previous screen	Press the **Esc** key.
Display the main menu	Press the **Ctrl+T** keys.
Refresh the screen display	Press the **Ctrl+R** keys.
Display the next page of information	Press the **N** key.
Display the previous page of information	Press the **P** key.

Help and System Messages

The bottom section of each screen displays field-level help and system messages.

- **Function**—Displays field-level help.
- **Message**—Displays system messages.

Configuring the Switch Modules

After logging on to the interconnect switch for the first time, perform the following tasks for each switch module:

1. Configure the IP address
2. Set up users, passwords, and access privileges
3. 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.

NOTE: After configuring the IP address on the switch module, the switch module can be accessed using Telnet, SNMP, or a Web browser. Refer to the section, “Configuring the Remote Management IP Interface Settings,” in Chapter 2 for information on how to set up the IP address.

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Configuring the Switch Modules using the Menu-driven Interface

Overview

This chapter describes how to configure the switch modules from the menu-driven interface.

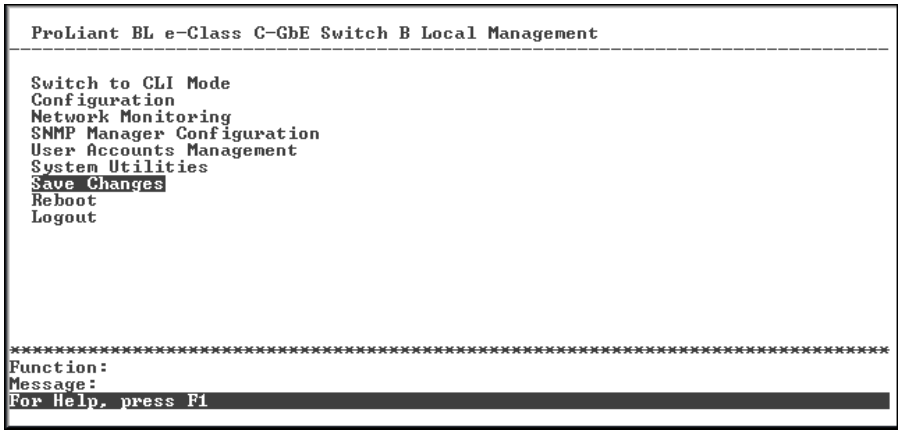
Saving Changes

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.

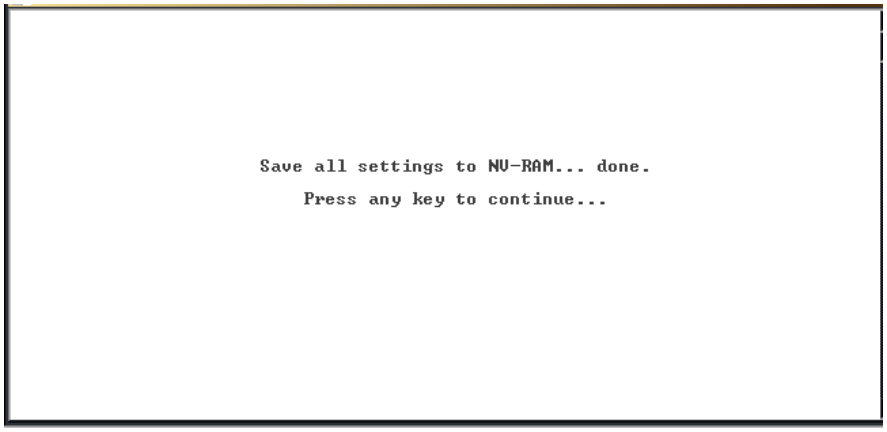
After the configuration settings have been saved to NVRAM, they become the current runtime settings for the switch module. These settings are then used every time the switch module is rebooted.

Configuration changes are made effective on a screen by highlighting **APPLY,** then pressing the **Enter** key. When this is done, the settings are immediately applied to the switching software in RAM.

To retain any configuration changes permanently:



1. Highlight **Save Changes** on the main menu.
2. 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 switch module is rebooted.

IMPORTANT: After saving your final configuration, HP highly recommends that you save the configuration image to TFTP server storage. Refer to the “Saving Settings to TFTP Server” section for more information.

Managing User Accounts

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

There are three levels of user privileges: Root, User+, and User. Some menu selections available to users with Root privileges may not be available to those with User+ and User privileges.

The following table summarizes the user privileges.

Table 2-1: User Privileges

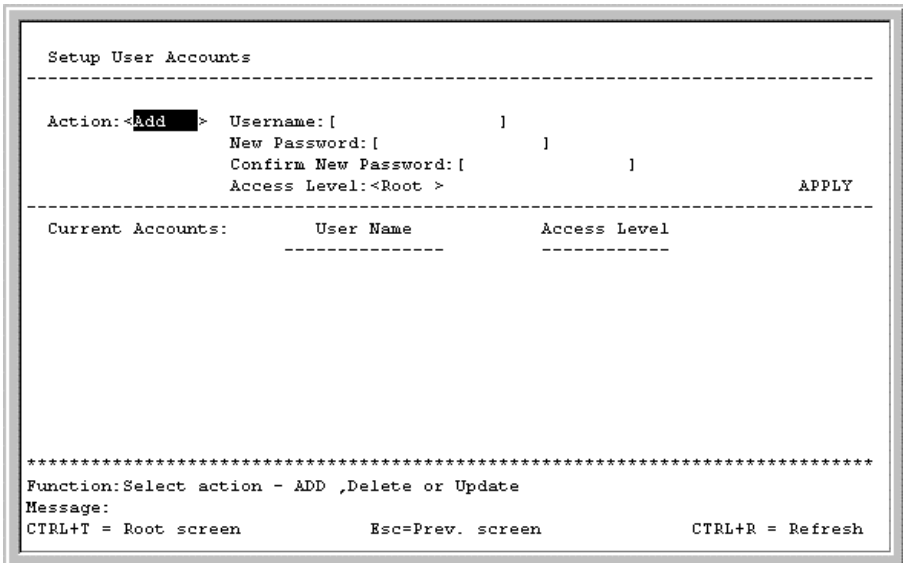
Privilege	Root	User+	User
Configuration	Yes	Read-only	Read-only
Network Monitoring	Yes	Read-only	Read-only
Community Strings and Trap Stations	Yes	Read-only	Read-only
Update Firmware and Configuration Files	Yes	No	No
System Utilities	Yes	Ping-only	Ping-only
Factory Reset	Yes	No	No
Reboot Switch	Yes	Yes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

Adding a User Account

To create a new user account:

1. Highlight **User Accounts Management** on the main menu.

2. Press the **Enter** key. The **Setup User Accounts** screen is displayed.



3. Using the spacebar, toggle the **Action** field to **Add.**
4. Type the user's name in the **Username** field.
5. Type an initial password for the user in the **New Password** field.

   IMPORTANT: Passwords used to access the switch module are case-sensitive.

6. Type the new password a second time in the **Confirm New Password** field.
7. Using the spacebar, toggle the **Access Level** field to select the user's access privilege.
8. Highlight **APPLY.**
9. Press the **Enter** key to make the user addition effective. A listing of all current user accounts and access levels is displayed.

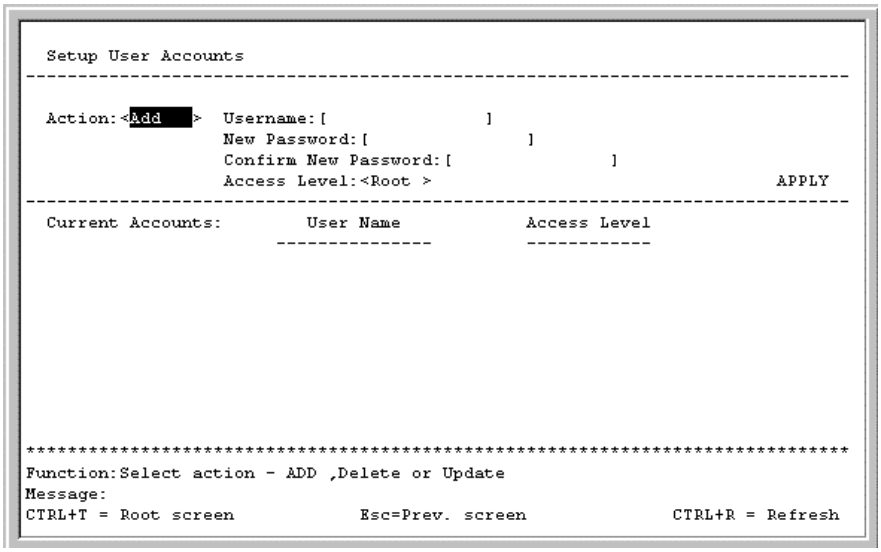
   IMPORTANT: APPLY makes changes to the switch configuration for the current session only. You must enter all permanent changes, including user additions or updates, into non-volatile RAM (NVRAM) using the **Save Changes** option on the main menu. Refer to the "Saving Changes" section for more information.

10. Press the **Esc** key to return to the main menu. Use the **Save Changes** option to save the changes into non-volatile RAM.

Updating User Account Information

To update a user password or privilege level:

1. Highlight **User Accounts Management** on the main menu.
2. Press the **Enter** key. The **Setup User Accounts** screen is displayed.



3. Toggle the **Action** field to **Update.**
4. Type the user name for the account you want to change in the **Username** field.
5. If the password is to be changed, type the new password in the **New Password** field.
6. Type the new password again in the **Confirm New Password** field.
7. If the privilege level is to be changed, toggle the **Access Level** field until the appropriate level is displayed—**Root, User+,** or **User.**
8. Highlight **APPLY.**
9. 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. Refer to the "Saving Changes" section for more information.

Displaying User Account Information

To view the current user accounts:

1. Highlight **User Accounts Management** on the main menu.
2. Press the **Enter** key. The **Setup User Accounts** screen displays a list of all current user accounts.

Deleting a User Account

To prevent accidental deletion of all of the users with Root privilege, the menu-driven interface does not allow you delete the current logged-on user.

To delete a user account:

1. Highlight **User Accounts Management** on the main menu.
2. Press the **Enter** key. The **Setup User Accounts** screen displays a list of all current user accounts.
3. Toggle the **Action** field to **Delete.**
4. Type the user name in the **Username** field.
5. Highlight **APPLY.**
6. Press the **Enter** key.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the main menu. Refer to the "Saving Changes" section 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 Interconnect Switch 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

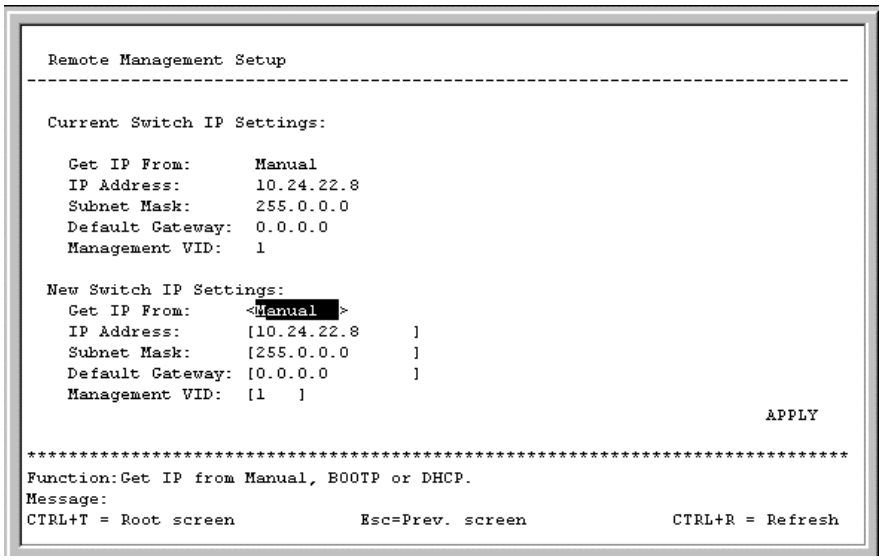
To access and manage the interconnect switch from an SNMP-based Network Management System, or by using the Telnet protocol or the Web, you must first configure the remote management IP interface parameters.

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 set up the switch module for remote management:

1. Highlight **Configure IP Address** from the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



The **Remote Management Setup** screen lets you specify how the switch module will be assigned an IP address, which allows an in-band network management system (for example, Telnet) client to find it on the network.

The fields listed under the **Current Switch IP Settings** heading are those that are currently being used by the switch module. Those fields listed under the **New Switch IP Settings** heading are those which will be used after the switch module has been rebooted.

3. Toggle the **Get IP From** field to choose 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.

4. 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.
5. Highlight **APPLY.**
6. 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. Refer to the "Saving Changes" section earlier in this chapter.

Displaying Basic Interconnect Switch Information

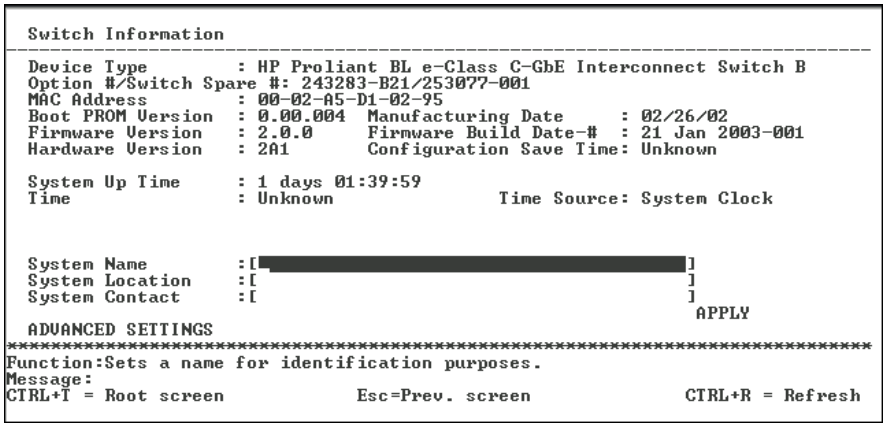
You can display basic information about the interconnect switch including the type of switch and the MAC address (assigned by the factory and unchangeable). In addition, the boot PROM and firmware version numbers display. This information is helpful in monitoring PROM and firmware updates.

In addition, you can display advanced switch information including global settings for IGMP snooping, GVRP, Telnet status, Web status, SNTP, and others.

To configure and display the interconnect switch information and advanced settings:

1. Highlight **Configure Switch Information and Advanced Settings** from the **Configuration** menu.

2. Press the **Enter** key. The following screen is displayed.



The **Switch Information** menu displays general information about the interconnect switch including:

- **Device Type**—Identifies the interconnect switch name and module (Switch A or Switch B).
- **Option #/Switch Spare #**—Identifies the option number and spare number for the interconnect switch.
- **MAC Address**—Identifies the unique MAC address assigned by the factory. This MAC address cannot be changed.
- **Boot PROM Version**—Identifies the version number of Boot PROM code installed on the interconnect switch.
- **Manufacturing Date**—Identifies the date the interconnect switch was manufactured.
- **Firmware Version**—Identifies the version number of interconnect switch firmware.
- **Firmware Build Date-#**—Identifies the firmware build date and build number.
- **Hardware Version**—Identifies the version number of interconnect switch hardware build.
- **Configuration Save Time**—Identifies the date and time the current settings were saved to the configuration file.
- **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.
- **Time**— Displays the current real time set on the switch module. If the current time has never been set up on the interconnect switch, “Unknown” will be displayed.
- **Time Source**—Identifies the method in which the interconnect switch gets the current time information: System Clock, Primary SNTP Server, or Secondary SNTP Server.

To complete the basic information:

1. Type the name of the system in the **System Name** field.
2. Type the location of the system in the **System Location** field.
3. Type the name and telephone number of the System Administrator in the **System Contact** field. HP recommends that the person who is responsible for the maintenance of the network system on which this interconnect switch is installed be listed here.
4. Highlight **APPLY.**
5. Press the **Enter** key to make the change effective.

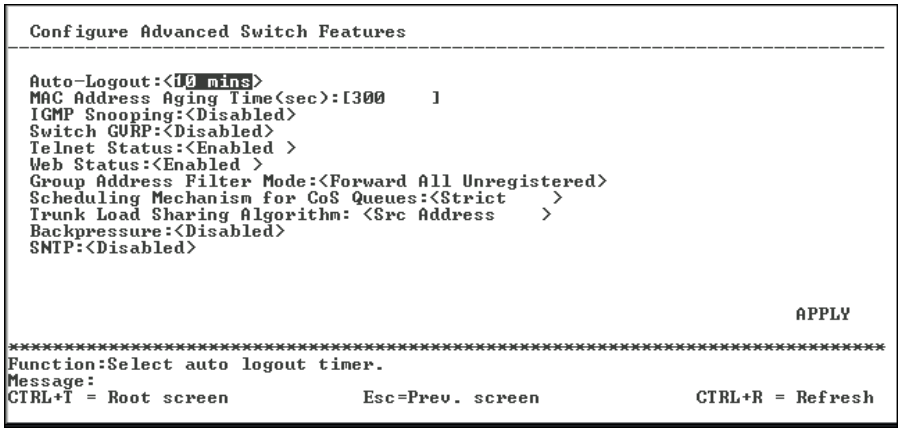
IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the main menu. Refer to the "Saving Changes" section earlier in this chapter.

Configuring Advanced Switch Module Features

The menu-driven interface allows you to easily set advanced switch features including global settings for IGMP snooping, GVRP, Telnet status, Web status, SNTP, and others.

To configure advanced switch module features:

1. Highlight **ADVANCED SETTINGS** at the bottom of the **Switch Information** menu.
2. Press the **Enter** key. The following screen is displayed.



This screen allows you to set the following features:

— **Auto-Logout**—Toggle to select the time the RS-232 console and Telnet management interface can be idle before the interconnect automatically logs out the user. The options are **2 mins, 5 mins, 10 mins, 15 mins,** and **Never.** Never indicates never timing out. The default is 10 minutes.

— **MAC Address Aging Time (sec)**—Type 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 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**—Toggle 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 in order to obtain multicast membership information from them and learn which ports are attached to which multicast group members. For additional information, refer to the "Configuring IGMP Snooping" section later in this chapter.

— **Switch GVRP**—Toggle to enable or disable GARP VLAN Registration Protocol (GVRP) on the interconnect switch. GVRP allows dynamic propagation of VLAN registration information across the GVRP-enabled switches on the same network. For additional information, refer to the "Configuring GVRP" section later in this chapter.

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

— **Web Status**—Toggle to enable or disable use of a Web-based browser to manage the interconnect switch.

— **Group Address Filter Mode**—Toggle to select the IGMP group address filter mode for forwarding multicast packets. The options are **Forward All, Forward All Unregistered,** and **Filtered All Unregistered.**

— **Scheduling Mechanism for CoS Queues**—Toggle to select the Class of Service queue scheduling option: **RoundRobin** or **Strict.** If you select **Strict,** when the highest priority queue is full, those packets are 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**—Toggle to select how port load sharing will be determined. The multitrunk load sharing options are destination address, source address, and source and destination address.

— **Backpressure**—Toggle to enable or disable backpressure flow control in and out of the switch. 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**—Toggle to enable or disable Simple Network Time Protocol (SNTP). For additional information, refer to the "Configuring the Switch Module Date and Time" section later in this chapter.

3. After making your changes, highlight **APPLY,** then press the **Enter** key.

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

Configuring Port Settings

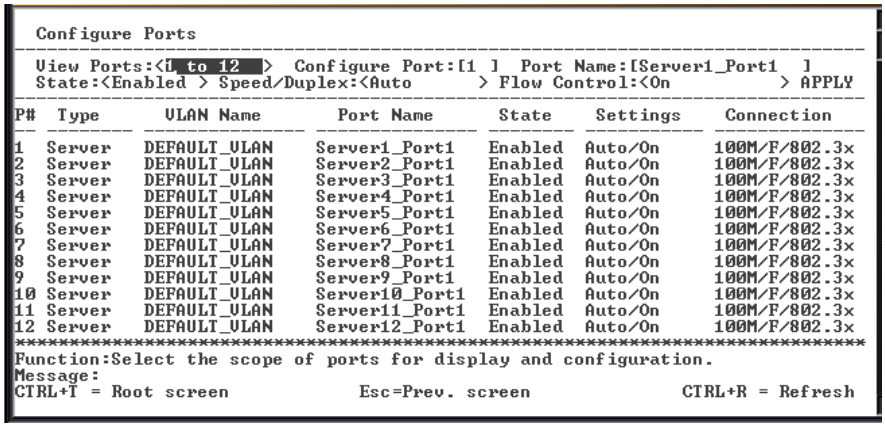
This section describes how to configure the following port settings: port name, speed/duplex parameter, and flow control state. Refer to the "Configuring Port Security" section later in this chapter for information on how to set the port security parameters.

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 ports:

1. Highlight **Configure Ports** from the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



The **Configure Ports** screen allows you to configure the name, speed-duplex, and flow control for each port

3. Toggle the **View Ports** field, using the space bar, to display the configuration of either Ports **1 through 12,** Ports **13 through 24,** or Ports **25 through 26.**
4. Type the port number in the **Configure Port** field.
5. Type the port name in the **Port Name** field.
6. Toggle the **State** field to either enable or disable a given port.
7. Toggle the **Speed/Duplex** field to select the speed and duplex/half-duplex state of the port. **Auto** means auto-negotiation between 10 and 100 Mb/s devices, in full- or half-duplex mode. The **Auto** setting allows the port to automatically determine the fastest settings the device the port is connected to can handle. The other options are **100M/Full, 100M/Half, 10M/Full,** or **10M/Half.** There is no automatic adjustment of port settings with any option other than **Auto.**
8. Toggle **Flow Control** to **On** or **Off** when.
9. Highlight **APPLY.**
10. 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. Refer to the "Saving Changes" section earlier in this chapter.

Configuring Bandwidth

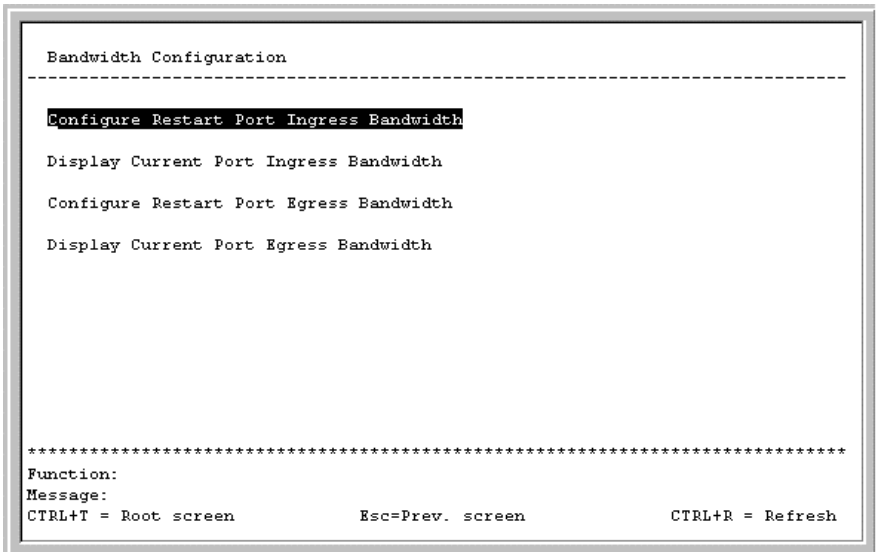
The GbE Interconnect Switch allows you to set a bandwidth limitation that restricts the ingress (receiving) and egress (transmitting) packet rate for each port. If the packet rate exceeds the allowed bandwidth rate, the excess packets will be dropped.

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.

To configure bandwidth:

1. Highlight **Configure Bandwidth** on the **Configuration** menu.

2. Press the **Enter** key. The following screen is displayed.

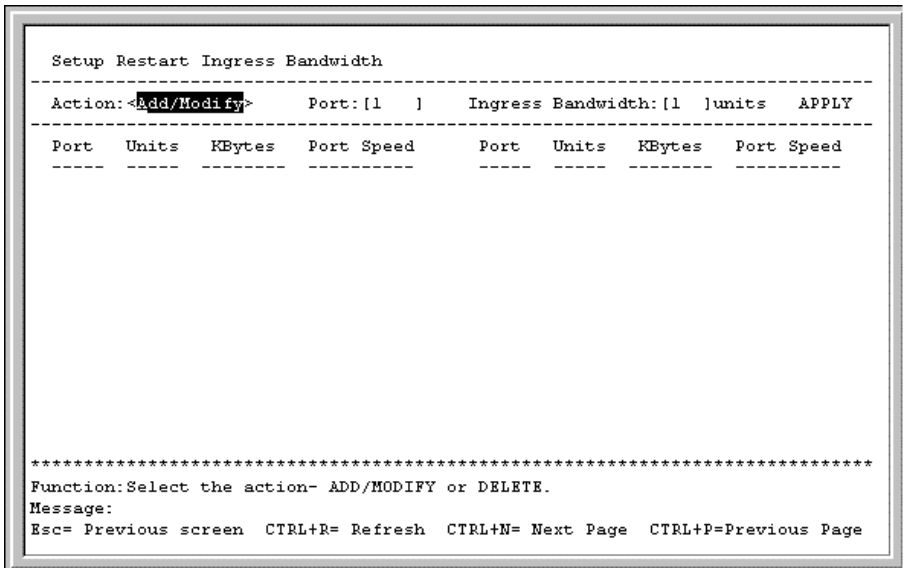


The **Bandwidth Configuration** menu allows you to access screens that set and display the ingress bandwidth and egress bandwidth of specified ports on the switch module.

Configuring Restart Port Ingress Bandwidth

To configure restart port ingress bandwidth:

1. Highlight **Configure Restart Port Ingress Bandwidth** on the **Bandwidth Configuration** menu.
2. Press **Enter.** The following screen is displayed.



3. Toggle the **Action** field to **Add/Modify.**

NOTE: To delete an entry, toggle the **Action** field to **Delete.**

4. Type a port number in the **Port** field.
5. Type a number between 1 and 127 in the **Ingress Bandwidth** field.
6. Highlight **APPLY.**
7. Press the **Enter** key.
8. Save the changes using **Save Changes** on the main menu.
9. Reboot the switch module to allow your changes to take effect.

Displaying Current Port Ingress Bandwidth

To view the current port ingress bandwidth settings:

1. Highlight **Display Current Port Ingress Bandwidth** on the **Bandwidth Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.

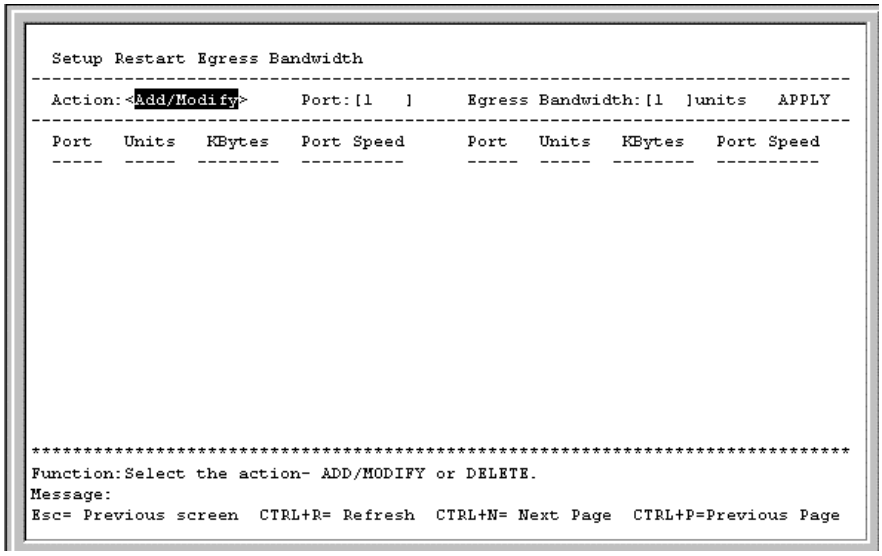
```
Display Current Ingress Bandwidth Settings
--------------------------------------------------------------------------------

  Port   Units   KBytes   Port Speed      Port   Units   KBytes   Port Speed
  -----  -----  --------  ----------      -----  -----  --------  ----------

********************************************************************************
Function:
Message:
Esc= Previous screen  CTRL+R= Refresh  CTRL+N= Next Page  CTRL+P=Previous Page
```

This read-only screen displays current ingress bandwidth information.

Configuring Restart Port Egress Bandwidth

To configure port egress bandwidth:

1. Highlight **Configure Restart Port Egress Bandwidth** on the **Bandwidth Configuration** screen.
2. Press the **Enter** key. The following screen is displayed.



3. Toggle to **Add/Modify** in the **Action** field.

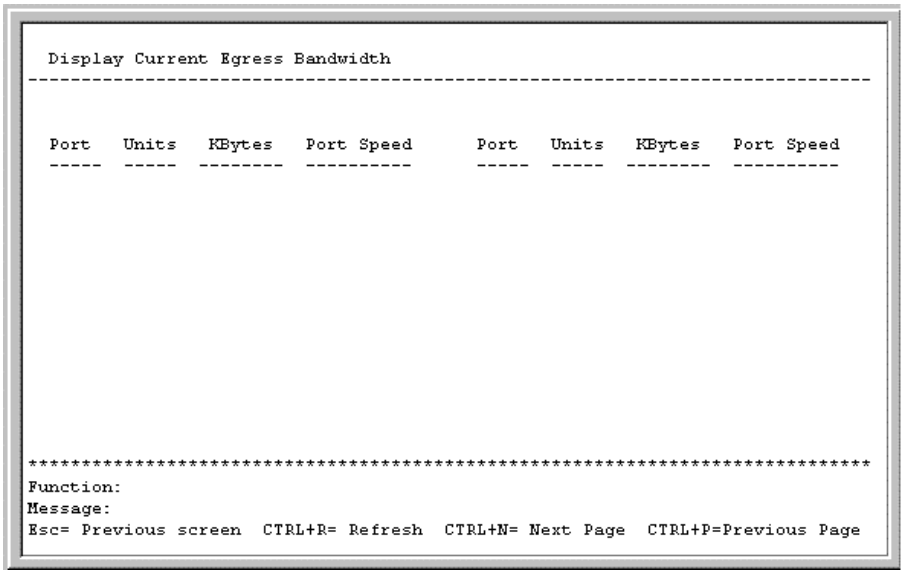
   NOTE: To delete an entry, toggle the **Action** field to **Delete.**

4. Type a destination port in the **Port** field.
5. Type a number between 1 and 127 in the **Egress Bandwidth** field.
6. Highlight **APPLY.**
7. Press the **Enter** key.
8. Save the changes using **Save Changes** on the main menu.
9. Reboot the switch module to allow your changes take effect.

Displaying Current Port Egress Bandwidth Settings

To view port egress bandwidth settings:

1. Highlight **Display Current Port Egress Bandwidth** on the **Bandwidth Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



This read-only screen displays current egress bandwidth information.

Configuring Spanning Tree Protocol

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.

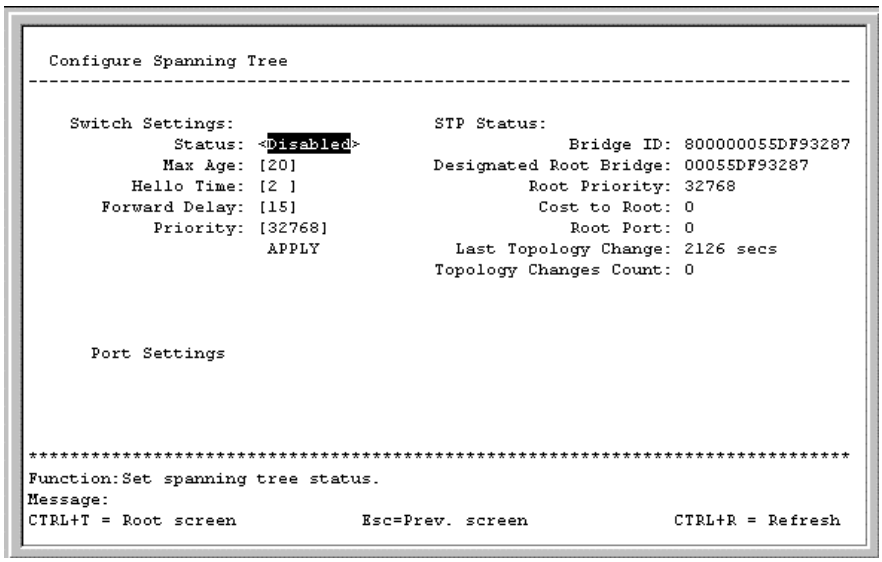
NOTE: Refer to Appendix D in the *HP ProLiant BL e-Class C-GbE Interconnect Switch User Guide* for more information on Spanning Tree Protocol.

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 globally configure Spanning Tree Protocol (STP) on the switch module:

1. Highlight **Configure Spanning Tree Protocol** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



The **Configure Spanning Tree** screen allows you to set the global STP parameters and displays the STP status.

You can set the following:

— **Status**—Toggle to **Enabled** to implement STP on the switch module.

— **Max Age**—The maximum age can be set from 6 to 40 seconds. At the end of the maximum age, 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.

— **Hello Time**—The hello time can be set from 1 to 10 seconds. This 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 set hello time will be used if and when your switch module becomes the root bridge. The hello time cannot be longer than the maximum age, otherwise, a configuration error will occur.

— **Forward Delay**—The forward delay can be from 4 to 30 seconds. This is the time any port on the switch module spends in the listening state while moving from the blocking state to the forwarding state.

— **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.

IMPORTANT: Observe the following formulas when setting the STP parameters for the root switch:

- Max Age ≤ 2 x (Forward Delay - 1 second)
- Max Age ≥ 2 x (Hello Time + 1 second)

3. After making your changes, highlight **APPLY,** then press the **Enter** key.

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

The screen also displays STP status information, including:

— **Bridge ID**—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 Bridge**—The current elected root bridge. The root bridge has a bridge ID lower than the other bridges.

— **Root Priority**—The priority of the current designated root bridge

— **Cost to Root**—The summation of all path costs between the current bridge and the root bridge via the root port

— **Root Port**—The port on the current bridge that has the best path to reach the designated root bridge.

— **Last Topology Change**—The number of seconds since the last change in topology occurred that caused the spanning tree algorithm to be recalculated

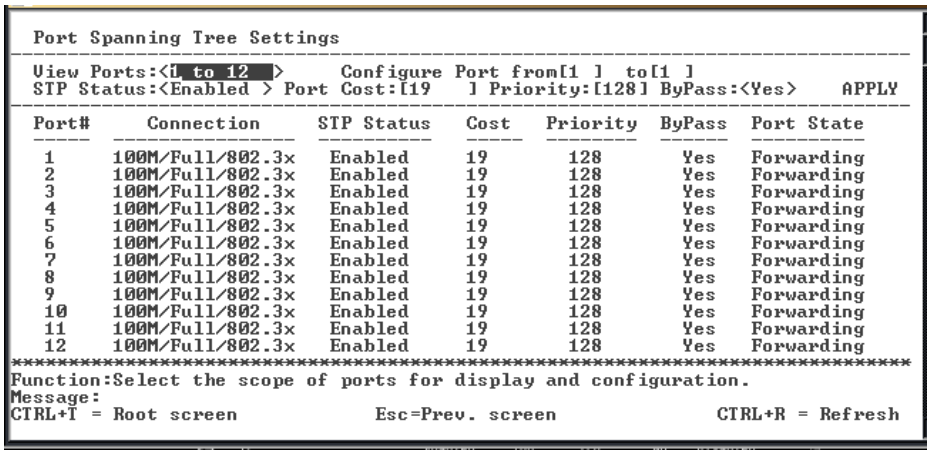
— **Topology Changes Count**—The number of times there has been a change in topology since the last reboot of the current bridge

Setting Spanning Tree Parameters at the Port Level

Once STP is enabled on the switch, 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 define individual ports:

1. Highlight **Port Settings** on the **Configure Spanning Tree** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Toggle the **View Ports** field to the range of ports to be displayed.
4. Type the port number or port range in the **Configure Port** field.
5. Toggle the **STP Status** field to **Enabled** or **Disabled.**
6. Type the Spanning Tree port cost in the **Port Cost** field. Port cost is a value used by STP to evaluate paths. STP calculates port costs and selects the path with the minimum cost as the active path.
7. Type the Spanning Tree priority in the **Priority** field. This parameter sets the relative priority for the port. A lower number indicates a higher priority and a greater chance of the port being elected as the root port.
8. Toggle the **ByPass** field to **Yes** to enable the switch module to skip the usual waiting time associated with the listening state. (This is also known as fast forward.)
9. Highlight **APPLY.**
10. Press the **Enter** key.

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

Configuring Static (Destination Address) Filtering Table

The switch module 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. The switch module 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 a switch module encounters a packet originating from or destined to a MAC address entered into the filter table, the switch module discards the packet.

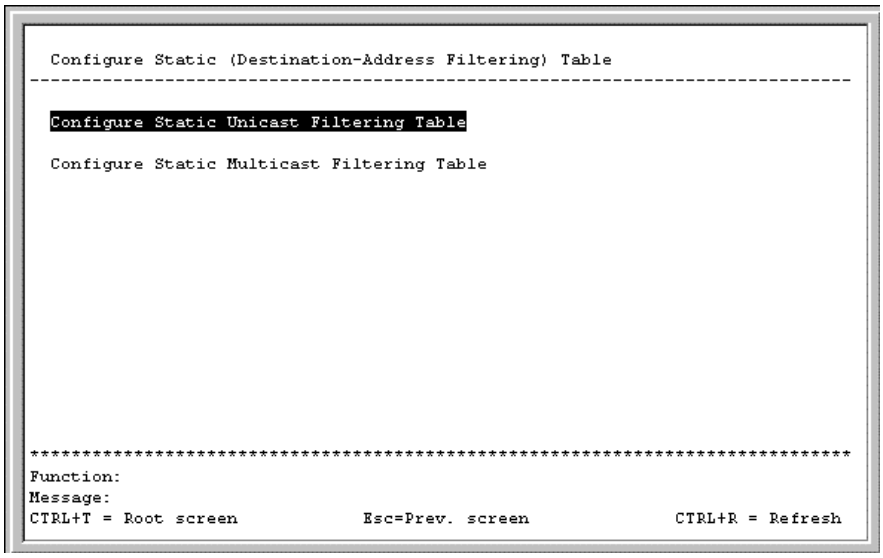
Some filtering is done automatically by the switch module, including:

- 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.

To configure the Static (Destination-Address Filtering) Table:

1. Highlight **Configure Static (Destination-Address Filtering) Table** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.

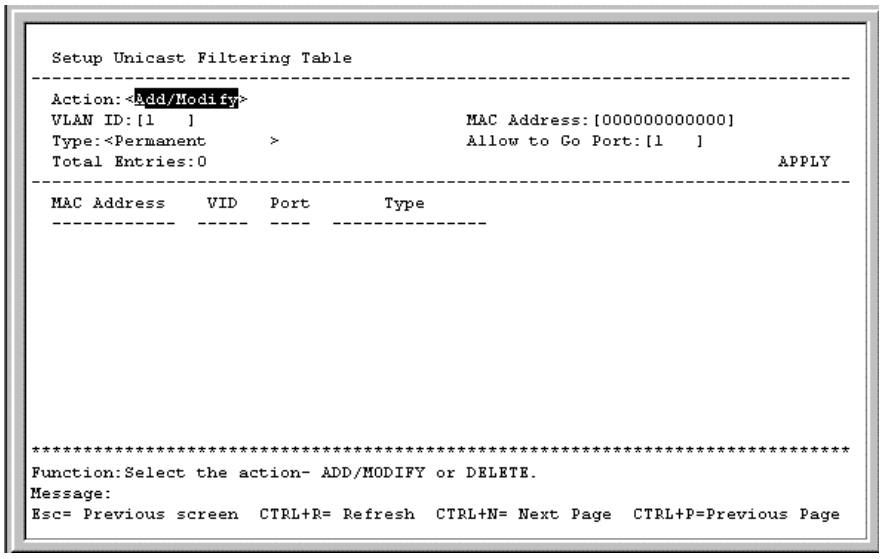


The **Configure Static (Destination-Address Filtering) Table** menu allows you to access screens to create, modify, and delete both the Static Unicast Filtering Table and the Static Multicast Filtering Table.

Adding Unicast Filter Actions

To configure the Static Unicast Table:

1. Highlight **Configure Static Unicast Table** on the **Configure Static (Destination-Address Filtering) Table** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Toggle the **Action** field to **Add/Modify.**

NOTE: To delete the unicast filter action for a VLAN, toggle the **Action** field to **Delete**.

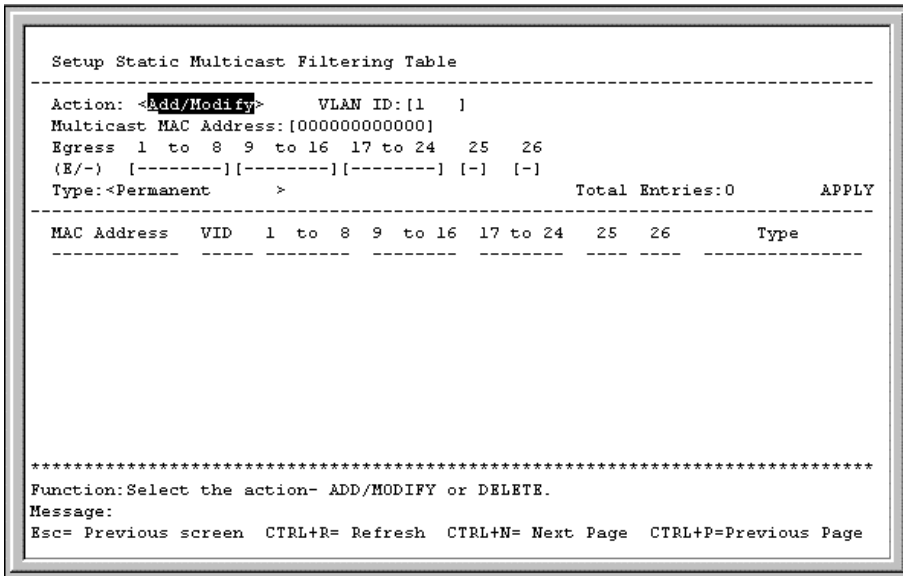
4. Type the VID in the **VLAN ID** field.
5. Type the MAC address to be statically entered in the forwarding table in the **MAC Address** field.
6. Toggle the **Type** field to **Permanent** or **DeleteOnReset,** to set the unicast filter type. **Permanent** maintains the filter permanently, until reconfigured. **DeleteOnReset** deletes the filter when the port is reset.
7. Type the port number in the **Allow to Go Port** field.
8. Highlight **APPLY.**
9. Press the **Enter** key.

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

Adding Multicast Filter Actions

To edit the multicast filtering settings:

1. Highlight **Configure Static Multicast Filtering Table** on the **Configure Static (Destination-Address Filtering) Table.**
2. Press the **Enter** key. The following screen is displayed.



3. Toggle the **Action** field to **Add/Modify.**
4. Type the VID number of the VLAN that will be receiving the multicast packets in the **VLAN ID** field.
5. Type the MAC address of the multicast source in the **Multicast MAC Address** field.
6. Set the multicast group membership of each port by highlighting **(E/-)** field using the arrow keys, and then toggling between **E, F,** or — using the space bar.
   a. **E** (Egress Member)—Specifies the port as being a static member of the multicast group. Egress Member Ports are ports that transmit traffic for the multicast group.
   b. **F** (Forbidden Nonmember)—Specifies the port as not being a member of the multicast group and that the port is forbidden from becoming a member of the multicast group dynamically.
   c. **—** (Nonmember)—Specifies the port as not being a member of the multicast group, but the port can become a member of the multicast group dynamically.
7. Toggle the **Type** field to the static multicast filter type **Permanent** or **DeleteOnReset.**
8. Highlight **APPLY.**
9. Press the **Enter** key.

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

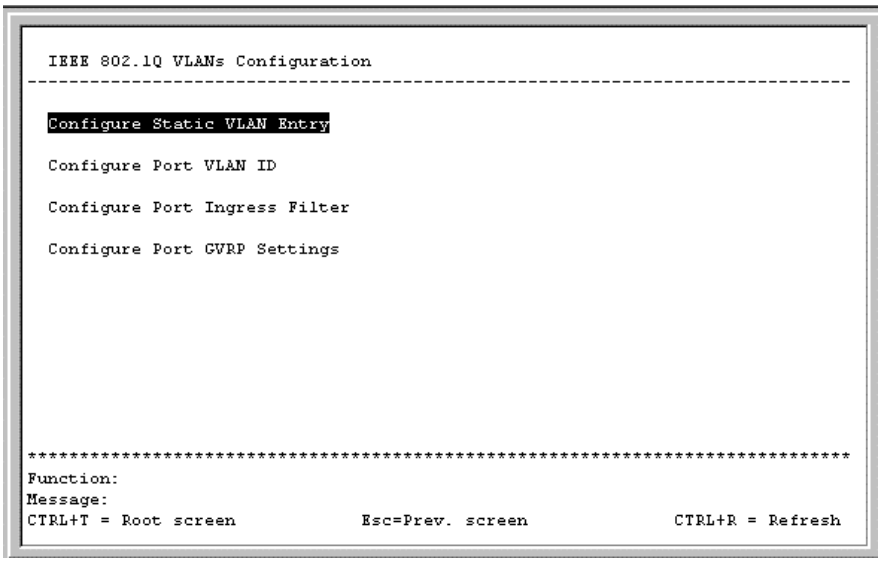
The switch module reserves one VLAN, VID 1, also called DEFAULT_VLAN. The factory default setting assigns all ports on the switch module to the default VLAN. As new VLANs are configured, their respective member ports are removed from the default VLAN.

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 edit VLAN definitions and to configure port settings for IEEE 802.1Q VLAN support:

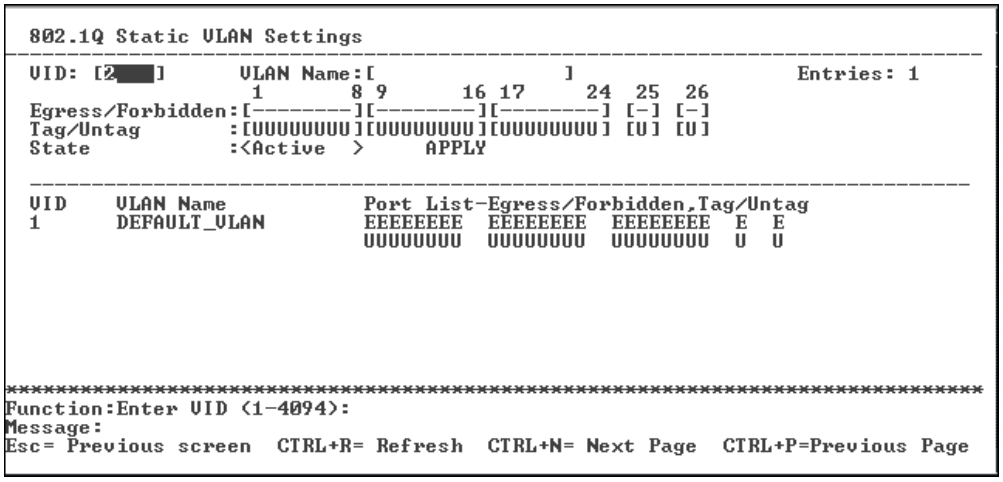
1. Highlight **Configure VLANs** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



Creating an 802.1 Static VLAN

To create an 802.1Q VLAN:

1. Highlight **Configure Static VLAN Entry** on the **IEEE 802.1Q VLANs Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Type a VLAN ID number in the **VID** field.
4. Type a name for the new VLAN in the **VLAN Name** field.
5. Set the 802.1Q VLAN membership for each port by highlighting the **Egress/Forbidden** field using the arrow keys, and then toggling between **E, F,** and — using the space bar.
   - — **E** (Egress Member)—Specifies the port as being a static member of the VLAN. Egress Member Ports are ports that will be transmitting traffic for the VLAN. These ports can be either tagged or untagged.
   - — **F** (Forbidden Nonmember)—Defines the port as not being a member and also forbids the port from joining a VLAN dynamically.
   - — **—** (Nonmember)—Specifies the port as not being a member of the VLAN, but the port can become a member of the VLAN dynamically.
6. Set the state of each port by highlighting the **Tag/Untag** field using the arrow keys and then toggling between **U** or **T** using the space bar.
   - — **U**—Specifies the port as an untagged member of the VLAN. When the port transmits an untagged packet, the packet header remains unchanged. When a tagged packet exits the port, the tag is stripped and the packet is changed to an untagged packet.
   - — **T**—Specifies the port as a tagged member of the VLAN. When the port transmits an untagged packet, the packet header is changed to include the 32-bit tag associated with the PVID (Port VLAN Identifier—refer to the following section). When a tagged packet exits the port, the packet header is unchanged.

IMPORTANT: If the port is attached to a device that is not IEEE 802.1Q VLAN compliant (VLAN-tag unaware), then set the port to U—Untagged. If the port is attached to a device that is IEEE 802.1Q VLAN compliant, (VLAN-tag aware), then set the port to T—Tagged.

7. Toggle the **State** field between **Active** and **Inactive.**
8. Highlight **APPLY.**
9. Press the **Enter** key.

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

Setting the PVID for a Port for a Specific VLAN

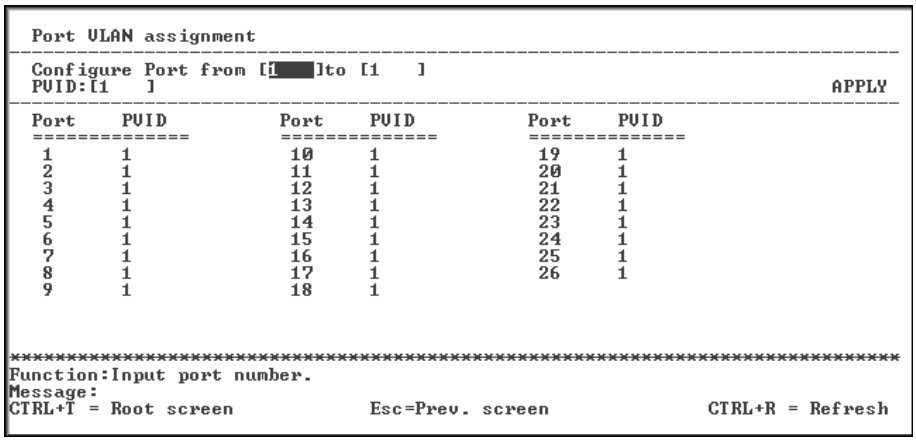
Port VLAN ID (PVID) is a classification mechanism that associates a port with a specific VLAN and is used to make forwarding decisions for untagged packets received by the port. For example, if Port 2 is assigned a PVID of 3, then all untagged packets received on Port 2 will be assigned to VLAN 3. This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

To assign a port a PVID:

1. Highlight **Configure Port VLAN ID** on the **IEEE 802.1Q VLANs Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Type the range of port numbers you want to configure in the **Configure Port** field.
4. Type the PVID for the VLAN member ports you want to configure in the **PVID** field.

   Port VLAN Identifier (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 in the **802.1Q Static VLAN Settings** screen.
5. Highlight **APPLY.**
6. Press the **Enter** key.

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

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.

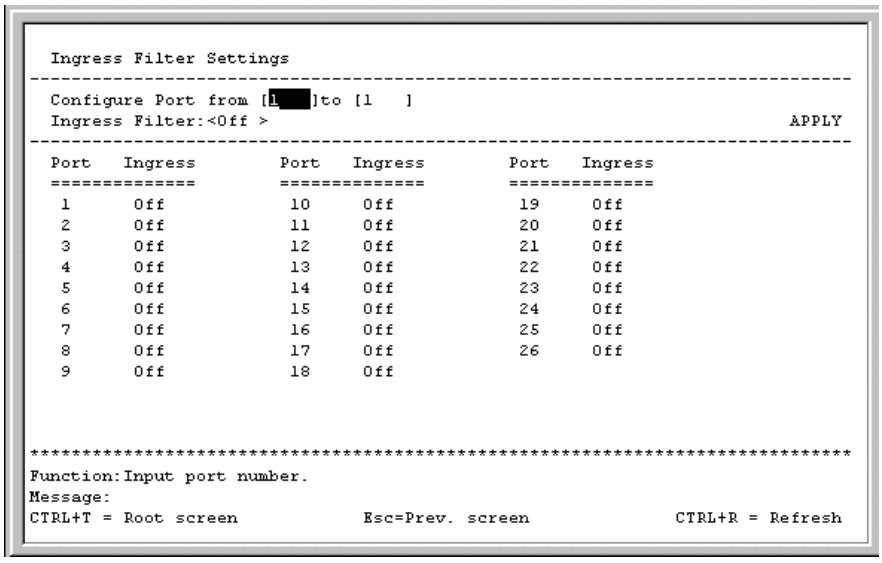
If the packet is not tagged with VLAN information, the ingress port tags the packet with its own PVID as a VID (if the port is a tagging port). The interconnect switch then determines if the destination port is a member of the same VLAN (has the same VID) as the ingress port.

- 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 ingress filtering on a port:

1. Highlight **Configure Port Ingress Filter** on the **IEEE 802.1Q VLANs Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Type the range of port numbers you want to configure in the **Configure Port** field.
4. Toggle between **On** and **Off** in the **Ingress Filter** field.

   An ingress filter enables the port to compare the VID tag of an incoming packet with the PVID number assigned to the port. If the two are different, the port filters (drops) the packet.
5. Highlight **APPLY.**
6. Press the **Enter** key.

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

Configuring GVRP

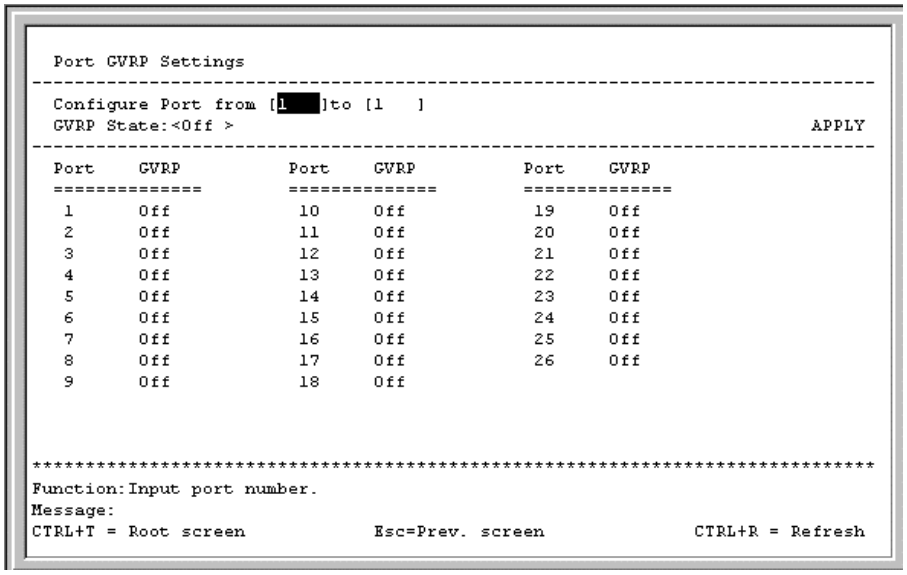
This section describes how to configure GVRP on a per port basis. For information on how to set GVRP globally on the switch module, refer to the "Configuring Advanced Switch Module Features" section earlier in this chapter.

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 trunk ports. With GVRP, the switch module can exchange VLAN configuration information with other GVRP switches, prune unnecessary broadcast and unknown unicast traffic, and dynamically create and manage VLANs on switches connected through 802.1Q trunk ports.

GVRP updates dynamic VLAN registration entries and communicates the new VLAN 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.

To enable a port to dynamically become a member of a VLAN:

1. Highlight **Configure Port GVRP Settings** on the IEEE 802.1Q VLANs **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Type the range of ports to be configured in the **Configure Port** fields.
4. Toggle the **GVRP State** to **On.**
5. Highlight **APPLY.**
6. Press the **Enter** key.

IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the main menu. Refer to the "Saving Changes" section 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 setting the IGMP filter mode for processing multicast packets, refer to the "Configuring 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.

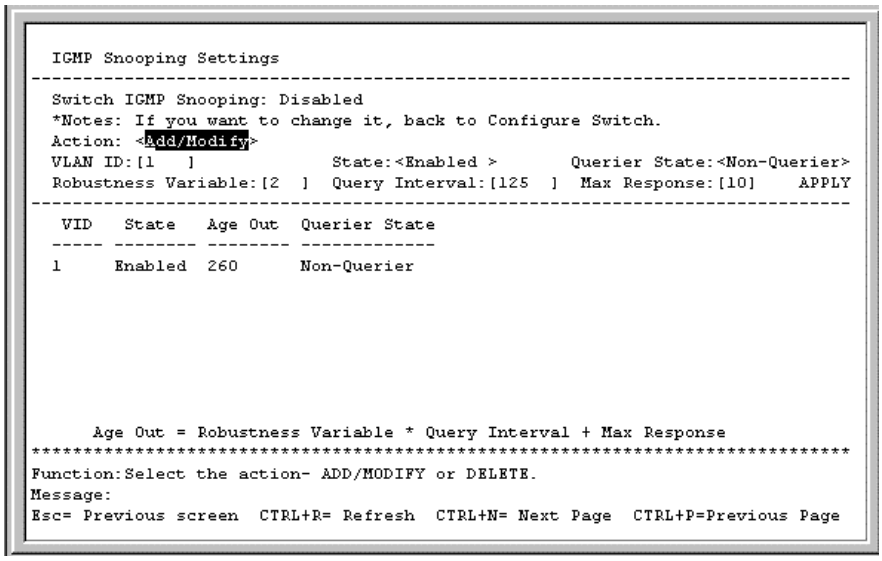
When IGMP snooping is enabled, any port receiving IGMP response packets will forward them to the CPU, and the CPU sets this port as a member of the corresponding multicast address.

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. Highlight **Configure IGMP Snooping** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



The top line displays if IGMP Snooping is enabled or disabled globally on the switch module.

If IGMP Snooping is enabled, you can set the following:

- **Action**—Toggle to **Add/Modify.**
- **VLAN ID**—Type the VLAN ID on which you want to enable IGMP snooping.
- **State**—Toggle to **Enabled** to enable IGMP snooping on the VLAN.
- **Querier State**—Toggle between **Non-Querier, V1-Querier,** and **V2-Querier.** This setting is used to specify the IGMP version (1 or 2) that is used by the IGMP interface when making queries.
- **Robustness Variable**—Enter a value between 2 and 255, with larger values being specified for subnetworks that are expected to lose larger numbers of packets.
- **Query Interval**—Enter a value between 1 and 65,500 seconds, with a default of 125 seconds. This setting specifies the length of time between sending IGMP queries.
- **Max Response**—Set the maximum amount of time allowed before sending an IGMP response report. A value between 1 and 25 seconds can be entered; the default is 10 seconds.

3. After making your changes, highlight **APPLY**, then press the **Enter** key.

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

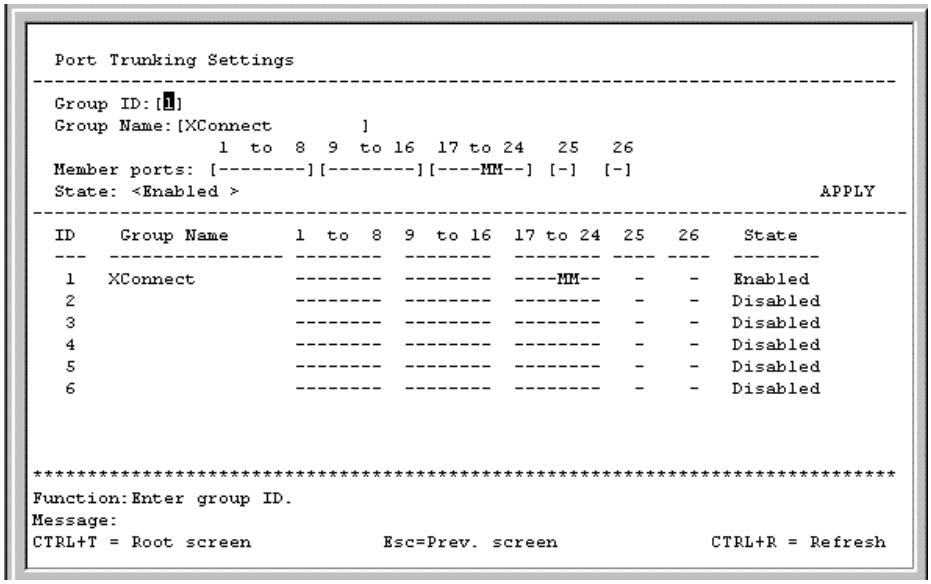
- The first port of the port trunk is implicitly configured to be the master logical port. This is the reference port used in configuration commands. It can be thought of as the logical port representing the entire group.
- When using a port trunk, always reference the master logical port of the group 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 a port trunking group:

1. Highlight **Configure Port Trunking** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



The user-changeable parameters in the switch module are as follows:

— **Group ID**—This field is for a group ID number for the port trunking group.

— **Group Name**—Enter a name for the port trunking group.

— **Member ports**—Toggle between **M** to indicate membership of the port trunking group, or a dash (**—**) to indicate nonmembership.

— **State**—Toggle between **Enabled** and **Disabled.** This setting is used to turn a port trunking group on or off. It is useful for diagnostics, to quickly isolate a bandwidth intensive network device or to have an absolute backup aggregation group that is not under automatic control.

3. After making your changes, highlight **APPLY,** then press the **Enter** key.

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

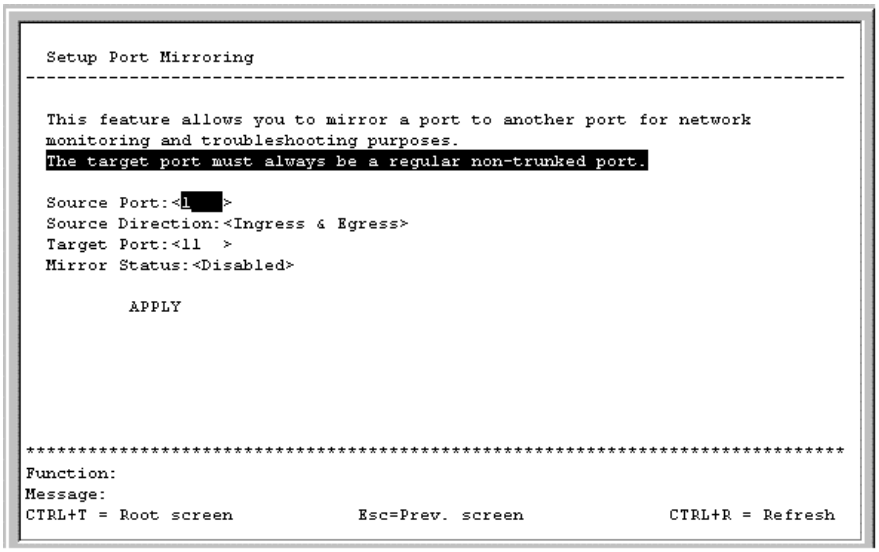
The direction of traffic on the source port can be one of the following:

- 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 100-Mb/s port onto a 10-Mb/s port, you can cause throughput problems. The port from which you are copying frames should always 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. Highlight **Configure Port Mirroring** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



3. In the **Source Port** field, toggle to the number of the port from which you want to copy frames.

4. In the **Source Direction** field, toggle to the desired direction: **Ingress, Egress,** or **Ingress & Egress**.
5. In the **Target Port** field, toggle to the port that receives the copies from the source port. The target port is where you connect a monitoring or troubleshooting device such as a sniffer or an RMON probe.
6. Toggle the **Mirror Status** field to **Enabled.**
7. Highlight **APPLY.**
8. Press the **Enter** key.

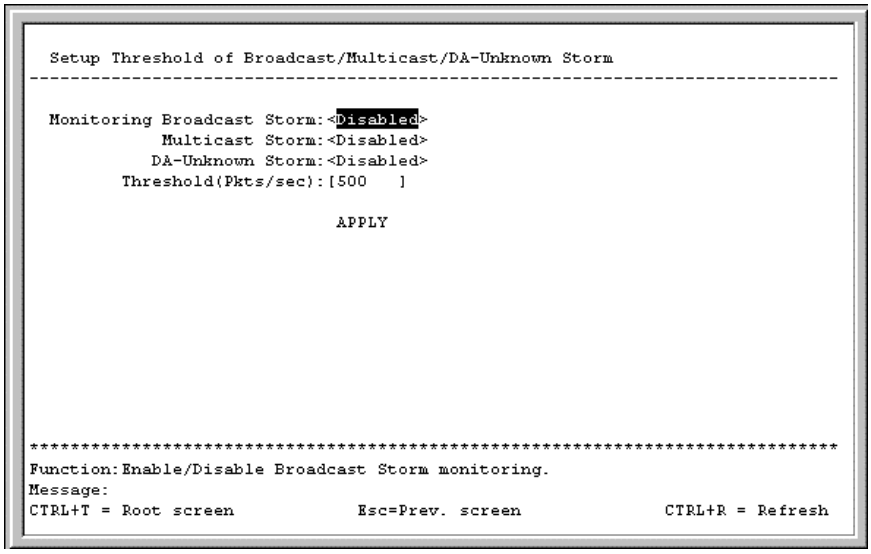
IMPORTANT: To save the configuration settings permanently, you must enter them into NVRAM using the **Save Changes** option on the main menu. Refer to the "Saving Changes" section earlier in this chapter.

Configuring Thresholds for Broadcast, Multicast, 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 threshold of a broadcast, multicast, unknown storm:

1. Highlight **Configure Threshold of Broadcast/Multicast/DA-Unknown Storm** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Toggle the desired storm option to **Enabled.** Leave the other two options **Disabled.**

4. Type a threshold in the **Threshold (Pkts/sec)** field.
5. Highlight **APPLY.**
6. Press the **Enter** key.

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

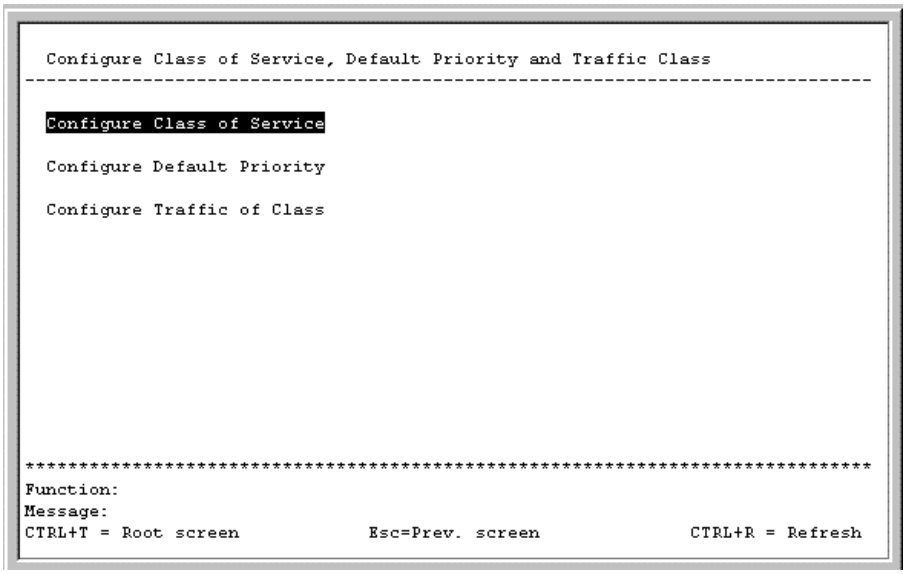
Configuring Class of Service, Default Port Priority, and Traffic Class

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.

To configure Class of Service, default priority, and traffic class:

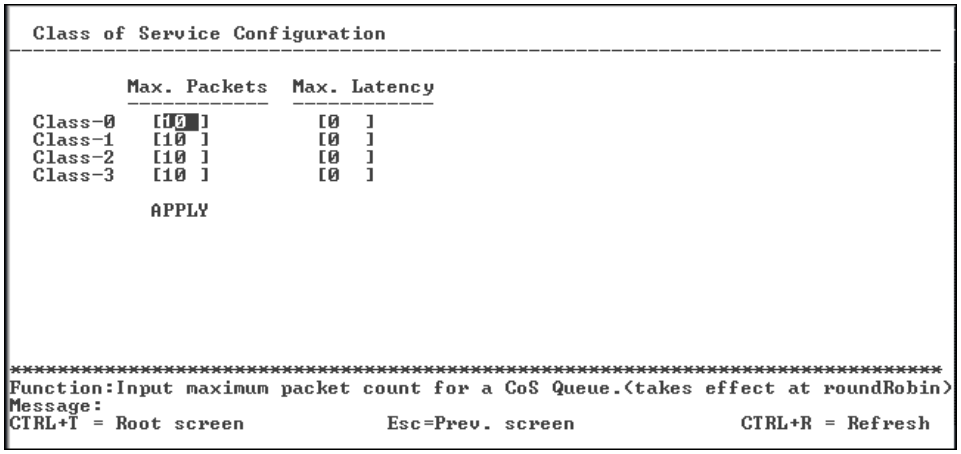
1. Highlight **Configure Class of Service, Default Priority,** and **Traffic Class** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



Setting Class of Service

To configure Class of Service:

1. Highlight **Configure Class of Service** on the **Configure Class of Service, Default Priority,** and **Traffic Class** menu.
2. Press the **Enter** key. The following screen is displayed.



This screen allows you to set the following features:

— **Max. Packets**—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. Values from 0 to 255 can be entered in this field. Entering zero instructs the switch module to continue processing packets until there are no more packets in the CoS transaction queue.

— **Max. Latency**—The maximum latency is the maximum allowable time a packet stays in the CoS queue. The packets in this queue are not delayed more than the amount 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.

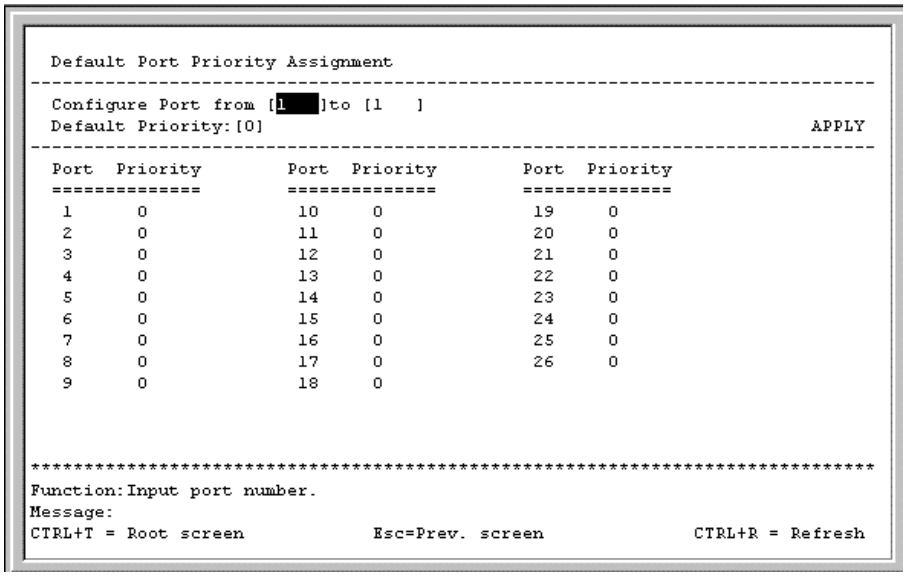
3. After making your changes, highlight **APPLY** and then press the **Enter** key.

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

Setting Port Priority

To assign port default priority:

1. Highlight **Configure Default Priority** on the **Configure Class of Service, Default Priority,** and **Traffic Class** menu.
2. Press the **Enter** key. The following screen is displayed.



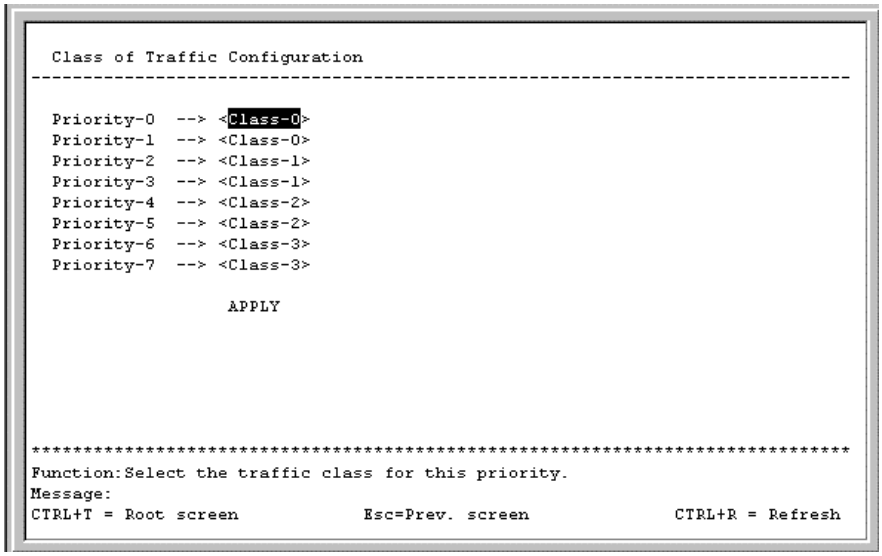
3. Type the port range in the **Configure Port** fields.
4. Type the port priority in the **Default Priority** field.
5. Highlight **APPLY.**
6. Press the **Enter** key.

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

Setting Traffic Class

To configure traffic class:

1. Highlight **Configure Traffic of Class** on the **Configure Class of Service, Default Priority,** and **Traffic Class** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Toggle the **Priority** fields to set the traffic class for the eight levels of priority for the switch module. Class values are from 0 to 3.
4. Highlight **APPLY.**
5. Press the **Enter** key.

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

Configuring Port Security

To configure security for a specified port or range of ports on the switch module:

1. Highlight **Configure Port Security** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.

```
  Port Security Settings
--------------------------------------------------------------------------------
  View Ports:<1 to 12  >     Configure Port from[1 ]  to[1 ]
  Admin State:<Disabled>  Max. Addr.[1    ]  Mode<DeleteOnReset  >       APPLY
--------------------------------------------------------------------------------
  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
********************************************************************************
Function:Select the scope of ports for display and configuration.
Message:
CTRL+T = Root screen            Esc=Prev. screen             CTRL+R = Refresh
```

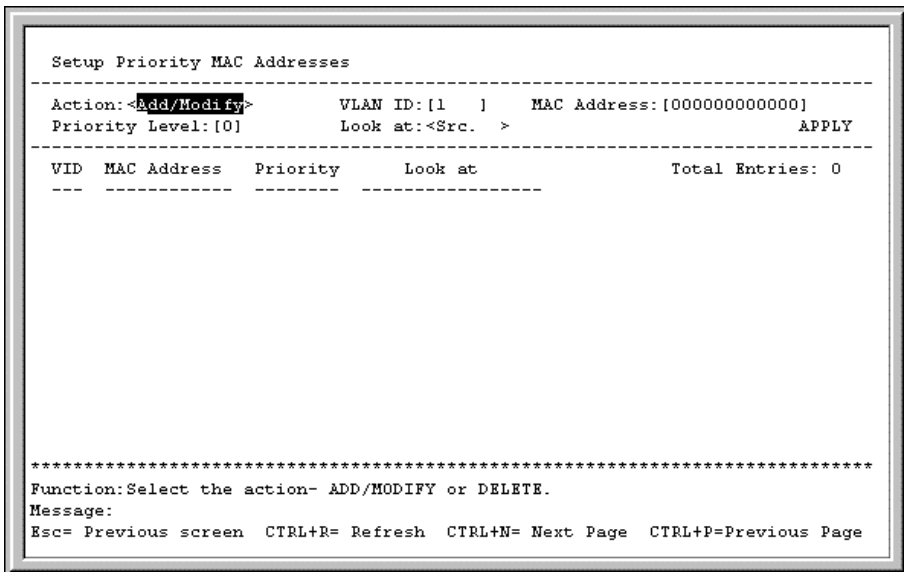
3. Toggle the **View Ports** field to the port range that you want to view.
4. Type the port number or range of numbers to configure in the **Configure Port** fields.
5. Toggle the **Admin State** field to **Enabled** to enable port security on the ports.
6. Type a number between 1 and 10 in the **Max. Addr.** field to set the maximum number of addresses that can be learned.
7. Toggle to the mode that you want in the **Mode** field: **DeleteOnRese**t or **DeleteOnTimeout.**
8. Highlight **APPLY.**
9. Press the **Enter** key.

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

Configuring Priority MAC Addresses

To configure priority MAC address for a specified VLAN on the switch module:

1. Highlight **Configure Priority MAC Addresses** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Toggle to **Add/Modify** in the **Action** field.
4. Type the VLAN ID in the **VLAN ID** field.
5. Type the MAC address for which priority on the switch module is to be established in the **MAC Address** field.
6. 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.
7. Select the state under which the above priority will be active in the **Look at** field. 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.
8. Highlight **APPLY.**
9. Press the **Enter** key.

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

Configuring the 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.

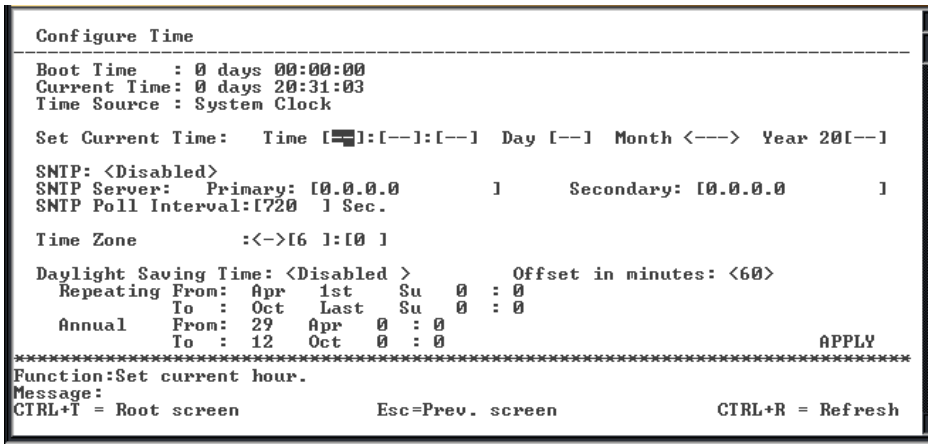
When SNTP is enabled, the following events cause the switch module to request the date and time through SNTP:

- 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.

To configure time settings:

1. Highlight **Configure Time** on the **Configuration** menu.
2. Press the **Enter** key. The following screen is displayed.



The **Configure Time** screen allows you to configure the current time and date, enable SNTP, set the SNTP parameters, and set the parameters for daylight saving time.

The screen displays the following:

- **Boot Time**—The date and time when the switch module was last rebooted
- **Current Time**—The current date and time (after they have initially been set or SNTP configured)
- **Time Source**—The method in which the switch module gets the current time information: System Clock, Primary SNTP Server, or Secondary SNTP Server

Complete the following fields to configure the time information:

- **Set Current Time**—This field will be grayed out when SNTP is enabled. To manually set the current type, enter the following:
  - **Time**—Type the current time in hh:mm:ss format. Leading zeros (0) are not required.
  - **Day**—Type the first two letters of the current day of the week: Mo, Tu, We, Th, Fr, Sa, or Su.
  - **Month**—Select the abbreviation for the current month.
  - **Year**—Type the last two digits of the current year.
- **SNTP**—Select **Disabled** or **Enabled.** The default is Disabled.
  - **SNTP Server Primary**—Type the IP address for the primary SNTP server.
  - **SNTP Server Secondary**—Type the IP address for the secondary SNTP server
  - **SNTP Poll Interval**—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.

- — **Time Zone**—Select + or – to indicate if the time zone is ahead of (+) or behind (-) the Greenwich Mean Time. Then, type the number of hours and minutes that the time zone is ahead or behind the Greenwich Mean Time.
- — **Daylight Saving Time**—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 allows you to set specific dates for the year, for example April 3 through October 27.
  - — **Offset in minutes**—Type the number of minutes that the daylight saving time is offset from the current time. Valid values are 00 to 60.
  - — **Repeating From**—Select the starting month, week of the month (1, 2, 3, 4, or last), and day of the week. Then type the starting hours and minutes.
  - — **Repeating To**—Select the ending month, week of the month, and day of the week. Then type the starting hour and minutes
  - — **Annual From**—Type the starting date. Select the starting month. Then type the starting hour and minutes.
  - — **Annual To**—Type the ending date. Select the starting month. Then type the starting hour and minutes.

3. After making your changes, highlight **APPLY** then press the **Enter** key.

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

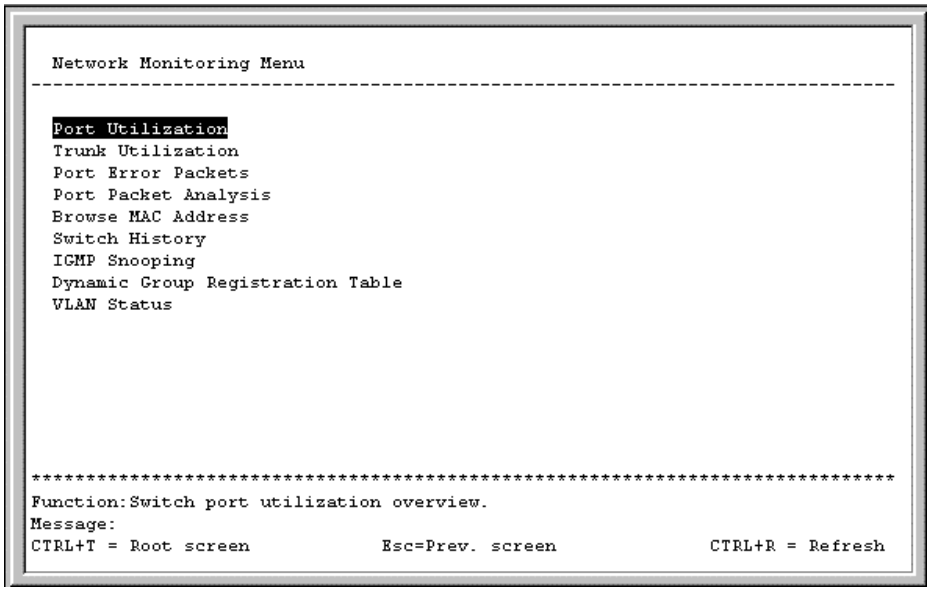
Monitoring Switch Module Functions

The switch module provides extensive network monitoring capabilities.

To display the network data compiled by the switch module:

1. Highlight **Network Monitoring** on the main menu.

2. Press the **Enter** key. The following screen is displayed.

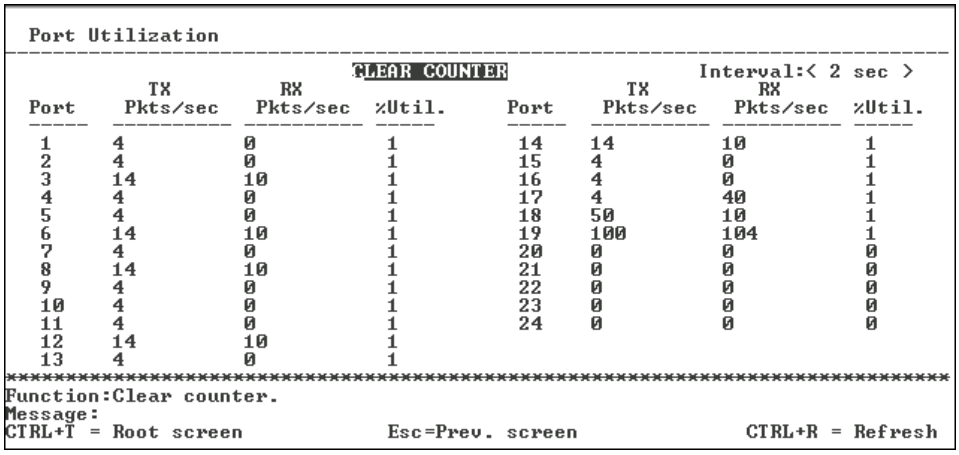


The **Network Monitoring Menu** lists the monitoring options for the switch module.

Monitoring Port Utilization

To view the port utilization of all the ports on the switch module:

1. Highlight **Port Utilization** on the **Network Monitoring Menu.**
2. Press the **Enter** key. The following screen is displayed.



The **Port Utilization** screen shows the number of packets transmitted and received per second and calculates the percentage of the total available bandwidth being used on the port (displayed under **%Util.**).

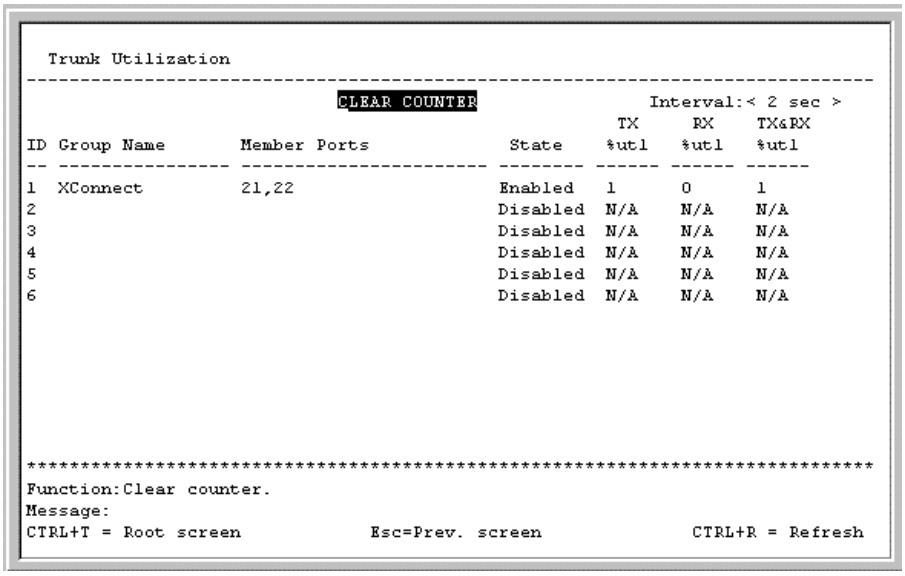
3. In the **Interval** field, toggle to select the frequency at which the information on the screen is refreshed. The default is two seconds.

4. To reset the counters, highlight **CLEAR COUNTER.**
5. Press the **Enter** key.

Monitoring Trunk Utilization

To view the trunk utilization of all the ports on the switch module:

1. Highlight **Trunk Utilization** on the **Network Monitoring Menu.**
2. Press the **Enter** key. The following screen is displayed.



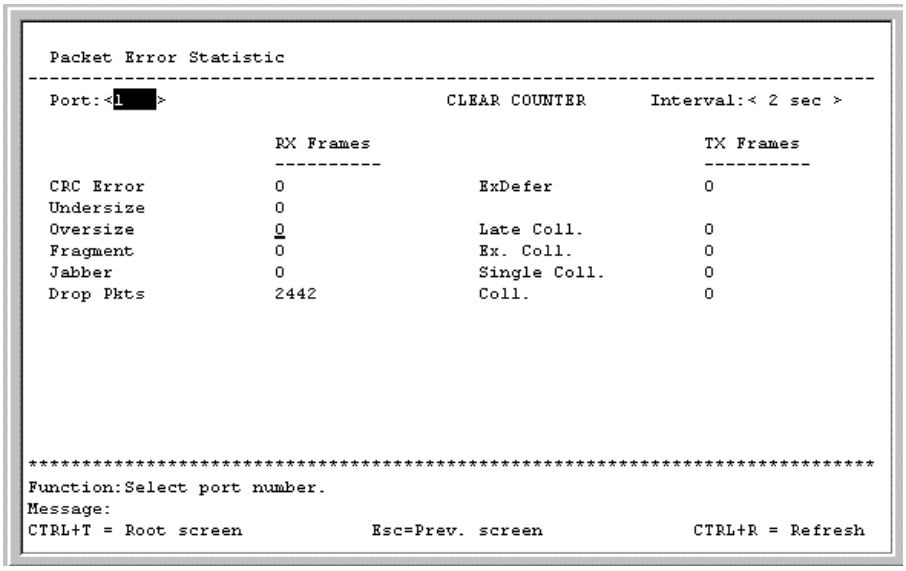
The **Trunk Utilization** window allows you to view three items for an individual port trunking group: the percentage of packets transmitted, the percentage of packets being received per second, and the percentage of total available bandwidth being used by the group.

3. In the **Interval** field, toggle to select the frequency at which the information on the screen is refreshed. The default is two seconds.
4. To reset the counters, highlight **CLEAR COUNTER.**
5. Press the **Enter** key.

Monitoring Port Error Packets

To view the error statistics for a port:

1. Highlight **Port Error Packets** on the **Network Monitoring Menu.**
2. Press the **Enter** key. The following screen is displayed.



The **Packet Error Statistic** screen displays the following for received frames:

— **CRC Error**—Counts 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 octets, or if a VLAN frame, 1522 octets, 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 Pkts**—Displays the number of frames that were dropped by this port since the last switch module reboot.

The **Packet Error Statistic** screen displays the following for transmitted frames:

— **ExDefer**—Counts the number of frames for which the first transmission attempt on a particular interface was delayed because the medium was busy.

— **Late Coll.**—Counts the number of times that a collision is detected later than 512 bit-times into the transmission of a packet.

— **Ex. Coll.**—Counts the number of frames that experienced 16 collisions during transmission and were aborted.

— **Single Coll.**—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.

3. Toggle the **Port** field to the number of the port to be viewed.
4. Toggle the **Interval** field from 2 seconds to 1 minute, or select **Suspend** to set the interval at which the error statistics are updated.
5. Highlight **CLEAR COUNTER.**
6. Press the **Enter** key to reset the counters.

Monitoring Port Packet Analysis

To view an analysis of the size of packets received or transmitted by a port:

1. Highlight **Port Packet Analysis** on the **Network Monitoring Menu.**
2. Press the **Enter** key. The following screen is displayed.

```
  Packet Analysis
--------------------------------------------------------------------------------
  Port:<1   >                          CLEAR COUNTER      Interval:< 2 sec >

                 Frames    Frames/sec                    Total     Total/sec
                ---------  ----------                  ----------  ----------
  64            4747       4              RX Bytes  0           0
  65-127        166        0              RX Frames 0           0
  128-255       184        0
  256-511       18         0              TX Bytes  2136579     256
  512-1023      3144       0              TX Frames 8259        4
  1024-1518     0          0

  Unicast RX    0          0
  Multicast RX  0          0
  Broadcast RX  0          0


********************************************************************************
Function:Select port number.
Message:
CTRL+T = Root screen            Esc=Prev. screen              CTRL+R = Refresh
```

The **Packet Analysis** screen displays the size of packets received or transmitted by the selected port and statistics on the number of unicast, multicast, and broadcast packets received.

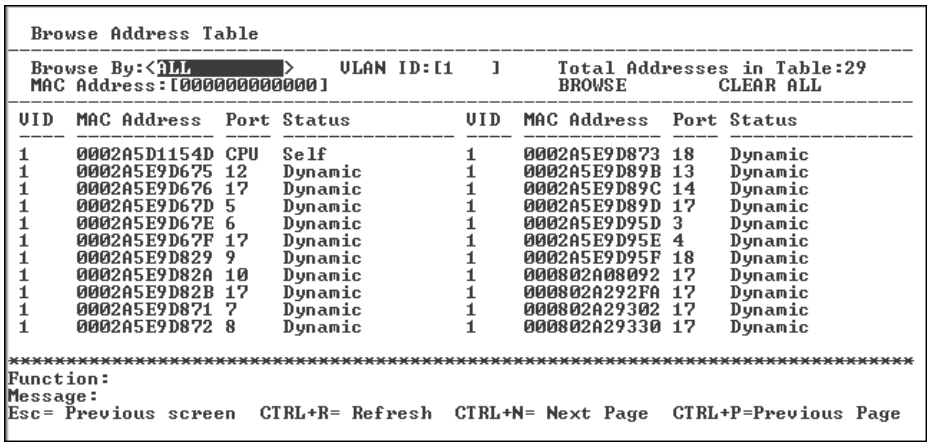
3. Toggle the **Port** field to the number of the port to be viewed.

4. In the **Interval** field, toggle to select the frequency at which the information on the screen is refreshed. The default is two seconds.
5. To reset the counters, highlight **CLEAR COUNTER.**
6. Press the **Enter** key.

Monitoring MAC Address Forwarding Table

To view the MAC address forwarding table:

1. Highlight **Browse MAC Address** on the **Network Monitoring Menu.**
2. Press the **Enter** key. The following screen is displayed.



3. Toggle the **Browse By** field between **ALL, MAC Address, Port,** and **VLAN.** This option sets a filter to determine which MAC addresses from the forwarding table are displayed. **ALL** specifies no filter.

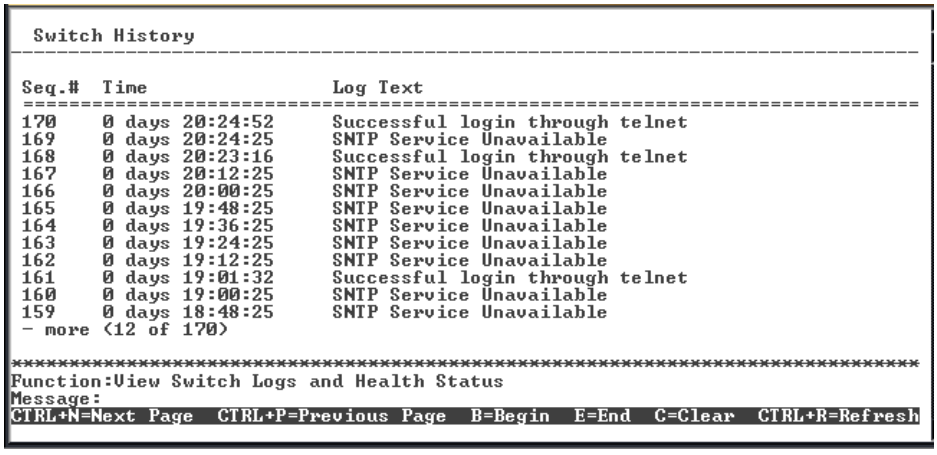
To search for a particular MAC address:

1. Toggle the **Browse By** field to **MAC Address.** A **MAC Address** field is displayed.
2. Type the MAC address in the **MAC Address** field, then press the **Enter** key.
3. Highlight **BROWSE.**
4. Press the **Enter** key to initiate the browsing action.
5. Highlight **CLEAR ALL.**
6. Press the **Enter** key to reset the table counters.

Monitoring Switch Module History

To view the **Switch Module History** log:

1. Highlight **Switch History** from the **Network Monitoring Menu.**
2. Press the **Enter** key. The following screen is displayed.



The **Switch History** screen displays the switch module logs and health status.

To scroll through the log

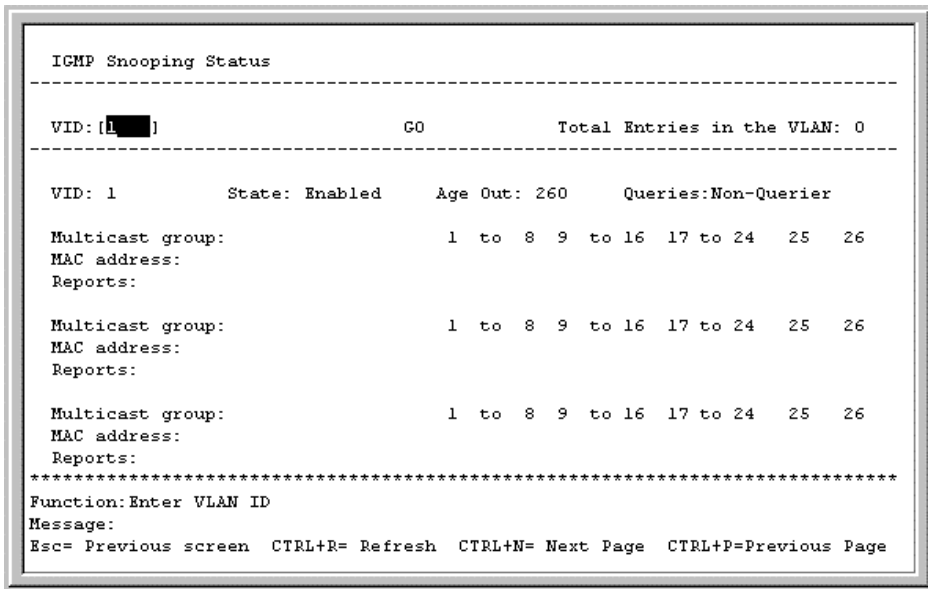
- Press the **Ctrl+N** keys to scroll to the next page.
- Press the **Ctrl+P** keys to scroll to the previous page.
- Press the **B** key to display the beginning page.
- Press the **E** key to display the last page.

Monitoring IGMP Snooping

IGMP Snooping allows the switch module to read the Multicast Group IP address and the corresponding MAC address from IGMP packets that pass through the switch module.

To view the IGMP Snooping table:

1. Highlight **IGMP Snooping** on the **Network Monitoring Menu.**
2. Press the **Enter** key. The following screen is displayed.

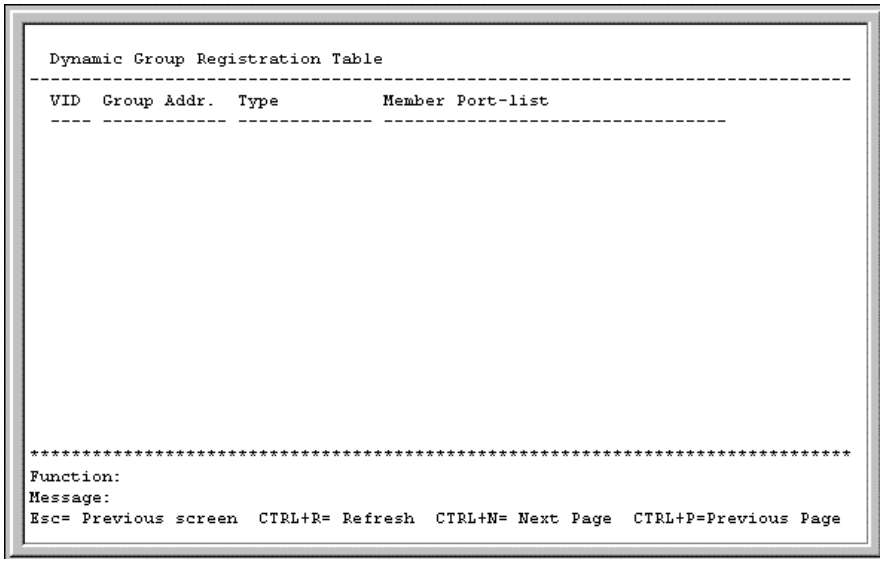


3. Type the VLAN name in the **VID** field.
4. Highlight **GO** and press the **Enter** key to view the IGMP Snooping table for the selected VLAN. The ports where the IGMP packets were snooped are displayed and designated with an "M." The number of IGMP reports that were snooped is also displayed in the **Reports** field.

Monitoring the Dynamic Group Registration Table

To view the **Dynamic Group Registration Table:**

1. Highlight **Dynamic Group Registration Table** on the **Network Monitoring Menu.**
2. Press the **Enter** key. The following screen is displayed.

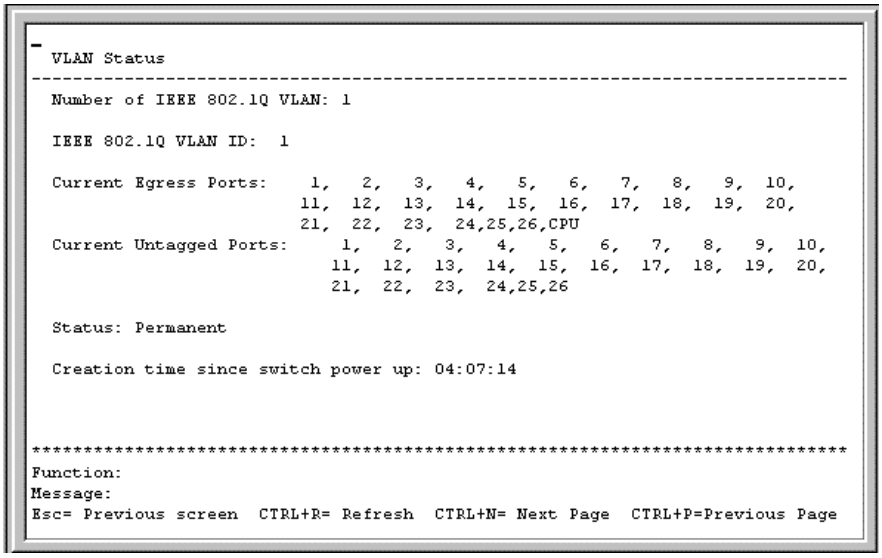


The **Dynamic Group Registration Table** displays filtering information for VLANs configured into the bridge by local or network management, or learned dynamically. It specifies the set of ports to which frames received on a VLAN for this forwarding database (FDB), and containing a specific group destination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

Monitoring VLAN Status

To view the **VLAN Status table:**

1. Highlight **VLAN Status** on the **Network Monitoring Menu.**
2. Press the **Enter** key. The following screen is displayed.



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

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.

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.

If the receiver of a request or trap does not recognize the community string, the request or trap is ignored.

To set the **SNMP Manager Configuration** settings:

1. Highlight **SNMP Manager Configuration** on the main menu.
2. Press the **Enter** key. The following screen is displayed.

```
  SNMP Manager Configuration
--------------------------------------------------------------------------------
  SNMP Community String          Access Right        Status
  [public                ]       <Read  Only>        <Valid  >
  [private               ]       <Read/Write>        <Valid  >
  [                      ]       <Read  Only>        <Invalid>
  [                      ]       <Read  Only>        <Invalid>

  SNMP Trap Manager Configuration
  IP Address            SNMP Community String        Status
  [10.44.7.1      ]     [public               ]      <Valid  >
  [               ]     [                     ]      <Invalid>
  [               ]     [                     ]      <Invalid>
  [               ]     [                     ]      <Invalid>

  Security IP:
  [0.0.0.0        ][0.0.0.0        ][0.0.0.0        ][0.0.0.0        ]
  [0.0.0.0        ][0.0.0.0        ][0.0.0.0        ][0.0.0.0        ]
                                                                  APPLY
********************************************************************************
Function:Edit SNMP Community Strings.
Message:
CTRL+T = Root screen            Esc=Prev. screen             CTRL+R = Refresh
```

The following parameters can be set:

— **SNMP Community String**—Displays the community string that is included on SNMP request and traps sent to and from the switch module. If the receiver of a request or trap does not recognize the community string, the request or trap is ignored. SNMP allows up to four community strings to be defined. The community strings "public" and "private" are defined by default. You can change the strings in addition to adding others. You must coordinate these strings with the community string settings you use in your network management system.

— **Access Right**—Allows each community string received by the switch module to be separately set to either **Read Only,** meaning that the community member can only view switch settings, or **Read/Write,** which allows the member to change settings in the switch module.

— **Status**—Determines whether this community string entry is **Valid** or **Invalid.** An entry can be disabled by changing its status to **Invalid.**

— **IP Address**—Displays the IP address of the network management station designated to receive traps.

— **Security IP**—Allows you to create a list of IP addresses that are allowed to access the switch module by means of SNMP, Telnet, or the Web.

3. After making your changes, highlight **APPLY.**
4. Press the **Enter** key.

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

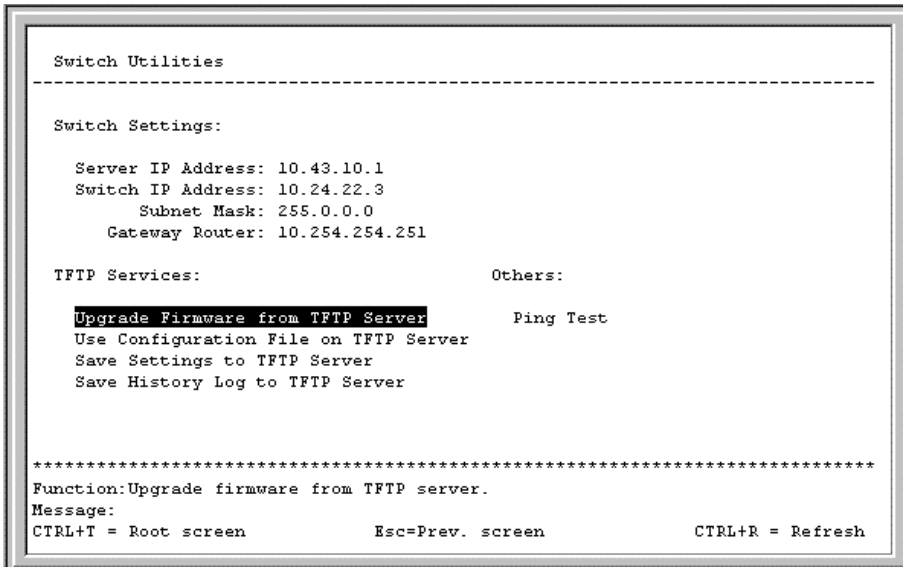
Using System Utilities

Trivial File Transfer Protocol (TFTP) services allow the switch firmware to be upgraded by transferring a new firmware file from a TFTP server to the switch module. A configuration file can also be loaded into the switch module from a TFTP server, switch module settings can be saved to the TFTP server, and a history log can be uploaded from the switch module to the TFTP server.

To set the system utilities settings:

1. Highlight **System Utilities** on the main menu.

2. Press the **Enter** key. The following screen is displayed.

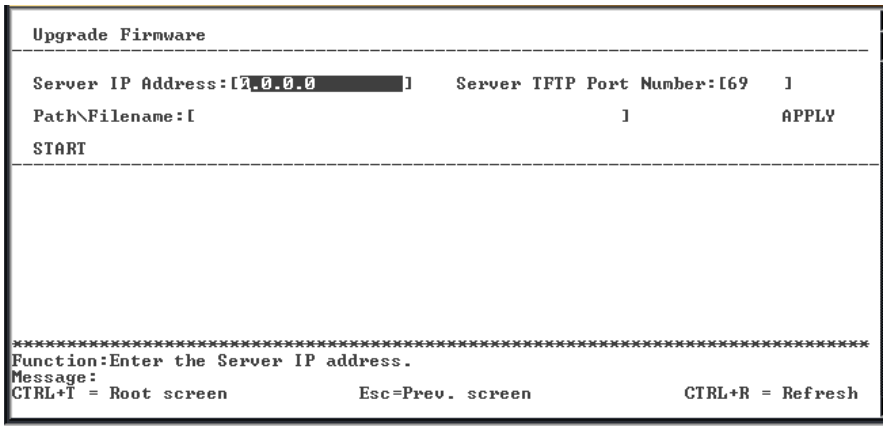


The **Switch Utilities** menu displays the server IP address and the switch module IP address, subnet mask, and gateway router addresses. The bottom of the screen provides a menu for using TFTP services and a performing a ping test.

Upgrading Firmware from a TFTP Server

To upgrade the firmware from a TFTP server:

1. Highlight **Upgrade Firmware from TFTP Server** on the **Switch Utilities** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Type the IP address of the TFTP server in the **Server IP Address** field.

   IMPORTANT: The TFTP server must be on the same IP subnet as the switch module.

4. Type the port number of the TFTP server you wish to connect to in the **Server TFTP Port Number** field.

5. Type the path and the filename to the firmware file on the TFTP server in the **Path\Filename** field.

   IMPORTANT: The TFTP server must be running TFTP server software to perform the file transfer. TFTP server software is included in many network management software packages, or it can be obtained as part of the interconnect switch utilities package.

6. Highlight **APPLY.**
7. Press the **Enter** key to record the IP address of the TFTP server.
8. Highlight **START.**
9. Press the **Enter** key 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 main menu. Refer to the "Saving Changes" section earlier in this chapter.

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

   www.compaq.com/support/servers

Downloading Configuration File from a TFTP Server

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

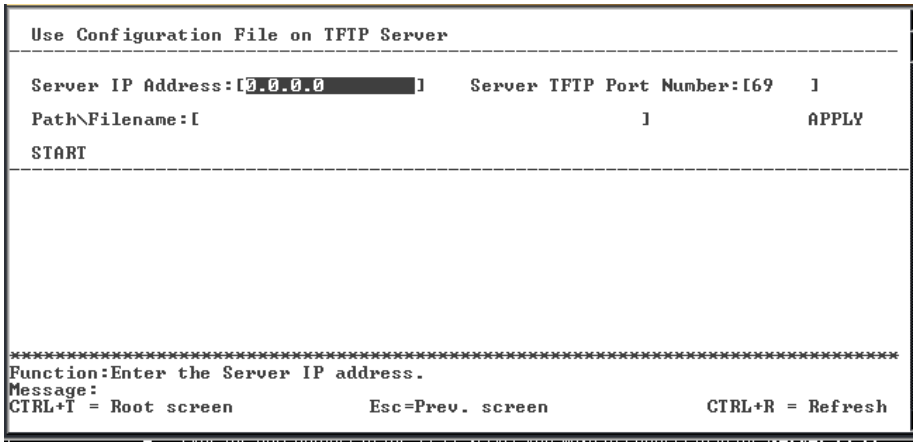
A configuration file can be downloaded from a TFTP server to the switch module. This file is then used by the switch module to configure itself. Beginning in firmware version 2.0.0, switch firmware configuration files are specified in XML format.

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 switch module configuration file from a TFTP server:

1. Highlight **Use a Configuration File on TFTP Server** on the **Switch Utilities** menu.

2. Press the **Enter** key. The following screen is displayed.



3. Type the IP address of the TFTP server in the **Server IP Address** field.
4. Type the port number of the TFTP server you wish to connect to in the **Server TFTP Port Number** field.
5. Type the location of the switch module configuration file on the TFTP server in the **Path\Filename** field.
6. Highlight **APPLY.**
7. Press the **Enter** key to record the IP address and location of the TFTP server.
8. Highlight **START.**
9. Press the **Enter** key 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 main menu. Refer to the "Saving Changes" section earlier in this chapter.

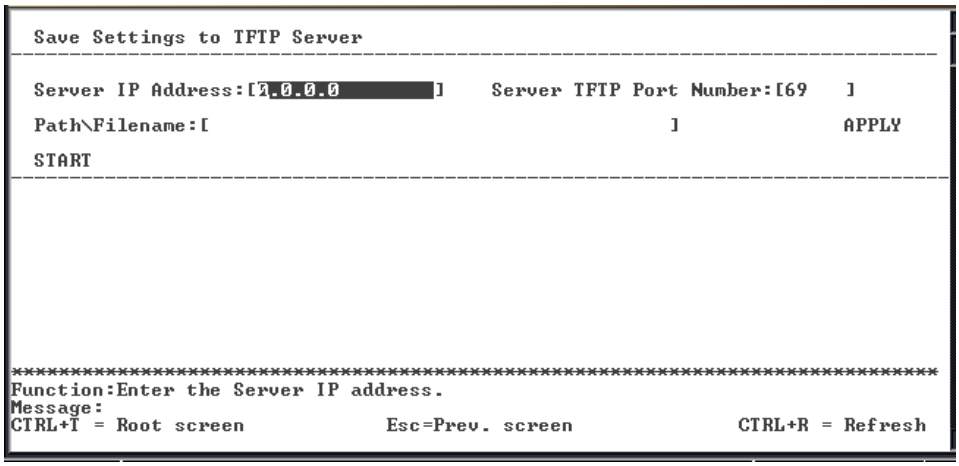
NOTE: For additional information, refer to Appendix H, XML Configuration, in the *HP ProLiant e-class C-GbE Interconnect Switch User Guide.*

Saving Settings to a TFTP Server

After completing the final configuration for the switch module, HP highly recommends that you save the switch module configuration file to TFTP server storage.

To save the switch module configuration file to a TFTP server:

1. Highlight **Save Settings to TFTP Server** on the **Switch Utilities** menu.
2. Press the **Enter** key. The following screen is displayed.



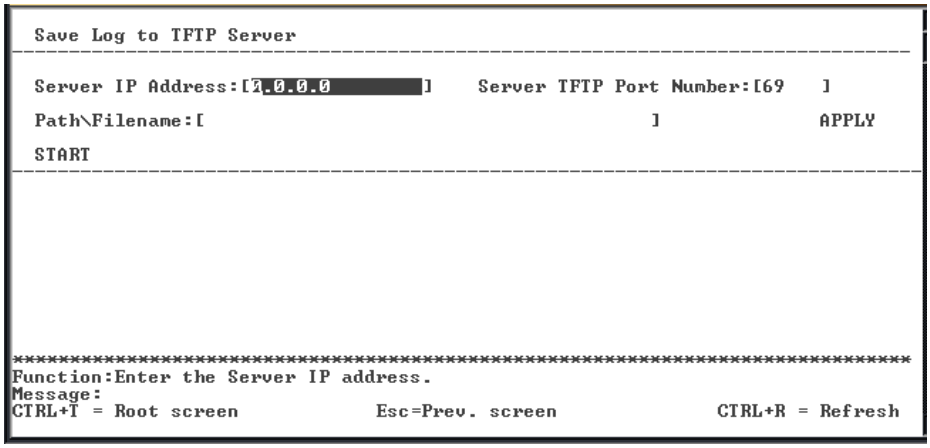
3. Type the IP address of the TFTP server in the **Server IP Address** field.
4. Type the port number of the TFTP server you wish to connect to in the **Server TFTP Port Number** field.
5. Type the location of the switch module configuration file on the TFTP server in the **Path\Filename** field.
6. Highlight **APPLY.**
7. Press the **Enter** key.
8. Highlight **START.**
9. Press the **Enter** key 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 main menu. Refer to the "Saving Changes" section earlier in this chapter.

Saving the History Log to a TFTP Server

To save the **History Log** on a TFTP server:

1. Highlight **Save History Log to TFTP Server** on the **Switch Utilities** menu.
2. Press the **Enter** key. The following screen is displayed.



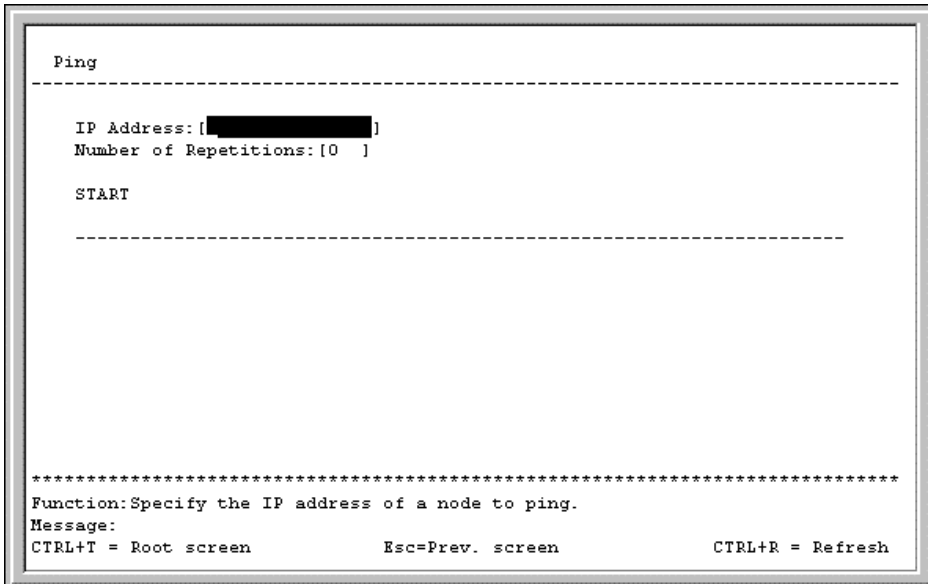
3. Type the IP address of the TFTP server in the **Server IP Address** field.
4. Type the port number of the TFTP server you wish to connect in the **Server TFTP Port Number** field.
5. Type the path and filename for the history log on the TFTP server in the **Path\Filename** field.
6. Highlight **APPLY.**
7. Press the **Enter** key to make the changes current.
8. Highlight **START.**
9. Press the **Enter** key 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 main menu. Refer to the "Saving Changes" section earlier in this chapter.

Performing a Ping Test

To test the connection with another network device using Ping:

1. Highlight **Ping Test** on the **Switch Utilities** menu.
2. Press the **Enter** key. The following screen is displayed.



3. Type the IP address of the network device to be pinged in the **IP Address** field.
4. Type the number of test packets to be sent (three is usually enough) in the **Number of Repetitions** field.
5. Highlight **START.**
6. Press the **Enter** key.

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

Rebooting the Switch Module

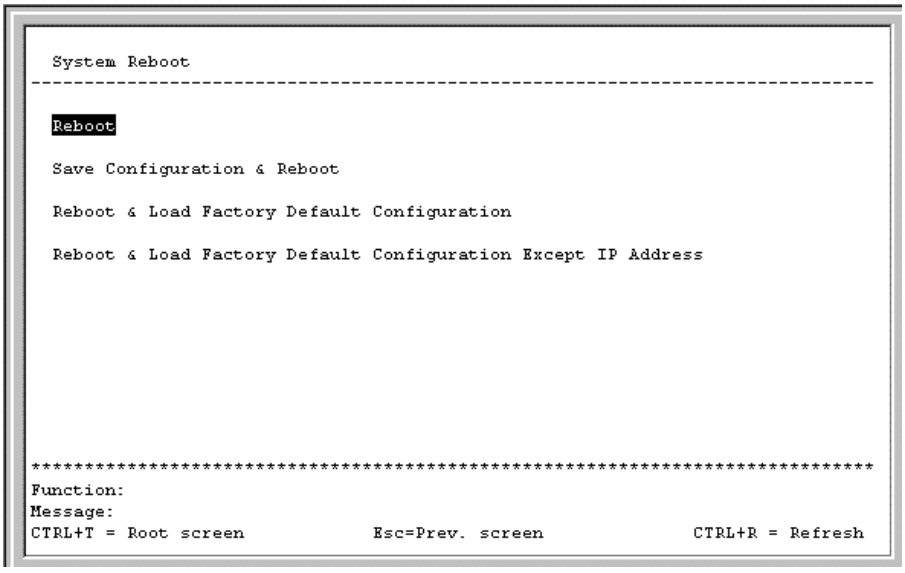
The switch module reboot options are:

- **Reboot**—Restarts the switch module. Any configuration settings not saved using **Save Changes** from the main menu are lost. The switch module configuration is restored to the last configuration saved in NVRAM.
- **Save Configuration & Reboot**—Saves the configuration to NVRAM (identical to using **Save Changes**) and then restarts the switch module.
- **Reboot & Load Factory Default Configuration**—Restarts the switch module using the default factory configuration. All user-defined configuration data is lost.
- **Reboot & Load Factory Default Configuration Except IP Address**—Restarts the switch module using the default factory configuration, except the user-configured IP address, which is retained. All other configuration data is lost. If you want your IP address to default from DHCP or BOOTP, do not choose this option.

NOTE: Refer to Appendix C in the *HP ProLiant e-Class C-GbE Interconnect Switch User Guide* for a list of factory default settings.

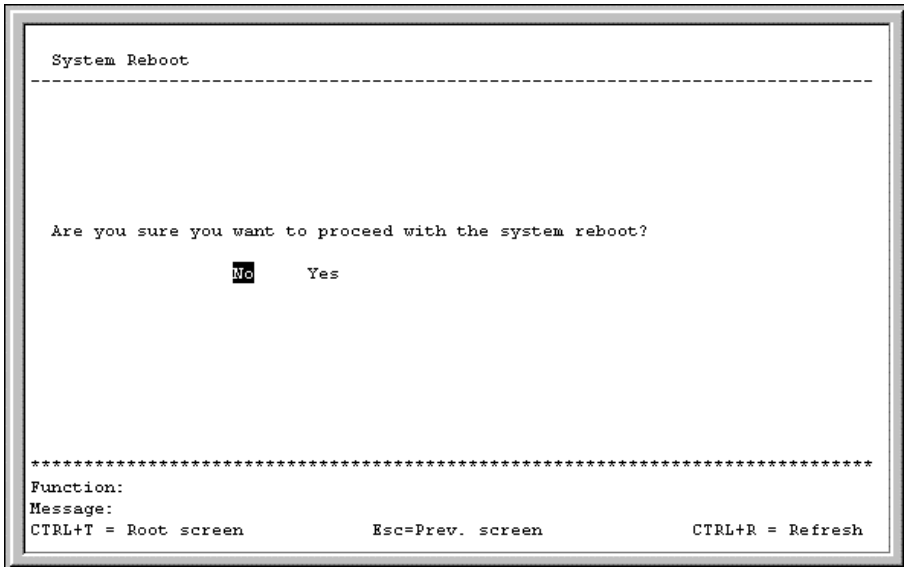
To reboot the switch module from the console:

1. Highlight **Reboot** on the main menu.
2. Press the **Enter** key. The following screen is displayed.



3. Highlight the appropriate selection.

4. Press the **Enter** key. The following screen is displayed.



5. Highlight **Yes.**
6. Press the **Enter** key.

Logging Out

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

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