IP Address Assignment

Each Switch must be assigned its own IP Address, which is used for communication with an SNMP network manager or other TCP/IP application (for example BOOTP, TFTP). The Switch's default IP address is 10.90.90.90. You can change the default Switch IP address to meet the specification of your networking address scheme.

The Switch is also assigned a unique MAC address by the factory. This MAC address cannot be changed, and can be found by entering the command "**show switch**" into the command line interface, as shown below.

```
Command: show switch

Device Type         : DES-3018 Ethernet Switch
Module 1 Type       : None
Module 2 Type       : None
MAC Address         : 00-11-95-EB-83-32
IP Address          : 10.53.13.33 (Manual)
VLAN Name           : default
Subnet Mask         : 255.0.0.0
Default Gateway     : 0.0.0.0
Boot PROM Version   : Build 1.01.003
Firmware Version    : Build 2.00.020
Hardware Version    : 0A1
System Name         :
System Location     :
System Contact      :
Spanning Tree       : Disabled
IGMP Snooping       : Disabled
802.1X              : Disabled
TELNET              : Enabled(TCP  23)
WEB                 : Enabled(TCP  80)
RMON                : Disabled

DES-3018:4#
```

Figure 4- 4. "show switch" command

The Switch's MAC address can also be found from the Web management program on the **DES-3018 Web Management Tool**.

The IP address for the Switch must be set before it can be managed with the Web-based manager. The Switch IP address can be automatically set using BOOTP or DHCP protocols, in which case the actual address assigned to the Switch must be known.

The IP address may be set using the Command Line Interface (CLI) over the console serial port as follows:

Starting at the command line prompt, enter the commands **config ipif System ipaddress xxx.xxx.xxx.xxx/yyy.yyy.yyy.yyy.** Where the x's represent the IP address to be assigned to the IP interface named System and the y's represent the corresponding subnet mask.

Alternatively, you can enter **config ipif System ipaddress xxx.xxx.xxx.xxx/z.** Where the x's represent the IP address to be assigned to the IP interface named System and the z represents the corresponding number of subnets in CIDR notation.

The IP interface named System on the Switch can be assigned an IP address and subnet mask, which can then be used to connect a management station to the Switch's Telnet or Web-based management agent.

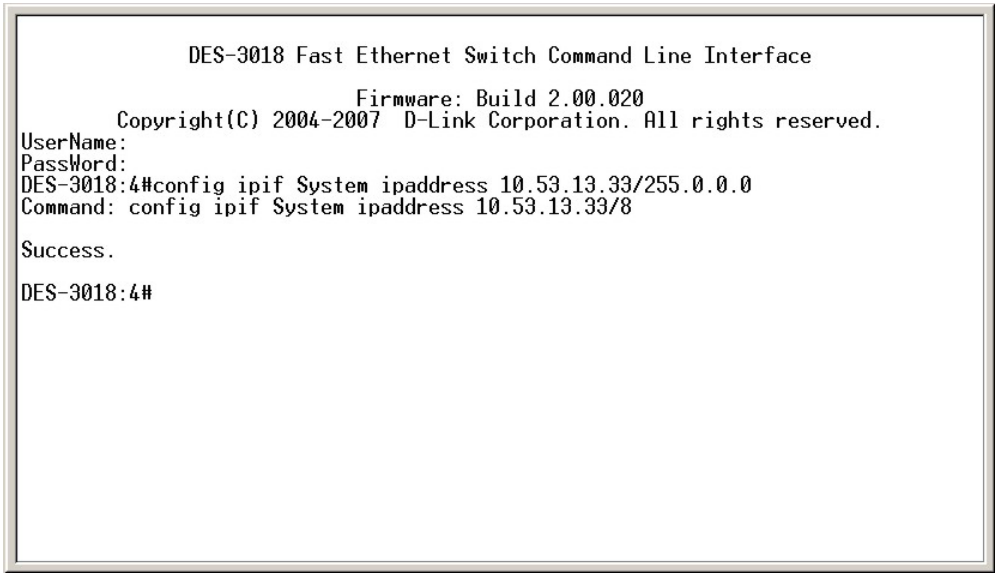


Figure 4- 5. Assigning the Switch an IP Address

In the above example, the Switch was assigned an IP address of 10.53.13.33 with a subnet mask of 255.0.0.0. The system message **Success** indicates that the command was executed successfully. The Switch can now be configured and managed via Telnet and the CLI or via the Web-based management.

Connecting Devices to the Switch

After you assign IP addresses to the Switch, you can connect devices to the Switch.

To connect a device to an SFP transceiver port:

- Use your cabling requirements to select an appropriate SFP transceiver type.
- Insert the SFP transceiver (sold separately) into the SFP transceiver slot.
- Use the appropriate network cabling to connect a device to the connectors on the SFP transceiver.

NOTICE: When the SFP transceiver acquires a link, the associated integrated 10/100/1000BASE-T port is disabled.

TFTP Services

Trivial File Transfer Protocol (TFTP) services allow the Switch's firmware to be upgraded by transferring a new firmware file from a TFTP server to the Switch or vice versa. Use the pull-down menu to select the service to be completed. **Download Firmware** is used to transfer a firmware file from an outside source to the Switch using the TFTP Protocol. **Download Configuration** is used to transfer a configuration file from an outside source to the Switch using the TFTP Protocol. **Upload Configuration** is used to transfer a configuration file from the Switch to an outside source using the TFTP Protocol. **Upload Log** is used to transfer the Switch's log file from the Switch to an outside source using the TFTP Protocol. Once the user has selected an operation to perform, enter the **Server IP Address** and the path of the filename in use and click **Start** to initiate the file transfer.

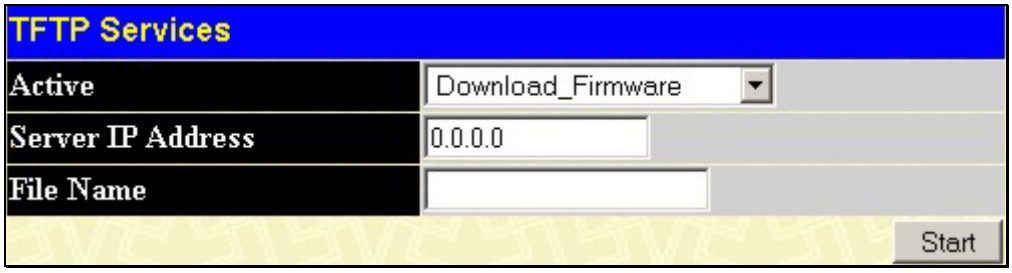


Figure 6- 15. TFTP Services screen

Ping Test

Ping is a small program that sends ICMP Echo packets to the IP address you specify. The destination node then responds to or "echoes" the packets sent from the Switch. This is very useful to verify connectivity between the Switch and other nodes on the network.

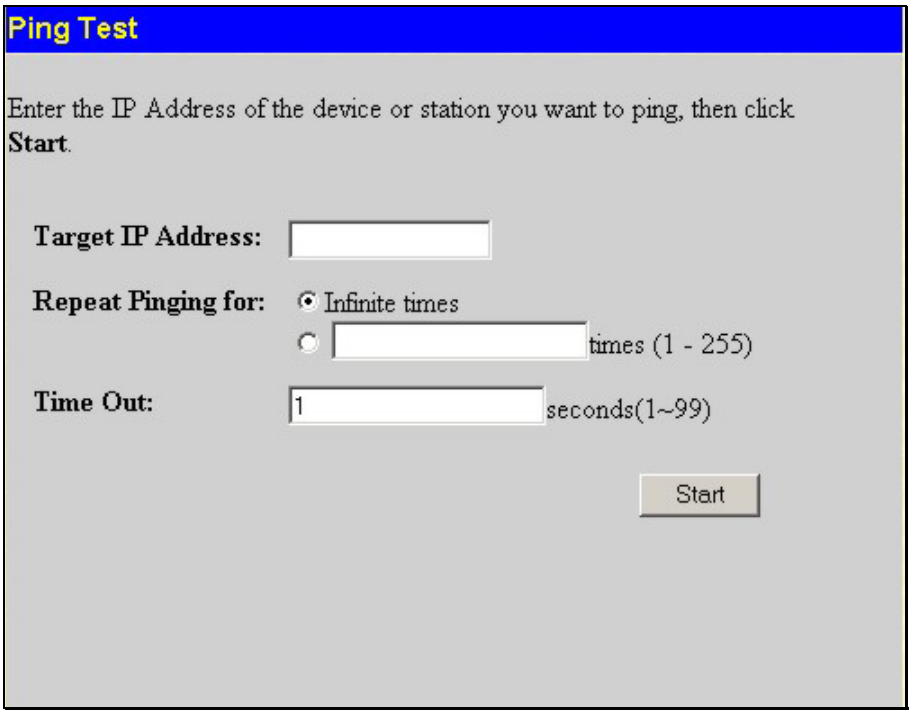


Figure 6- 16. Ping Test

The user may use Infinite times radio button, in the **Repeat Pinging for:** field, which will tell the ping program to keep sending ICMP Echo packets to the specified IP address until the program is stopped. The user may opt to choose a specific number of times to ping the **Target IP Address** by clicking its radio button and entering a number between 1 and 255. The user can also choose a **Time Out** for the ping, which will terminate the ping request if no response packet has returned to the Switch in the allotted time. Click **Start** to initiate the Ping program.

Device Information

The **Device Information** window shows the **Switch's MAC Address** (assigned by the factory and unchangeable), the **Boot PROM**, **Firmware Version**, and **Hardware Version**. This information is helpful to keep track of PROM and firmware updates and to obtain the Switch's MAC address for entry into another network device's address table, if necessary. The user may also enter a **System Name**, **System Location** and **System Contact** to aid in defining the Switch, to the user's preference. In addition, this screen displays the status of functions on the Switch to quickly assess their current global status. Three of these functions, Spanning Tree, Port Mirror and Single IP Management have a detail setting link which when clicked will automatically flip to the configuration page for that feature. This serves as a great quick reference for network administrators to promptly assess problems concerning Switch functions.

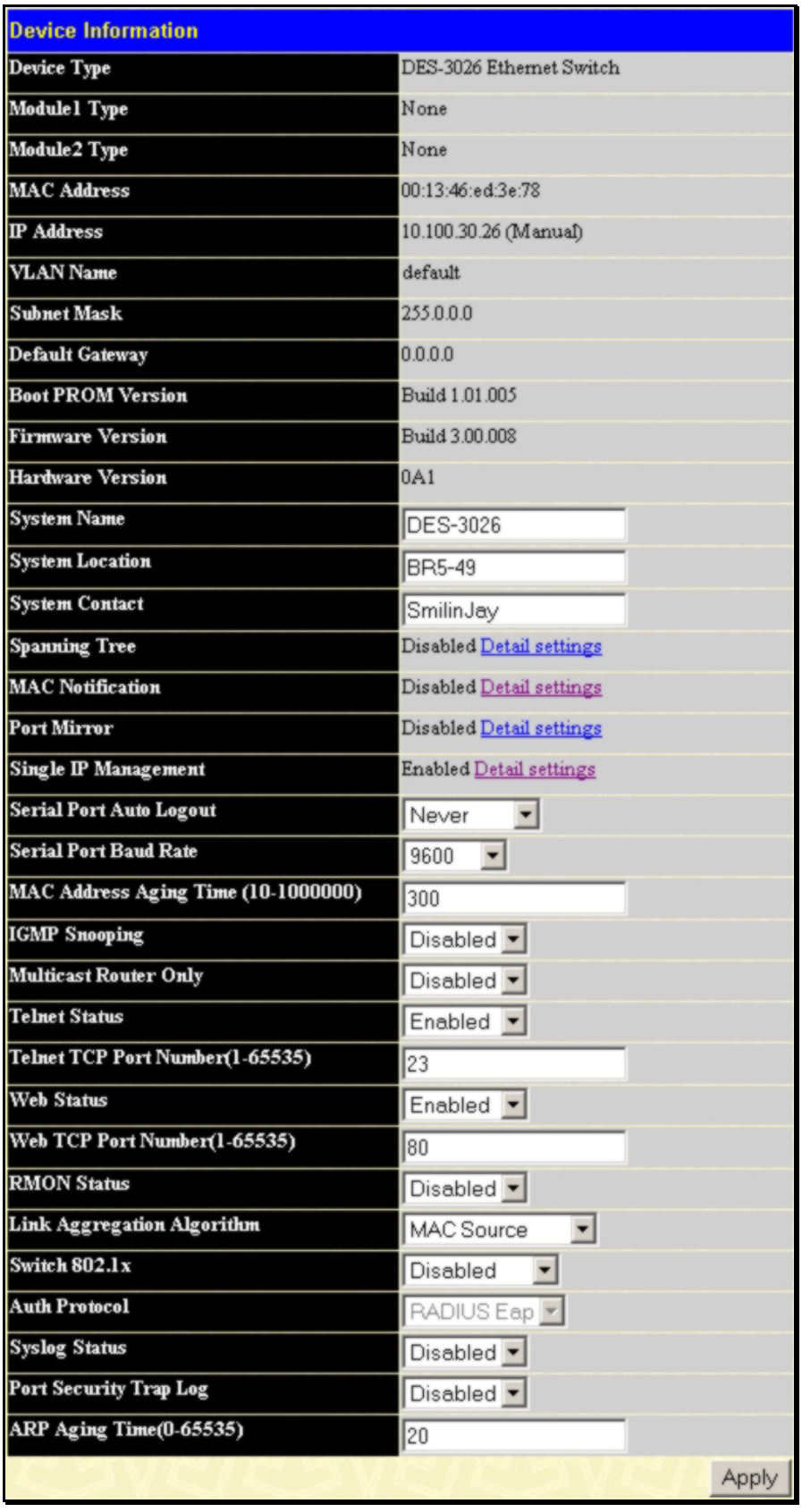


Figure 6- 1. Device Information screen

Static VLAN Entry

In the **L2 Features** folder, open the **VLAN** folder and click the **Static VLAN Entry** link to open the following window:

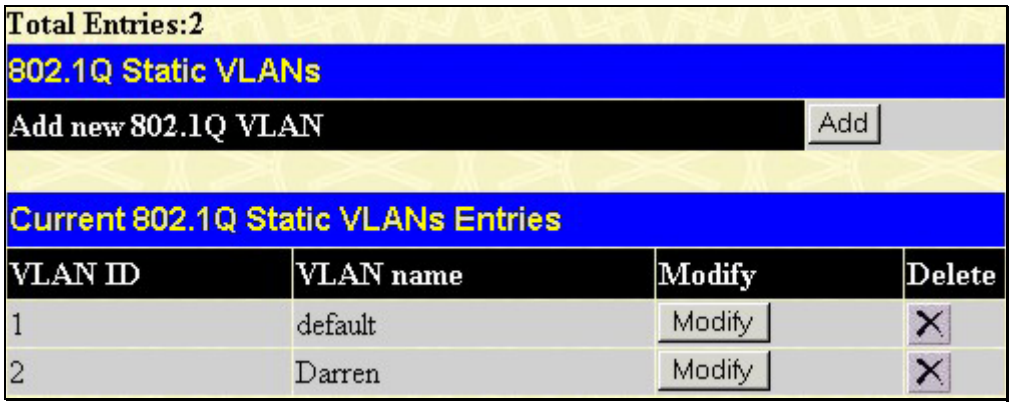


Figure 7- 4. 802.1Q Static VLANs window

The **802.1Q Static VLANs** menu lists all previously configured VLANs by **VLAN ID** and **VLAN Name**. To delete an existing 802.1Q VLAN, click the corresponding button under the **Delete** heading.

To create a new 802.1Q VLAN, click the **Add** button in the **802.1Q Static VLANs** menu. A new menu will appear, as shown below, to configure the port settings and to assign a unique name and number to the new VLAN. See the table below for a description of the parameters in the new menu.

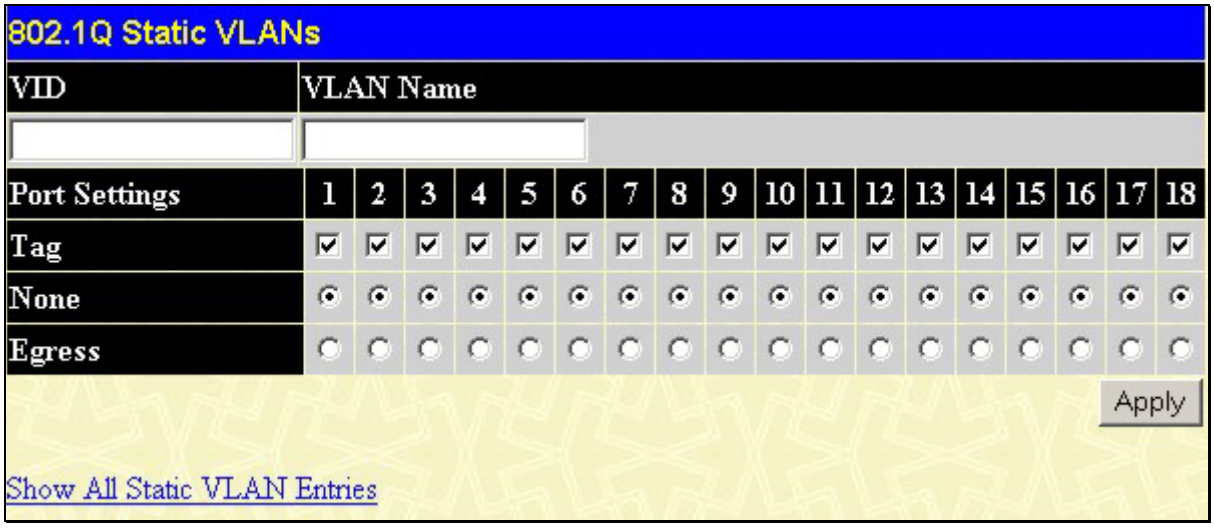


Figure 7- 5. 802.1Q Static VLANs - Add

To return to the **Current 802.1Q Static VLANs Entries** window, click the Show All Static VLAN Entries link. To change an existing 802.1Q VLAN entry, click the **Modify** button of the corresponding entry you wish to modify. A new menu will appear to configure the port settings and to assign a unique name and number to the new VLAN. See the table below for a description of the parameters in the new menu.

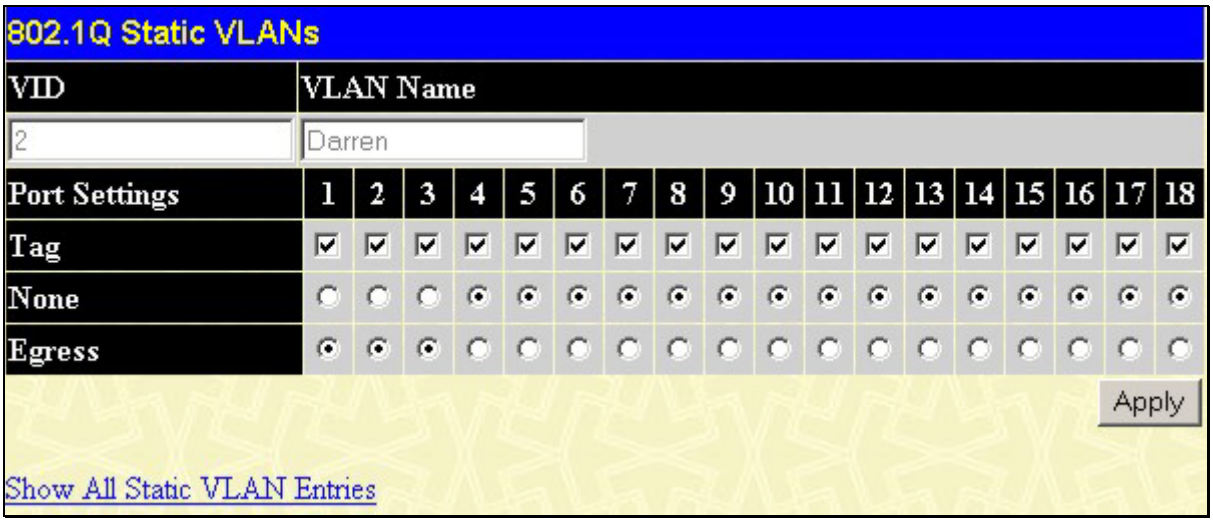


Figure 7- 6. 802.1Q Static VLANs - Modify

The following fields can then be set in either the **Add** or **Modify 802.1Q Static VLANs** menus:

Parameter	Description
VID (VLAN ID)	Allows the entry of a VLAN ID in the Add dialog box, or displays the VLAN ID of an existing VLAN in the Modify dialog box. VLANs can be identified by either the VID or the VLAN name.
VLAN Name	Allows the entry of a name for the new VLAN in the Add dialog box, or for editing the VLAN name in the Modify dialog box.
Port Settings	Allows an individual port to be specified as member of a VLAN.
Tag	Specifies the port as either 802.1Q tagging or 802.1Q untagged. Checking the box will designate the port as Tagged.
None	Allows an individual port to be specified as a non-VLAN member.
Egress	Select this to specify the port as 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.

Click **Apply** to implement changes made. Click the Show All Static VLAN Entries link to return to the **802.1Q Static VLANs** window.

STP Bridge Global Settings

To open the following window, open the **Spanning Tree** folder in the **L2 features** menu and click the **STP Bridge Global Settings** link.

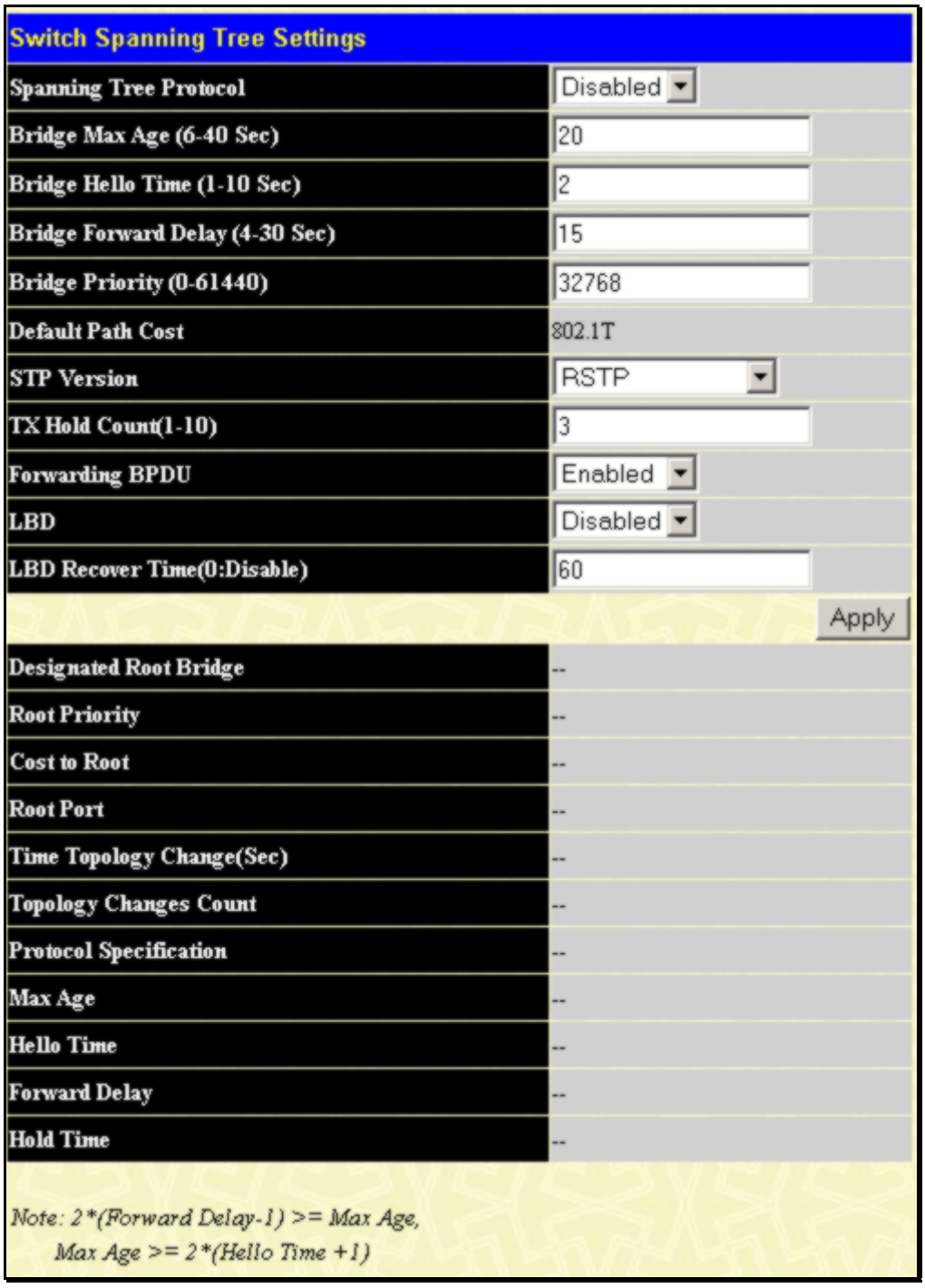


Figure 7- 14. STP Bridge Global Settings

NOTE: The Hello Time cannot be longer than the Max. Age. Otherwise, a configuration error will occur. Observe the following formulas when setting the above parameters:

Max. Age ≤ 2 x (Forward Delay - 1 second)

Max. Age ≥ 2 x (Hello Time + 1 second)

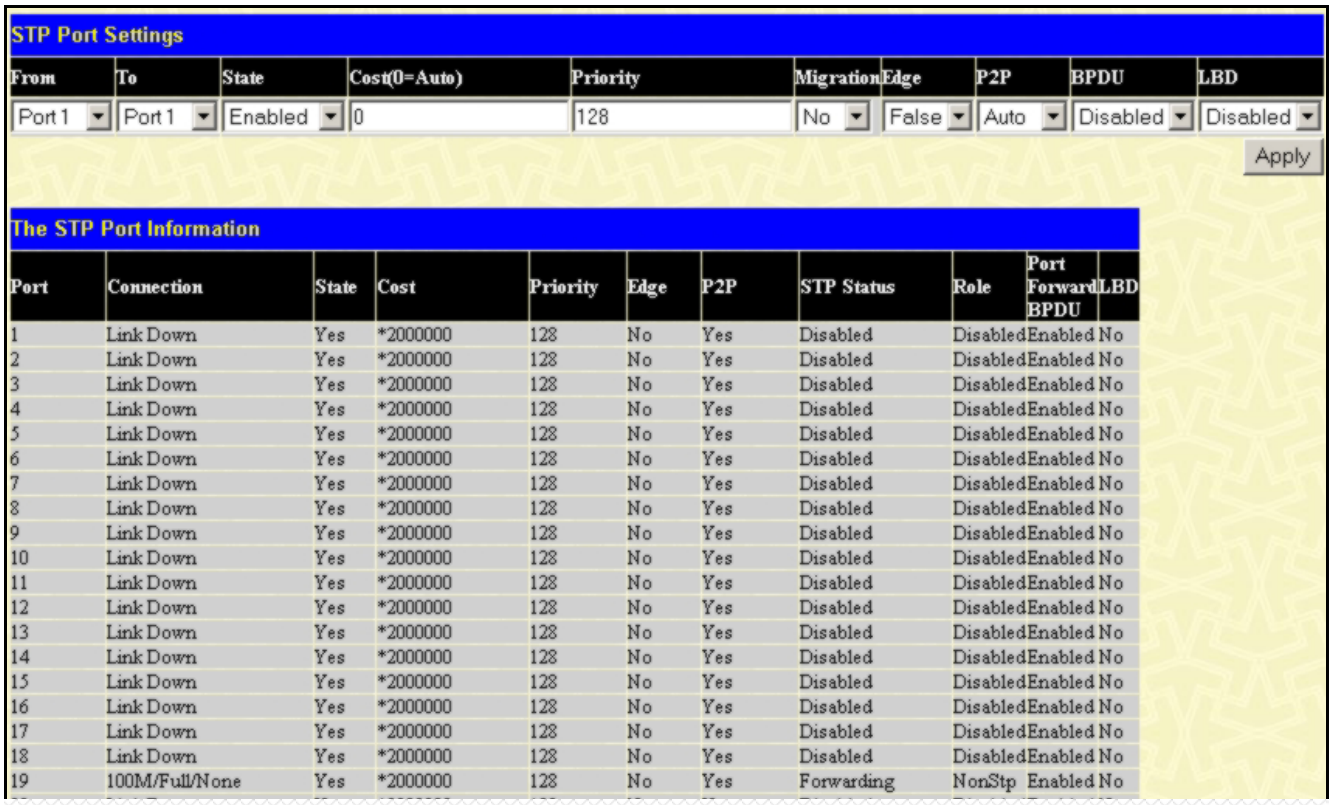
The following parameters can be set:

Parameter	Description
Spanning Tree Protocol	Use the pull-down menu to enable or disable STP globally on the Switch. The default is *Disabled*.
Bridge Max Age: *(6 - 40 sec)*	The **Max Age** may be set to ensure that old information does not endlessly circulate through redundant paths in the network, preventing the effective propagation of the new information. Set by the Root Bridge, this value will aid in determining that the Switch has spanning tree configuration values consistent with other devices on the bridged LAN. If the value ages out and a BPDU has still not been received from the Root Bridge, the Switch will start sending its own BPDU to all other switches for permission to become the Root Bridge. If it turns out that your switch has the lowest Bridge Identifier, it will become the Root Bridge. The user may choose a time between 6 and 40 seconds. The default value is 20.
Bridge Hello Time: *(1 - 10 sec)*	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.
Bridge Forward Delay: (4 - 30 sec)	The **Forward Delay** can be from 4 to 30 seconds. Any port on the Switch spends this time in the listening state while moving from the blocking state to the forwarding state.
Bridge Priority (0-61440)	A Priority for the Switch can be set from *0* to *61440*. This 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 high probability that this Switch will be elected as the root Switch.
Default Path Cost	This read-only field displays the protocol used in determining the default path cost per port. **802.1T** will calculate this 32-bit cost value through the use of a specific formula based on the port bandwidth.
STP Version	Use the pull-down menu to choose the desired version of STP to be implemented on the Switch. There are two choices: *STPCompatability* - Select this parameter to set the Spanning Tree Protocol (STP) globally on the switch. *RSTP* - Select this parameter to set the Rapid Spanning Tree Protocol (RSTP) globally on the Switch.
TX Hold Count (1-10)	Used to set the maximum number of Hello packets transmitted per interval. The count can be specified from 1 to 10. The default is 3.
Forwarding BPDU	This field can be *Enabled* or *Disabled.* When *Enabled,* it allows the forwarding of STP BPDU packets from other network devices. The default is Enabled.
LBD	This feature is used to temporarily block STP on the Switch when a BPDU packet has been looped back to the switch. When the Switch detects its own BPDU packet coming back, it signifies a loop on the network. STP will automatically be blocked and an alert will be sent to the administrator. The LBD STP port will restart (change to discarding state) when the **LBD Recover Time** times out. The user may enable or disable this function using the pull-down menu. The default is Disabled.
LBD Recover Time	This field will set the time the STP port will wait before recovering the STP state set. 0 will denote that the LBD will never time out or restart until the administrator personally changes it. The user may also set a time between 60 and 1000000 seconds. The default is 60 seconds.

Click **Apply** to implement changes made.

STP Port Settings

STP can be set up on a port per port basis. To view the following window click **L2 Features > Spanning Tree > STP Port Settings**:



STP Port Settings

From	To	State	Cost(0=Auto)	Priority	Migration	Edge	P2P	BPDU	LBD
Port 1	Port 1	Enabled	0	128	No	False	Auto	Disabled	Disabled

Apply

The STP Port Information

Port	Connection	State	Cost	Priority	Edge	P2P	STP Status	Role	Port Forward BPDU	LBD
1	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
2	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
3	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
4	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
5	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
6	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
7	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
8	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
9	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
10	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
11	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
12	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
13	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
14	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
15	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
16	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
17	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
18	Link Down	Yes	*2000000	128	No	Yes	Disabled	Disabled	Enabled	No
19	100M/Full/None	Yes	*2000000	128	No	Yes	Forwarding	NonStp	Enabled	No

Figure 7- 15. STP Port Settings and Table window

In addition to setting Spanning Tree parameters for use on the switch level, the Switch allows for the configuration of groups of ports, each port-group of which will have its own spanning tree, and will require some of its own configuration settings. An STP Group will use the switch-level parameters entered above, with the addition of **Port Priority** and **Port Cost**.

An STP Group spanning tree works in the same way as the switch-level spanning tree, but the root bridge concept is replaced with a root port concept. A root port is a port of the group that is elected based on port priority and port cost, to be the connection to the network for the group. Redundant links will be blocked, just as redundant links are blocked on the switch level.

The STP on the switch level blocks redundant links between switches (and similar network devices). The port level STP will block redundant links within an STP Group.

It is advisable to define an STP Group to correspond to a VLAN group of ports.

The following fields can be set:

Parameter	Description
From/To	A consecutive group of ports may be configured starting with the selected port.
Cost (*0 = Auto)*	**External Cost** - This defines a metric that indicates the relative cost of forwarding packets to the specified port list. Port cost can be set automatically or as a metric value. The default value is 0 (auto). • *0 (auto)* - Setting 0 for the external cost will automatically set the speed for forwarding packets to the specified port(s) in the list for optimal efficiency. Default port cost: 100Mbps port = 200000. Gigabit port = 20000. • *value 1-2000000* - Define a value between 1 and 2000000 to determine the external cost. The lower the number, the greater the probability the port will be chosen to forward packets.
Priority	A Port Priority can be from *0* to *240*. The lower the number, the greater the probability the port will be chosen as the Root Port.
Migration	Setting this parameter as "*yes*" will set the ports to send out BPDU packets to other bridges, requesting information on their STP setting If the Switch is configured for RSTP, the port will be capable to migrate from 802.1d STP to 802.1w RSTP. Migration should be set as yes on ports connected to network stations or segments that are capable of being upgraded to 802.1w RSTP on all or some portion of the segment.
Edge	Choosing the true parameter designates the port as an edge port. Edge ports cannot create loops, however an edge port can lose edge port status if a topology change creates a potential for a loop. An edge port normally should not receive BPDU packets. If a BPDU packet is received, it automatically loses edge port status. Choosing the false parameter indicates that the port does not have edge port status.
P2P	Choosing the *True* parameter indicates a point-to-point (P2P) shared link. P2P ports are similar to edge ports, however they are restricted in that a P2P port must operate in full-duplex. Like edge ports, P2P ports transition to a forwarding state rapidly thus benefiting from RSTP. A p2p value of *false* indicates that the port cannot have p2p status. *Auto* allows the port to have p2p status whenever possible and operate as if the p2p status were true. If the port cannot maintain this status, (for example if the port is forced to half-duplex operation) the p2p status changes to operate as if the p2p value were *False*. The default setting for this parameter is *True*.
BPDU	Choosing *Enabled* will allow the forwarding of BPDU packets in the specified ports from other network devices. This will go into effect only if STP is globally disabled AND Forwarding BPDU is globally enabled (See **STP Bridge Global Settings** above). The default setting *Disabled*, does not forward BPDU packets when STP is disabled.
LBD	Use the pull-down menu to enable or disable the loop-back detection function on the Switch for the ports configured above. For more information on this function, see the **STP LoopBack Prevention** section.

Click **Apply** to implement changes made.

NOTE: To enable Forwarding BPDU on a per port basis, the following settings must first be in effect: 1. STP must be globally disabled and 2. Forwarding BPDU must be globally enabled. These are the default settings configurable in the **STP Bridge Global Settings** menu discussed previously.

The following fields can be set or viewed:

Parameter	Description
Time Interval [1s]	Select the desired setting between 1s and 60s, where "s" stands for seconds. The default value is one second.
Record Number [200]	Select number of times the Switch will be polled between 20 and 200. The default value is 200.
64	The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).
65-127	The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
128-255	The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
256-511	The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
512-1023	The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
1024-1518	The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
Show/Hide	Check whether or not to display 64, 65-127, 128-255, 256-511, 512-1023, and 1024-1518 packets received.
Clear	Clicking this button clears all statistics counters on this window.
View Table	Clicking this button instructs the Switch to display a table rather than a line graph.
View Line Chart	Clicking this button instructs the Switch to display a line graph rather than a table.

MAC Address

This allows the Switch's dynamic MAC address forwarding table to be viewed. When the Switch learns an association between a MAC address and a port number, it makes an entry into its forwarding table. These entries are then used to forward packets through the Switch.

To view the MAC Address forwarding table, from the **Monitoring** menu, click the **MAC Address** link:

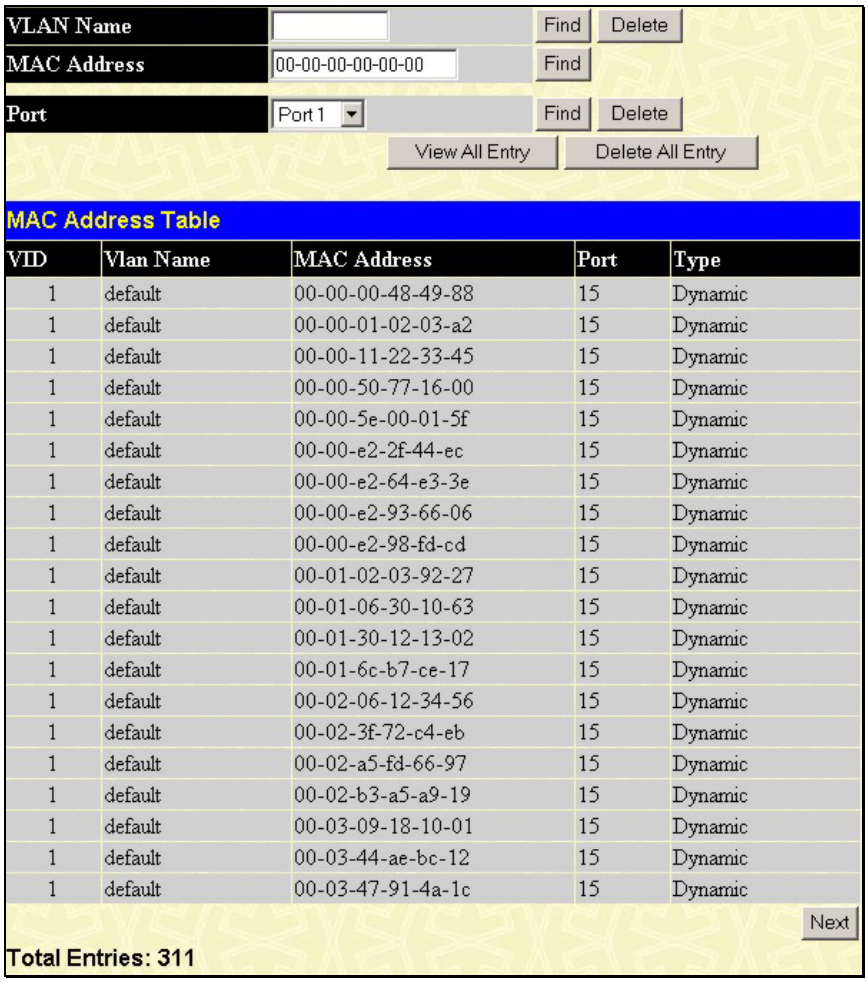


Figure 11- 15. MAC Address Table

The following fields can be viewed or set:

Parameter	Description
VLAN Name	Enter a VLAN Name by which to browse the forwarding table.
MAC Address	Enter a MAC address by which to browse the forwarding table.
Port	Select the port by using the corresponding pull-down menu.
Find	Allows the user to move to a sector of the database corresponding to a user defined port, VLAN, or MAC address.
VID	The VLAN ID of the VLAN of which the port is a member.
MAC Address	The MAC address entered into the address table.
Port	The port to which the MAC address above corresponds.
Type	Describes the method which the Switch discovered the MAC address. The possible entries are Dynamic, Self, and Static.
Next	Click this button to view the next page of the address table.
View All Entry	Clicking this button will allow the user to view all entries of the address table.

Reset

The **Reset** function has several options when resetting the Switch. Some of the current configuration parameters can be retained while resetting all other configuration parameters to their factory defaults.

NOTE: Only the **Reset System** option will enter the factory default parameters into the Switch's non-volatile RAM, and then restart the Switch. All other options enter the factory defaults into the current configuration, but do not save this configuration. **Reset System** will return the Switch's configuration to the state it was when it left the factory

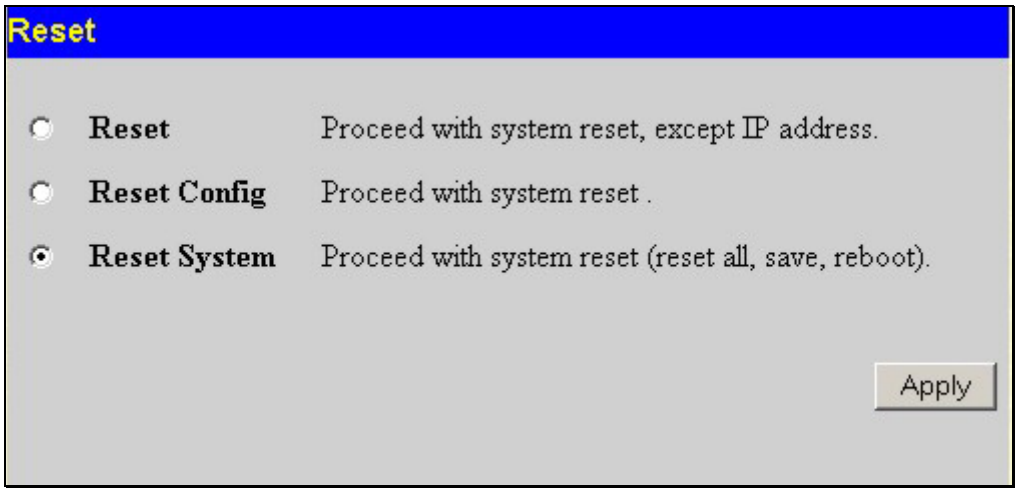


Figure 11- 29. Factory Reset to Default Value window

Reboot System

The following menu is used to restart the Switch.

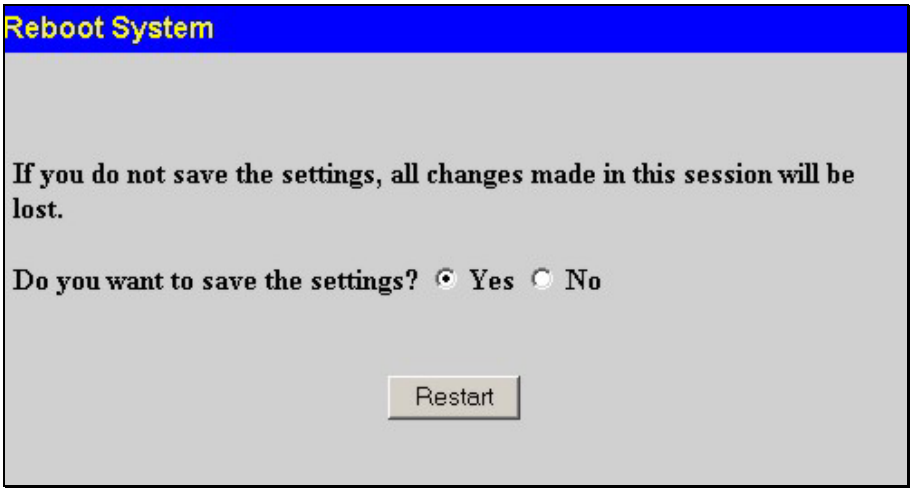


Figure 11- 30. Reboot System window

Clicking the **Yes** click-box will instruct the Switch to save the current configuration to non-volatile RAM before restarting the Switch.

Clicking the **No** click-box instructs the Switch not to save the current configuration before restarting the Switch. All of the configuration information entered from the last time **Save Changes** was executed, will be lost.

Click the **Restart** button to restart the Switch.

Save Changes

The Switch has two levels of memory, normal RAM and non-volatile or NV-RAM. Some settings, require you to restart the Switch before they will take effect. Restarting the Switch erases all settings in RAM and reloads the stored settings from the NV-RAM. Thus, it is necessary to save all setting changes to NV-RAM before rebooting the switch.

There are three Save Changes options:

- **Save Config** – Saves current configuration to NV-RAM. This configuration will be loaded upon rebooting.
- **Save Log** – Save history log.
- **Save All** – Save configuration and log.

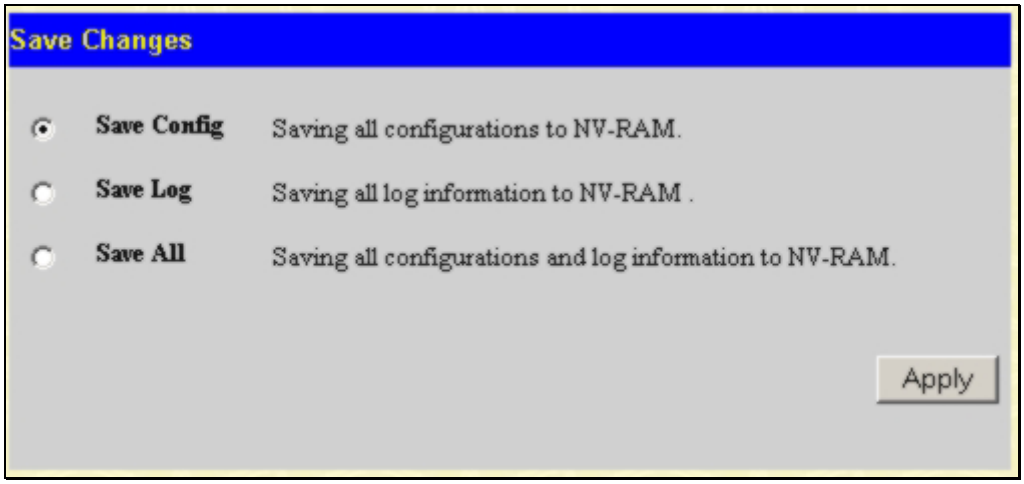


Figure 11- 31. Save Changes screen