**D-Link**®

# DES-5600 Gigabit/Fast Ethernet Switching System User's Guide

# Limited Warranty

## Hardware:

D-Link warrants each of its hardware products to be free from defects in workmanship and materials under normal use and service for a period commencing on the date of purchase from D-Link or its Authorized Reseller and extending for the length of time stipulated by the Authorized Reseller or D-Link Branch Office nearest to the place of purchase.

This Warranty applies on the condition that the product Registration Card is filled out and returned to a D-Link office within ninety (90) days of purchase. A list of D-Link offices is provided at the back of this manual, together with a copy of the Registration Card.

If the product proves defective within the applicable warranty period, D-Link will provide repair or replacement of the product. D-Link shall have the sole discretion whether to repair or replace, and replacement product may be new or reconditioned. Replacement product shall be of equivalent or better specifications, relative to the defective product, but need not be identical. Any product or part repaired by D-Link pursuant to this warranty shall have a warranty period of not less than 90 days, from date of such repair, irrespective of any earlier expiration of original warranty period. When D-Link provides replacement, then the defective product becomes the property of D-Link.

Warranty service may be obtained by contacting a D-Link office within the applicable warranty period, and requesting a Return Material Authorization (RMA) number. If a Registration Card for the product in question has not been returned to D-Link, then a proof of purchase (such as a copy of the dated purchase invoice) must be provided. If Purchaser's circumstances require special handling of warranty correction, then at the time of requesting RMA number, Purchaser may also propose special procedure as may be suitable to the case.

After an RMA number is issued, the defective product must be packaged securely in the original or other suitable shipping package to ensure that it will not be damaged in transit, and the RMA number must be prominently marked on the outside of the package. The package must be mailed or otherwise shipped to D-Link with all costs of mailing/shipping/insurance prepaid. D-Link shall never be responsible for any software, firmware, information, or memory data of Purchaser contained in, stored on, or integrated with any product returned to D-Link pursuant to this warranty.

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Warranty service for software products may be obtained by contacting a D-Link office within the applicable warranty period. A list of D-Link offices is provided at the back of this manual, together with a copy of the Registration Card. If a Registration Card for the product in question has not been returned to a D-Link office, then a proof of purchase (such as a copy of the dated purchase invoice) must be provided when requesting warranty service. The term "purchase" in this software warranty refers to the purchase transaction and resulting license to use such software.

D-Link warrants that its software products will perform in substantial conformance with the applicable product documentation provided by D-Link with such software product, for a period of ninety (90) days from the date of purchase from D-Link or its Authorized Reseller. D-Link warrants the magnetic media, on which D-Link provides its software product, against failure during the same warranty period. This warranty applies to purchased software, and to replacement software provided by D-Link pursuant to this warranty, but shall not apply to any update or replacement which may be provided for download via the Internet, or to any update which may otherwise be provided free of charge.

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The product's Registration Card, provided at the back of this manual, must be sent to a D-Link office. To obtain an RMA number for warranty service as to a hardware product, or to obtain warranty service as to a software product, contact the D-Link office nearest you. An addresses/
telephone/fax list of D-Link offices is provided in the back of this manual.

D-Link Offices to Contact for Warranty Service:
To mail your Registration Card, or to obtain an RMA number or warranty service, see the following address:

### In North, Central, and South America:

D-Link Systems Inc.
53 Discovery Drive, Irvine CA 92618
Tel. (1) 949-788-0805  Fax (1) 949-753-7033

### In Europe and Israel:

D-Link Europe

Denmark House, Staples Corner, The Broadway, London NW9 7BW, U.K.
Tel. (44)181-203-9900 Fax (44)181-203-6915

**In the Middle East (except Israel), Asia, Oceania and Africa:**

D-Link Corporation

No. 233-2, 2$^{nd}$ F. Pao Chiao Road, Hsin Tien Taipei, Taiwan
TEL. (886)2-916-1600

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策.

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Bitte lesen Sie sich diese Hinweise sorgfältig durch.

Heben Sie diese Anleitung für den spätern Gebrauch auf.

Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Ververden Sie keine Flüssig- oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.

Um eine Beschädigung des Gerätes zu vermeiden sollten Sie nur Zubehörteile verwenden, die vom Hersteller zugelassen sind.

Das Gerät is vor Feuchtigkeit zu schützen.

Bei der Aufstellung des Gerätes ist auf sichern Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen. Verwenden Sie nur sichere Standorte und beachten Sie die Aufstellhinweise des Herstellers.

Die Belüftungsöffnungen dienen zur Luftzirkulation die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, daß diese Öffnungen nicht abgedeckt werden.

Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.

Die Netzanschlußsteckdose muß aus Gründen der elektrischen Sicherheit einen Schutzleiterkontakt haben.

Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollete auch nichts auf der Leitung abgestellt werden.

Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.

Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.

Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. Elektrischen Schlag auslösen.

Öfnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von autorisiertem Servicepersonal geöffnet werden.

Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einerqualifizierten Servicestelle zu überprüfen:

Netzkabel oder Netzstecker sint beschädigt.

Flüssigkeit ist in das Gerät eingedrungen.

Das Gerät war Feuchtigkeit ausgesetzt.

Wenn das Gerät nicht der Bedienungsanleitung ensprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.

Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.

Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.

Bei Reparaturen dürfen nur Orginalersatzteile bzw. den Orginalteilen entsprechende Teile verwendet werden. Der Einsatz von ungeeigneten Ersatzteilen kann eine weitere Beschädigung hervorrufen.

Wenden Sie sich mit allen Fragen die Service und Repartur betreffen an Ihren Servicepartner. Somit stellen Sie die Betriebssicherheit des Gerätes sicher.

# Table of Contents

# About This Guide

This section defines the scope of this guide and gives a summary of the contents of each chapter. It describes the features of the D-Link DES-5600 Gigabit/Fast Ethernet Switching System. Information about the DES-5600 and other D-Link products is available on our web site at www.dlink.com.

## Audience

This user guide is intended for the networking or computer technician who is installing the DES-5600 on a network. Refer to other sources for information about networking in general.

All the information you need to install, configure and troubleshoot the DES-5600 is contained in this user guide.

## Organization

Chapter 1, *Introduction*, gives a physical and functional overview of the DES-5600. The DES-5600 features, LEDs, and management methods are covered.

Chapter 2, *Installing the DES-5600*, covers installation and powering on.

Chapter 3, *Connecting the DES-5600 to the Network*, covers connecting the DES-5600 to the network, maximum cable length, cable specifications and connections between multiple DES-5600 switches.

Chapter 4, *LEDs*, covers reading and interpreting the LED panel.

Chapter 5, Console Based Management, covers managing the DES-5600 over Local Console.

Chapter 6, *Web Management*, covers managing the DES-5600 over the web.

Chapter 7, *Troubleshooting*, covers troubleshooting the DES-5600.

Appendix A, *DES-5600 Technical Specifications*, covers the technical specifications of the DES-5600.

# 1

# Introduction

This chapter gives a physical and functional overview of the DES-5600. The DES-5600 is an intelligent, managed, modular switch, designed for use on medium sized networks as part of the backbone or for use with other switches and hubs on a larger network.

The chapter is divided into the following sections. Each section briefly describes the features of the DES-5600. Most of the topics discussed will be explained in greater detail later in the manual.

The topics covered are:
- Summary of Features
- Modules of the DES-5600
- Explanation of Front and Rear Panels
- Management Methods
- Updating Firmware

## Features

The DES-5600 has three modules available. You can use the modules in any combination. The modules have the following ports:
- 16 Port 10/100 Mbps TX Module
- 12 Port 100 Mbps FX Module
- 4 Port 1000 Mbps SX Module

The DES-5600 has the following features:

- All TX ports auto-negotiate 10/100 Mbps.

- Supports up to sixty-four 10/100-TX ports.

- Supports up to forty-eight 100BASE-FX ports.

- Supports sixteen 1000BASE-SX ports.

- The DES-5600 can be managed through four methods: Console Management, Telnet Management, SNMP Management and Web Management.

- Supports Store-and-Forward switching.

- Supports Full and Half Duplex for both 10 Mbps and 100 Mbps.

- Supports Spanning Tree Protocol to eliminate network loops.

- Sixteen thousand active MAC address table entries per device with self-learning and table aging.

- The DES-5600 supports SNMP for RFC 1213, RFC 1757, and RFC 1493.

- VLAN support for eight broadcast domains.

- Port Trunking support for bandwidth aggregation between two DES-5600 switches.

- The 1000BASE-SX port supports flow control compliant with IEEE 802.3x standard.

- Modular chassis that support RJ-45, fiber optic and gigabit expansion modules

- Support for RMON statistics through SNMP software.

# Front Panel

The DES-5600 is designed for management at a glance. The front of the DES-5600 has LEDs that give you essential information at a glance.

The DES-5600 is a modular unit. The chassis has a CPU slot and four slots for media modules. All the modules have LEDs. See Chapter 4, LEDs, for information on interpreting the LEDs. All slots are full sized. All slots support modules and can be used simultaneously.

All ports can be used for network connections. The RS-232 port is used for Console Management.

All LEDs are located on the front panel of the DES-5600. Their purpose is to enable you to monitor the operation and performance of the DES-5600.

Contact D-Link, Inc. sales to purchase additional modules.

The front of the DES-5600 is shown in Figure 1.

## Modules

There are three modules available:
- 16-Port 10/100TX
- 12-Port 100Base-FX module
- 4-Port 1000Base-SX Module

 **Note:** Back Plane refers to the internal back plane of the DES-5600 series. It is not visible or accessible without opening the case. All modifications and repairs to the back plane must be done by D-Link Systems, Inc. or authorized repair facilities. Do not open the case. Opening the case can cause injury and/or damage. If there is a problem with the modules or the back plane, contact D-Link System, Inc. Technical Support for assistance.

## DES-5600
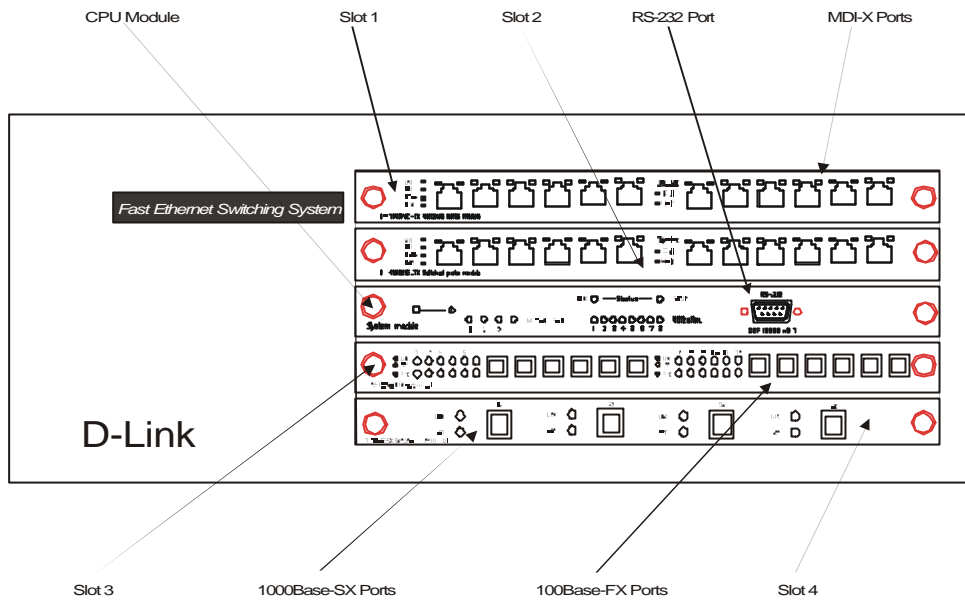


**Figure 1: DES-5600 Front Panel**

# Rear Panel

The three pronged power plug and ventilation fan are located at the rear of the DES-5600, displayed in Figure 2. The DES-5600 works with AC in the range 100-240 VAC, 50-60 Hz. The power requirements are indicated on the rear panel of the DES-5600. When installing the DES-5600, leave enough room to enable you to plug in the power cable.

There are heat vents located on the sides. The fans and the vents help to cool the DES-5600. Always leave two inches of space around the DES-5600 so that air can circulate and cool the DES-5600.
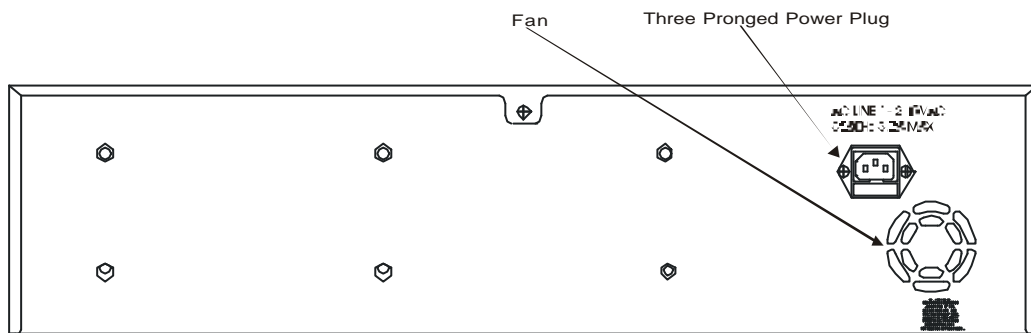


**Figure 2: DES-5600 Rear Panel**

# Management Methods

The DES-5600 supports four management methods:
- Local Console Management
- Telnet Management
- Web Management
- D-View/ SNMP Management

## Local Console Management

Local Console Management is done through the RS-232 Console port. Managing the DES-5600 in this mode requires a direct connection between a PC and the DES-5600.

## Telnet Management

Telnet is done over the network. Once the DES-5600 is on the network, you can use Telnet to log in and change the configuration.

## SNMP Management

The DES-5600 supports SNMP through other vendor's SNMP applications. Please refer to the appropriate documentation for instructions on installing and using SNMP applications.

## Web Management

Web Management is done over the Internet. Once an Internet Protocol (IP) address has been assigned to the DES-5600 it can be accessed over the Internet.

# Software Update

Software can be updated quickly and easily. See the section Software Update Menu, Chapter 5, for instructions on updating software.

# 2

# Installing the DES-5600

This chapter covers the following:
- Unpacking the DES-5600
- Installation Options
- Installing Optional Modules
- Powering on the DES-5600

## Unpacking the DES-5600

Open the box and carefully unpack the DES-5600. You should have all the items on the following checklist:
- DES-5600 Gigabit/Fast Ethernet Switching System
- RS-232 DCE serial cable
- Two mounting brackets and eight screws
- Four rubber pads with adhesive backing
- One 1.82 m (6 foot) power cord
- DES-5600 User's Guide CD ROM
- Registration Card

If any items are missing, contact the retailer where you purchased the DES-5600 for assistance.

Be sure to register the DES-5600 immediately. Failure to register the DES-5600 may void the warranty.

# Installation Options

There are two options for installing the DES-5600: desktop/ shelf installation or rack installation.

Follow these guidelines for desktop/ shelf installation or rack installation:
- The surface must support 8 kg (18 lbs.)
- The power source must be within 1.82 m (6 feet)
- The power cord and cables should never be stretched.
- Leave at least 5.08 cm (2 in.) around the DES-5600 for ventilation

The following tools and materials may be necessary to install the DES-5600:
- Screwdriver to install the brackets as needed.
- Wire cutters to cut cable as needed for network connections.
- Crimpers to crimp cable as needed.
- RJ-45 connectors as needed.
- SC fiber optic cable connectors as needed.

Refer to Chapter 3, Cable Specifications for cable types and specifications.

## Desktop/ Shelf Installation

The dimensions of the DES-5600 are 17.4inches (442 mm) x 10.5 inches (267 mm) x 6 inches (160 mm). These measurements include the 8 mm rubber feet provided with the DES-5600.

Follow these steps to install the DES-5600 on a desktop or shelf:

1. Place the four rubber feet at the corners of the DES-5600. See Figure 3.

2. Place the DES-5600 on a desktop/ shelf. See Figure 4.
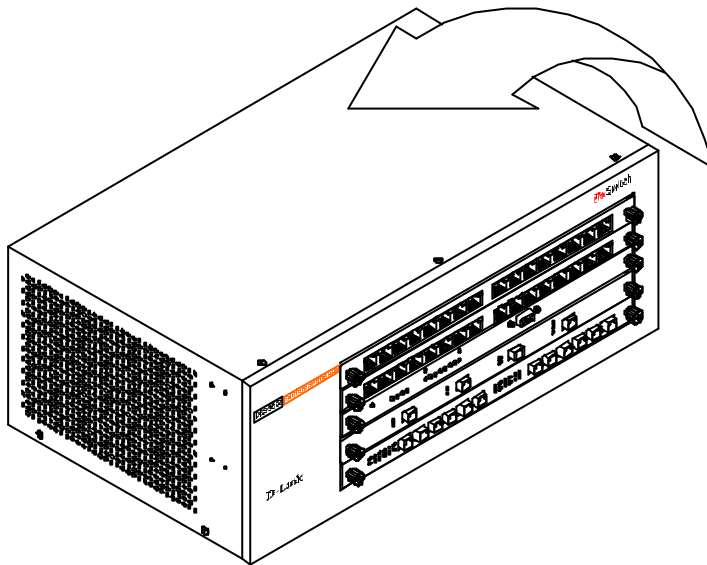


**Figure 3: Install Feet on Bottom**
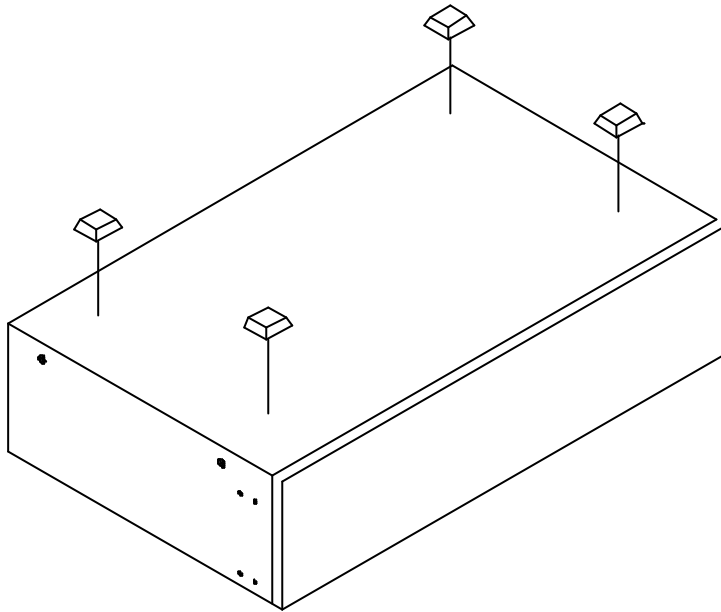
**Figure 4: Attach Feet**

## Rack Installation

The DES-5600 can be mounted in an EIA standard size, 19 inch rack. The dimensions of the DES-5600 are 6 inches (152 mm) x 10.5 inches (266 mm) x 17.4 inches (442 mm). The DES-5600 can be placed in a wiring closet along with other equipment.

Follow these steps to install the DES-5600 on a rack:

1.  Attach a mounting bracket to each side of the DES-5600 with the screws provided. See Figure 5.

2.  Slide the DES-5600 into the rack and use the screws provided to secure the DES-5600 to the rack. See Figure 6.

3.  Connect the power cord and verify that the DES-5600 is receiving adequate power.
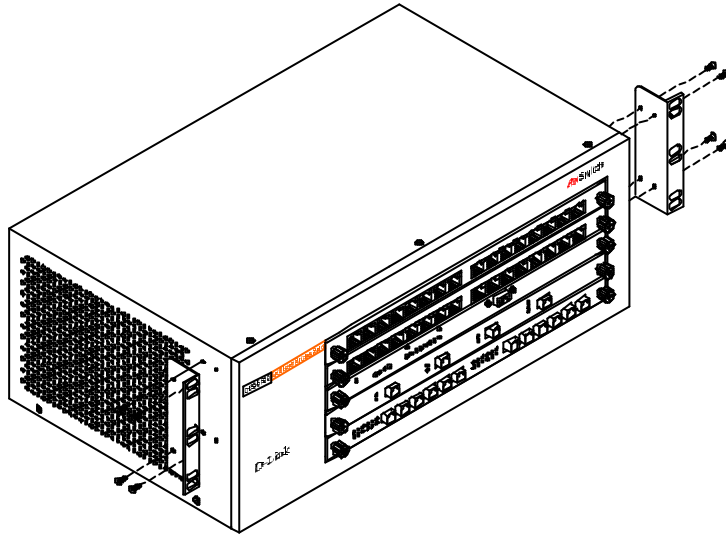
**Figure 5: Attach Mounting Brackets**
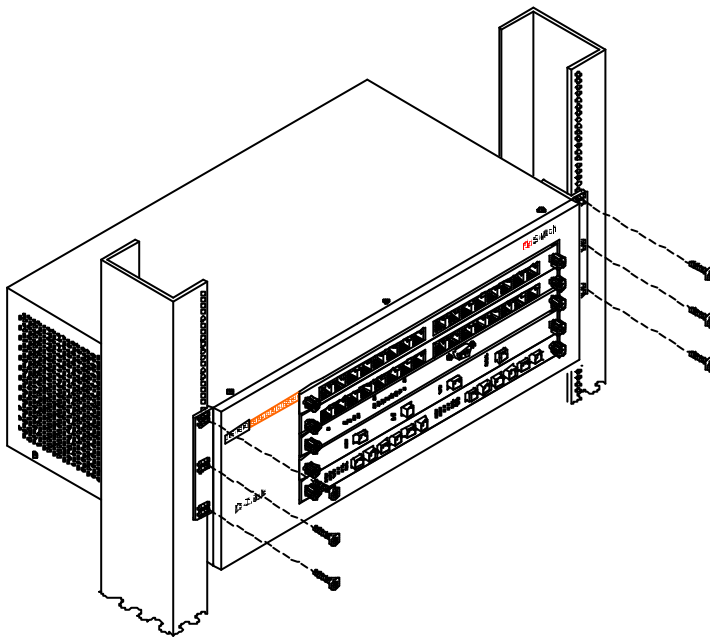


**Figure 6: Insert into Rack**

# Installing Modules

The process for installing all modules is the same. You cannot change the position of the CPU module. It must remain in the CPU slot. The DES-5600 will not work unless the CPU module is installed in the CPU slot.

You can purchase modules separately in order to meet the needs of your network. The procedure for installing all modules is the same. Follow these steps to install modules:

1. Power the DES-5600 off before installing or removing modules. None of the modules are hot swappable. Removing or installing modules while the DES-5600 is powered on can damage the DES-5600 and the modules.

2. Grasp the thumbscrews on the side of the module or blank bracket and turn counterclockwise to unscrew them. Remove the old module or the blank bracket and set aside. Do not discard the module or blank bracket. Put the old module or blank bracket back in if you remove the new module.

3. Install the new module by inserting it into the guides, see Figure 7, and sliding it in until it stops. Press in firmly until you feel the module snap into place. The module should be level and flush with the rest of the DES-5600 Never force, twist or bend the module. The module slides in smoothly.

4. Gently push the thumbscrews in and turn clockwise to tighten. Do not over tighten the thumbscrews.

5. Power the DES-5600 on after the new module is installed. The DES-5600 will auto detect the module and it will appear on the menu.

6. The 100BASE-FX and 1000-BASE-SX ports have dust covers over the transceivers. Remove the dust covers before plugging in the cable.

7. Check the LEDs to verify that there is a link at the port.
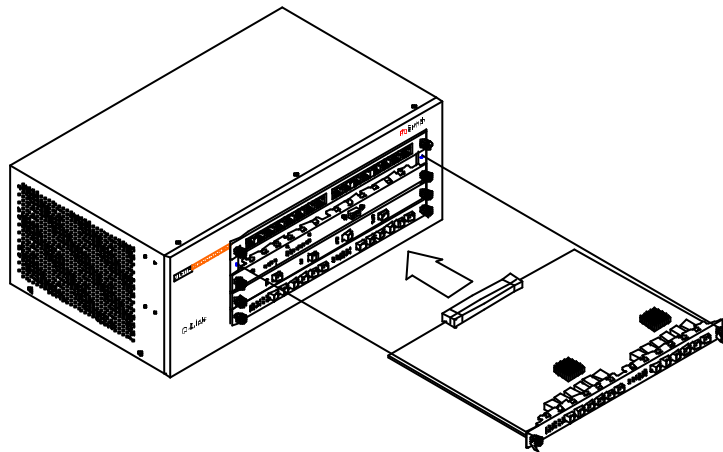
**Figure 7: Insert Module**

See the Troubleshooting section if the optional module is not working properly.

# Power On

The universal power supply will adjust to the local power source automatically. The DES-5600 may be plugged in without having any or with all LAN segment cables connected.

The power plug is located at the rear of the DES-5600. Plug the cable into the wall socket and plug the other end into the DES-5600. The power LED lights and all ports  auto negotiate the proper speed and duplex mode.

Reboot the DES-5600 if there is a problem. Contact D-Link Systems, Inc. for technical support. Check the configuration of the DES-5600 after a power failure but do not reset unless it is necessary.

The DES-5600 can be used with power sources in the range 100 to 240 VAC., 50 to 60 Hz.

# 3

# Connecting the DES-5600 to the Network

This chapter covers the following:

- Cable Specifications
- Ports
- Connecting the DES-5600 to another DES-5600
- Connecting the DES-5600 to other switches and hubs

This section deals with making cables and connecting the DES-5600 to other devices. It is extremely important that cables have the correct pin arrangement and that the proper cables be used when connecting to servers, switches, hubs, workstations and other devices.

# Cable Specifications

Use the following guidelines when handling cables:

- Do not stretch or bend cables.

- Do not put copper cables near sources of electromagnetic interference. Fiber optic cables are immune to most electromagnetic interference.

- Do not create trip hazards by laying cables in aisles and walkways.

- Secure cables to the floor when routing in aisles or walkways.

Do not use telephone cable. Telephone cable does not support Ethernet or Fast Ethernet.

## Copper Cable

In order for Ethernet or Fast Ethernet to work the wires must be arranged correctly inside the RJ-45 connector. The most common problem on Ethernet or Fast Ethernet networks is the cable. If you migrate from Ethernet to Fast Ethernet, make sure the cables are pinned out properly.

There are two types of cables: straight through and crossover. Category 3, 4, and 5 UTP/STP cable has eight wires inside the sheath. The wires form four pairs. Straight through cable has the same pin out, inside the RJ-45 connector, at both ends. Crossover cable has a different pin arrangement at each end. Fast Ethernet does not tolerate incorrect pin arrangements. You must use the correct pin arrangement in order for the DES-5600 to work properly. See Figure 8, for an example of straight through and crossover cable.

The type of cable you use depends on the speed of your network. A network running at 10 Mbps can use lower grade cable than a network running at 100 Mbps. Table 1: Cable Specifications for Copper Connection, shows the cable requirements for Ethernet and Fast Ethernet networks.

**Table 1: Cable Specifications for Copper Connection**

| Ethernet Type | Cable Requirements | Maximum Length |
|---|---|---|
| 10BASE-T | Category 3, 4, and 5 UTP or STP | 100 M (328 ft.) |
| 100BASE-TX | Category 3, 4, and 5 UTP or STP | 100 M (328 ft.) |

## 568B Specification - Cable Fabrication Instructions

### RJ-45 Connector Pin Identification

Pin # 8
Pin # 1

### CAT 5 Cable Pairs Color Code

Pair # 1 { White/Orange / Orange

Pair # 2 { White/Green / Green

Pair # 3 { Blue / White/Blue

Pair # 4 { White/Brown / Brown

### Straight Cable

1 2 3 4 5 6 7 8 SIDE 1

1 2 3 4 5 6 7 8 SIDE 2

**SIDE 1**

1 = White/Orange ─── Pair #1
2 = Orange ───
3 = White/Green ─── Pair #2
4 = Blue ───
5 = White/Blue ─ Pair #3
6 = Green ───
7 = White/Brown ─── Pair #4
8 = Brown ───

**SIDE 2**

1 = White/Orange ─── Pair #1
2 = Orange ───
3 = White/Green ─── Pair #2
4 = Blue ───
5 = White/Blue ─ Pair #3
6 = Green ───
7 = White/Brown ─── Pair #4
8 = Brown ───

### Cross Over Cable

1 2 3 4 5 6 7 8 SIDE 1

1 2 3 4 5 6 7 8 SIDE 2

**SIDE 1**

1 = White/Orange ─── Pair #1
2 = Orange ───
3 = White/Green ─── Pair #2
4 = Blue ───
5 = White/Blue ─ Pair #3
6 = Green ───
7 = White/Brown ─── Pair #4
8 = Brown ───

**SIDE 2**

1 = White/Green ─── Pair #2
2 = Green ───
3 = White/Orange ─── Pair #1
4 = White/Brown ─── Pair #4
5 = Brown ───
6 = Orange ───
7 = Blue ─── Pair #3
8 = White/Blue ─

**Figure 8: Cable Diagram**

## Fiber Optic Cable for Fast Ethernet

Cable length can be up to two kilometers (1.25 miles) in full duplex and 412 meters (1350 feet) in half duplex transmitting at 100 Mbps.

Fiber optic cables connected to the fiber expansion module for 100 Mbps must meet the following specifications to carry 1300 nm wavelength for the specified distance:

- Multi-mode cable ISO/IEC 793-2 type B1 and ITU-T G.652 standards

- Cable must have MTRJ connectors

## Fiber Optic Cable for Gigabit Ethernet

Fiber optic cables attached to the gigabit expansion module must meet the following specifications to carry 850 nm wavelength for the specified distance:

- Multi-mode cable ISO/IEC 793-2 type B1 and ITU-T G.652 standards

- Cable must have MTRJ connectors

Gigabit traffic can travel the following distances using the specified cable:

- 62.5 um cable 220 meters (720 feet)

- 50 um cables 500 meters (1639 feet)

# Ports

## Fiber Optic Ports

The DES-5600 supports 100BASE-FX and 1000BASE-SX. The chassis supports a maximum of 48 100BASE-FX ports and a maximum of 16 1000BASE-SX ports.

There are two fiber optic modules available: a 12-Port 100BASE-FX module and a 4-Port 1000Base-SX module.

Refer to Installing Modules for installation instructions. Refer to Cable Specifications for information on cable types and connectors.

Follow these steps to connect cables to the DES-5600:

1. Check for the appropriate cable configuration for each device.

2. Plug one end of the cable into any of the ports.

3. Plug the other end into the appropriate port on the other device.

4. Verify that the LED indicates connection at the proper speed and duplex mode.

## RS-232 Port

Follow these steps to connect the DES-5600 and another device:

1. Plug one end of the cable provided into the port.

2. Plug the other end into the PC.

3. Run HyperTerminal or a terminal emulation program using the settings given for Local Console Management at the beginning of Chapter 5.

# DES-5600 to DES-5600 Connection

Two or more DES-5600s can be connected together through crossover cable ports. When connecting multiple ports to another DES-5600 use port trunking for better performance. When bandwidth aggregation is desired, connect multiple ports to another DES-5600. Refer to Chapter 5 for information about port trunking.

# Connecting the DES-5600 to other Switches and Hubs

You can connect the DES-5600 to other switches and hubs on the network. The DES-5600 is compatible with the DES-3216, DES-3224, DES-5016, DES-5024 and DES-5200.

# 4

# LEDs

The LED panel is designed to enable you to manage the DES-5600 at a glance. The LEDs on each module are dealt with in detail.

The LEDs indicate the following:

- Power
- Status
- Link/ Act/ 100/ 10/ 1000
- Utilization
- Full/ Half Duplex
- Link
- Speed
- Duplex mode
- Act
- Status
- OK
- Fault

All LEDs are described in detail. Use the tables to determine the meaning of each LED. All LEDs are located on the front of the DES-5600, displayed in Figure 9.
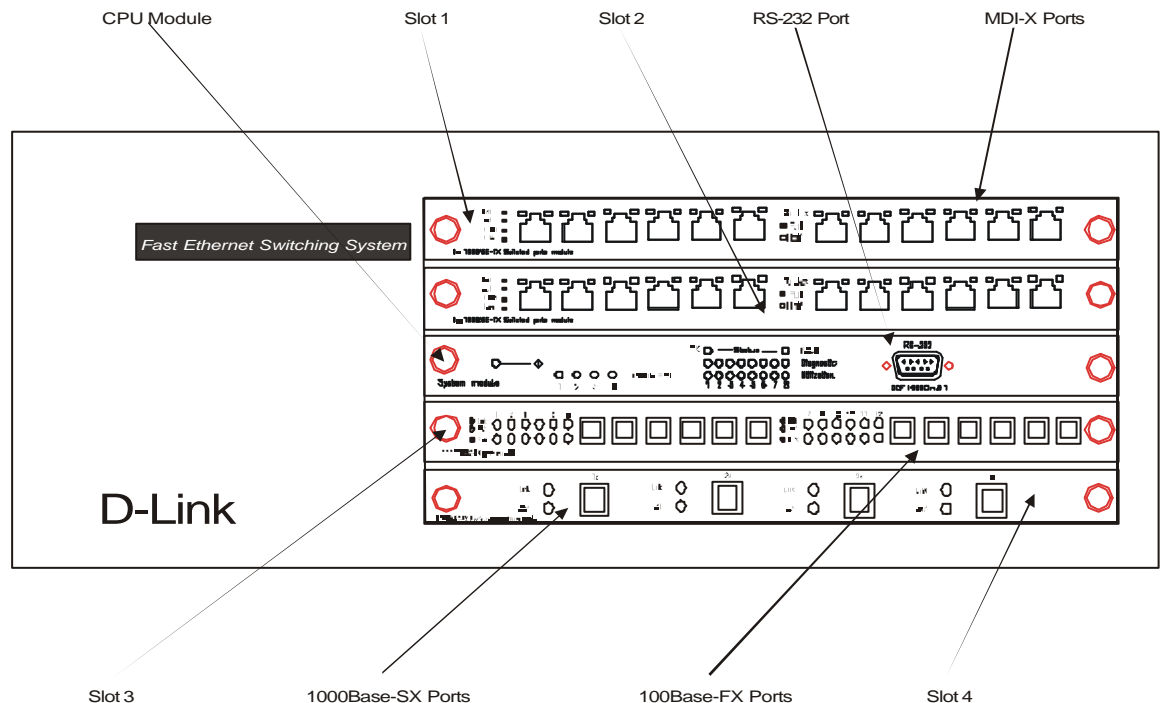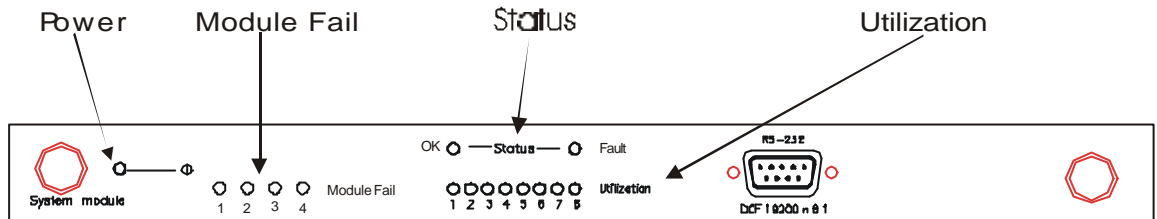


**Figure 9: DES-5600 LEDs**

# CPU Module

The CPU module, displayed in **Figure 10**, is in the middle of the chassis. This is the only slot it will work in. If it is not middle of the chassis, the DES-5600 will not work. See Table 2: Power LED for an explanation of the LEDs on the CPU module.

Each LED is explained in detail.



**Figure 10: CPU Module**

## Power

The power LED lights when the DES-5600 is powered on. The purpose is to confirm that the DES-5600 is getting adequate power. See Table 2: Power LED.

**Table 2: Power LED**

| Status | Color | Meaning |
|--------|-------|---------|
| On | Green | DES-5600 is powered on |
| Off | Dark | DES-5600 is powered off, check power cable and connection |

## Status

The OK indicates the status of the switch. The OK LED is green when the switch is okay. The Fault LED is amber if there is problem.

## Utilization

The Utilization LED indicates the utilization of the DES-5600's CPU. It increments from left to right. The higher the number the greater the switch utilization.

## Module Fail

Indicates the number of the module that has failed.

# 16-Port 10/100-TX Module

This section covers the LEDs on the 16-Port 10/100 TX Module, see Figure 11. The meaning of the LEDs is displayed in Table 3: 16-Port 10/100-TX Module LEDs.



**Figure 11: 16-Port 10/100-TX Module**

## Link/ Act/ 100/10

The Link/ Act/ 100/ 10 LED shows the link status, activity and speed of the port. The LED is green when there is a link at the port. It flashes when there is activity. 100Mbps is indicated by color. Green indicates port speed of 100Mbps. Amber indicates port speed of 10 Mbps.

## Duplex

The Duplex LED indicates the duplex mode the port is in. The LED is green when the port is in full duplex. It is dark when the port is in half duplex.

Full duplex means the port is transmitting and receiving data simultaneously. Half duplex means that data is only being transmitted or received in one direction at a time.

**Table 3: 16-Port 10/100-TX Module LEDs**

| LED | Color | Dark |
|---|---|---|
| Link/ Act/ 100/ 10 | Green indicates port speed is 100 Mbps<br>Orange indicates port speed is 10 Mbps<br>LED flashes when there is activity. | No link or link is down |
| Duplex | Green indicates port is working at full duplex | Port is working at half duplex |

# 12-Port FX Module

This section covers the LEDs on the 12-Port FX Module, displayed in Figure 12. Refer to Table 4: 8-Port FX Module LEDs.
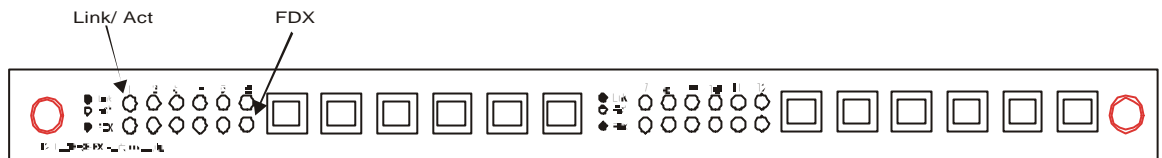


**Figure 12: 12-Port 100Mbps-FX**

### Link/Act

The Link/Act LED indicates there is a link between devices at a specific port and that there is activity at the port. The LED lights when there is a link at the port. It is dark when there is no link. Act refers to data passing through the port. The LED flashes when there is activity at the port.

### FDX

FDX refers to the duplex mode of the port. The Led is lit when the port is in full duplex and dark when the port is in half duplex.

**Table 4: 8-Port FX Module LEDs**

| LED | Lit or Flashing | Dark |
|-----|-----------------|------|
| Link/Act | Steady green indicates link to another device<br><br>Flashing green indicates there is activity at the port | There is no link or activity |
| FDX | Indicates port is in full duplex | Indicates port is in half duplex |

# 4-Port 1000BASE-SX Module
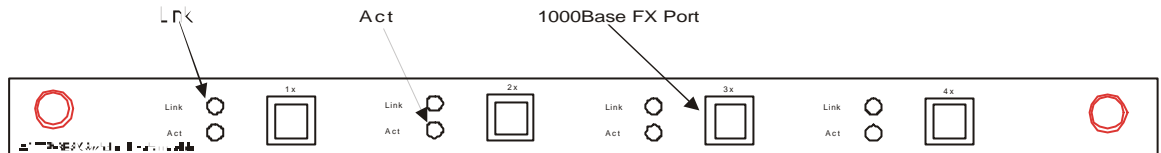


**Figure 13: 4-Port 1000Base-SX Module**

The gigabit module, displayed in Figure 13, has one port. Refer to Table 5: Gigabit Module LED.

### Link

The Link LED lights to indicate there is a link at the port.

### Act

Act means activity. The Activity LED indicates the port is transmitting or receiving data.

**Table 5: Gigabit Module LED**

| LED | Lit | Dark |
|---|---|---|
| Link (Green) | Port is linked to another device | No link |
| Act (Flashing Geen) | Port is transmitting or receiving data | Port is not transmitting or receiving data |

# 5

# Console Based Management

This chapter covers three types of management:

- Console Management (out-of-band)
- Telnet Management (in-band)
- SNMP Management

Web management is covered in Chapter 6.

The DES-5600 can be managed in-band or out-of-band. In-band management refers to managing the DES-5600 through Telnet, using one of the ports.

Out-of-band management means going through the RS-232 port.

The interface and options are the same with Console and Telnet Management. The difference is the type of connection and the port that is used to manage the DES-5600. Telnet is In-Band Management.

The DES-5600 supports SNMP management applications and uses standard MIB. Refer to appropriate documentation for installing and using SNMP application programs. Refer to your documentation when using SNMP applications.

All instructions given in this chapter assume that you are logged into the DES-5600 and are at the appropriate panel for carrying them out.

# Console Management

Console Management is always done through the RS-232 serial port and requires a direct connection between the DES-5600 and a PC. This type of management is very useful when the network is down and the DES-5600 cannot be reached by any other means.

Use Console Management to log into the DES-5600 for the first time. You do not need to know the IP address to log in using Console Management. You can change all the settings and configure the DES-5600, set the IP address and perform other management functions. The management session will timeout after five minutes if you have not taken any action. Press Enter or Control + r to refresh the screen. You will have to log in again after a timeout.

Follow these steps to begin a management session using Console Management:

1. Attach the male end of the RS-232 serial cable provided with the DES-5600 to the RS-232 port located at the front of the DES-5600.

2. Attach the other end to the serial port of a PC or workstation.

3. Run a terminal emulation program using the following settings:
- **Emulation:** VT-100/ANSI compatible
- **BPS:** 19 200
- **Parity:** None
- **Stop bits:** 1
- **Flow Control:** Xon/Xoff
- **Enable:** Terminal keys

4. Press Enter to display the login panel.

5. Log in using the default User Name and Password. The User Name and Password are case sensitive. The default user name is "admin" and the default password field is blank.
- **User Name:** admin
- **Default Password:** leave field blank

6. Press Enter to reach the Main menu.

# Telnet Management

You can manage the DES-5600 via Telnet session. However, first you must assign a unique IP address to the DES-5600. Use Console Management to log into the DES-5600 for the first time so that you can assign an IP address. Once you have assigned an IP address to the DES-5600, you can use the management method of your choice.

Telnet management can be done through any of the ports on the switch. You can use any Telnet application that emulates a VT100 terminal. You must install TCP/IP on the workstation before using Telnet. Only one Telnet session can be active at a time.

## Configuring Through the Ethernet Port

Follow these steps to manage the DES-5600 through a Telnet session:

1.  Assign an IP address to the DES-5600.

2.  Attach one end of an Ethernet cable to one of the Ethernet ports on the DES-5600.

3.  Attach the other end of the cable to a workstation.

4.  Access the DES-5600 through Telnet.

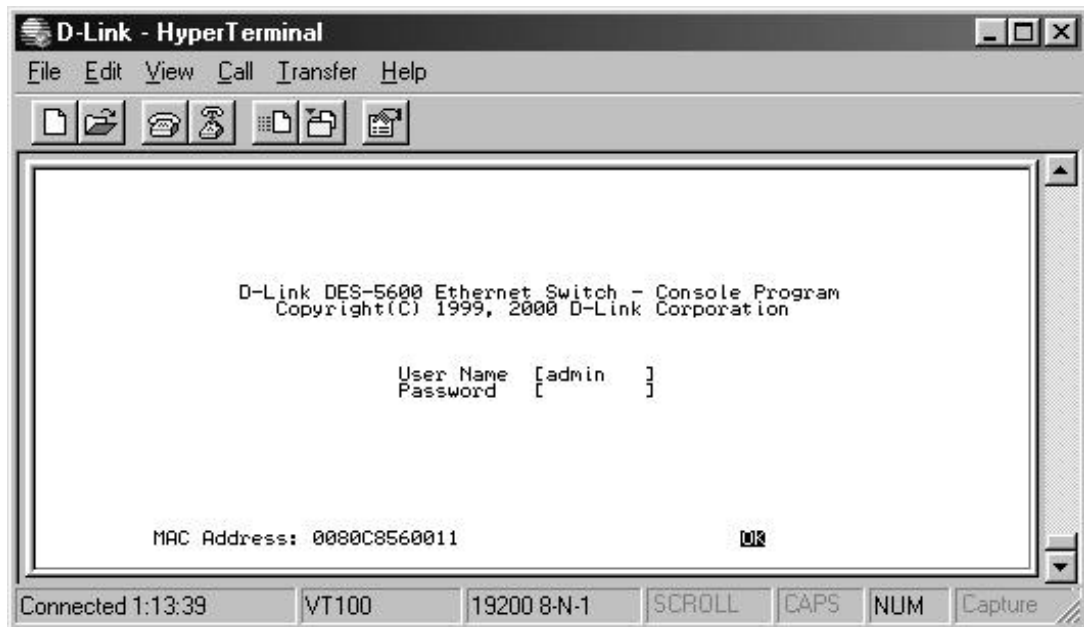5.  Log into the DES-5600 using your user name and password.

The Telnet session will timeout after five minutes. Any changes that have not been saved are lost. Press Enter to reconnect after a timeout.

# Log In

The Log In panel, displayed in Figure 14, is the first panel you see when connecting to the DES-5600. All management methods require you to log into the DES-5600 with your user name and password before beginning a management session. For security, you should change the default User Name and Password.



**Figure 14: Login**

Follow these steps to log into the DES-5600 for the first time:

Enter the default User Name and Password and press Enter. The User Name and Password are case sensitive.

- **Default User Name:** admin
- **Default Password:** leave the password field blank

The MAC Address at the bottom of the screen cannot be changed.

# Help Message

A one page panel, displayed in Figure 15, is available. The menu lists the keystroke and typographic conventions available on the DES-5600.



**Figure 15: Help Message**

# Panel Conventions

Keystroke Conventions

| Example | Description |
| --- | --- |
| UP, DOWN, or TAB keys | Select different items |
| SPACEBAR | Toggle-switch |
| DEL, or BACKSPACE | Remove an input character from the screen. |
| LEFT or RIGHT keys | Move cursor backward or forward. |
| Ctrl-r | Refresh Screen |

Typographic Conventions

| Example | Description |
| --- | --- |
| :168.8.254.20 | Each read only value can be changed only by the toggle switch. |
| [168.8.254.1] | Each changeable value is enclosed in square brackets. |
| EXIT | Uppercase letters indicate a COMMAND item. |
| Blinking Text | Warning Message. |
| PREV | Moves backwards to the previous panel. |
| NEXT | Moves forward to the next panel in the sequence, loops back to the first panel if the end of the sequence has been reached. |
| SAVE | Saves all changes make, highlight save and then press Enter to make changes permanent. |
| EXIT | Exits the panel you are currently viewing. |

After you are finished viewing the help panel, press Enter to return to the main menu.

# Console Program

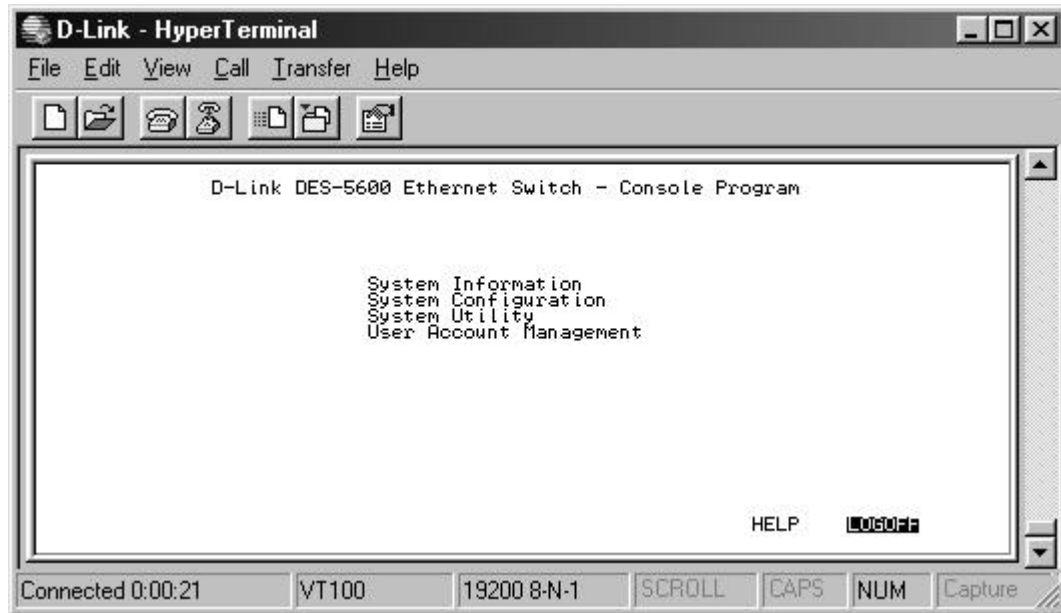The Console Program, shown in Figure 16, is the main menu of the DES-5600.



**Figure 16: Console Program**

## System Information

The System Information menu displays the Hardware Revision, Plug-in Module Revision, MAC address and other information on the DES-5600.

## System Configuration

The System configuration menu shows general information about the DES-5600 and enables you to assign a LAN IP Address, Subnet Mask, LAN Default Gateway and the contact information of the system administrator.

## System Utility

The System Utility menu enables you to reset the DES-5600 without powering off, reset to factory default values and update software.

## User Account Management

The User Account Management menu enables you to add users, delete users and modify user account information.

Follow these steps to select a menu:

1.    Use the tab key or the up and down arrow keys to select an option.

2.    Press Enter.

# Switch Information

The Switch Information menu, shown in Figure 17, enables you to change the configuration of the DES-5600 and gather statistics about each of the ports.
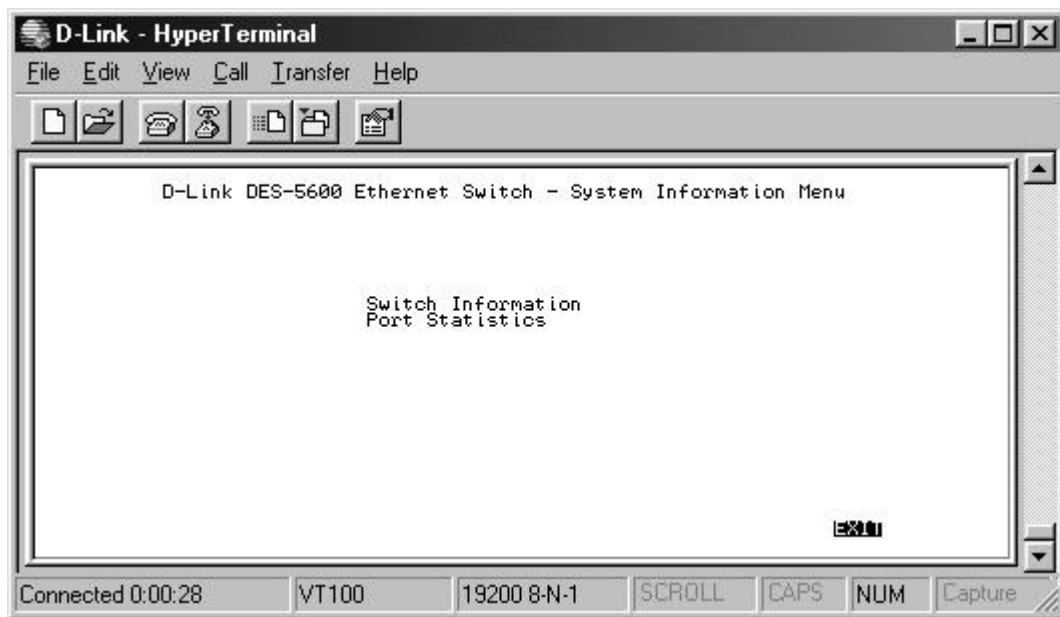


**Figure 17: System Information Menu**

## Switch Information

The System Information menu displays the Hardware Revision, MAC address, Plug-in Module Revision and other information on the DES-5600.

## Port Statistics

The Port Statistics panel shows information about each port.

Follow these steps to select an option:

1.    Highlight the option

2.    Press Enter

# Switch Information

The System Information menu, displayed in Figure 18, enables you to enter management and configuration information on the DES-5600.
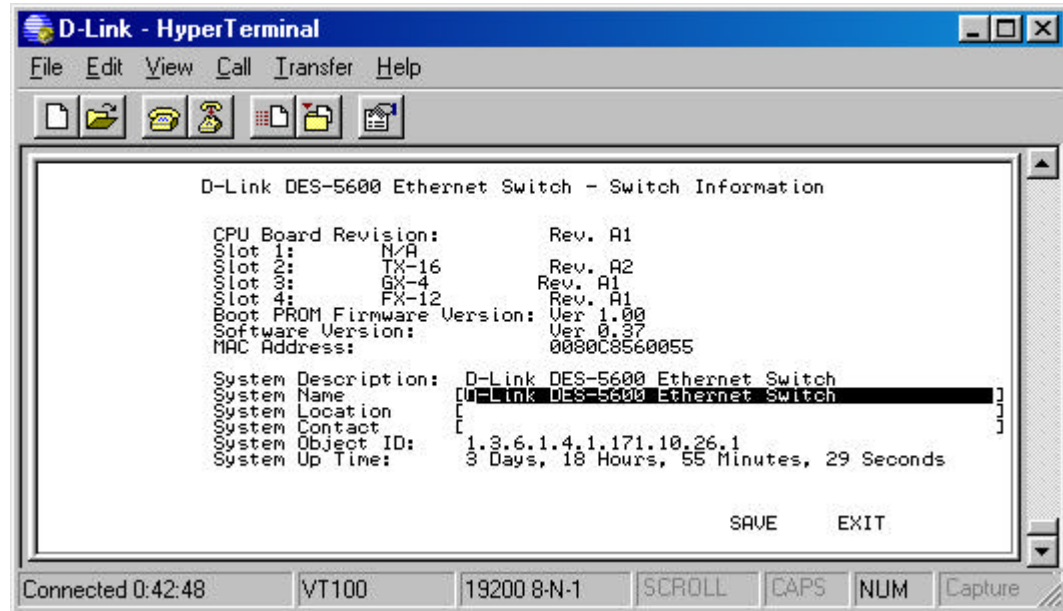


**Figure 18: Switch Information**

## CPU Board Revision

Specifies the hardware revision and the product generation. Each revision is numbered incrementally.

## Boot PROM Firmware Version

Specifies the version of the Boot PROM being used on the DES-5600. Each version is numbered incrementally.

## Software Version

Specifies the software version being used on the DES-5600. You can update the software. Each version is numbered incrementally.

## MAC Address

Specifies the hardwired address of the DES-5600. This address cannot be changed.

## System Description

Brief manufacturer description of the DES-5600. This value cannot be changed.

### System Name

Specifies the full name of the DES-5600. This value can be changed, enabling you to assign a unique name. The field holds 44 characters.

### System Location

Specifies the physical location of the DES-5600. A building number or street address can be entered in this field. You can enter up to 44 characters.

### System Contact

The network or other administrator's name to contact if there are problems.

### System Object ID

Is the object identifier used to manage the DES-5600 over RMON and SNMP. The MIB requires you to enter the number. The System Object ID is hardwired and cannot be changed.

### System Up Time

Is the amount of time the DES-5600 has gone without being rebooted.

Follow these steps to select an option:

1. Use the tab or arrow keys to select an option.

2. Enter the new value in the field.

3. Select Save and exit. Some changes require reboot.

## Port Statistics

The Port Statistics panel, displayed in Figure 19, shows statistical information about each port. Enter the Slot number and then the Port number. The slot and port numbers are shown in the Port Configuration menu.
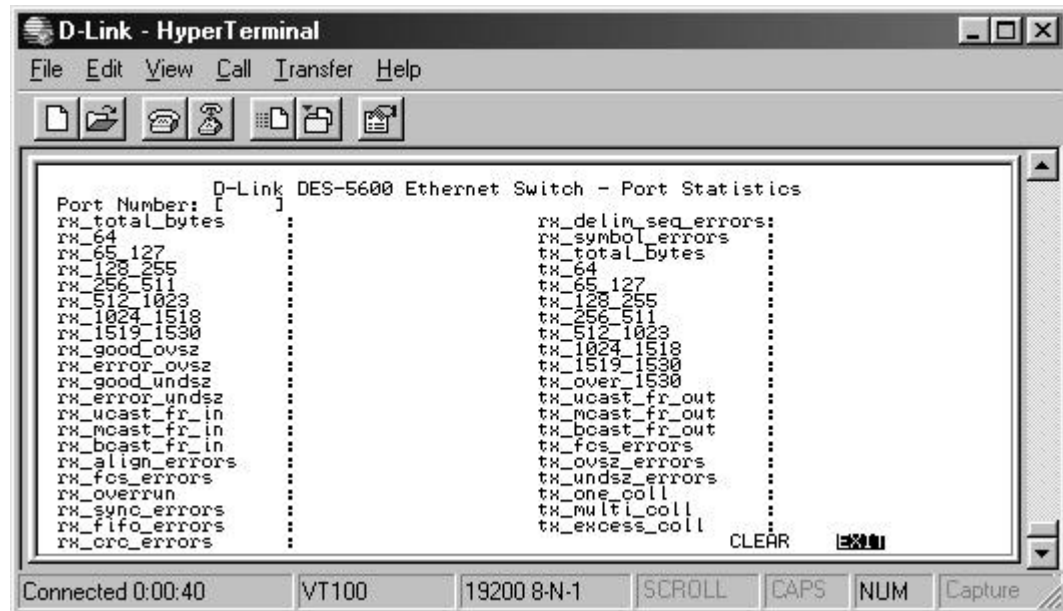


**Figure 19: Port Statistics**

### Port Number

Number of the port being monitored.

### Rx Total Bytes

Total bytes received.

### Rx 64

Number of frames (including frames with errors) that were 64 bytes long.

### Rx 65 – 127

Number of frames (including frames with errors) that were 65 to 127 bytes long.

### Rx 128 – 255

Number of frames (including frames with errors) that were 128 to 255 bytes long.

### Rx 256 – 511

Number of frames (including frames with errors) that were 256 to 511 bytes long.

### Rx 512 – 1023

Number of frames (including frames with errors) that were 512 to 1023 bytes long.

### Rx 1024 – 1518

Number of frames (including frames with errors) that were 1024 to 1518 bytes long.

### Rx 1519 – 1530

Number of frames (including frames with errors) that were 1519 to 1530.

### Rx Good Oversized

Number of good oversized frames received

### Rx Error Oversized

Number of error oversized frames received.

### Rx Good Undersize

Number of good undersized frames received.

### Rx Unicast Frames In

Number of unicast frames received.

### Rx Multicast Frames In

Number of multicast frames received.

### Rx Broadcast Frames In

Number of broadcast frames received.

### Rx Alignment Errors

Number of aligned frames that were received with alignment errors.

### Rx FCS Errors

Number of frames received with FCS errors.

### Rx FiFo Errors

Number of frames that were received with FiFo errors.

### Rx CRC Errors

Number of frames that were received with CRC errors.

### Rx Delimiter Sequence Errors

Number of frames that were received with delimiter sequence errors.

### Rx Symbol Errors

Number of frames that were received with symbol errors.

### Rx Total Bytes

Number of total bytes received.

### Tx Total Bytes

Total number of bytes transmitted.

### Tx 64

Number of frames (including frames with errors) that were 64 bytes long.

### Tx 65 – 127

Number of frames (including frames with errors) that were 65 to 127 bytes long.

### Tx 128 – 255

Number of frames (including frames with errors) that were 128 to 255 bytes long.

### Tx 256 – 511

Number of frames (including frames with errors) that were 256 to 511 bytes long.

### Tx 512 – 1023

Number of frames (including frames with errors) that were 512 to 1023 bytes long.

### Tx 1024 – 1518

Number of frames (including frames with errors) that were 1024 to 1518 bytes long.

### Tx 1519 – 1530

Number of frames (including frames with errors) that were 1519 to 1530 bytes long.

### Tx Over 1530

Number of frames (including frames with errors) that were 1530bytes long.

### Tx Unicast Frames Out

Number of Unicast frames out.

### Tx Multicast Frames Out

Number of multicast frames out.

### Tx Broadcast Frames Out

Number of broadcast frames out.

### Tx FCS Errors

Number of frames that were discarded on the transmit side because of FCS errors.

### Tx Oversize Errors

Number of frames with oversize errors.

### Tx Undersize Errors

Number of frames with undersize errors.

### Tx One Collision

Number of frames that were transmitted after one collision.

### Tx Multiple Collisions

Number of frames that were transmitted after multiple collisions.

### Tx Excess Collisions

Number of frames that were dropped because of excess collisions.

Follow these steps to select a port to monitor:

    1.    Enter the port number in the brackets.

    2.    Press Enter.

# System Configuration

The System Configuration menu, shown in Figure 20, enables you to configure ports, network settings, Spanning Tree, SNMP, address aging, port monitoring, VLAN and Port Trunking.
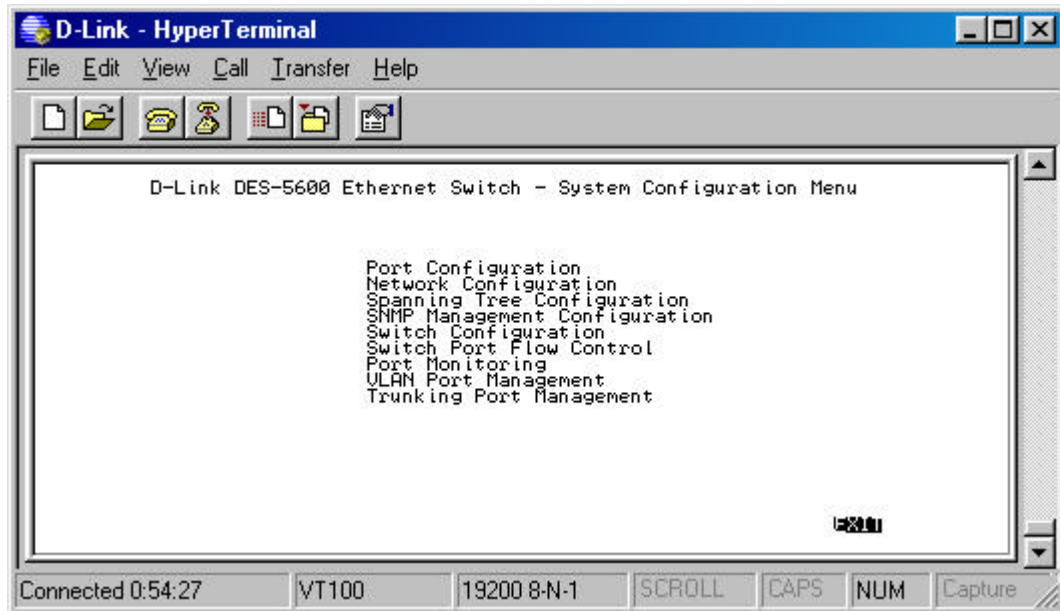


**Figure 20: System Configuration Menu**

## Port Configuration

The Port Configuration menu enables you to configure individual ports. You can set the speed, duplex mode, enable and disable ports and make other changes. The panels and options may be different, depending on the modules you have installed. Refer to Chapter 4, LEDs, for an explanation of the differences between the modules.

## Network Configuration

This panel is used to configure the IP Address, Subnet Mask, and Default Gateway.

## Spanning Tree Configuration

Enables you to configure Spanning Tree globally for the DES-5600 and on a port by port level.

## SNMP Management Configuration

The SNMP Management Configuration menu enables you to create SNMP Communities and configure SNMP Trap Manager Settings.

## Switch Configuration

Enables you to configure the Address Aging.

## Switch Port Flow Control

Enables you to control the flow of packets through the port.

## Port Monitoring

Enables you to configure port monitoring.

## VLAN Port Management

Enables you to create, delete, and modify VLANs quickly and easily.

## Trunking Port Management

Enables you to create, delete and modify Trunking Ports quickly and easily.

Follow these steps to select a menu:

1.  Use the tab or arrow to select an option.

2.  Press Enter.

# Port Configuration

The Port Configuration panel, shown in Figure 21, enables you to configure individual ports according to the needs of your network.
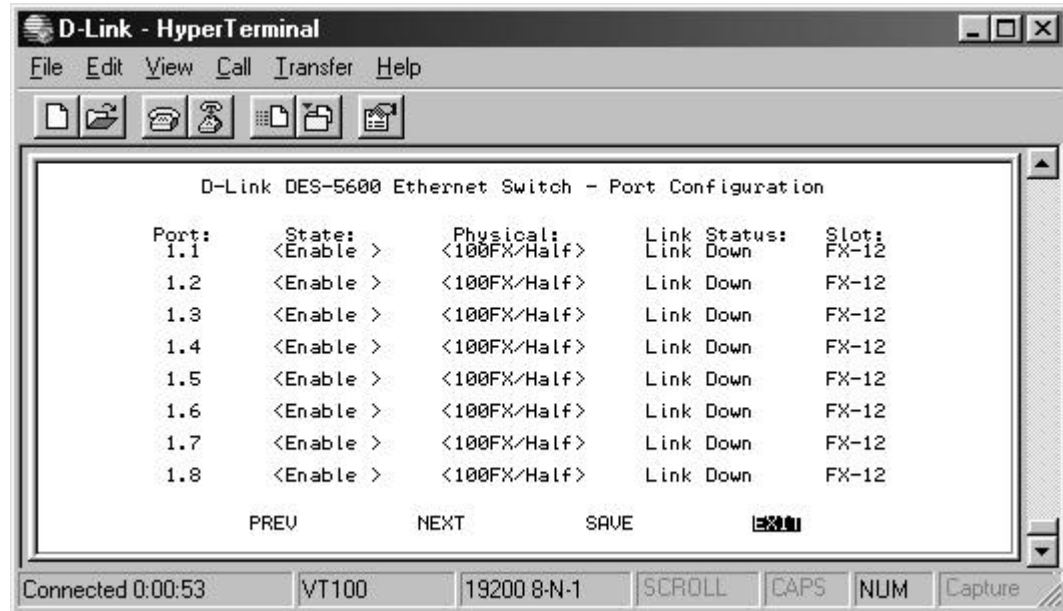


**Figure 21: Port Configuration**

## Port

Port indicates the port and module number. The module number is first and the port number is after the decimal point.

## State

Port state can be enabled or disabled. Packets can only pass through enabled ports. Disabled ports don't allow packets to pass through them.

## Physical

The physical states a port can be in depends on the module and the type of port. Refer to Table 6: Port Configuration.

**Table 6: Port Configuration**

| Port Configuration | | |
|---|---|---|
| **Ethernet (TX)** | **Fiber Optic (FX)** | **Gigabit (GX)** |
| Auto (default) | 100FX/Half (default) (100 Mbps Half Duplex) | Auto (default) |
| 100TX/Full (100 Mbps Full Duplex) | 100FX/Full (100 Mbps Full Duplex) | 1000SX/Full (1000 Mbps Full Duplex) |
| 100TX/Half (100 Mbps Half Duplex) | Port does not automatically negotiate speed. | Port does not operate in half duplex and cannot be set for lower speed. |
| 10TX/Full (10 Mbps Full Duplex) | Cannot be set for speeds lower than 100FX/Half | |
| 10TX/Half (10 Mbps Half Duplex) | | |

## Link Status

Status can be Link up or Link down. Link status indicates speed and duplex mode when the link is up. Packets can only pass through when the link is up. No packets can pass through the port when the link is down. If link status changes either up or down, the changes appear in the menu you are currently viewing, even when you are not in the Port Configuration menu. Exiting the menu or refreshing the screen with Control + R removes the message.

## Slot

The physical module and the number of ports the module has. TX indicates Ethernet ports, FX indicates fiber optic ports and GX indicates gigabit ports.

Follow these steps to configure the port:

1. Use the tab and arrow keys to select the appropriate panel and port.

2. Use the space bar to toggle between selected options.

3. Select Save and press Enter. Follow on screen instructions.

## Network Configuration

The Network Configuration panel, shown in Figure 22, is used to configure the IP Address, Subnet Mask and Default Gateway.
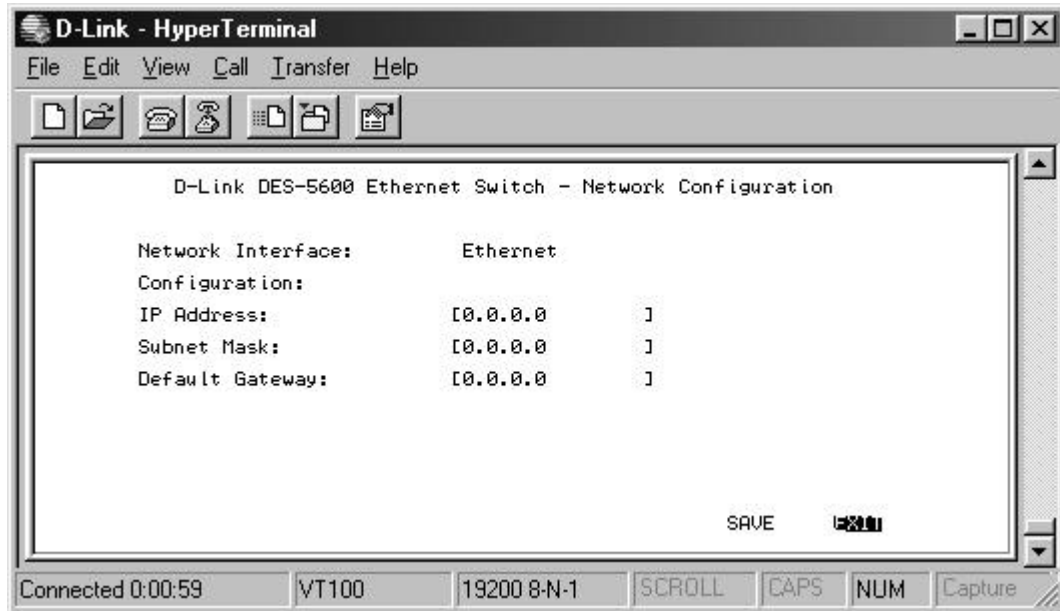


**Figure 22: Network Configuration**

### Network Interface

Refers to the type of network the DES-5600 is being used on.

### Configuration

Refers to user entered configuration information.

### IP Address

The user assigned IP Address of the DES-5600.

### Subnet Mask

The user configured Subnet Mask used on the network.

### Default Gateway

The user configured Default Gateway used on the network.

Follow these steps to configure network settings:

    1.     Use the tab and arrow keys to select the appropriate field.

    2.     Enter the new value in the field.

3.  Select Save and press Enter.

4.  Reboot the DES-5600 for the new settings to take effect.

## Spanning Tree Configuration Menu

The Spanning Tree Configuration Menu, shown in Figure 23, enables you to configure Spanning Tree globally on the DES-5600 or on a port by port basis. The Spanning Tree Algorithm (STA) in the DES-5600 enables you to create alternative paths (using multiple switches or bridges) in your network. These backup paths are idle until the DES-5600 determines that a problem has developed in the primary path. If the primary path breaks down STA will activate the backup path. STA is very complicated and you should understand it well before changing the default settings.

### STA Operation Levels

STA operates on the bridge level and the port level. On the bridge level, STA calculates the Bridge Identifier for each DES-5600, then sets the Root Bridge and the Designated Bridges. On the port level, STA sets the Root Port and Designated Ports.
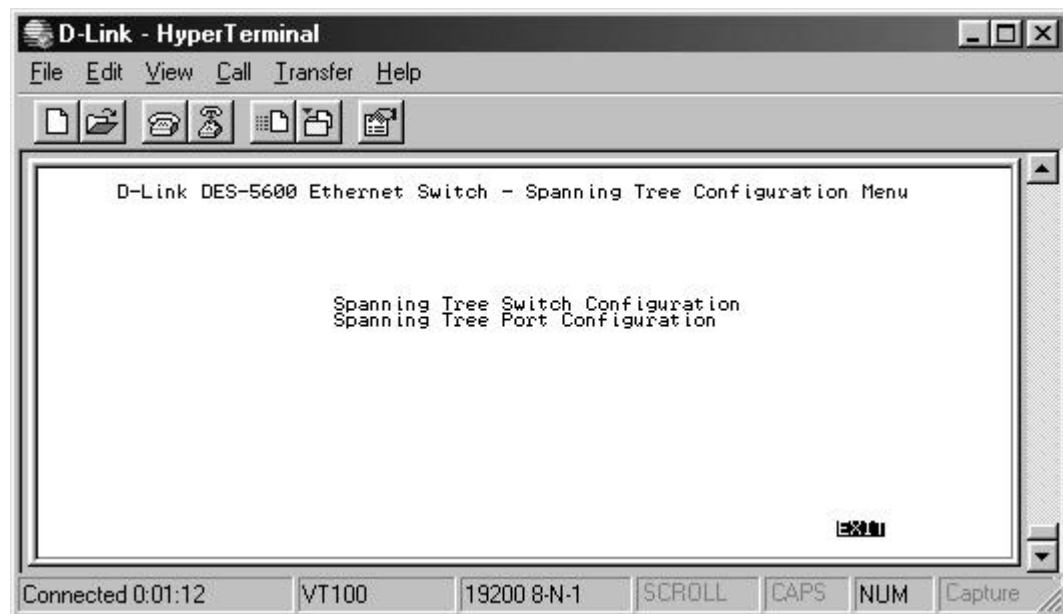


**Figure 23: Spanning Tree Configuration**

### Spanning Tree Switch Configuration

Configures global Spanning Tree and bridge priority on the DES-5600.

### Spanning Tree Port Configuration

Sets the individual port priority.

Follow these steps to select an option:

1.      Use the tab and arrow keys to select an option.

2.      Press Enter.

## Spanning Tree Switch Configuration

Shown in Figure 24, the panel enables you to configure Spanning Tree globally on the DES-5600.
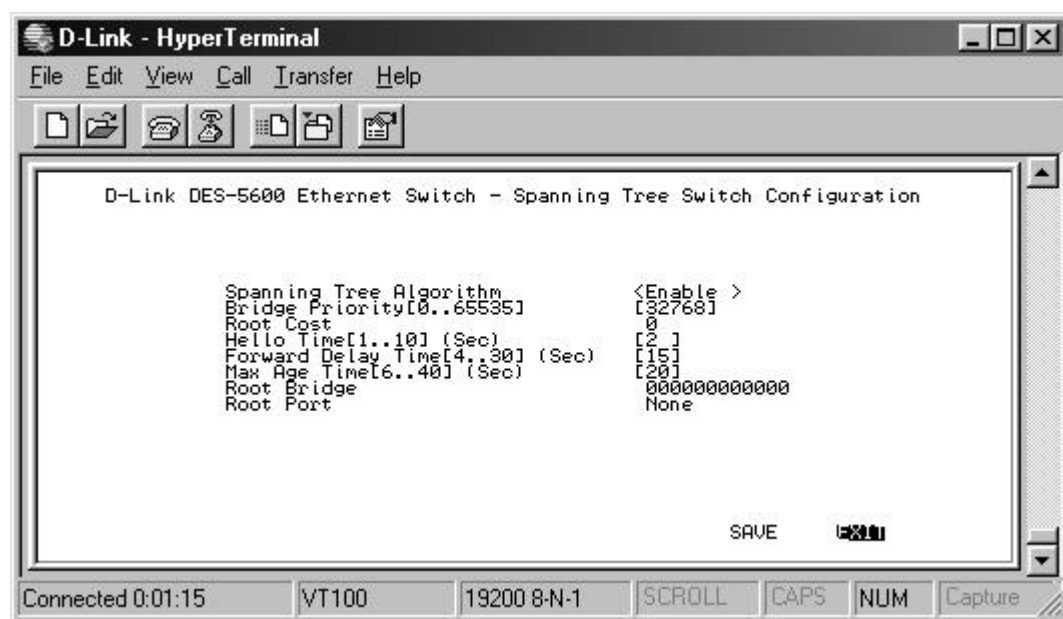


**Figure 24: Spanning Tree Switch Configuration**

### Spanning Tree Algorithm

Spanning Tree Algorithm can be enabled or disabled. Use Spanning Tree to prevent network loops.

### Bridge Priority

The Bridge Priority can be from 0 to 65535. Zero is the highest Bridge Priority. The higher the Bridge Priority the greater the chance that the DES-5600 will be selected as the Root Bridge. The DES-5600 with the highest Bridge Priority is the Root Bridge.

### Root Cost

The Root Cost is the number of times a packet is regenerated before reaching its destination. A source sends a packet to the first device (switch or hub) on the

network. When the packet reaches the next hub or switch and is sent out again, the Path Cost becomes two. Each switch and active hub regenerates the packet. To determine the Root Path Cost, count the number of times the packet is regenerated.

The switch with the lowest Path Cost is the Root Bridge. Make the Root Bridge the best switch on the network.

## Hello Time

Is the interval between two transmissions of packets sent by the Root Bridge to tell all other switches that it is the Root Bridge. The Hello Time can be set manually, with a range in seconds from 1 to 10. If the Hello Time is set for the switch and the switch is not the Root Bridge then the Hello Time will not take effect until the switch becomes the Root Bridge.

## Forward Delay Time

This is the time any port on the DES-5600 spends in the listening state while moving from the listening state to the forwarding state. It can be set from 4 to 30 seconds.

Use the following formula when setting the Hello Time and the Forward Delay Time:

2 x (Forward Delay minus 1 second) $\geq$ Max Age

2 x (Hello Time plus 1 second) $\leq$ Max Age

## Max Age Time

Is the time a non-root bridge waits for a packet to be sent. At the end of the Max Age, if a packet has not been received from the Root Bridge, the DES-5600 will start sending its own packets and request permission to become the Root Bridge.

The switch with the lowest Bridge Identifier is the Root Bridge. It is best to make the Root Bridge the best switch on the network to ensure the best network performance and reliability.

## Root Bridge

Specifies the MAC address of the Root Bridge. The DES-5600 may or may not be the root bridge. The DES-5600 is the default root bridge.

## Root Port

Specifies the preferred path to the Root Bridge. Only one path per bridge can exist. The default setting is none.

**Table 7: User Selective STA Parameters**

| STA Parameters | Settings | Effects | Comment |
|---|---|---|---|
| Enable/Disable | Enable/Disable | Participate in or remove from STA | Enable in a SNMP network |
| Bridge Priority | Lower the #, higher the priority | Increases chance of becoming the Root Bridge | Avoid, if the switch is used in workgroup level of a large network |
| Hello Time | 1 – 10 seconds | No effect, if not Root Bridge | Never set greater than Max Age Time |
| Max Age Time | 6 – 40 seconds | Compete for Root Bridge, if BPDU is not received | Avoid low number for unnecessary reset of Root Bridge |
| Forward Delay Time | 4 – 30 seconds | High # delays the change in state | 2 x (Forward Delay minus 1 second) $\geq$ Max Age, 2 x (Hello Time plus 1 second) $\leq$ Max Age |
| Port Level STA parameters | | | |
| Enable/ Disable | Enable/ disable | Enable or disable LAN segment | Disable a port for security or problem isolation |
| Port Priority | Lower the #, higher the priority | Increases chance of becoming the Root Port | No comment |

Follow these steps to configure STA:

1. Use the Tab and arrow keys to select the appropriate field.

2. Toggle the space bar or enter the new setting.

3. Select Save and press enter.

4. Reboot to make changes effective.

## Spanning Tree Port Configuration

Shown in Figure 25, enables you to set the Spanning Tree Priority for each port.
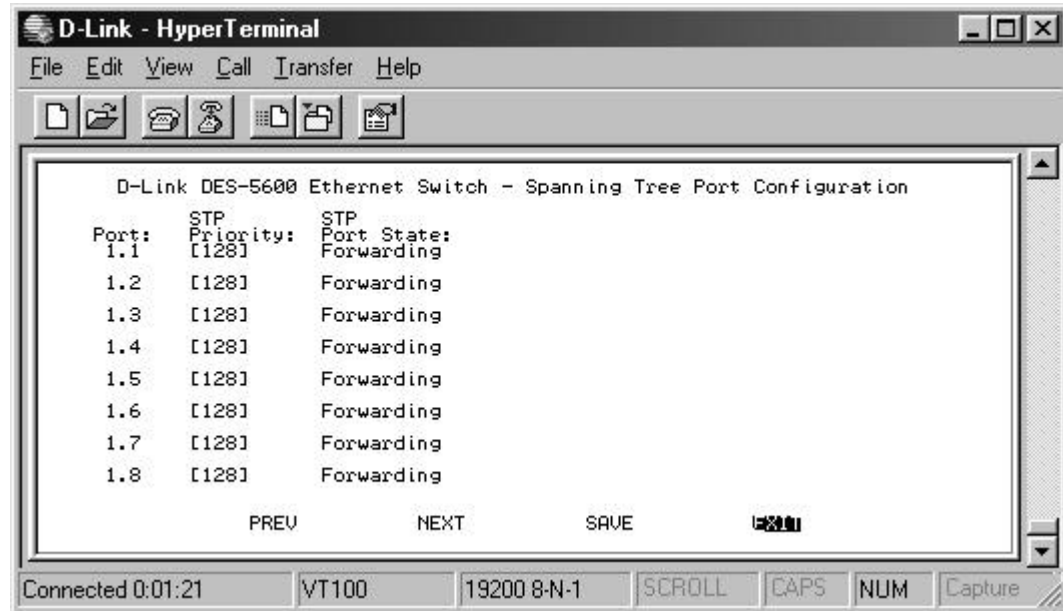


**Figure 25: Spanning Tree Port Configuration**

### Port

Indicates the slot number the module is in and the port number.

### STP Priority

Indicates the STP priority. The lower the number the higher the priority. The port priority can be set from zero to 255. Zero is the highest port priority. The default setting will work in most situations.

### STP Port State

All ports have four states: blocking, listening, learning and forwarding. Blocking means that nothing is coming through the port. If the Spanning Tree Algorithm detects a loop it will change the state of the port where the loop is detected to the Blocking State. You can disable the Spanning Tree Algorithm. Forwarding means the port is forwarding data packets to their destination. Listening means that the port is listening for data packets. Learning means the port is learning the MAC address for data packets. This setting cannot be changed manually.

Follow these step to configure STP:

1. Select the appropriate port.

2. Enter the new value in the field and reboot the DES-5600.

# SNMP Management Configuration Menu

Shown in Figure 26, these panels are used to configure the DES-5600 for SNMP management. Leave the default values in place if you are not managing your network through SNMP.

The DES-5600 uses the standard MIB-II Management Information Base module. The MIB values can be retrieved from any SNMP based network manager. The DES-5600 supports its own proprietary enterprise as an extended MIB. The MIB can be retrieved by specifying their Object-Identity (OID). MIB values can be read-only or read-write. The OID values for the DES-5600 are displayed on the Switch Information panel under System Object ID.

Read-only MIB variables can be constants that are programmed into the DES-5600 or variables that change while the DES-5600 is running. For example, the number and type of ports on the DES-5600 is a read-only constant. The number and type of ports is fixed. Statistics, such as the number of errors that have occurred, are read-only variables.

Read-write MIBs are usually related to user customized configurations. Examples of these are the DES-5600's IP address, STA parameters and port status.

If you use third party vendors' SNMP software to manage the DES-5600, a diskette listing the DES-5600's proprietary enterprise MIB can be obtained by request. If your software provides functions to browse or modify MIB, you can get the MIB values and change them (if the MIB's attributes permit the write option). This process can be difficult. You must know the MIB OID's and retrieve them individually.



**Figure 26: SNMP Management Configuration Menu**

## SNMP Manager Configuration

Shown in Figure 27, this panel enables you to configure the DES-5600 for SNMP Management. You must configure these settings to manage the DES-5600 through SNMP.
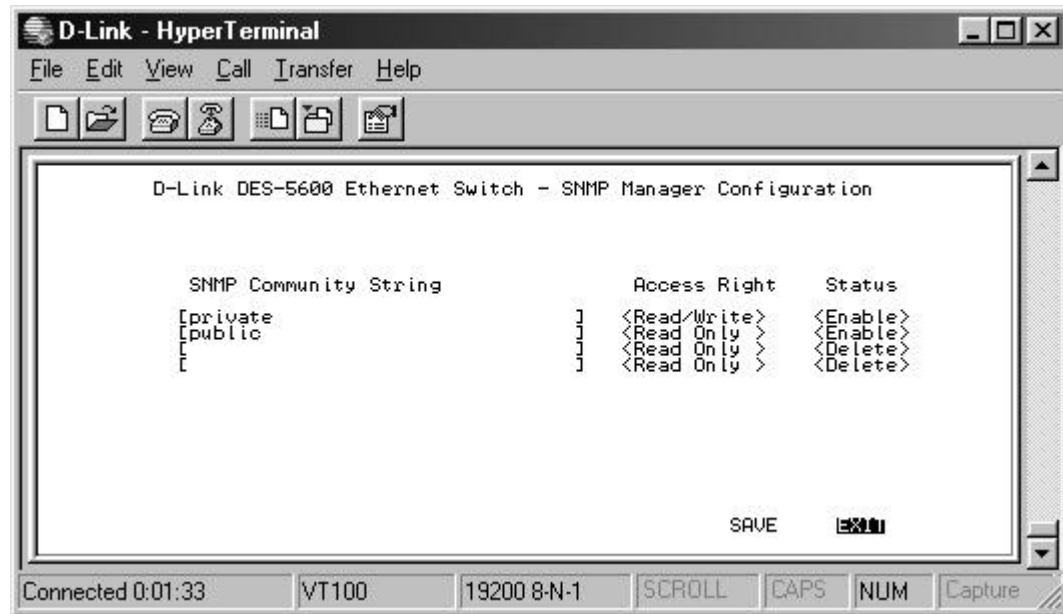


**Figure 27: SNMP Manager Configuration**

### SNMP Community String

The SNMP Community String field enables you to name the SNMP Communities. The names public and private are only default names. For security you should change these names to help prevent unauthorized access to the DES-5600.

You can name the SNMP communities anything you like. You can enter up to 32 characters in each of the four fields. You can create up to four SNMP Communities.

### Access Right

Enables you to set the access rights that members of the SNMP Communities have. Read Only access rights mean that members of the community can view the information on the DES-5600 but they cannot make changes to the configurations. Read/ Write access rights enable the members of the community to make any changes they desire.

### Status

Can be Enable or Delete. Only communities with Enable status can access the DES-5600. Communities with Delete status cannot access the DES-5600.

Follow these steps to configure the DES-5600 for SNMP Management:

1.  Select the appropriate field with the Tab and arrow keys. Enter the new value or toggle the space bar to change the settings.

2.  Select Save and press enter.

3.  Reboot the DES-5600 to make the changes effective.

## SNMP Trap Manager Configuration

Displayed in Figure 28, the panel enables you to configure the SNMP Trap Manager settings.
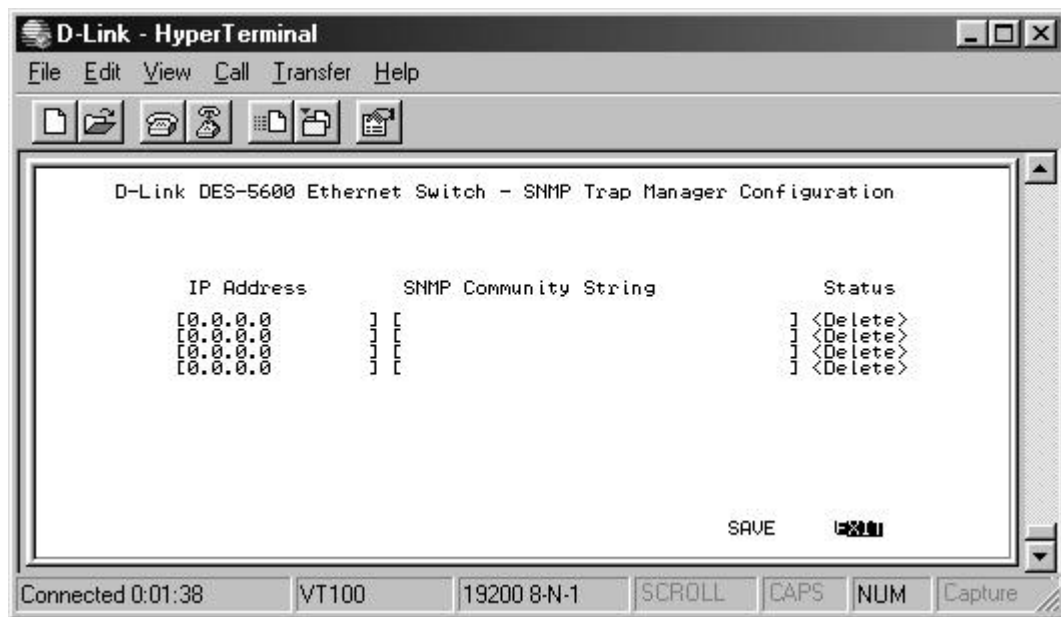


**Figure 28: SNMP Trap Manager Configuration**

### IP Address

Enables you to enter the IP address of trap managers.

### SNMP Community String

Enter the Community String of the Trap Managers in this field.

Traps are messages the DES-5600 sends out to inform trap managers of events on the network. The DES-5600 generates traps and sends them to the network manager. Trap managers are special network users who are given certain rights and access to oversee and maintain the network. This feature is available only in D-View or by using other SNMP management software.

You can specify which network managers may receive traps from the DES-5600 by creating a list of IP Addresses of the authorized network managers.

Trap managers can receive the following trap types:
- Cold Start

- Authentication Failure
- Link Change Event

## Cold Start

Signifies that the DES-5600 has been powered up. Software settings are reconfigured and hardware systems are rebooted. A cold start is different from a factory reset.

## Authentication Failure

Signifies that an addressee (or manager/ user) on the DES-5600 is not a valid user of the DES-5600 and may have entered an incorrect community name.

## Link Change Event

Signifies that the link of a port has changed from link up to link down or vice versa.

## Status

Can be Delete or Enable. Only community strings whose status is Enabled can receive Traps.

Follow these steps to configure the community string:

1. Use the Tab and arrow keys to move to the appropriate field.

2. Enter the new value in the field or toggle the space bar to change the value.

3. Select Save and press Enter. Reboot the DES-5600 for changes to take effect.

# Switch Configuration

The Switch Configuration panel, shown in Figure 29, enables you to decide how long the DES-5600 waits for a response before an address time out.
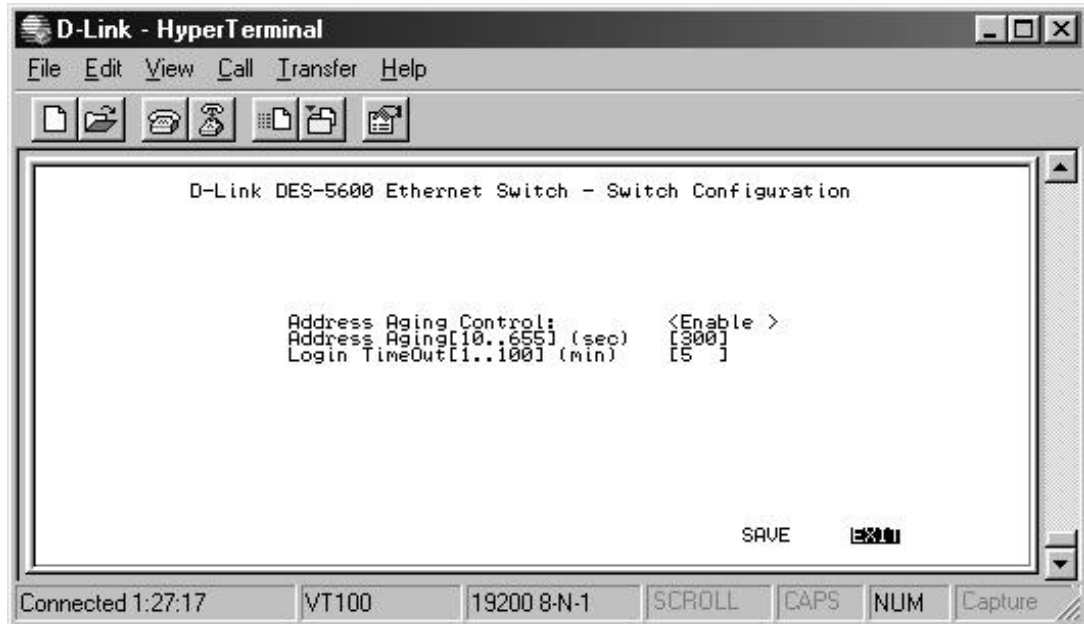


**Figure 29: Switch Configuration**

## Address Aging Control

Enables or disables address aging. Address aging refers to how long the MAC Address of devices remains in the Media Access Control Table (MAC Table) of the DES-5600.

## Address Aging

The setting can be from 10 seconds to 655 seconds. Disabling this feature means that addresses never age out. This can create problems on the network if a device is moved or removed from the network. It is best to allow addresses to age out so that information in the MAC is always refreshing itself and remains accurate.

## Login TimeOut

Enables you to determine how long the DES-5600 waits before connections time out. The time can be set from 1 minute to 100 minutes. This setting does not affect users on the switch, only users actually logged in with user name and password.

Follow these steps to set the Switch Configuration:

      1.     Toggle Address Aging Control to the desired setting.

2.    Enter the number in seconds you want the address to age.

3.    Enter the number in minutes the DES-5600 should wait before logging out inactive users. This step is independent of the other two.

## Switch Port Flow Control

The Switch Port Flow Control panel, shown in Figure 30, enables you to set the flow control for each port individually. Flow control must be on for packets to pass through the port.
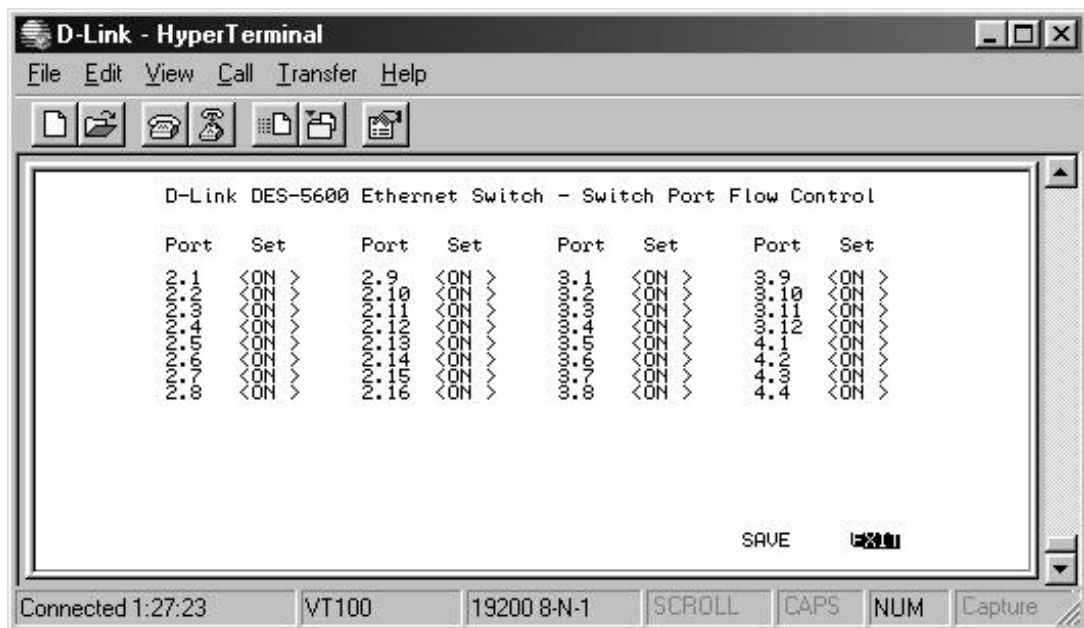


**Figure 30: Switch Port Flow Control**

### Port

Refers to the slot and port shown on the panel.

### Set

Refers to Flow Control being on or off. Packets can only flow through ports set to the ON position. Packets cannot flow through ports set in the OFF position.

## Port Monitoring

The Port Monitoring panel, shown in Figure 31, enables you to monitor specific ports for network traffic and packet type. You need third party monitoring software to monitor traffic. Monitoring software is not included in the switch.
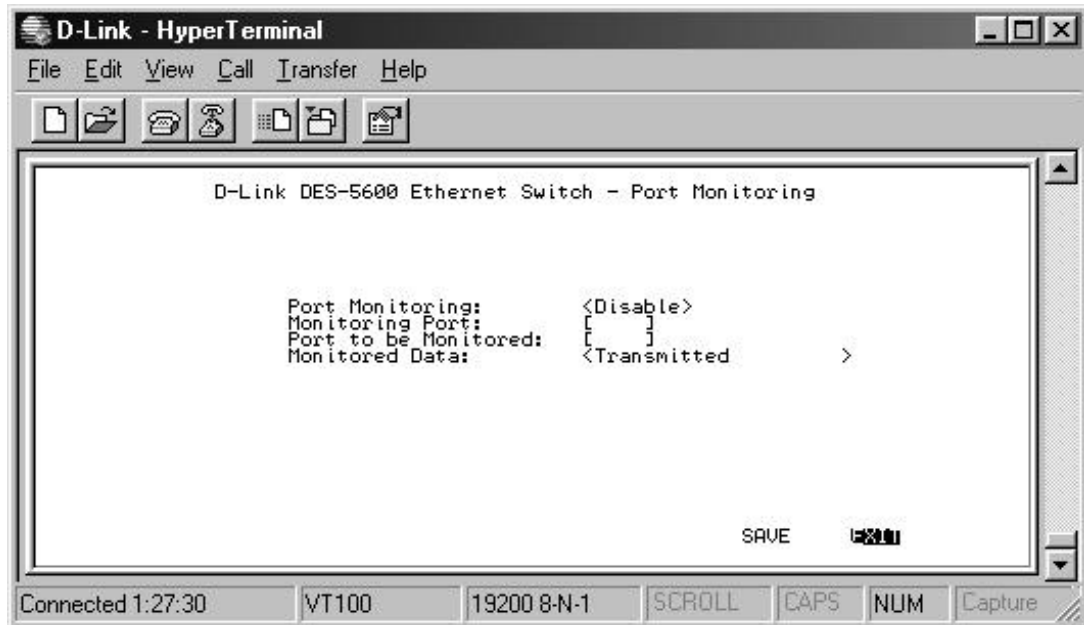


**Figure 31: Port Monitoring**

### Port Monitoring

Must be enabled in order to set up a monitoring port.

### Monitoring Port

Is the port that does the actual monitoring.

### Port to be Monitored

Slot and port number of the port to be monitored.

### Monitored Data

Data that is collected by the monitoring port. Transmitted refers to packets that are transmitted from the port. Received refers to packets that are received by the port. Transmitted and received refer to packets that are transmitted from and received by the port.

Follow these steps to configure port monitoring:

1.     Toggle the space bar to enable Port Monitoring.

2.      Enter the slot and port number of the port you that is being used as the monitoring port.

3.      Enter the slot and port number of the port to be montored.

4.      Toggle the space bar to select Transmitted, Received or Transmitted & Received.

5.      Select Save and press Enter.

# VLAN Port Management

The VLAN Port Management Menu, shown in Figure 32, enables you to create, delete and modify VLANs. A Virtual Local Area Network (VLAN) is a logical subgroup within a LAN that is created with software rather than physical connections. The purpose of a VLAN is to prevent broadcast storms and ease congestion on the network.

Each VLAN created is a broadcast domain. A broadcast is a packet that is sent to all nodes on the network. A broadcast domain is a domain in which every node in the domain receives the broadcast packet. The advantage of creating VLANs is that they permit you to group LAN segments together in order to get the most out of your network.

VLANs become more important as the network grows and traffic increases. VLANs are usually used on high traffic networks. You should consider a VLAN on a smaller network if a department or workgroup routinely does tasks that take up a lot of bandwidth and they are not already on their own LAN segment.

VLANs can be used to subdivide the network. The DES-5600 supports port based VLAN. Port based VLAN means that the VLAN is grouped by port. If a VLAN is created using three ports, then those ports become a separate broadcast domain.

By using VLANs, members of a particular department or workgroup can be partitioned from the rest of the network. For example, the marketing department can be on one VLAN and the accounting department can be on another. If a workstation in marketing sends a broadcast packet to another workstation in marketing the packet will remain on the marketing VLAN.



**Figure 32: VLAN Port Management Menu**

### Create VLAN

Creates VLAN by selecting specific ports as part of a VLAN.

### Delete VLAN

Deletes VLANs in their entirety.

### Modify/ View VLAN

Enables you to modify VLANs by specific ports.

Follow these steps to create, delete and modify VLAN:

1.    Select the appropriate option.

2.    Press Enter.

## Create VLAN

The Create New VLAN menu, displayed in Figure 33, is used to create a new VLAN. The default value is that all ports belong to one VLAN. You can create up to eight separate VLANs. Ports can belong to two VLANs at the same time. Each VLAN is a broadcast domain. If you have created a trunking group, you must include the entire trunk group in the VLAN.
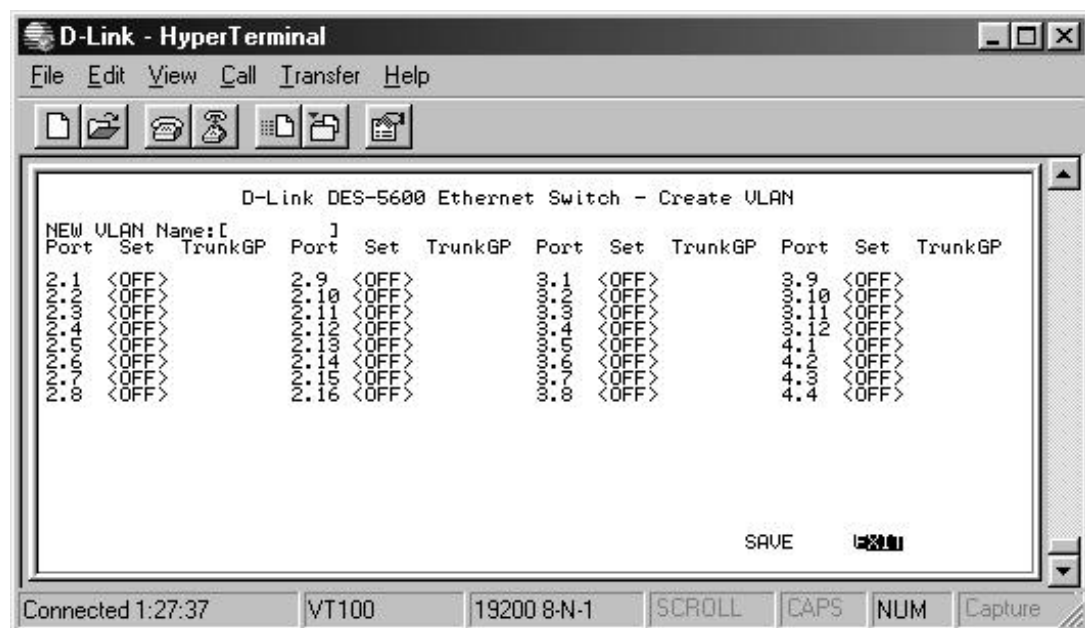


**Figure 33: Create VLAN**

### New VLAN Name

Is the name of the VLAN you are creating. All VLANs must have a unique name.

### Port

Indicates the slot and port that is part of the VLAN.

### Set

Off indicates the port is not part of a VLAN. On indicates it is.

### TrunkGP

The name of the Trunking Group the VLAN is a part of, if any. The field is open if the port has not been assigned to a Trunk Group.

Follow these steps to create a VLAN:

1.  Enter the name of the VLAN you are creating.

2.  Select the ports you want to include in the VLAN and toggle the space bar to change the status from Available to Selected.

3.  Select Save and press Enter.

## Delete VLAN

The Delete VLAN panel, shown in Figure 34, is used to delete VLANs.



**Figure 34: Delete VLAN**

### VLAN Name

Is the name of the VLAN.

### Delete

After you have created a VLAN, this column will have the option to delete it.

Follow these steps to delete VLANs:

1.  Select the VLAN you want to delete in the Delete column.

2.  Toggle the space bar to Yes to delete the VLAN.

3.  Select Save and press Enter.

4.  A screen prompt will warn you that you must reset the DES-5600 in order for the change to take effect.

## Modify/ View VLAN

The Modify/ View VLAN panel, shown in Figure 35, is used to modify a VLAN and to look at the ports that are part of the VLAN.
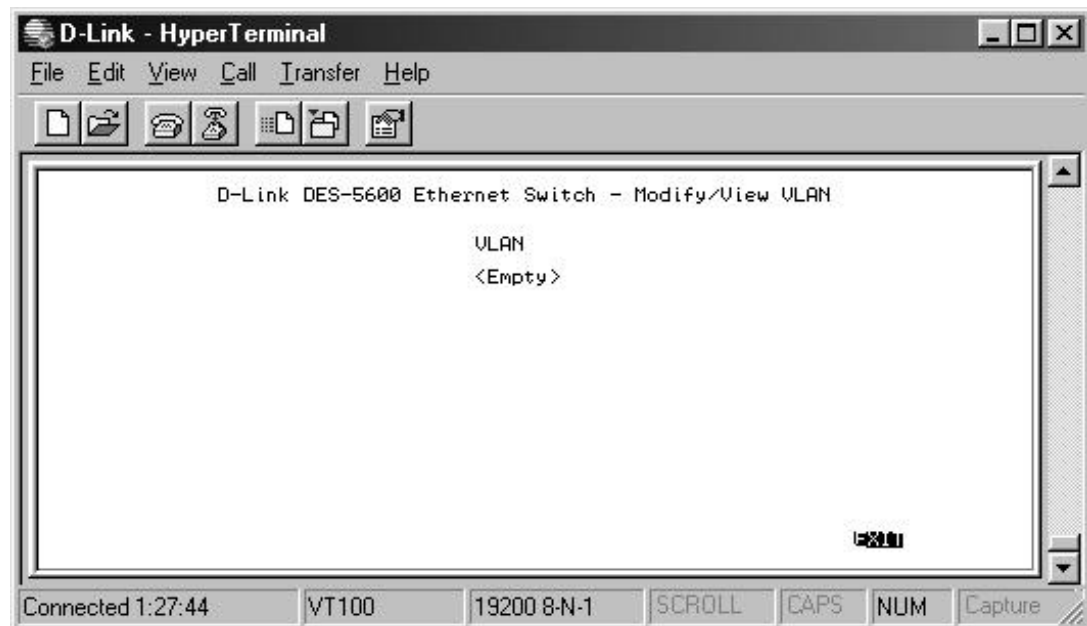


**Figure 35: Modify/ View VLAN**

### Virtual LAN Name

The names of all VLANs appear in this column.

Follow these steps to modify VLANs:

1.  Select the name of the appropriate VLAN.

2.  Press Enter.

3.  You will see the VLAN Modify menu. Use this panel to modify a VLAN.

4.  Select the ports that you want to include in the VLAN or delete from the VLAN. Toggle the space bar to change the current setting. Available means the port is available for inclusion in the VLAN. Selected means the port has been selected as part of a VLAN.

5.  Select Save and press Enter to implement your changes.

# Trunking Port Management

The Trunking Port Management panels, displayed in Figure 36, are used to create, delete and modify trunk ports. Some ports on some modules are not available for inclusion in any Trunking Groups.
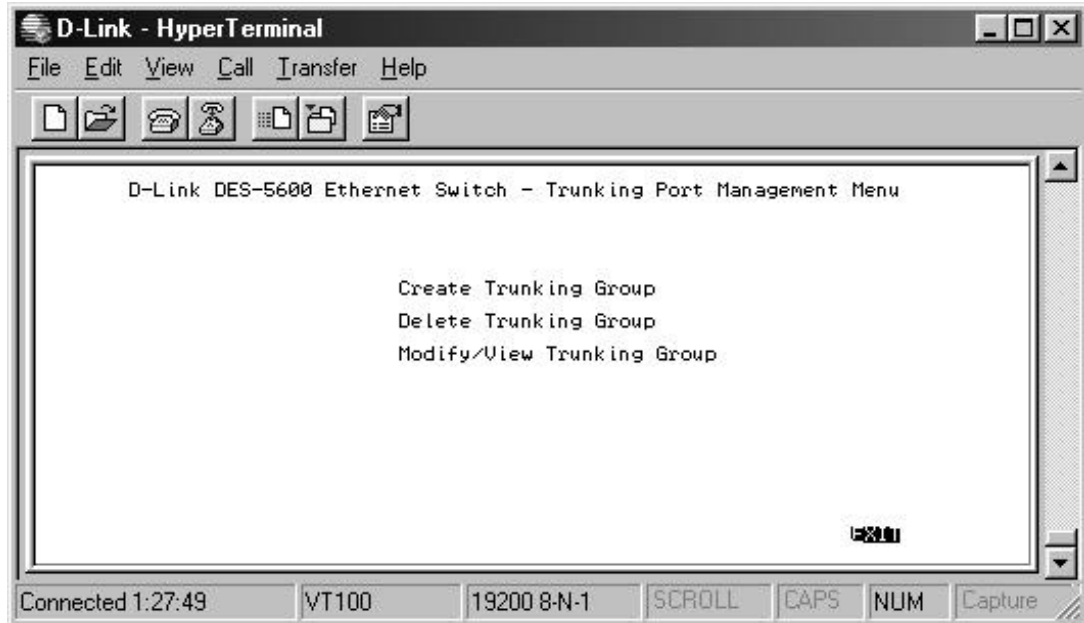


**Figure 36: Trunking Port Management**

### Create Trunking Group

Select this option to create a Trunking Group.

### Delete Trunking Group

Select this option to delete a Trunking Group.

### Modify/ View Trunking Group.

Select this option to modify or view a Trunking Group.

## Create Trunking Group

The Create Trunking Group panel, shown in Figure 37, enables you to create Trunking Groups. You can create up to seven trunking groups with up to eight ports in each group. Each Trunking Group acts like a single port. The trunking speed is 800 Mbps in half duplex and 1.6 gigabits in full duplex.



```
D-Link - HyperTerminal
File  Edit  View  Call  Transfer  Help

          D-Link DES-5600 Ethernet Switch - Create Trunking Group

New Trunking Group Name: [        ]
Port  Set   Name      Port  Set   Name      Port  Set   Name      Port  Set   Name

2.1   <OFF>           2.9   <OFF>           3.1   <OFF>           3.9   <OFF>
2.2   <OFF>           2.10  <OFF>           3.2   <OFF>           3.10  <OFF>
2.3   <OFF>           2.11  <OFF>           3.3   <OFF>           3.11  <OFF>
2.4   <OFF>           2.12  <OFF>           3.4   <OFF>           3.12  <OFF>
2.5   <OFF>           2.13  <OFF>           3.5   <OFF>           4.1   <OFF>
2.6   <OFF>           2.14  <OFF>           3.6   <OFF>           4.2   <OFF>
2.7   <OFF>           2.15  <OFF>           3.7   <OFF>           4.3   <OFF>
2.8   <OFF>           2.16  <OFF>           3.8   <OFF>           4.4   <OFF>


                                                        SAVE        EXIT

Connected 1:27:53      VT100      19200 8-N-1    SCROLL   CAPS   NUM   Capture
```
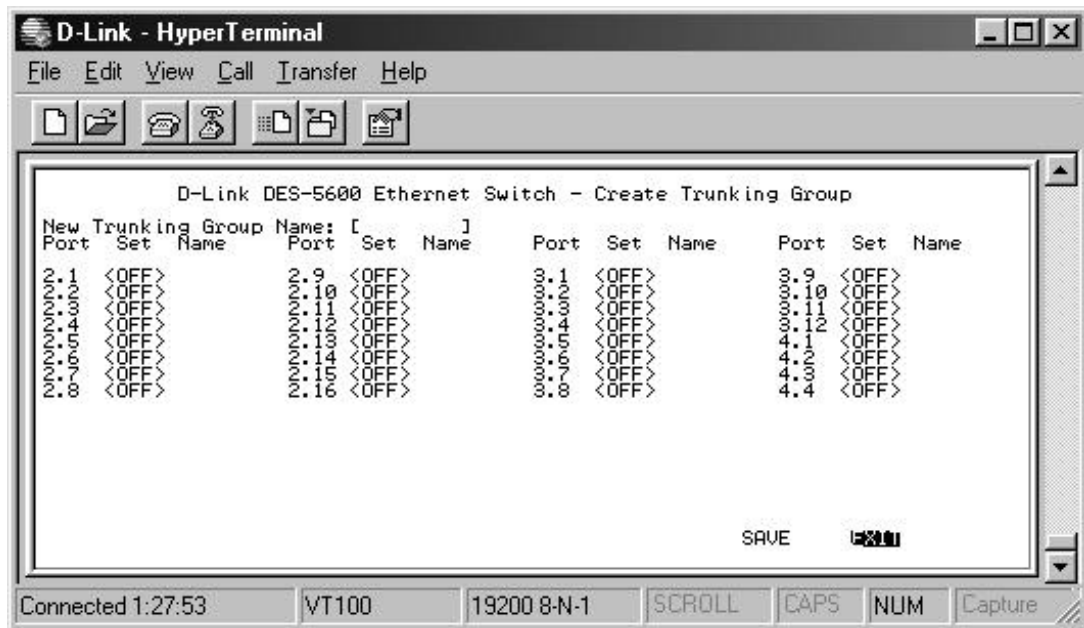
**Figure 37: Create Trunking Group**

### New Trunking Group Name

Is the name of the Trunking Group being created.

### Port

Indicates the slot and port that is part of the VLAN.

### Set

Off indicates the port is not part of a VLAN. On indicates it is.

### Name

Is the name you assign to the Trunking Group.

## Delete Trunking Group

The Delete Trunking Port panel, displayed in Figure 38, is used to delete Trunk Ports.
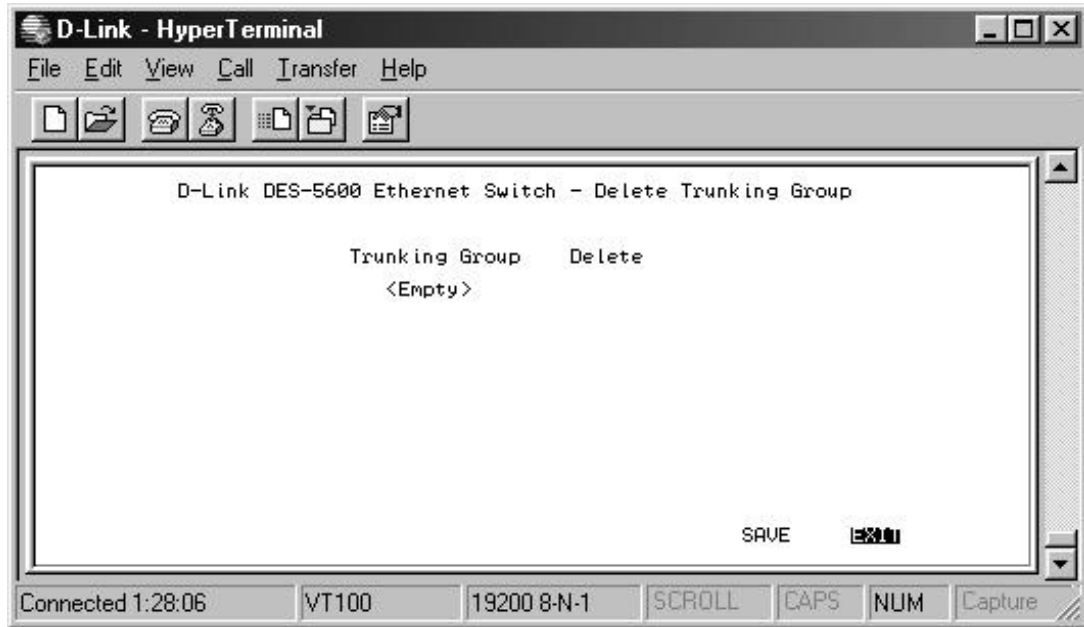


**Figure 38: Delete Trunking Group**

### Trunking Port

Is the name of the Trunking Group.

### Delete

All trunking groups can be deleted from this panel.

Follow these steps to delete a Trunking Group:

1.  Select the Trunking Group to be deleted in the Delete column.

2.  Toggle the space bar to Yes to delete the Trunking Group.

3.  Select Save and press Enter.

## Modify/ /View Trunking Group

The Modify Trunking port panel, displayed in Figure 39, enables you to Modify Trunking Ports.
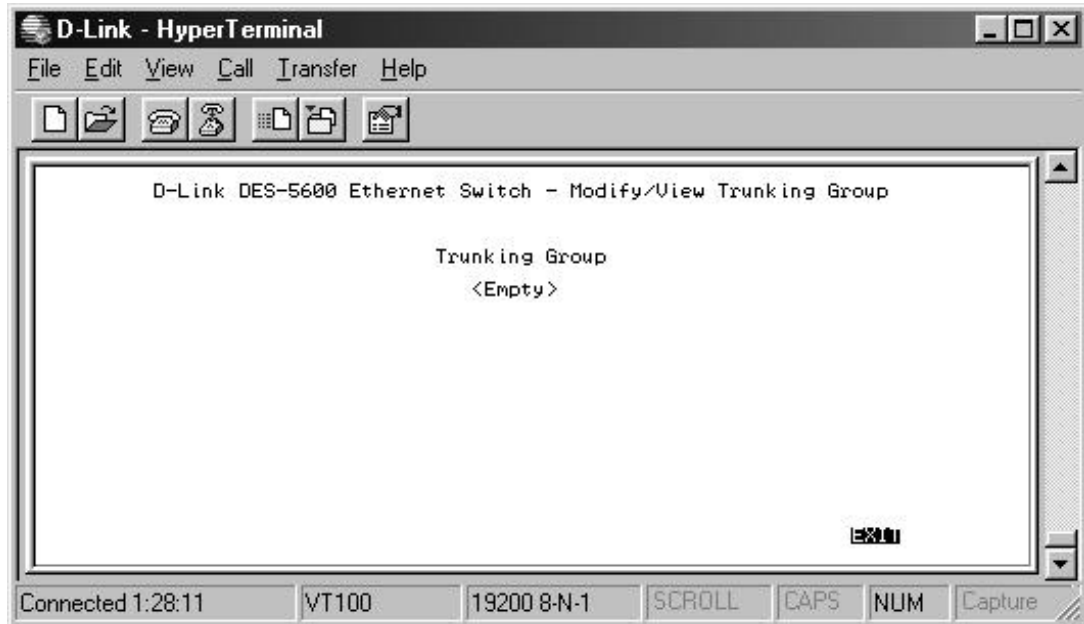


**Figure 39: Modify/ View Trunking Group**

### Trunking Group

The names of all Trunked Ports appear in this column.

Follow these steps to modify Trunked Ports:

1.    Select the appropriate Trunking Group.

2.    Press Enter.

3.    Select the ports that you want to include in the Trunking Group or delete from the Trunking Group. Toggle the space bar to change the current setting. Available means the port is available for inclusion in the Trunking Group. Selected means the port has been selected as part of a Trunking Group. N/A indicates ports that are not available for inclusion in any trunking group.

4.    Select Save and press Enter to implement your changes.

# System Utility Menu

The System Utility Menu, shown in Figure 40, enables you to reset the DES-5600 without powering off, return to factory default settings and update software.
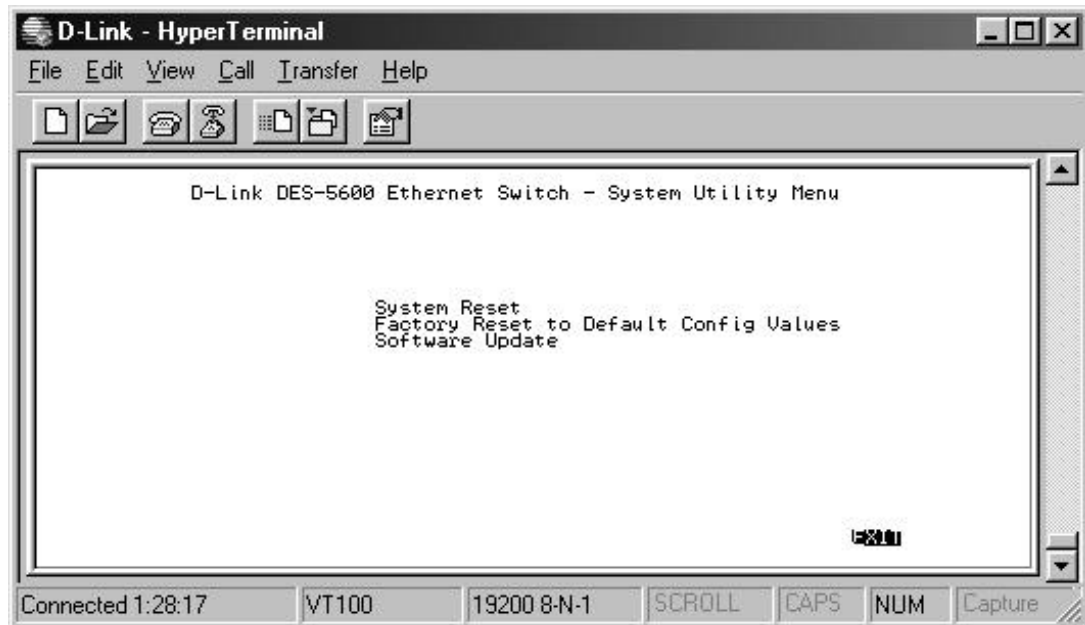


**Figure 40: System Utility Menu**

### System Reset

Resets the DES-5600 without powering off.

### Factory Reset to Default Config Values

Resets the DES-5600 back to the factory default values.

### Software Update

Enables you to update the software.

# System Reset

The System Reset panel, displayed in Figure 41, enables you to reset the DES-5600 without powering off.
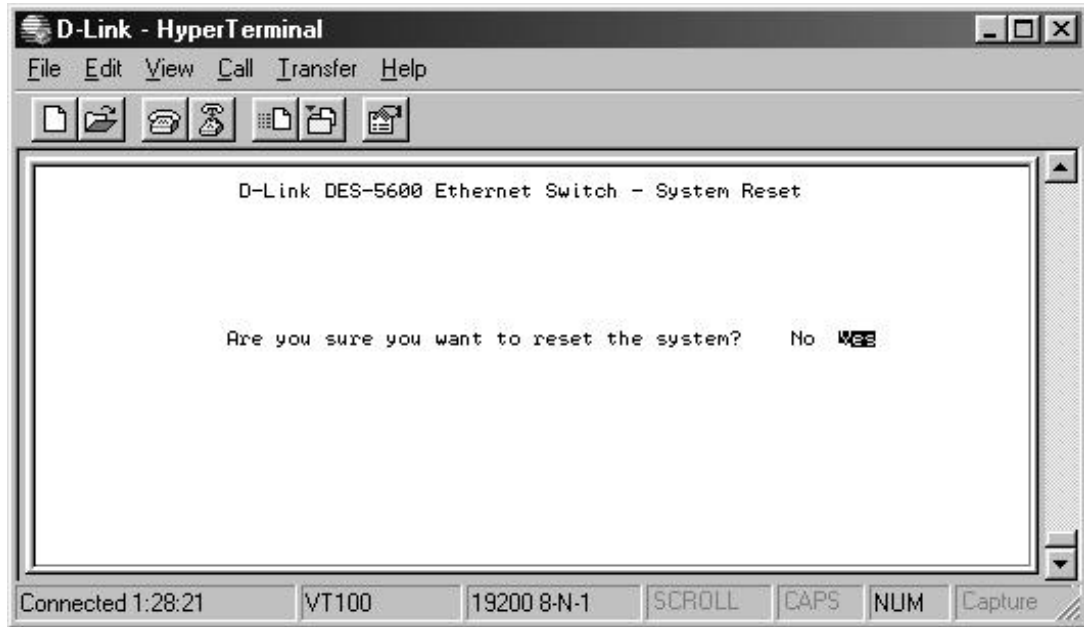


**Figure 41: System Reset**

Some configurations require that the DES-5600 be reset in order for them to take effect. Screen prompts instruct you to reset as needed.

Follow these steps to reset the DES-5600:

    1.    Select Yes.

    2.    Press Enter.

To exit without resetting:

    1.    Select No.

    2.    Press Enter.

## Factory Reset to Default Configuration Values

The Factory Reset panel, displayed in Figure 42, is used to reset the DES-5600 and restore all factory default values. Using this panel erases all configurations and customization.
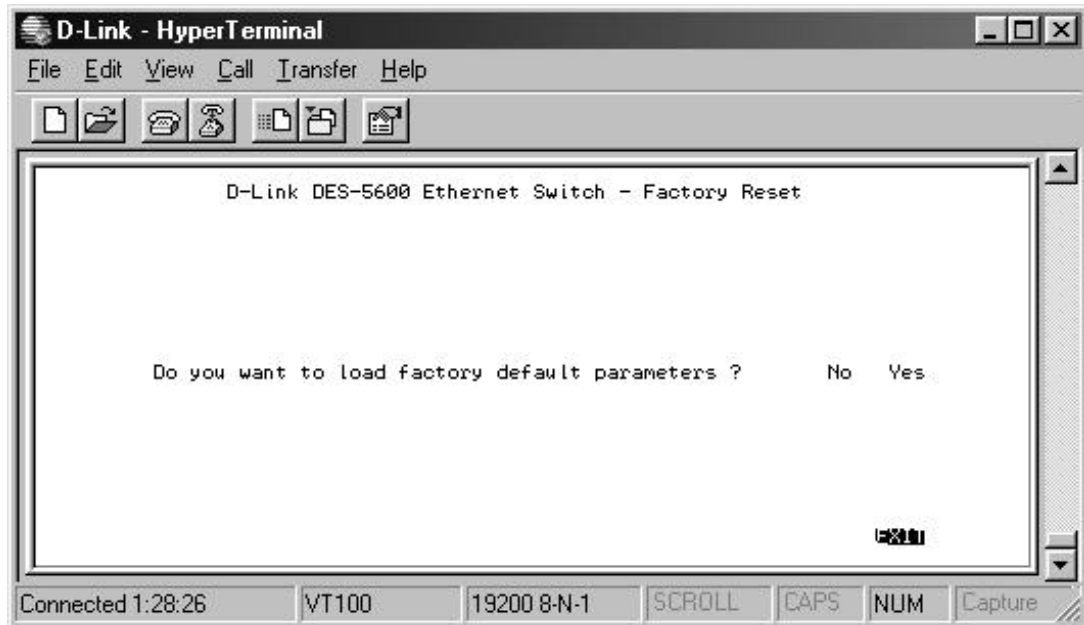


**Figure 42: Factory Reset**

Follow these steps to restore factory default configurations:
1. Select Yes.
2. Press Enter.

To exit without resetting:
1. Select No or EXIT.
2. Press Enter.

## Software Update

The Software Update panels, shown in Figure 43, are used to update the software on the DES-5600. Software can be updated using either XMODEM or TFTP.

XMODEM requires a direct physical connection between a PC and the DES-5600.

TFTP requires a TFTP server and that you know the Internet Protocol (IP) address of the server and the complete path and filename. TFTP can be done over the network or from a remote location.

### Software Update

### XMODEM

Xmodem is the default option.



**Figure 43: Software Update**

### Download Mode

Is the mode that will be used to download new software.

### Download File

Is the type of file you can download. Run_Time_Program refers the software that runs the DES-5600.

### TFTP Server IP Address

Is the address of the TFTP server you are downloading code from.

### File Name

Is the name of the file that you are downloading.

Follow these steps to download using XMODEM:

1. Use HyperTerminal with the settings given under Local Console Management.

2. Verify the download mode is set for XMODEM.

3. Select EXECUTE and press Enter.

4.      You will see a confirmation panel. If you do not want to update software select No and press Enter to return to the previous panel.

5.      Go to Transfer on the HyperTerminal menu and select Send File. Browse to the location of the software update and send the file. You will see a panel that shows elapsed time and other information about the software update.

Reset the DES-5600 when you see the final update panel.

This method can be used over the network or from a remote location.

TFTP is done using Telnet. It can be done from a remote location using a TFTP server. The TFTP server and the DES-5600 must be on the same subnet. For example, if the IP address of the DES-5600 is 100.100.100.001 then the TFTP server must have an IP address beginning with 100.100.100. Only the last three digits will be unique to the server and the DES-5600. Remember that two devices cannot have the same IP address.

Follow these steps to update software using TFTP.

1.      Verify the download mode is TFTP. Use the space bar to toggle between XMODEM and TFTP.

2.      Enter the Internet Protocol (IP) address of the TFTP server.

3.      Enter the complete path and filename of the software and select Execute.

4.      When the transfer is complete, reset the DES-5600 for the changes to take effect.

# User Account Management

The User Account Management menu, shown in Figure 44, enables you to create users, delete users and change user passwords.



**Figure 44: User Account Management Menu**

## Create New User

Is for entering the names and passwords of new users.

## Modify/ Delete Users

Modifying user profiles or deleting users.

## Change Password

Change user passwords.

Follow these steps to select an option:

      1.     Use the tab and arrow keys to select an option.

      2.     Press Enter.

## Create New User

The Create New User panel, shown in Figure 45, is used to add new user profiles to the DES-5600.
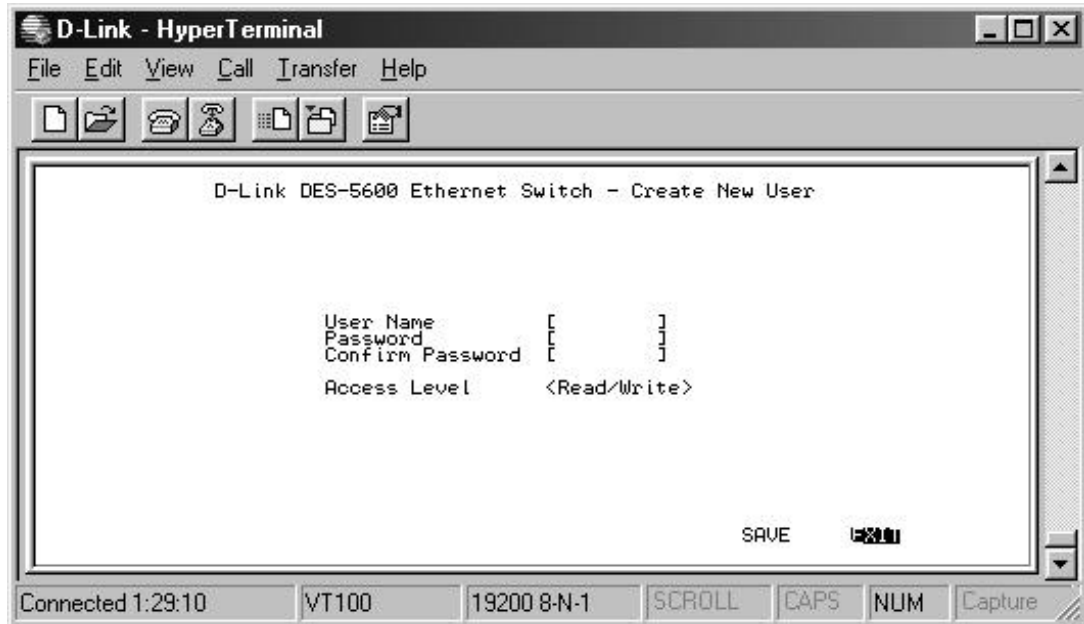


**Figure 45: Create New User**

### User Name

Enter the user's name in this field. User names are case sensitive. You can enter a maximum of eight characters.

### Password

Enter the user's password in this field. Passwords are case sensitive. You can enter a maximum of eight characters in this field.

### Confirm Password

Retype the password in this field to confirm it.

### Access Level

There are two access levels available on the DES-5600: Read/Write and Read Only. Read/Write can add and delete users, change the configuration of the DES-5600 and perform all management functions.

Read/Only users have read only access to the DES-5600. They can look at the panels but they cannot make any changes to existing settings or configurations.

Follow these steps to add users:

1.    Enter the User Name.

2.    Enter the Password.

3.    Reenter the password in the Confirm Password field.

4.    Toggle the space bar to set the access level of the new user.

5.    Select Save and press Enter.

## Modify/ Delete Users

The Modify/ Delete Users panel, shown in Figure 46, enables you to modify or delete user profiles. As a safety precaution, the DES-5600 will not enable the user who is currently logged in to delete themself by accident.
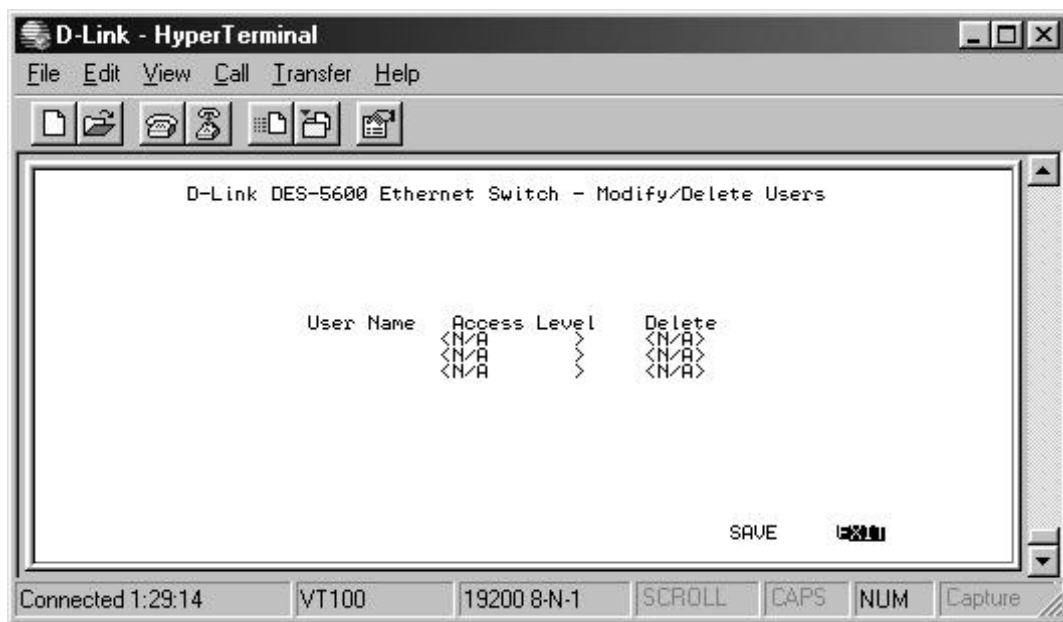


**Figure 46: Modify/ Delete Users**

### User Name

The name of the user.

### Access Level

Is the User's Access Level.

### Delete

Enables you to delete users. N/A means not available. The option is available after user names are entered. After new users are entered, it changes to No. Toggle the space bar to Yes to delete the user.

Follow these steps to change user Access Level:

1. Select the user's Access Level.

2. Toggle the space bar to change the current Access Level.

3. Select Save and press Enter.

Follow these steps to delete users:

1. Select the Access Level of the user you want to delete.

2. Move the cursor to the Delete column and use the space bar to toggle the option from No to Yes.

3. Press Enter.

4. Select Save and press Enter.

## Change Password

The Change Password panel, displayed in Figure 47, enables you to change user passwords.
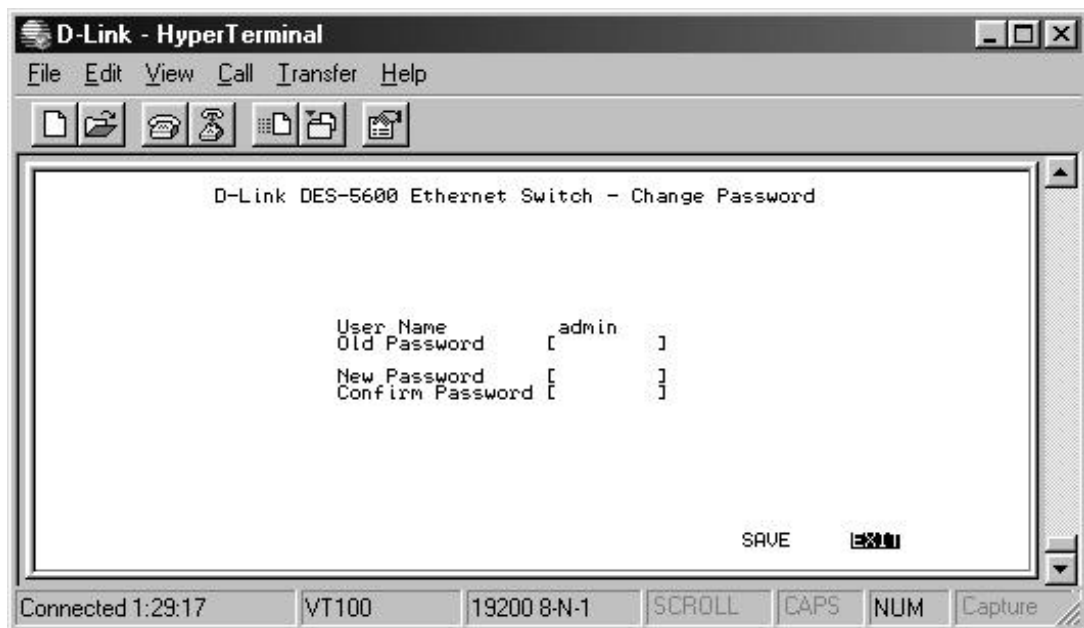


**Figure 47: Change Password**

### User Name

The name of the user whose password is being changed.

### Old Password

The user's old password.

### New Password

The user's new password.

## Confirm Password

Reenter the new password in this field to confirm it.

Follow these steps to change user passwords:

1. Enter the user's name in the User Name field.

2. Enter the user's old password in the Old Password field.

3. Enter the new password in the New Password field.

4. Reenter the new password in the Confirm Password field.

5. Select Save and press Enter to save your changes.

6

# Web Management

The DES-5600 can be managed through an Internet connection. This type of connection is called Web Management. The panels look different but they have the same information and function as Console Based Management.

## Using Web Management

You can use your web browser to configure and manage the DES-5600. The DES-5600 must have an IP address in order to be managed over the web. Log in through Local Console Management the first time and assign an IP address to the DES-5600. All subsequent management sessions can be done over the web.

Follow these steps to configure the DES-5600 for web based management:

1.    Enter the IP address of the DES-5600 in the address field of your Web browser and press Enter.

2.    Log in using your user name and password.

## Commands

The following commands are used in Web based management.

### Apply

Applies the changes that you have just made. Some settings require you to reset the DES-5600 in order for changes to take effect. A message appears onscreen when this is the case.

### Refresh

Refresh enables you to refresh the panel after you have made changes. Use refresh to see the changes you have made.

# Logging In

The Login panel, shown in Figure 48 and Figure 49, appears when you log in over the web. The user name and password are the same ones used on the console.

Select Login to display the Login panel.

Follow these steps to login:

1.    Enter your user name and password.

2.    Select OK. Select the check box to save the password in your password list.

3.    Select Cancel to cancel log in.
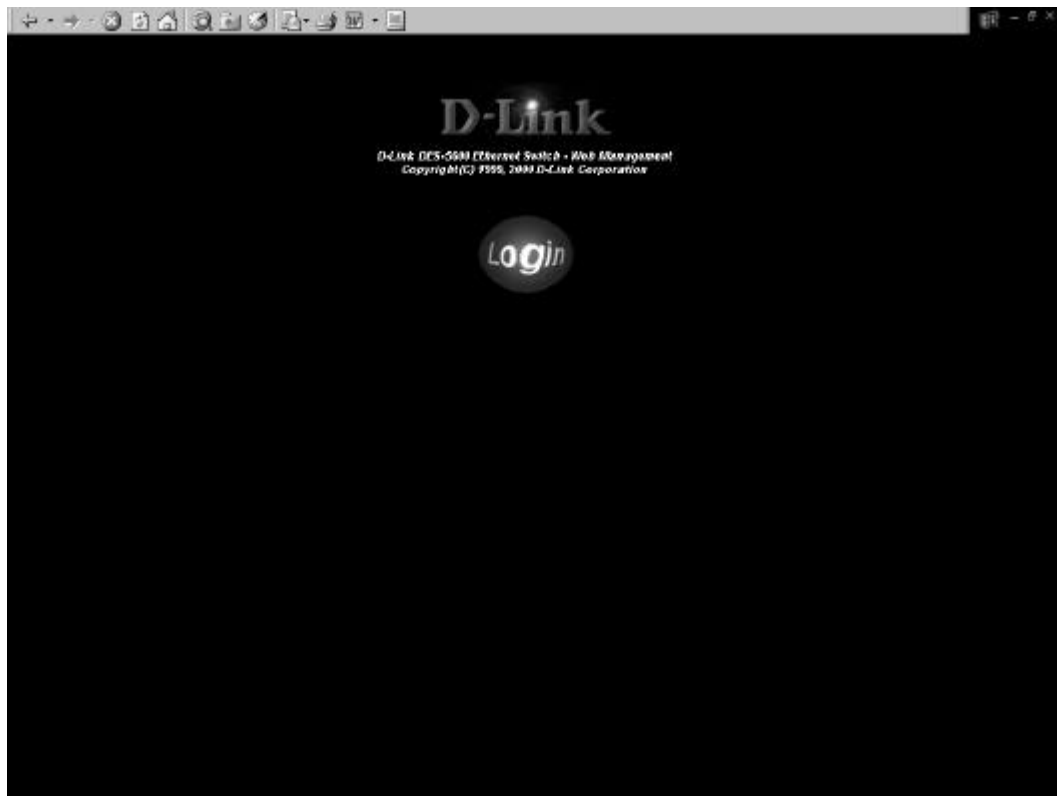


**Figure 48: Login**

Follow these steps to log into the DES-5600 for the first time:
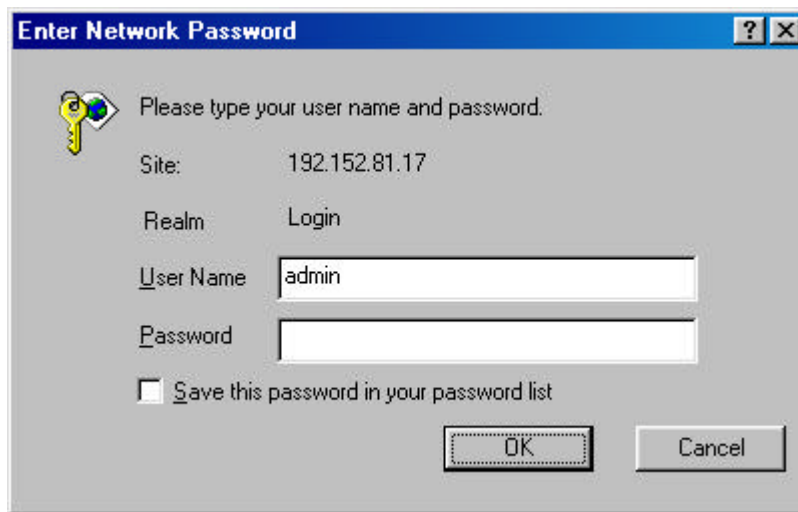
**Figure 49: Enter Password**

Enter the default User Name and Password and press Enter. The User Name and Password are case sensitive.

- **Default User Name:** admin
- **Default Password:** leave field blank

## System Information

The System Information menu displays the Hardware Revision, MAC address and other information on the DES-5600.

## System Configuration

The System configuration menu shows general information about the DES-5600 and enables you to assign a LAN IP Address, Subnet Mask, LAN Default Gateway and the contact information of the system administrator.

## System Utility

The System Utility menu enables you to reset the DES-5600 without powering off, reset to factory default values and update software.

## User Account Management

The User Account Management menu enables you to add users, delete users and modify user account information.

Follow these steps to select a menu option:

1. Click on the menu option to expand it.

2. Click on a submenu to make it the active menu.

# Switch Information

The Switch Information menu, shown in Figure 50, enables you to change the configuration of the DES-5600 and gather statistics about each of the ports.
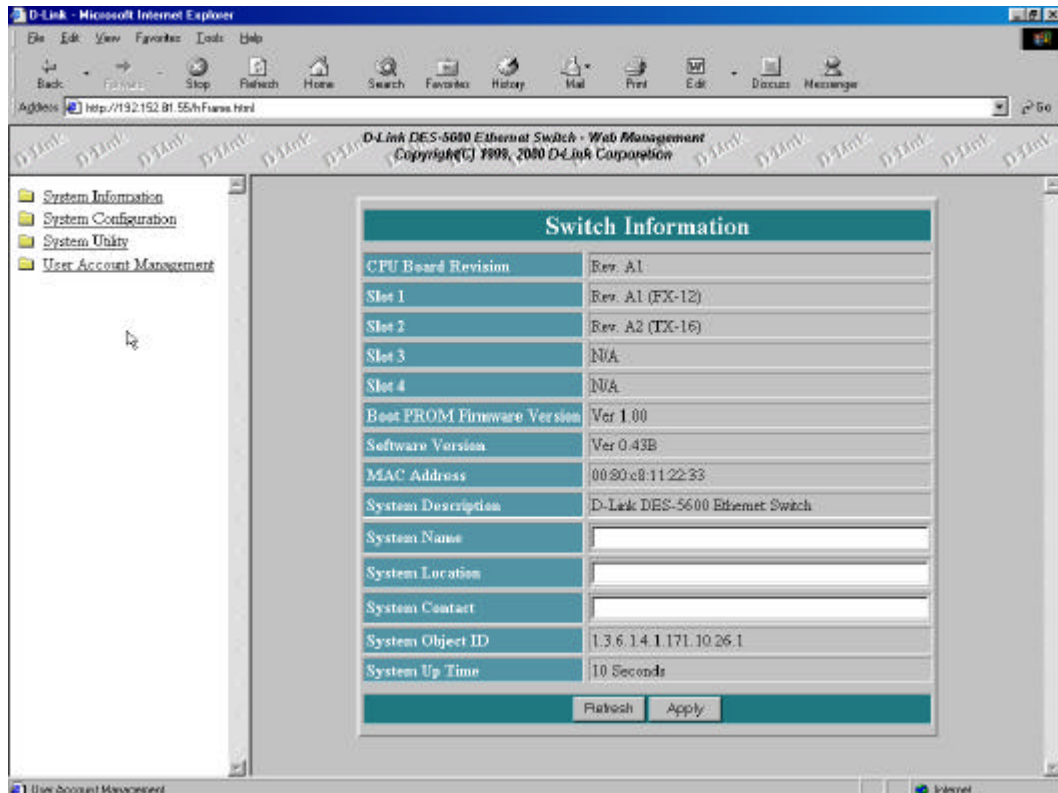


**Figure 50: Switch Information**

## Hardware Revision

Specifies the hardware revision. Each revision is numbered incrementally.

## Boot PROM Firmware Version

Specifies the version of the Boot PROM being used on the DES-5600. Each version is numbered incrementally.

## Software Version

Specifies the software version being used on the DES-5600. You can update the software. Each version is numbered incrementally.

## MAC Address

Specifies the hardwired address of the DES-5600. This address cannot be changed.

### System Description

Brief manufacturer description of the DES-5600. This value cannot be changed.

### System Name

Specifies the full name of the DES-5600. This value can be changed, enabling you to assign a unique name. The field holds 44 characters.

### System Location

Specifies the physical location of the DES-5600. A building number or street address can be entered in this field. You can enter up to 44 characters.

### System Contact

The network or other administrator's name to contact if there are problems.

### System Object ID

Is the object identifier used to manage the DES-5600 over RMON and SNMP. The MIB requires you to enter the number. The System Object ID is hardwired and cannot be changed.

### System Up Time

Is the amount of time the DES-5600 has gone without being rebooted.

Follow these steps to select an option:

1.  Enter the appropriate information in the white spaces on the panel.

2.  Click Apply to save your changes.

# Port Statistics

The Port Statistics panel, shown in Figure 51, shows statistical information about each port.
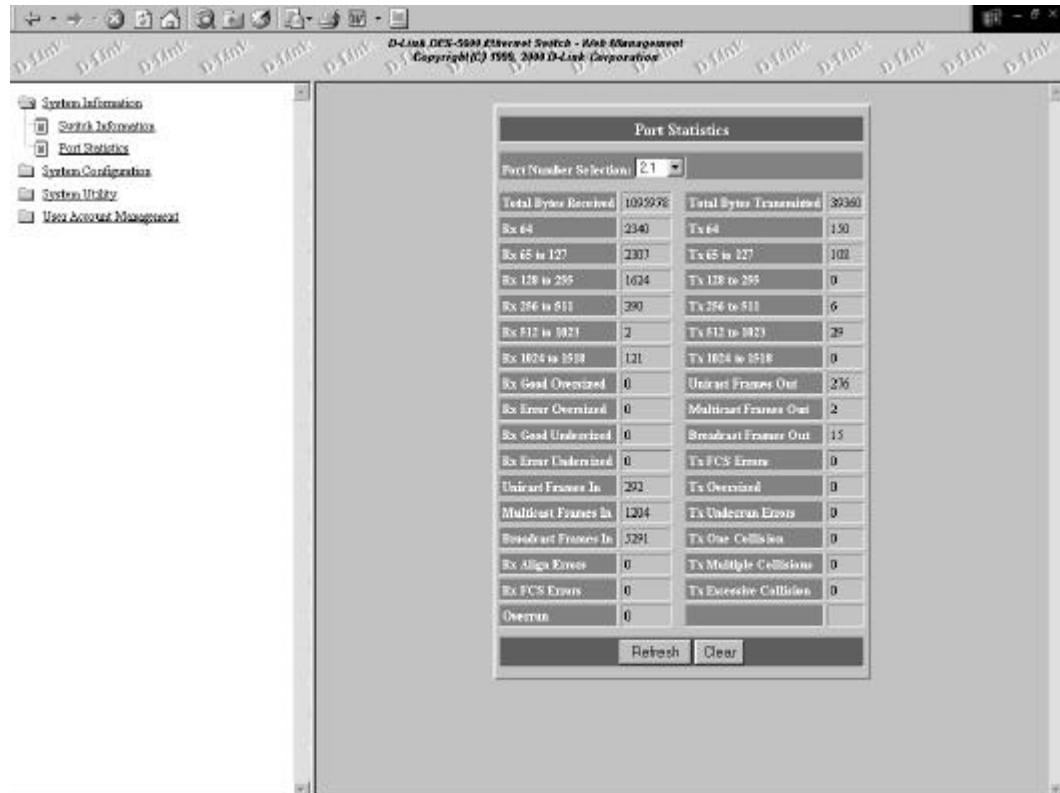


**Figure 51: Port Statistics**

### Port Selection Number

Enter the number of the module and port that the statistics will be gathered from or use the down arrow to select from a list.

### Total Bytes Received

Is the total number of bytes received by the port.

### Rx64

Number of frames (including frames with errors) that were 64 bytes long.

### Rx65 to 127

Number of frames (including frames with errors) that were 65 to 127 bytes long.

### Rx128 to 255

Number of frames (including frames with errors) that were 128 to 255 bytes long.

### Rx256 to 511

Number of frames (including frames with errors) that were 256 to 511 bytes long.

### Rx512 to 1023

Number of frames (including frames with errors) that were 512 to 1023 bytes long.

### Rx 1024 to 1518

Number of frames (including frames with errors) that were 1024 to 1518 bytes long.

### Rx Good Oversized

Number of good oversized frames received.

### Rx Error Oversized

Number of error oversized frames received.

### Rx Good Undersized

Number of good undersized frames received.

### Rx Error Undersized

Number of undersized frames received with errors.

### Unicast Frames In

Number of unicast frames received.

### Multicast Frames In

Number of mulitcast frames received.

### Broadcast Frames In

Number of broadcast frames received.

### Rx Align Errors

Number of aligned frames that were received with alignment errors.

## Rx FCS Errors

Number of frames received with FCS errors.

## Overrun

Number of frames that were overruns.

## Total Bytes Transmitted

Total number of bytes transmitted from the port.

## Tx64

Number of frames (including frames with errors) that were 64 bytes long.

## Tx65 to 127

Number of frames (including frames with errors) that were 65 to 127 bytes long.

## Tx 128 to 255

Number of frames (including frames with errors) that were 128 to 255 bytes long.

## Tx 256 to 511

Number of frames (including frames with errors) that were 256 to 511 bytes long.

## Tx 512 to 1023

Number of frames (including frames with errors) that were 512 to 1023 bytes long.

## Tx 1024 to 1518

Number of frames (including frames with errors) that were 1024 to 1518 bytes long.

## Unicast Frames Out

Number of Unicast frames out.

## Multicast Frames Out

Number of multicast frames out.

## Broadcast Frames Out

Number of broadcast frames out.

## TxFCS Errors

Number of frames that were discarded on the transmit side because of FCS errors.

## Tx Oversized

Number of with undersize errors.

## Tx Underrun Errors

Number of frames transmitted with underrun errors.

## Tx One Collision

Number of frames transmitted after one collision.

## Tx Multiple Collisions

Number of frames that were transmitted after multiple collsions.

## Tx Excessive Collision

Number of frames that were dropped because of excess collisions.

Follow these steps to select a port to monitor:

1.     Enter to port number or use the down arrow to select from a list.

2.     Click Apply to save your changes.

# System Configuration

The System configuration menu enables you to configure the DES-5600. Network configurations customizing are done in the following menus.

## Port Configuration

The Port Configuration panel, shown in Figure 52, enables you to configure individual ports according to the needs of your network. You can set the speed, duplex mode, enable and disable ports and make other changes. The panels and options may be different, depending on the DES-5600 model you purchased and the modules you have installed. Refer to Chapter 4, LEDs, for an explanation of the differences between the modules.
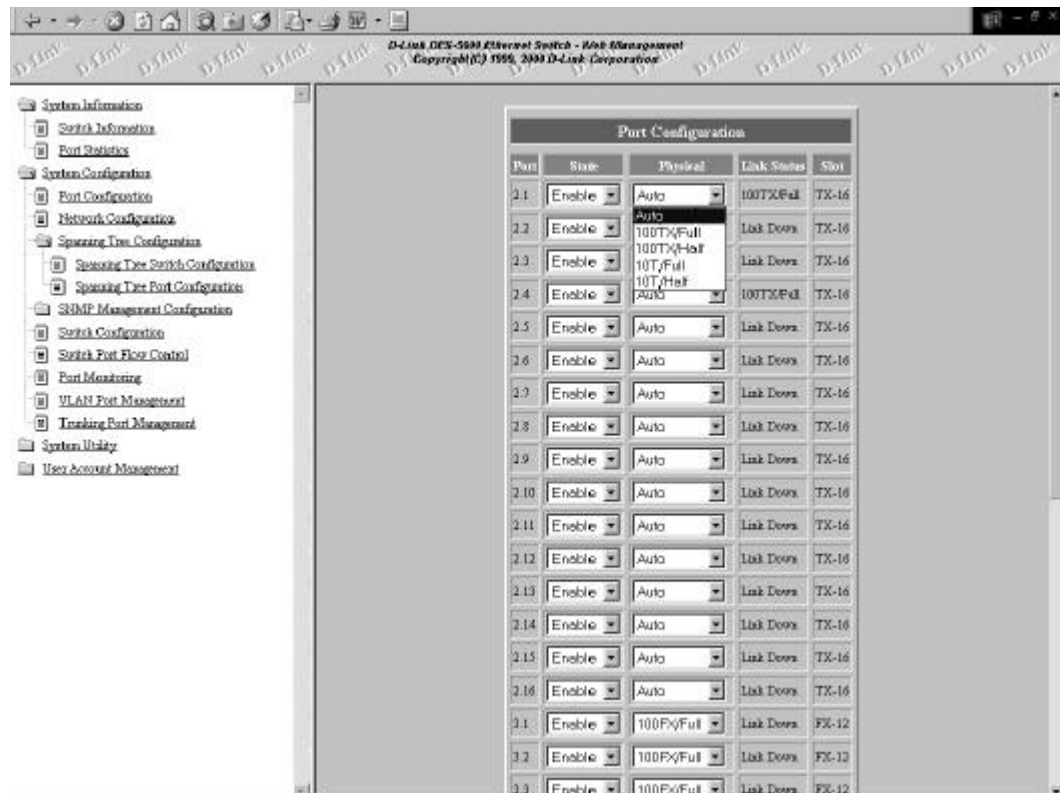


**Figure 52: Port Configuration**

### Port

Port indicates the port and module number. The module number is first and the port number is after the decimal point.

### State

Port state can be enabled or disabled. Packets can only pass through enabled ports. Disabled ports don't allow packets to pass through them.

### Physical

The physical states a port can be in depend on the module and the type of port. Refer to Table 6: Port Configuration.

**Table 8: Port Configuration**

| Port Configuration | | |
|---|---|---|
| **Ethernet (TX)** | **Fiber Optic (FX)** | **Gigabit (GX)** |
| Auto (default) | 100FX/Half (default) (100 Mbps Half Duplex) | Auto (default) |
| 100TX/Full (100 Mbps Full Duplex) | 100FX/Full (100 Mbps Full Duplex) | 1000SX/Full (1000 Mbps Full Duplex) |
| 100TX/Half (100 Mbps Half Duplex) | Port does not automatically negotiate speed. | Port does not operate in half duplex and cannot be set for lower speed. |
| 10TX/Full (10 Mbps Full Duplex) | Cannot be set for speeds lower than 100FX/Half | |
| 10TX/Half (10 Mbps Half Duplex) | | |

### Link Status

Status can be Link up or Link down. Link status indicates speed and duplex mode when the link is up. Packets can only pass through when the link is up. No packets can pass through the port when the link is down. If link status changes either up or down, the changes appear in the menu you are currently viewing, even when you are not in the Port Configuration menu. Exiting the menu or refreshing the screen with Control + R removes the message.

### Slot

The physical module and the number of ports the module has. TX indicates Ethernet ports, FX indicates fiber optic ports and GX indicates gigabit ports.

Follow these steps to configure the port:

1.    Enable or disable the port using the drop down list.

2.    Set the Physical value with the drop down list.

3.    Select Apply to save your changes.

## Network Configuration

The Network Configuration panel, shown in Figure 53, is used to configure the IP Address, Subnet Mask, and Default Gateway.
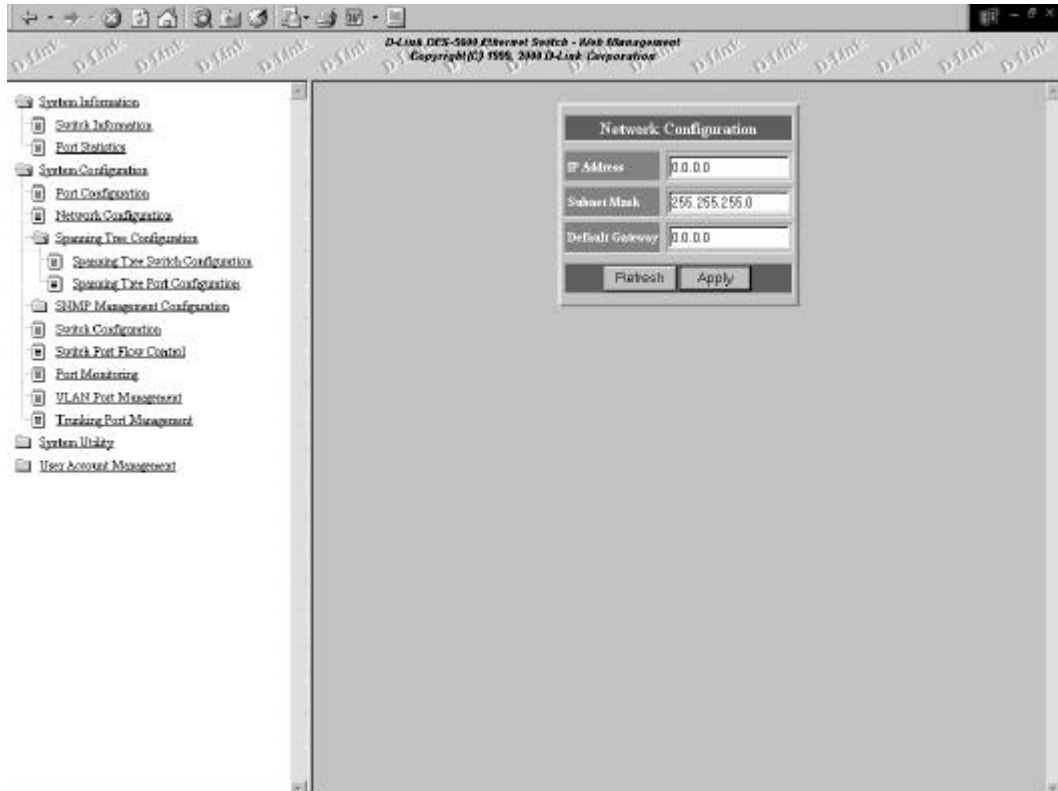


**Figure 53: Network Configuration**

### IP Address

The user assigned IP Address of the DES-5600.

### Subnet Mask

The user configured Subnet Mask used on the network.

### Default Gateway

The user configured Default Gateway used on the network.

Follow these steps:

1.    Enter the IP Address in the field.

2.    Enter the Subnet Mask in the field.

3.    Enter the Default Gateway.

# Spanning Tree Switch Configuration

The Spanning Tree Switch Configuration panel, shown in Figure 54, enables you to configure Spanning Tree either globally for the DES-5600 or locally on a port by port level. The Spanning Tree Algorithm (STA) in the DES-5600 enables you to create alternative paths (using multiple switches or bridges) in your network. These backup paths are idle until the DES-5600 determines that a problem has developed in the primary path. If the primary path breaks down STA will activate the backup path. STA is very complicated and you should understand it well before changing the default settings.

## STA Operation Levels

STA operates on the bridge level and the port level. On the bridge level, STA calculates the Bridge Identifier for each DES-5600, then sets the Root Bridge and the Designated Bridges. On the port level, STA sets the Root Port and Designated Ports.

## Spanning Tree Switch Configuration

Configures global Spanning Tree and bridge priority on the DES-5600.
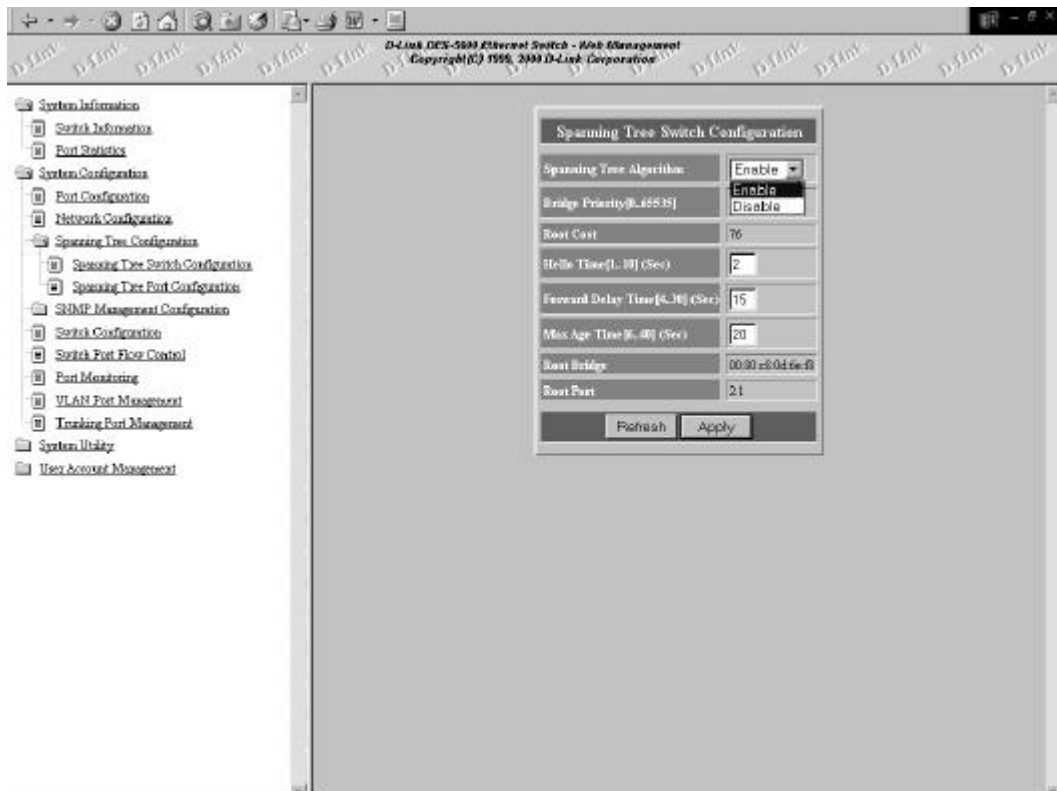


**Figure 54: Spanning Tree Switch Configuration**

## Spanning Tree Algorithm

Spanning Tree Algorithm can be enabled or disabled. Use Spanning Tree to prevent network loops.

### Bridge Priority

The Bridge Priority can be from 0 to 65535. Zero is the highest Bridge Priority. The higher the Bridge Priority the greater the chance that the DES-5600 will be selected as the Root Bridge. The DES-5600 with the highest Bridge Priority is the Root Bridge.

### Root Cost

The Root Cost is the number of times a packet is regenerated before reaching its destination. A source sends a packet to the first device (switch or hub) on the network. When the packet reaches the next hub or switch and is sent out again, the Path Cost becomes two. Each switch and active hub regenerates the packet. To determine the Root Path Cost, count the number of times the packet is regenerated.

The switch with the lowest Path Cost is the Root Bridge. Make the Root Bridge the best switch on the network.

### Hello Time

Is the interval between two transmissions of packets sent by the Root Bridge to tell all other switches that it is the Root Bridge. The Hello Time can be set manually, with a range in seconds from 1 to 10. If the Hello Time is set for the switch and the switch is not the Root Bridge then the Hello Time will not take effect until the switch becomes the Root Bridge.

### Forward Delay Time

This is the time any port on the DES-5600 spends in the listening state while moving from the listening state to the forwarding state. It can be set from 4 to 30 seconds.

Use the following formula when setting the Hello Time and the Forward Delay Time:

2 x (Forward Delay minus 1 second) $\geq$ Max Age

2 x (Hello Time plus 1 second) $\leq$ Max Age

### Max Age Time

Is the time a non-root bridge waits for a packet to be sent. At the end of the Max Age, if a packet has not been received from the Root Bridge, the DES-5600 will start sending its own packets and request permission to become the Root Bridge.

The switch with the lowest Bridge Identifier is the Root Bridge. It is best to make the Root Bridge the best switch on the network to ensure the best network performance and reliability.

### Root Bridge

Specifies the MAC address of the Root Bridge. The DES-5600 may or may not be the root bridge. The DES-5600 is the default root bridge.

### Root Port

Specifies the preferred path to the Root Bridge. Only one path per bridge can exist. The default setting is none.

**Table 9: User Selective STA Parameters**

| STA Parameters | Settings | Effects | Comment |
|---|---|---|---|
| Enable/Disable | Enable/Disable | Participate in or remove from STA | Enable in a SNMP network |
| Bridge Priority | Lower the #, higher the priority | Increases chance of becoming the Root Bridge | Avoid, if the switch is used in workgroup level of a large network |
| Hello Time | 1 – 10 seconds | No effect, if not Root Bridge | Never set greater than Max Age Time |
| Max Age Time | 6 – 40 seconds | Compete for Root Bridge, if BPDU is not received | Avoid low number for unnecessary reset of Root Bridge |
| Forward Delay Time | 4 – 30 seconds | High # delays the change in state | 2 x (Forward Delay minus 1 second) $\geq$ Max Age, 2 x (Hello Time plus 1 second) $\leq$ Max Age |
|  |  |  |  |
|  |  |  |  |
| Port Priority | Lower the #, higher the priority | Increases chance of becoming the Root Port | No comment |

Follow these steps to configure the Spanning Tree Switch Configuration:

1. Use the down arrow to Enable or Disable Spanning Tree.

2. Set the Bridge Priority between 0 and 65535.

3. Set the Hello Time between 1 and 10 seconds.

4. Set the Forward Delay time between 4 and 30 seconds.

5. Set the Max Age Time between 6 and 40 seconds.

6. Press Apply to save your changes.

# Spanning Tree Port Configuration

The Spanning Tree Port configuration panel, shown in Figure 55, enables you to configure Spanning Tree for each port.
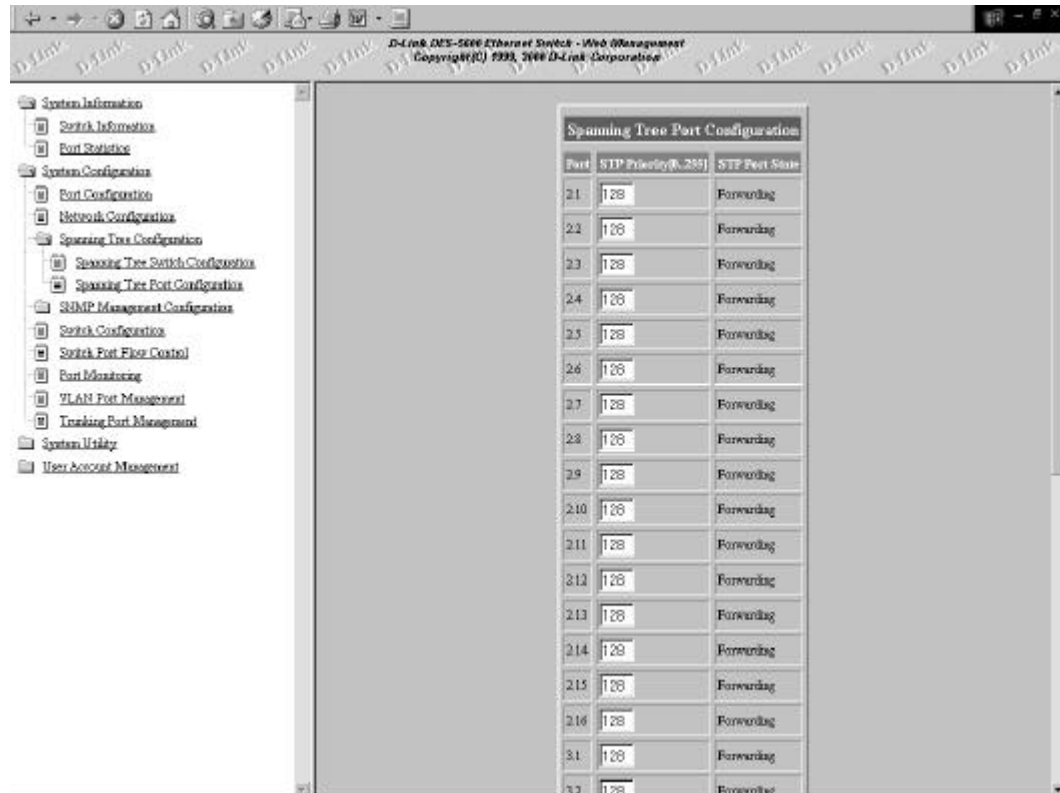


**Figure 55: Spanning Tree Port Configuration**

### Port

Indicates the slot number is in and port number.

### STP Priority

Indicates the STP priority. The lower the number, the higher the priority. The port priority can be set from zero to 255. Zero is the highest port priority. The default setting will work in most situations.

### STP Port State

All ports have four states: blocking, listening, learning and forwarding. Blocking means that nothing is coming through the port. If the Spanning Tree Algorithm detects a loop it will change the state of the port where the loop is detected to the Blocking State. You can disable the Spanning Tree Algorithm. Forwarding means the port is forwarding data packets to their destination. Listening means that the

port is listening for data packets. Learning means the port is learning the MAC address for data packets. This setting cannot be changed manually.

Follow these steps to configure STP:

1.  Select the appropriate port and enter an STP value between 0 and 255.

2.  Select Apply to implement your changes.

# SNMP Management Configuration

Shown in Figure 56, these panels are used to configure the DES-5600 for SNMP management. Leave the default values in place if you are not managing your network through SNMP.

The DES-5600 uses the standard MIB-II Management Information Base module. The MIB values can be retrieved from any SNMP based network manager. The DES-5600 supports its own proprietary enterprise as an extended MIB. The MIB can be retrieved by specifying their Object-Identity (OID). MIB values can be read-only or read-write. The OID values for the DES-5600 are displayed on the Switch Information panel under System Object ID.

Read-only MIB variables can be constants that are programmed into the DES-5600 or variables that change while the DES-5600 is running. For example, the number and type of ports on the DES-5600 is a read-only constant. The number and type of ports is fixed. Statistics, such as the number of errors that have occurred, are read-only variables.

Read-write MIBs are usually related to user customized configurations. Examples of these are the DES-5600's IP address, STA parameters and port status.

If you use third party vendors' SNMP software to manage the DES-5600, a diskette listing the DES-5600's proprietary enterprise MIB can be obtained by request. If your software provides functions to browse or modify MIB, you can get the MIB values and change them (if the MIB's attributes permit the write option). This process can be difficult. You must know the MIB OID's and retrieve them individually.

**Figure 56: SNMP Manager Configuration**

## SNMP Community String

The SNMP Community String field enables you to name the SNMP Communities. The names public and private are only default names. For security you should change these names to help prevent unauthorized access to the DES-5600.

You can name the SNMP communities anything you like. You can enter up to 32 characters in each of the four fields. You can create up to four SNMP Communities.

## Access Right

Enables you to set the access rights that members of the SNMP Communities have. Read Only access rights mean that members of the community can view the information on the DES-5600 but they can not make changes to the configurations. Read/ Write access rights enable the members of the community to make any changes they desire.

## Status

Can be Enable or Delete. Only communities with Enable status can access the DES-5600. Communities with Delete status cannot access the DES-5600.

Follow these steps to SNMP Manager Configuration:

1. Enter the SNMP Community String and use the down arrow to set the read and write options.

2. Click the box to delete the SNMP Community String.

3. Click Apply to save your changes.

## SNMP Trap Manager Configuration

The SNMP Trap Manager Configuration panel, shown in Figure 57, enables you to configure the SNMP Trap Manager settings.
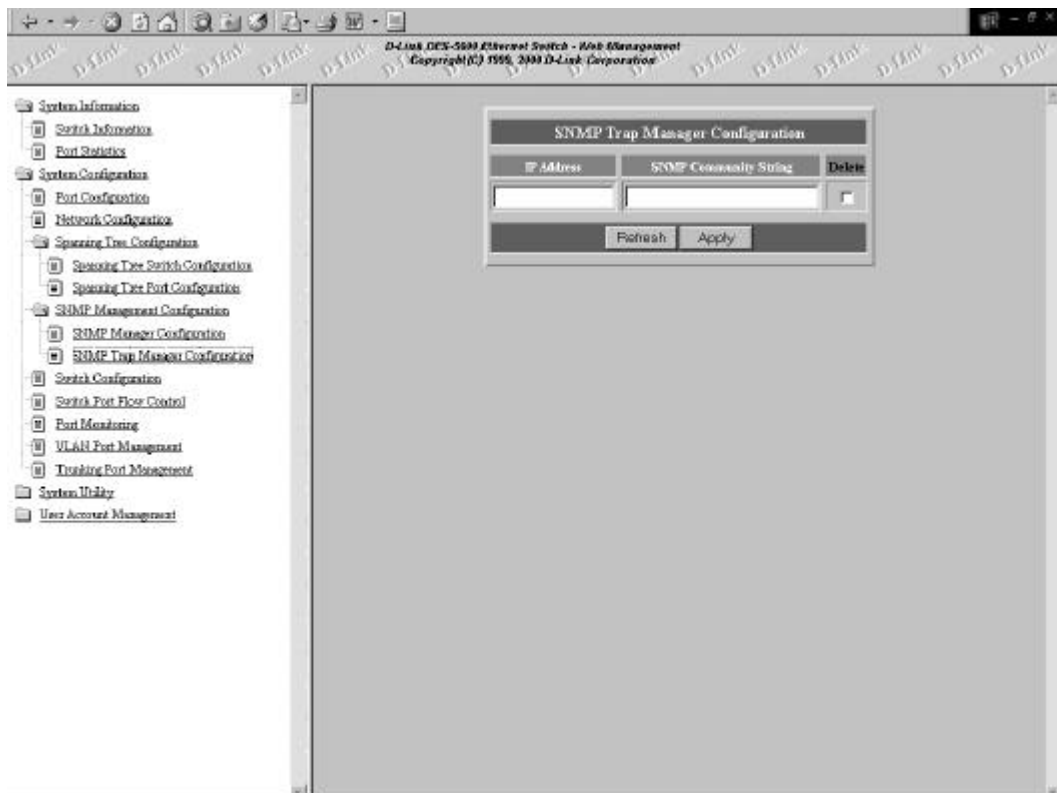


**Figure 57: SNMP Trap Manager Configuration**

### IP Address

Enables you to enter the IP address of trap managers.

### SNMP Community String

Enter the Community String of the Trap Managers in this field.

Traps are messages the DES-5600 sends out to inform trap managers of events on the network. The DES-5600 generates traps and sends them to the network manager. Trap managers are special network users who are given certain rights and access to oversee and maintain the network. This feature is available only in D-View or by using other SNMP management software.

You can specify which network managers may receive traps from the DES-5600 by creating a list of IP Addresses of the authorized network managers.

Trap managers can receive the following trap types:

- Cold Start
- Authentication Failure
- Link Change Event

## Cold Start

Signifies that the DES-5600 has been powered up. Software settings are reconfigured and hardware systems are rebooted. A cold start is different from a factory reset.

## Authentication Failure

Signifies that an addressee (or manager/ user) on the DES-5600 is not a valid user of the DES-5600 and may have entered an incorrect community name.

## Link Change Event

Signifies that the link of a port has changed from link up to link down or vice versa.

## Status

Can be Delete or Enable. Only community strings whose status is Enabled can receive Traps.

Follow these steps to configure the SNMP Trap Manager:

1. Enter the IP Address and SNMP Community String in the appropriate fields.

2. Press Apply to save your changes. Check the box to delete the SNMP Trap Manager Configuration.

# Switch Configuration

The Switch Configuration panel, shown in Figure 58, enables you to decide how long the DES-5600 waits for a response before an address times out.
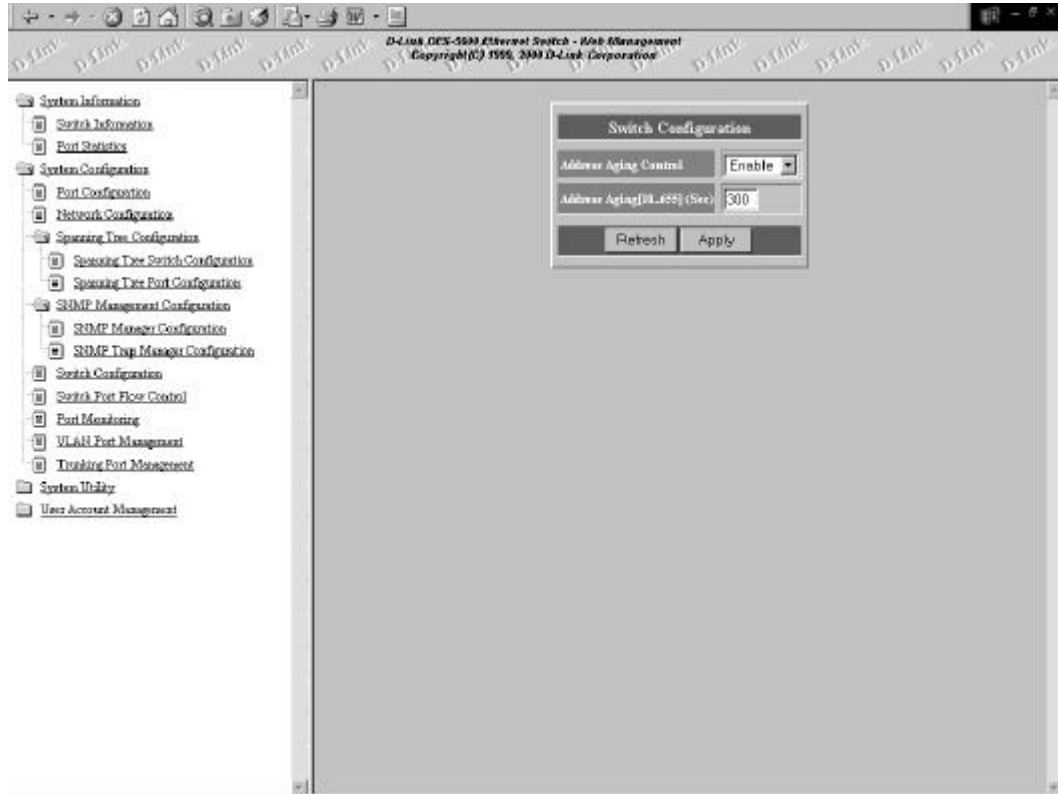


**Figure 58: Switch Configuration**

## Address Aging Control

Enables or disables address aging. Address aging refers to how long the MAC Address of devices remains in the Media Access Control Table (MAC Table) of the DES-5600.

## Address Aging

The setting can be from 10 seconds to 655 seconds. Disabling this feature means that addresses never age out. This can create problems on the network if a device is moved or removed from the network. It is best to allow address to age out so that information in the MAC is always refreshing itself and remains accurate.

Follow these steps to set the Switch Configuration:

1. Use the down arrow to enable or disable the Address Aging Control.

# Switch Port Flow Control

The Switch Port Flow Control panel, shown in Figure 59, enables you to set the flow control for each port individually.
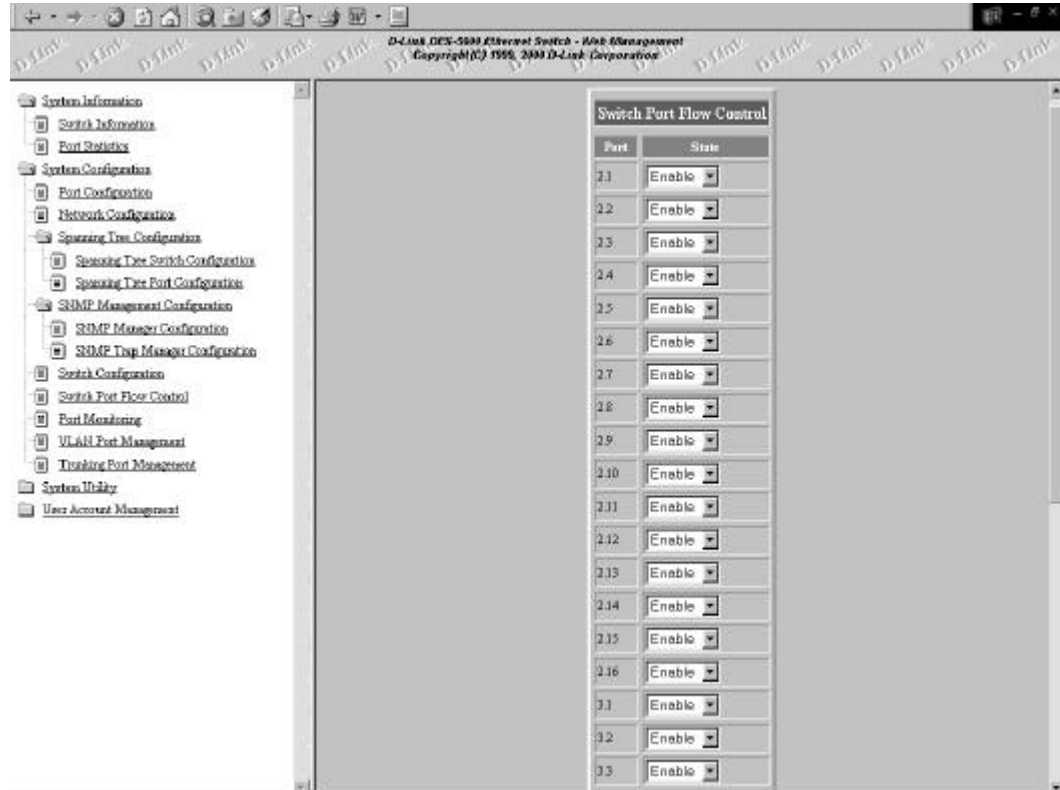


**Figure 59: Switch Port Flow Control**

### Port

Refers to the slot and port shown on the panel.

### State

Refers to Flow Control being on or off. Packets can only flow through ports set to the ON position. Packets cannot flow through ports set in the OFF position.

Follow these steps to configure Switch Port Flow Control:

1.   Use the down arrow to enable or disable the port state. Press Apply to save your changes.

## Port Monitoring

The Port Monitoring panel, shown in Figure 60, enables you to monitor specific ports to monitor network traffic and packet type. You need third part monitoring software to monitor traffic.
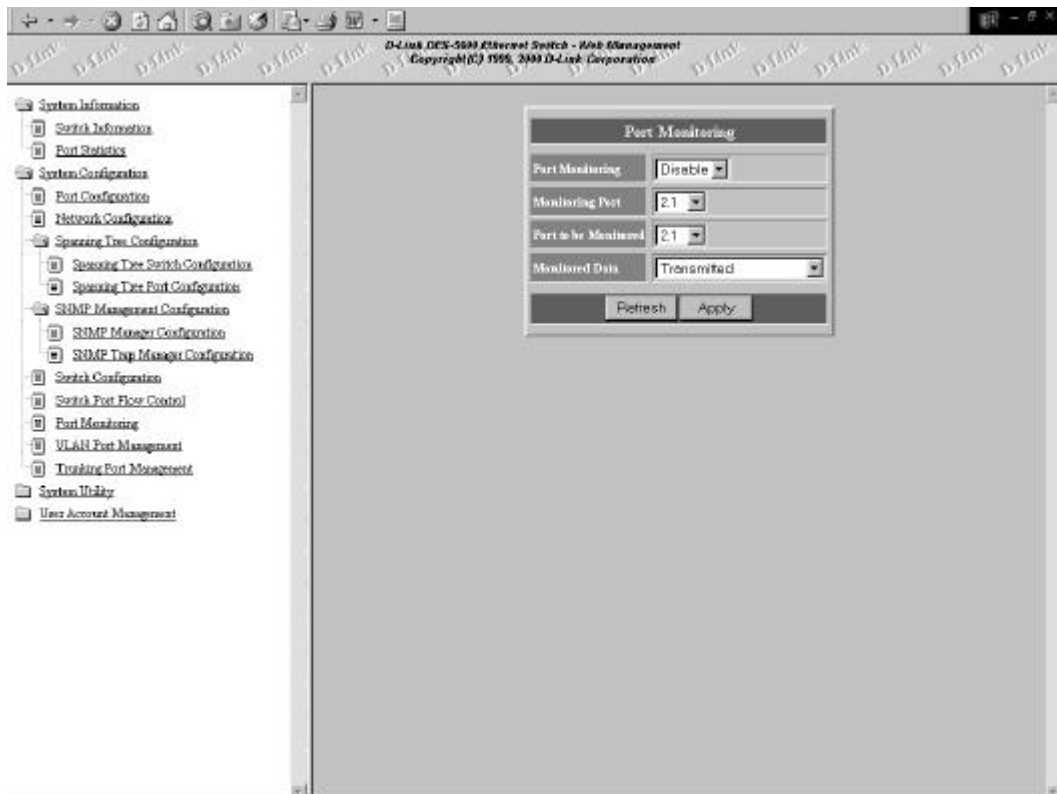
**Figure 60: Port Monitoring**

### Port Monitoring

Must be enabled in order to set up a monitoring port.

### Monitoring Port

Is the port that does the actual monitoring.

### Port to be Monitored

Slot and port number of the port to be monitored.

### Monitored Data

Data that is collected by the monitoring port. Transmitted refers to packets that are transmitted from the port. Received refers to packets that are received by the port. Transmitted and received refer to packets that are transmitted from and received by the port.

Follow these steps to configure port monitoring:

1. Use the down arrow to Enable or Disable port monitoring.

2. Set the monitoring port.

3. Set the port to be monitored.

4.      Use the down arrow to select Transmitted, Received or Transmitted & Received.

# VLAN Port Management

The VLAN Port Management Menu, shown in Figure 61, enables you to create, delete and modify VLANs. A Virtual Local Area Network (VLAN) is a logical subgroup within a LAN that is created with software rather than physical connections. The purpose of a VLAN is to prevent broadcast storms and ease congestion on the network.

Each VLAN created is a broadcast domain. A broadcast is a packet that is sent to all nodes on the network. A broadcast domain is a domain in which every node in the domain receives the broadcast packet. The advantage of creating VLANs is that they permit you to group LAN segments together in order to get the most out of your network.

VLANs become more important as the network grows and traffic increases. VLANs are usually used on high traffic networks. You should consider a VLAN on a smaller network if a department or workgroup routinely does tasks that take up a lot of bandwidth and they are not already on their own LAN segment.

VLANs can be used to subdivide the network. The DES-5600 supports port based VLAN. Port based VLAN means that the VLAN is grouped by port. If a VLAN is created using three ports, then those ports become a separate broadcast domain.

By using VLANs, members of a particular department or workgroup can be partitioned from the rest of the network. For example, the marketing department can be on one VLAN and the accounting department can be on another. If a workstation in marketing sends a broadcast packet to another workstation in marketing the packet will remain on the marketing VLAN.

## Create VLAN/ Modify VLAN

The Create VLAN panel, shown in Figure 61, enables you to create VLAN by selecting specific ports as part of a VLAN. The default value is that all ports belong to one VLAN. You can create up to eight separate VLANs. Ports can belong to two VLANs at the same time. Each VLAN is a broadcast domain. If you have created a trunking group, you must include the entire trunk group in the VLAN.

## Delete VLAN

Deletes VLANs in their entirety.
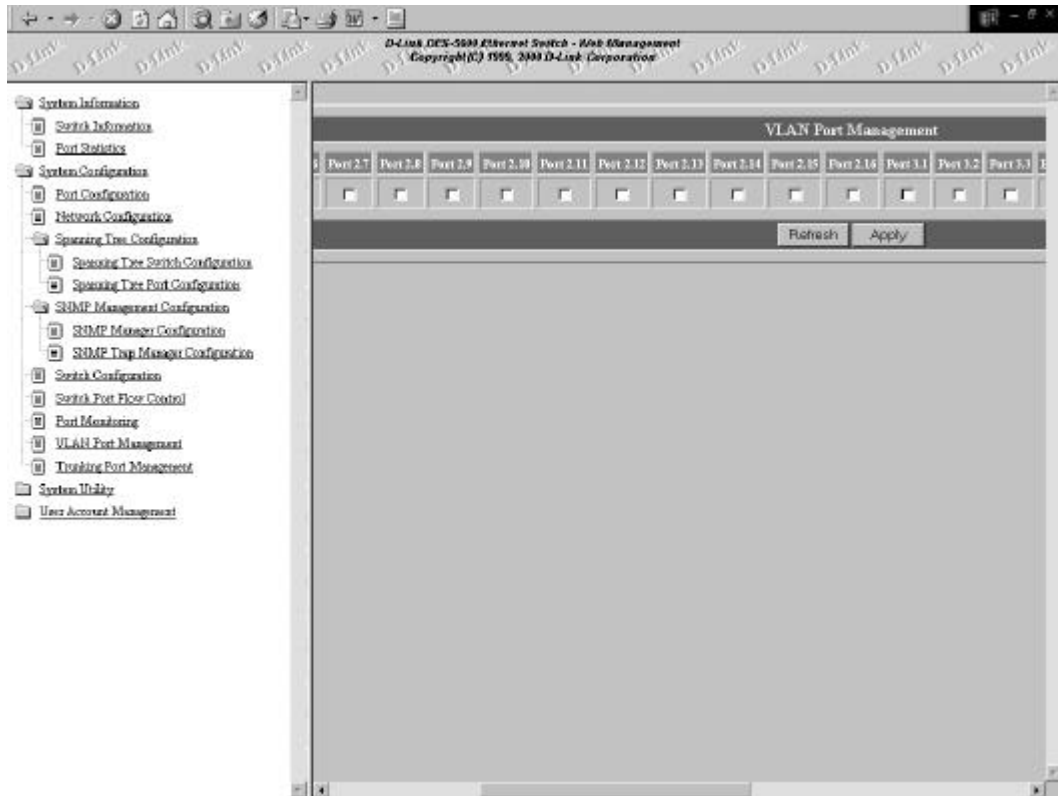
**Figure 61: VLAN Port Management**

Follow these steps to configure VLAN:

1. Click the check boxes of the ports that you want to include in the VLAN. Press Apply to save your changes.

2. Select "delete" box, to delete VLAN, press Apply to save your changes.

# Trunking Port Management

The Trunking Port Management panel, displayed in Figure 62, is used to create, delete and modify trunk ports. You can create up to seven trunking groups with up to eight ports in each group. Each Trunking Group acts like a single port. The trunking speed is 800 Mbps in half duplex and 1.6 gigabits in full duplex.
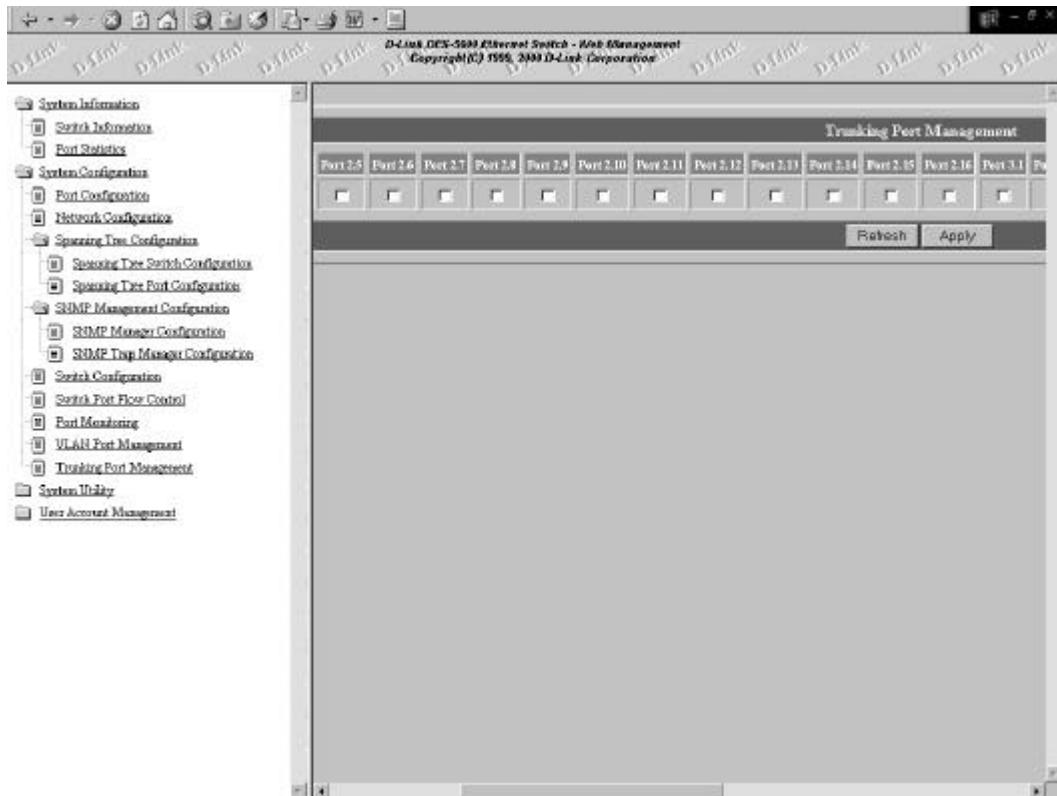


**Figure 62: Trunking Port Management**

Create a Trunking Group by checking the boxes of the ports you want to be part of the Trunking Group. Delete it by using the Delete box. Select Apply to save your changes.

# System Utility Menu

The System Utility menu, shown in Figure 63, enables you to reset the DES-5600 without powering off, return to factory default settings and update software.

## System Reset

Resets the DES-5600 without powering off.

Press Apply to warm boot the DES-5600.
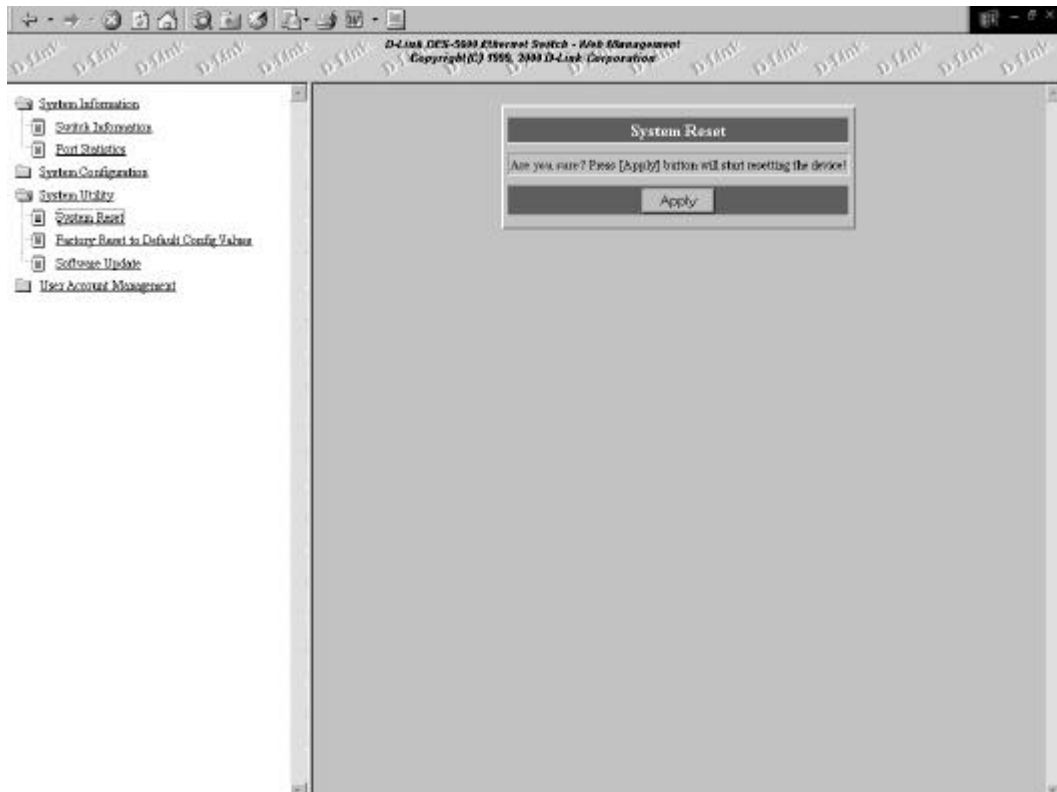


**Figure 63: System Reset**

## Factory Reset to Default Config Values

The Factory Reset to Default Config Values panel, shown in , enables you to reset the DES-5600 back to the factory default configurations. Using this panel erases all configurations and customization.

Press Apply to reset the DES-5600 back to the factory defaults.
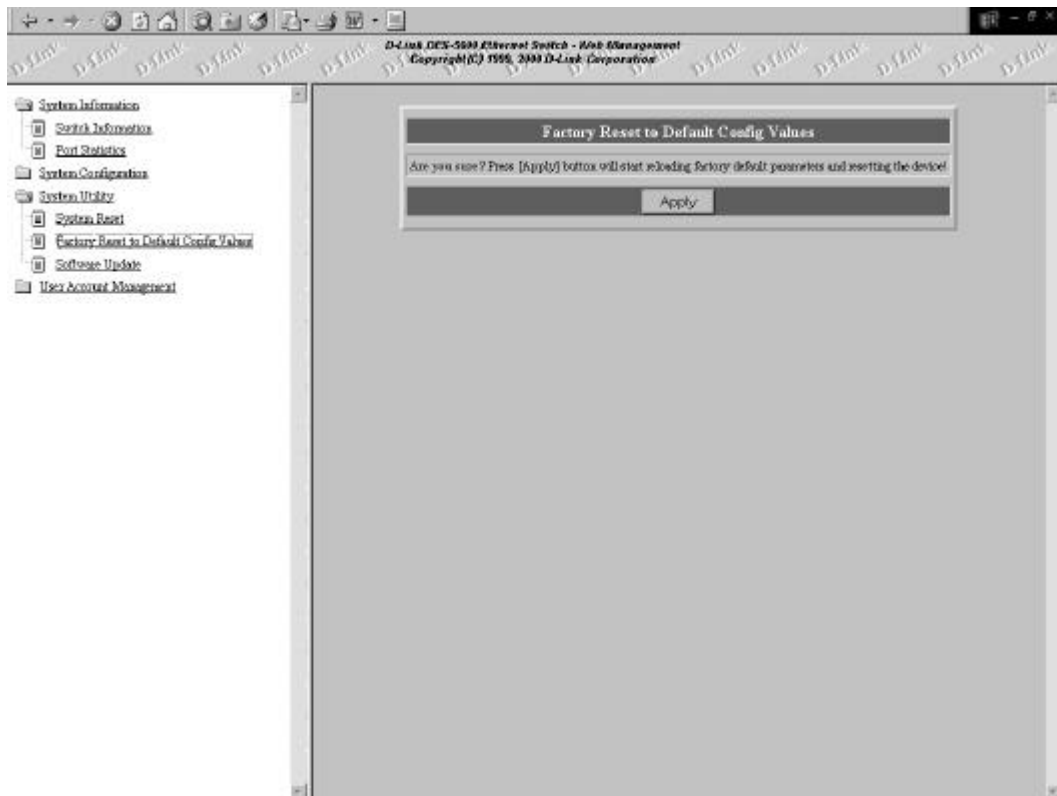
**Figure 64: Factory Reset to Default Config Values**

## Software Update

The Software Update panel, shown in , is used to update the software on the DES-5600. Software can be updated using either XMODEM or TFTP.

TFTP requires a TFTP server and that you know the Internet Protocol (IP) address of the server and the complete path and file name. TFTP can be done over the network or from a remote location.

### Download Mode

Is the mode that will be used to download new software.

### Download File

Is the type of file you can download. Run_Time_Program refers the software that runs the DES-5600.

### TFTP Server IP Address

Is the address of the TFTP server you are downloading code from.

### File Name

Is the name of the file that you are downloading.
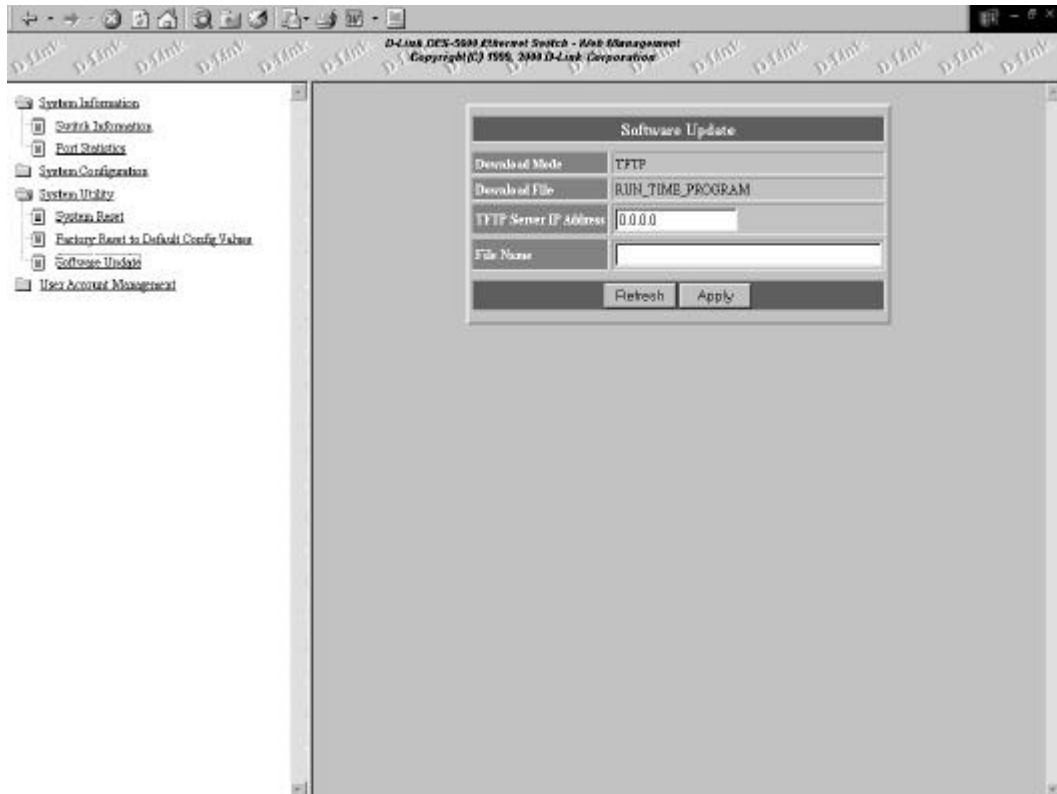


**Figure 65: Software Update**

## TFTP

Can be used over the network or from a remote location.

TFTP is done using Telnet. It can be done from a remote location using a TFTP server. The TFTP server and the DES-5600 must be on the same subnet. For example, if the IP address of the DES-5600 is 100.100.100.001 then the TFTP server must have an IP address beginning with 100.100.100. Only the last three digits will be unique to the server and the DES-5600. Remember that two devices cannot have the same IP address.

Enter the IP address of the TFTP Server and the filename. Press Apply to begin loading software.

# User Account Management

The User Account Management panel, shown in Figure 66, enables you to create users, delete users and change passwords.

## Create New User

The Create New User panel, shown in Figure 66, is used to add new users profiles to the DES-5600.
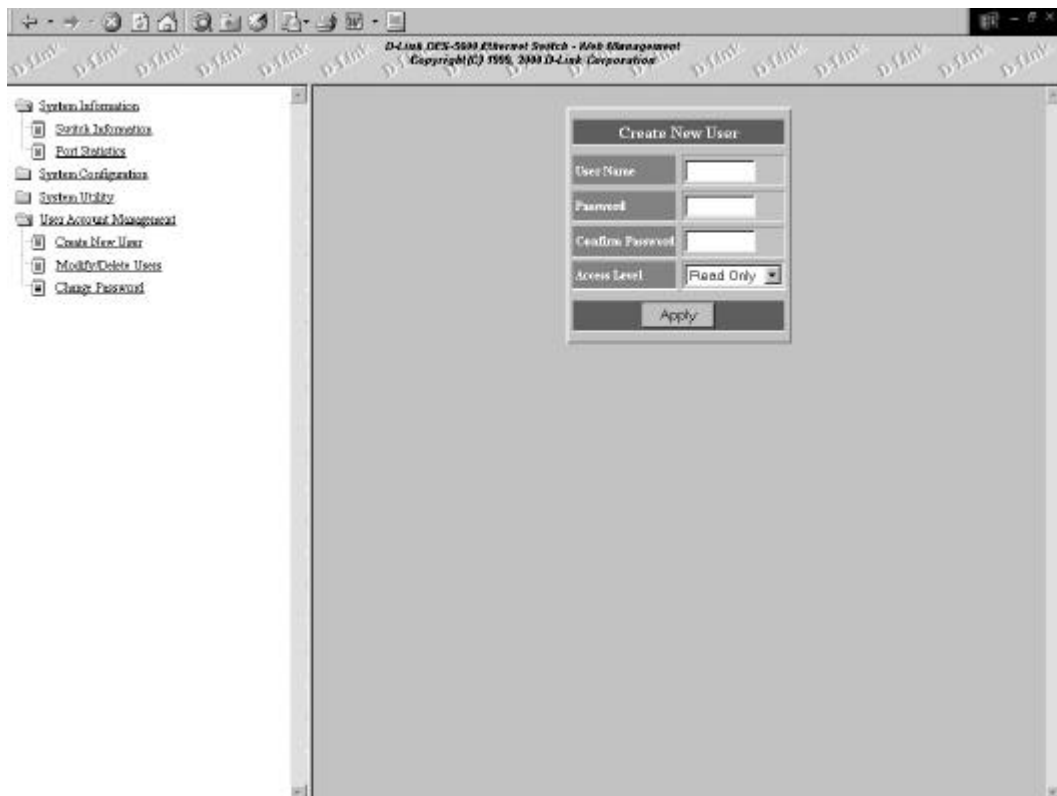


**Figure 66: Create New Users**

### User Name

Enter the user's name in this field. User names are case sensitive. You can enter a maximum of eight characters.

### Password

Enter the user's password in this field. Passwords are case sensitive. You can enter a maximum of eight characters in this field.

### Confirm Password

Retype the password in this field to confirm it.

### Access Level

There are two access levels available on the DES-5600: Read/Write and Read Only. Read/Write can add and delete users, change the configuration of the DES-5600 and perform all management functions.

Read/Only users have read only access to the DES-5600. They can look at the panels but they cannot make any changes to existing settings or configurations.

Create new users by entering the user's name, password and confirming password. Use the down arrow to set the Access Level.

## Modify/ Delete Users

The Modify/ Delete Users panel, shown in Figure 67, enables you to modify or delete user profiles. As a safety precaution, the DES-5600 does not allow the user who is currently logged in to delete themselves.
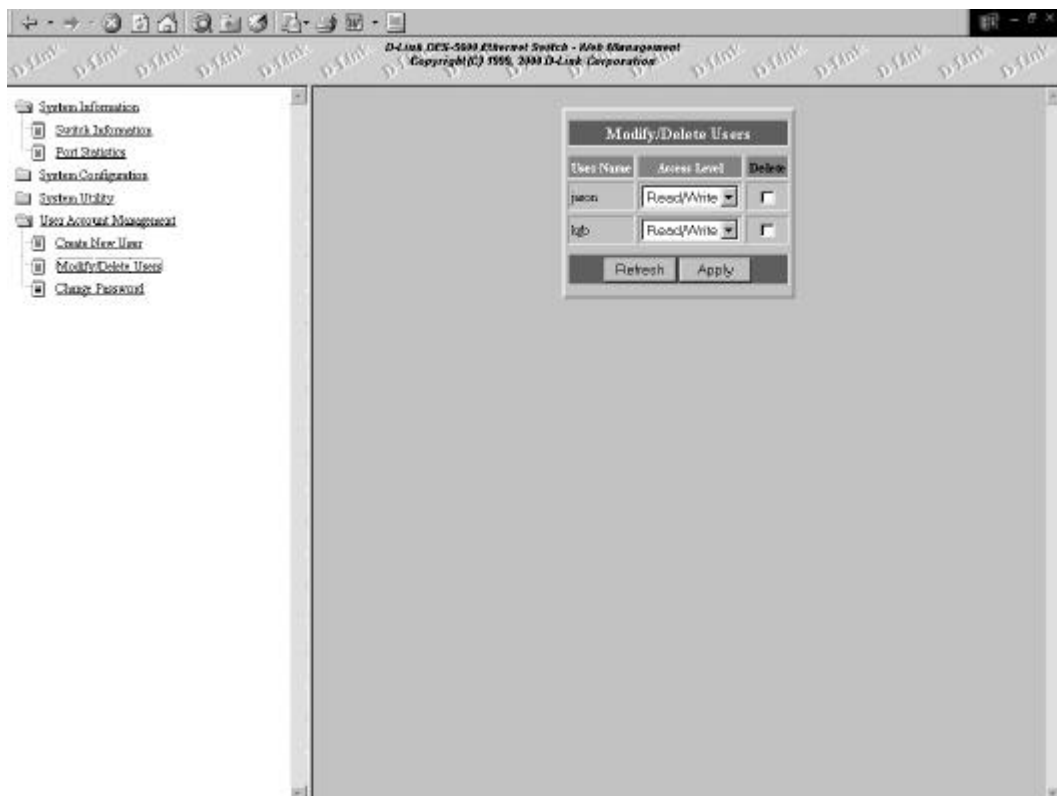


**Figure 67: Modify/ Delete Users**

### User Name

The name of the user.

### Access Level

Is the User's Access Level.

### Delete

Enables you to delete users. N/A means not available. The option is available after user names are entered. After new users are entered, it changes to No. Toggle the space bar to Yes to delete the user.

Select the user who whose account is going to be modified or deleted. Use the down arrow to change their account attributes or use the delete check box to delete their account.

## Change Password

The Change Password panel, shown in Figure 68, enables you to change user passwords.
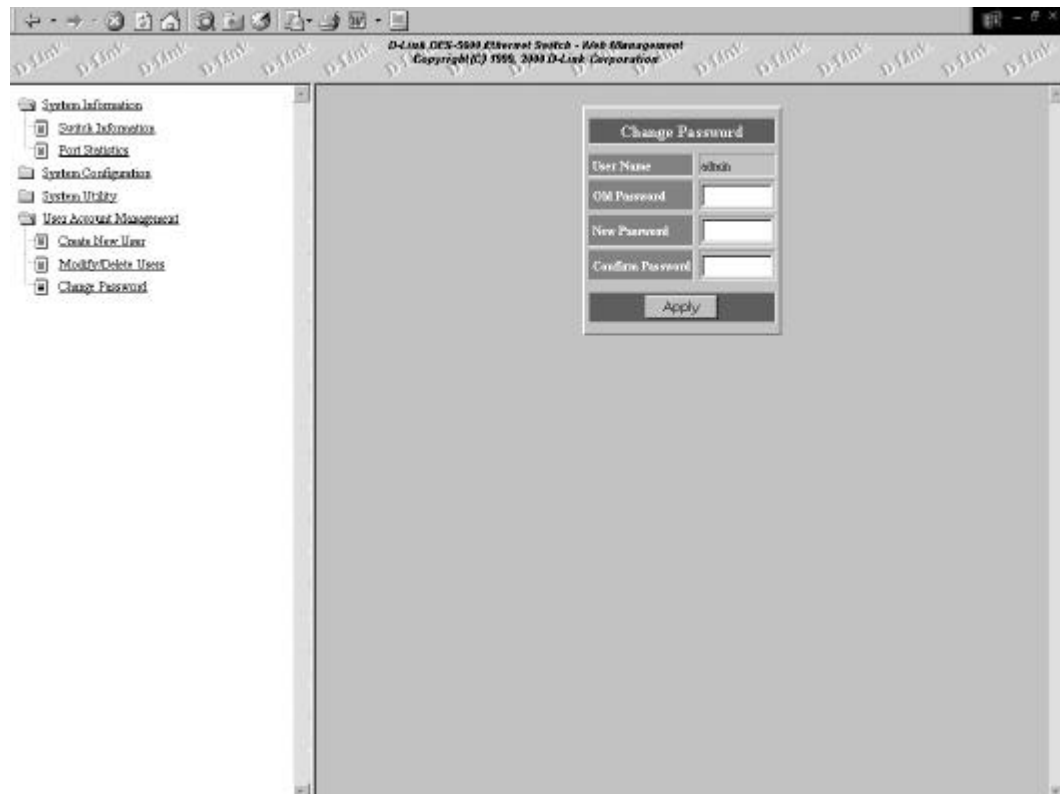


**Figure 68: Change Password**

### User Name

The name of the user whose password is being changed.

### Old Password

The user's old password.

## New Password

The user's new password.

## Confirm Password

Reenter the new password in this field to confirm it.

**7**

# Troubleshooting

This troubleshooting section is intended to help you solve the most common problems on the DES-5600.

If an error cannot be resolved by implementing the solutions in this section, contact D-Link Technical Support.

All LEDs are explained in detail in Chapter 4, LEDs. If you are having a problem that is not discussed here, contact technical support.

| Problem | Solution |
|---|---|
| **POST Errors** | The DES-5600 performs a Power On Self Test (POST) every time it is powered on. If you are connected to the DES-5600 through Local Console Management during the POST you can see the results displayed on your monitor. The login panel appears after the DES-5600 has completed the POST. |
| | The POST checks all of the hardware components on the DES-5600. |
| **Cables** | Faulty cable is the most common source of problems on Ethernet and Fast Ethernet networks. Check the cable first if you are having any problems connecting to a device. |
| | Ethernet is more fault tolerant than Fast Ethernet. If you are moving from Ethernet to Fast Ethernet, make sure the cables are pinned out correctly. See Chapter 3, Connecting the DES-5600 to the Network, Cable Specifications, for a diagram showing the proper pin arrangement for Ethernet and Fast Ethernet. |
| **Port States** | TX and SX ports on the DES-5600 have two modes: auto negotiation and forced mode. Ports in auto negotiation mode auto negotiate the proper speed and duplex mode. Ports in forced mode have been manually set to a particular speed and duplex mode. Check the LEDs on the DES-5600 and on the link partner to verify settings. See Chapter 4, *LEDs*, for an explanation of all LEDs. |
| | The port settings on the DES-5600 and the port settings on the device you are connecting to must be the same in order for them to communicate. Check the speed and duplex setting on both the port and device you are connecting to. |

**Power LED is Off**  Check the three pronged power plug and verify that you are getting power from the wall socket. Return the DES-5600 if the unit is on and the power LED is not working properly. If the DES-5600 is not powering on while the power cord is plugged into the wall socket, the power supply is not working. Return the unit.

**All LEDs Are Off**  Check the power plug and verify that the DES-5600 is receiving adequate power. Log in to the DES-5600 using Local Console Management, see Chapter 5, Console Management, for instructions.

Power the DES-5600 off and then power it on again. Use the monitor to check the error messages. Return the DES-5600 to D-Link for service if the problem persists.

**Forget Password**  If you forget your password, contact D-Link Technical Support at (949) 788-0805 for assistance or check our web site at www.dlink.com.

# Appendix A
# DES-5600 Technical Specifications

## Switch Specifications

- Complies with IEEE 802.3 CSMA/CD 10/100-TX, 100BASE-FX and 1000BASE-SX

- Complies with IEEE 802.1D Spanning Tree

- Switched IEEE 802.3 MAC layer frame size: 64-1518

- NWAY Auto-negotiation for each 10/100-TX network port providing auto-detection of connected cable type, auto-sensing of full and half duplex signaling and auto-configuration

- Store-and-Forward switching for reliable error-free packet transfers

- Native SNMP management support with Ethernet MIB II (RFC 1213) and bridge MIB (RFC 1493), RMON MIB (RFC-1757)

- 16K maximum entries for MAC table

- Comprehensive LED indicators display of the system/ port status

- 1 MB EEPROM (flash memory) for firmware upgrade

- RS-232 (DB-9) port for Out-of-Band management (asynchronous, 8-bit data, 1 stop bit, no parity, 19.2 K baud)

- Rack mountable (Fits standard EIA 19" rack)

- 16 port 10/100-TX module with built-in support of RMON and VLAN

- 12 port fiber optic (FX) module with built-in support of RMON and VLAN

- 4 port gigabit (SX) expansion module with built-in support of RMON and VLAN

- Supports Trunking Group

## Port Specifications

- RJ-45 port for Category 3, 4, and 5 UTP cable (Cat. 5 required for 10/100-TX)

- 10, 100, 1000 Mbps data transfer rate

- NWAY Auto-negotiation for all 10/100-TX ports

- Full or Half Duplex for all 10/100-TX ports

- 100BASE-FX ports operate at full or half duplex requires 1300 nm multimode fiber optic cable, ISO/IEC 793-2 type B-1 and ITU-T G.652 with MTRJ connectors

- 4 1000BASE-SX port, operates at full duplex and requires 850 nm multimode fiber optic cables with MTRJ connectors. This port also negotiates flow control.

| General | |
|---|---|
| Standards: | IEEE 802.3 10BASE-T Ethernet |
| | IEEE 802.3u 100-TX, 100BASE-FX Fast Ethernet and 1000BASE-SX for Gigabit Ethernet |
| | ANSI/IEEE Std 802.3 NWAY ™Auto Negotiation |
| | IEEE 802.3 Frames types: Transparent |
| | IEEE 802.3 MAC layer frame size: 64-1518 |
| Protocol: | CSMA/CD, Full Duplex |
| Data Transfer Rate: | Fast Ethernet: |
| | 100 Mbps (half duplex) |
| | 200 Mbps (full duplex) |
| | Gigabit: |
| | 2000 Mbps (full duplex) |
| Topology: | Star |
| Network Cables: | • 10BASE-T: |
| | 2-pair UTP Cat. 3 (100 m) |
| | 4-Pair UTP Cat. 4, 5 (100 m) |
| | EIA/ TIA-568 150ohm STP (100 m) |
| | • 100-TX: |
| | 4-pair UTP cat. 5 (100 m) |
| | EIA/ TIA-568B 150-ohm STP (100 m) |
| | 100BASE-FX ports require |
| | 1300 nm multimode fiber optic cable with MTRJ connectors, ISO/IEC 793-2 type B1 and ITU-T G.652 standards |
| | • 1000BASE-SX ports require: |
| | 850 nm multimode fiber optic cables with MTRJ connectors |
| Number of Ports: (depending on modules used) | 16, 32, 48, 64x 10/100 Mbps NWAY Ethernet ports plus optional module ports, maximum of 66 10/100 Mbps NWAY Ethernet ports |
| | 12, 24, 36, 48 fiber optic ports plus optional modules, maximum of 20 fiber optic ports |
| | Optional 2 gigabit ports using both 1 port gigabit optional modules |

| Physical and Environmental | |
|---|---|
| AC inputs: | 100 – 240 VAC, 50/60 Hz (internal universal power supply) |
| Power Consumption: | 150 watts maximum |
| DC fans: | 2 built in 80 x 80 mm fans and 1 60 x 60 mm fan |
| Operating Temperature: | 0 ~ 45 degrees Celsius |
| Storage Temperature: | -25 ~ 70 degrees Celsius |
| Humidity: | 5% ~ 95% non-condensing |
| Dimensions: | 482.6 x 267.2 x 154, 19" x 10.5" x 6" 19 inch rack-mount width |
| Weight: | 6.94 kg 15.3 lbs |
| EMI: | FCC Class A, CE Mark Class A, VCCI Class A, C-Tick, BSMI Class-A |
| Safety: | UL (UL 1950), CSA (CSA950) |

| Performance | |
|---|---|
| Transmission Method: | Cut-Through and Store-and-Forward |
| RAM Buffer: | 2 M bytes per device |
| Filtering Address Table: | 8 K entries per device |
| Packet Filtering/ Forwarding Rate: | 148810 pps per port (for 100 Mbps) |
| MAC Address Learning: | Automatic Update<br>Max age: five minutes |

# Index

# Registration Card

**Print, type or use block letters.**

Your name: Mr./ Mrs. _____

Organization: _____ Dept. _____

Your title at Organization: _____

Telephone: _____ Fax: _____

Organization' s full address: _____

_____

Country: _____

Date of Purchase (Month, Day, Year): _____

| Product Model | Product Serial Number | * Product installed in type of computer (e.g. Compaq 486) | * Product Installed in computer Serial Number |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

(* Applies to adapters only)

Product was purchased from:

Reseller' s Name: _____

Telephone: _____

Reseller' s full address: _____

**Answers to the following questions help us to support your product:**

1. **Where and how will the product primarily be used?**

   ☐Home  ☐ Office  ☐Travel  ☐ Company Business  ☐Home Business  ☐Personal Use

2. **How many employees work at installation site?**

   ☐1 employee  ☐2-9  ☐10-49  ☐50-99  ☐100-499  ☐500-999  ☐1000 or more

3. **What network protocol(s) does your organization use?**

   ☐XNS/IPX  ☐TCP/IP  ☐DECnet  ☐Others_____

4. **What network operating system(s) does your organization use?**

   ☐D-Link LANsmart  ☐Novell Netware  ☐Netware Lite  ☐SCO Unix/Xenix  ☐PC NFS
   ☐3Com 3+Open  ☐Banyan Vines  ☐DECnet Pathworks  ☐Windows NT  ☐Windows
   ☐NTAS  ☐Windows 95/98  ☐Other:_____

5. **What network management program does your organization use?**

   ☐D-View  ☐HP OpenView/Windows  ☐HP OpenView/Unix  ☐SunNet Manager
   ☐Novell NMS  ☐NetView 6000  ☐Others_____

6. **What network medium/media does your organization use?**

   ☐Fiber-optic  ☐Thick coax Ethernet  ☐10Base-T UTP/STP  ☐100Base-TX  ☐100Base-T4
   ☐100VGAnyLan  ☐Others:_____

**7.      What applications are used on your network?**

☐Desktop publishing  ☐Spreadsheet  ☐Word processing  ☐CAD/CAM  ☐Database management
☐Accounting     ☐Others:_____

**8.      What category best describes your company?**

☐Aerospace   ☐Engineering   ☐Education   ☐Finance   ☐Hospital   ☐Legal
☐Insurance/ Real Estate   ☐Manufacturing   ☐Retail/ Chainstore/ Wholesale   ☐Government
☐Transportation/ Utilities/ Communication   ☐VAR   ☐System house/ company

☐Other:_____

**9.      Would you recommend your D-Link product to a friend?**

☐Yes ☐No ☐Don't know yet

**10.      Your Comments:**_____
_____

Mail to:

D-Link Systems Inc.

53 Discovery Drive

Irvine CA 92618

USA

Email us at:

www.dlink.com