D-Link®

DES-3204
4-Port Gigabit Ethernet Switch
D-View Management Module
User's Guide

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DGS-3204 Management User's Guide

About this Guide

This User's Guide tells you how to use the D-View network management system (version 4.1 or later) to manage your DGS-3204 intelligent Gigabit Ethernet switch, including how to install the D-View management module for the switch, and how to use the module to control and monitor the switch. Additional information on installing your switch and configuring it for management can be found in the DGS-3204 *User's Guide*.

Introduction

DGS-3204 Intelligent Ethernet Switch

This guide discusses how to manage the DGS-3204 switch using the D-View network management system. The DGS-3204 combines conventional Ethernet, Gigabit Ethernet and switching technologies into one package. This device features four ultra high-speed 1000BASE-SX Gigabit Ethernet switching ports supporting.

Additional information about configuring the DGS-3204 Ethernet switch may be found in the Ethernet switch's hardware *User's Guide*.

Network Management

As networks grow larger, network management becomes more and more of a necessity. A large network requires a considerable amount of work to keep it running smoothly, including time and effort spent on user support, troubleshooting, network planning, and performance monitoring. The intent of a network management system (NMS) is to make it possible to monitor a widely spread-out network (possibly spanning many different sites) from a centralized location.

Network management works by placing a small degree of "intelligence" in the network elements (routers, switches, hubs, hosts, etc.) to be managed. This intelligence takes the form of an *agent* that is capable of collecting statistics and status information, as well as performing control operations that affect the operation of the network. The agent responds to commands and requests for information from the centralized network management system, allowing the health and performance of the network to be monitored and adjusted.

A network protocol known as the Simple Network Management Protocol (SNMP) is generally used to communicate between network management stations and the devices they manage. SNMP was originally developed for controlling the devices that made up the infrastructure of the Internet, and has become the primary standard for network management. SNMP commonly runs "on top of" the TCP/IP Internet Protocol, though other transmission methods are possible.

Because a network management station can be used to manage a wide range of devices, network management software is generally divided into two different parts: a base *platform* consisting of software common to the management of all devices; and a set of *modules*, each of which can communicate with a narrow range of devices by way of their SNMP-based agents. If a new device type is added to the network, then a new module (compatible with the particular platform being used) needs to be added to facilitate its management.

This manual describes the module used on the D-View platform for controlling DGS-3204 intelligent Gigabit Ethernet switches.

Installing the Management Module

This section describes the requirements and procedures for installing the DGS-3204 management module on your network management system.

Requirements

We recommend that your system meet the following requirements to be able to use the DGS-3204 switch management module:

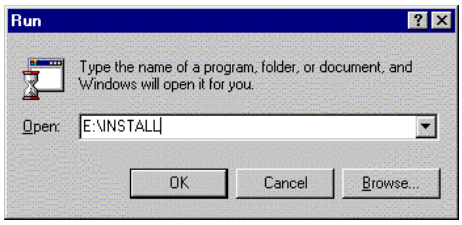
- A PC-compatible computer with a 486DX2-66 or faster processor
- Microsoft Windows version 3.1*x* or Microsoft Windows 95 or later operating system.
- D-View SNMP Network Management Program, version 4.1 or later.
- 8 megabytes (16M preferred) of main memory (RAM)
- At least 10 megabytes of free hard disk space
- A Windows-compatible mouse or other pointing device
- An Ethernet network card with appropriate drivers
- CD-ROM drive

Installing the Module Software

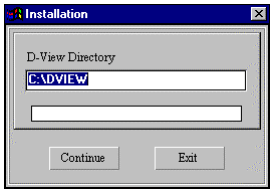
Note: Please ensure that the D-View platform program has been installed on the computer you are using for network management before proceeding.

Take the following steps to install the module on your network management system:

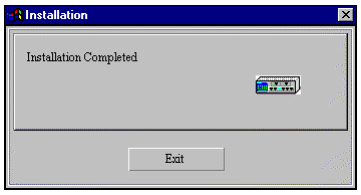
1. Exit D-View if you are running it.
2. Insert the Setup/Application CD-ROM containing the module into your CD-ROM drive (**E:** will be used in this manual although your CD-ROM drive letter may be different).
3. If you are using Windows 3.1, choose **Run…** from the Program Manager's **File** menu. Under Windows 95, choose **Run…** from the **Start** menu on the taskbar. When the dialog box appears, type the pathname of the Install program on the CD-ROM drive (`E:\INSTALL`)



4. Click OK. The installation program will start.
5. When the program prompts for your D-View Directory, enter the pathname of the directory where you installed D-View, and click **Continue**.



6. The installation program will install all of the necessary files onto your system. When it is finished, it will display the following dialog:



Click on the **Exit** button. The D-View network management system is now ready to manage DGS-3204 Ethernet switches.

Preparing the Switch for Management

You will need to make sure that your switch is properly set up before you can use the management module:

- Ensure that the switch is connected to the same network as the network management station.
- Ensure that the switch's TCP/IP settings are set properly. If the switch is on the same local network, the network portion of the switch's IP address needs to be the same as that of the network management station. If they are on separate LANs, the TCP/IP gateway (router) field of both the switch and the router need to be set properly so that information can be routed properly between the switch and the management station.

For more information about these and other items, consult the DGS-3204 hardware *User's Guide*.

DGS-3204 Management

Adding your DGS-3204 Switch to the Map

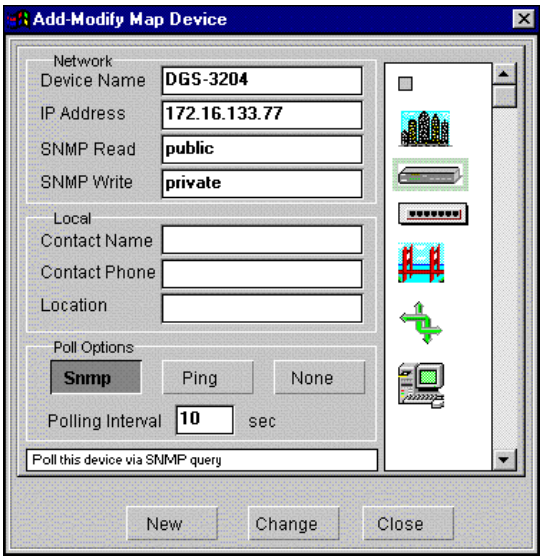
Before you can manage individual DGS-3204 Ethernet switches, you need to add them to your D-View network map. You can do this either by:

- Using D-View's Auto Discover capability to add all new SNMP-manageable devices to the map.
- Using the Add-Modify Map Device command to place each switch on the map.

To use the second method:

1. Press the Add/Modify a device on the map button shown below.

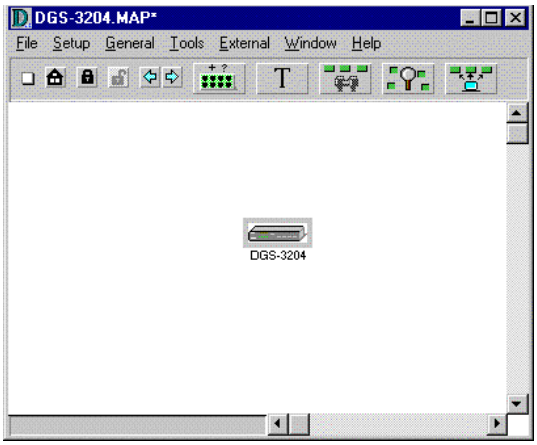
2. Select the DGS-3204 from the icon list at the right of the Add-Modify Map Device dialog.



3. Give the switch a name, and enter its IP address and SNMP community names.

4. Click on **New**.

The DGS-3204 switch icon should now be displayed on your network map as shown below.



The Module Display

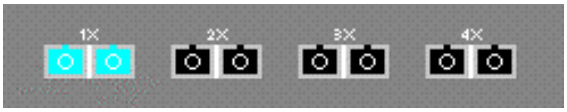
Double-clicking on the icon in the network map causes the module display to open. The module display is used to monitor and perform network management functions on the selected device. The module display for the DGS-3204 appears as follows:

- **Menu Buttons** The *Configuration*, *Monitor*, *Reset*, and *Help* buttons display their respective pull-down menus. The items listed in these menus are described later on in this manual.

- **Error Status Line** This line displays messages describing errors that occur when the module is unable to obtain information it needs. When an error occurs, a red border appears around the error status line.
- **Ports** Each of the 1000BASE-SX ports on the front panel are depicted. You can select individual ports to perform operations on them. Clicking on the gray area immediately surrounding the ports will deselect the port and select the switch as a whole.
- **Port Status Indicators** There are corresponding port status indicators for each of the ports on the switch. Each port indicator can be interpreted as follows:
  - **Link** Lights green when the port is connected to a powered-on Gigabit Ethernet device.
  - **Act** Lights blink off briefly when information is transmitted or received on the port.
  - **Full** Lights green when the port is operating in full-duplex.

Selecting Ports

Many of the switch management functions can be applied to the switch itself, or to a particular port. You can select an individual port by clicking on the port itself. The color of the port will change to indicate that you have selected it (as shown below). You can select the switch itself by clicking in the gray area surrounding the ports, so that none of the ports are selected.



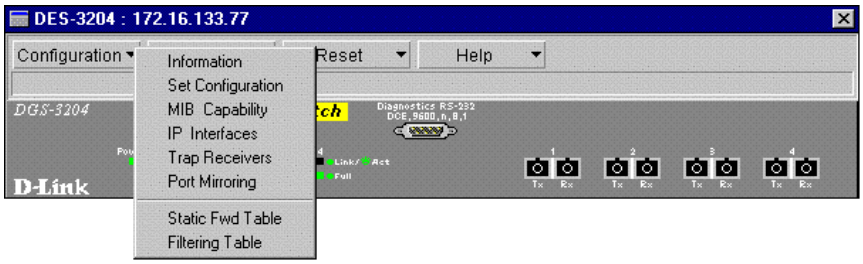
Menu Buttons

The menu buttons on the module - *Configuration*, *Monitor*, *Reset*, and *Help* – are used to access all the configuration settings, polling parameters and viewing

tables used in management. The section below addresses the function and use of each item in the menu button's drop-down menus.

Configuration Menu Button

The Configuration menu contains options that allow you to get information about current settings, configure switch parameters and setup the switch for monitoring. The configuration menu appears as follows:

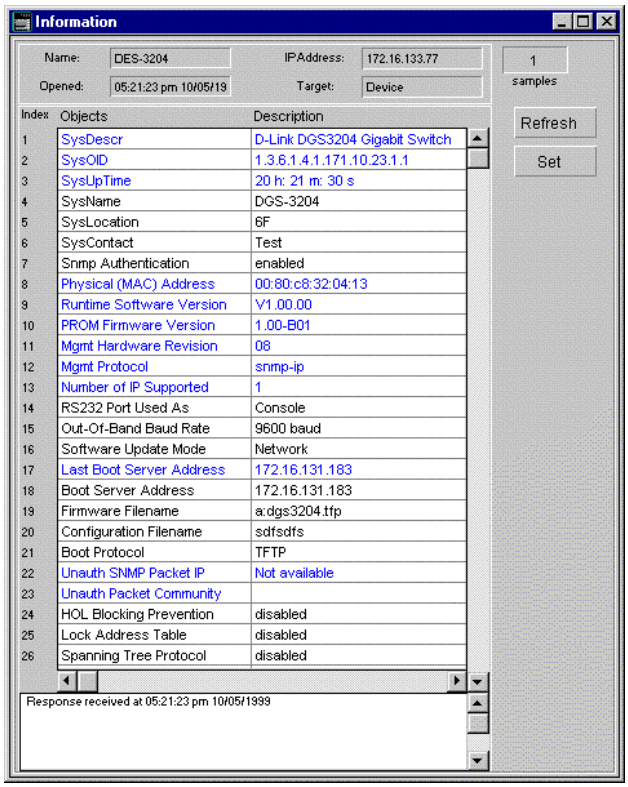


Information

There are two Information windows; one for the switch as a whole, and one for the individual ports.

Switch Information

Choosing the first item – **Information** - in the *Configuration* menu when the switch is selected (an individual port is not selected) causes the following window to open:



The values in the window that are displayed in black can be changed either in the D-View management module or by using the console program; values in blue are fixed either by the hardware or by the switch's firmware.

Clicking on the **Set** button allows you to configure settings for the switch, and opens the *Set Configuration* window described later in this manual.

The items displayed in the Switch Information table are described as follows:

- **SysDescr** A description of the switch type.
- **SysOID** The SNMP Object Identifier for this switch model.

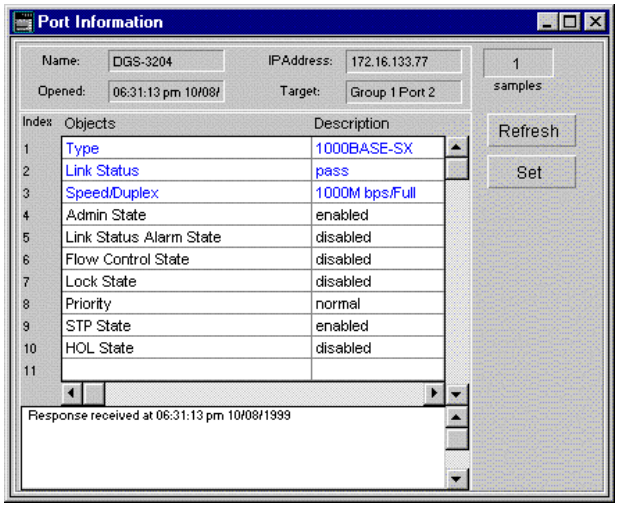
- **SysUpTime** The amount of time that the switch has been powered on, or since the last time the switch was reset.
- **SysName** A user-assigned name for the switch. Information on changing this setting can be found in the *Set Configuration* section below.
- **SysLocation** A user-assigned description for the physical location of the switch. Information on changing this setting can be found in the *Set Configuration* section below.
- **SysContact** User-defined contact information describing how to find the person responsible for the switch. Information on changing this setting can be found in the *Set Configuration* section below.
- **Snmp Authentication** Enables a trap to be sent to the network manager whenever an attempt is made to access the switch using an invalid SNMP login password.
- **Physical (MAC) Address** The physical (MAC) address of the switch.
- **Runtime Software Version** Version number for the switching software that drives the switch.
- **PROM Firmware Version** Version number for the software stored in a PROM chip that takes the switch through that startup sequence.
- **Mgmt Hardware Revision** Version number for the switch's management hardware.
- **Mgmt Protocol** Protocols supported by the switch's management hardware.
- **Number of IP Supported** The number of TCP/IP channels available for use for switch management. This will be 2 if the SLIP (Out-of-Band) interface is enabled, and 1 if only the in-band Gigabit Ethernet interface is available.
- **RS232 Port Used As** Displays whether the RS232 port is configured to support a console terminal connection or a SLIP connection.

- **Out-Of-Band Baud Rate** Displays the baud the RS232 port is set to operate at.
- **Software Update Mode** Displays whether the switch is setup to download new software from a TFTP server on the *Network*, or directly from a *SLIP* server.
- **Last Boot Server address** Displays the last IP Address used when using BootP or TFTP to boot up the server.
- **Boot Server Address** Displays the IP Address of the server currently used to boot up the switch.
- **Firmware Filename** Displays the complete path and filename of the firmware image file. This file is switching software used to replace (upgrade) the existing switching software in the switch.
- **Configuration Filename** Displays the filename of the configuration file, which contains all settings in the switch.
- **Boot Protocol** Displays the protocol – BootP or TFTP - that will be used to boot the switch.
- **Unauth SNMP Packet IP** When a request with an unknown (unauthorized) SNMP community name is received, this entry shows the source IP address of the most recent unauthorized packet.
- **Unauth packet community** When a request with an unknown (unauthorized) SNMP community name is received, this entry shows the community name the most recent unauthorized packet was using.
- **HOL State** Displays whether Head-Of-Line blocking is *enabled* or *disabled*.
- **Lock Address Table** Displays whether the Forwarding Table is *locked* or *unlocked*.
- **Spanning Tree Protocol** Displays whether the Spanning Tree Protocol is *enabled* or *disabled* on the switch.

For more detailed explanations on the function and use of the above items, please refer to the DGE-3204 User's Guide.

Port Information

Choosing the first item – **Information** - in the *Configuration* menu when an individual port is selected (colored blue) causes the following window to open:



Tip: Double-clicking on the port will also cause the above window to open.

The values in the window that are displayed in black can be changed either in the D-View management module or by using the console program; values in blue are fixed either by the hardware or by the switch's firmware.

Clicking on the **Set** button allows you to configure settings for the selected port, and opens the *Port Configuration* window described later in this manual.

The items displayed in the Port Information table are described below

- **`Type`** The type of connection supported by the port.
- **`Link Status`** Displays *Pass* when the port has a connection to another Gigabit Ethernet device that is powered on. If no such connection exists, it will display *Fail*.

- **Speed/Duplex** Displays the current speed and duplex settings for the port. All ports on the DGS-3204 can only be set to run at 1Gbps (1000Mbps) at Full duplex.
- **Admin State** When you *disable* the Admin State, the port will be partitioned from the rest of the network. In this partitioned state, it will only be able to accept management packets. All other packets will be dropped.
- **Link Status Alarm State** Displays whether the Link Status Alarm, which sends a *trap* to the network manager whenever the Link Status changes, is *enabled* or *disabled*.
- **Flow Control State** Displays whether IEEE 802.3x flow control is *enabled* or *disabled* on the port.
- **Lock State** Displays whether the Forwarding Table for this port is locked or not. When *locked*, automatic learning for all stations connected to this port will stop and entries in the Forwarding Table for all devices residing on this port will age out. The only traffic this port will allow is traffic from machines manually entered in the Static Forwarding Table.
- **Priority** Displays the whether traffic arriving at this port will be given a high, normal or low priority in the switch's packet queuing.
- **STP State** Displays whether Spanning Tree Protocol is *enabled* or *disabled* on this port.
- **HOL State** Displays whether Head-Of-Line Blocking Prevention is *enabled* or *disabled* on this port.

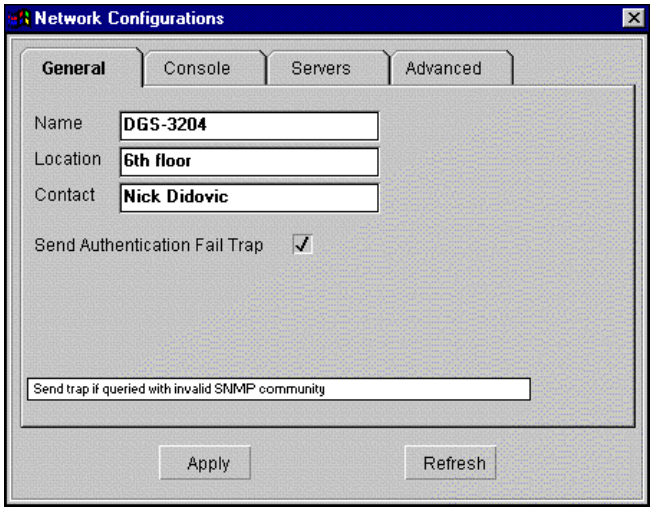
For more detailed explanations on the function and use of the above items, please refer to the DGE-3204 User's Guide.

Set Configuration

There are two Configuration windows; one for the switch as a whole, and one for the individual ports.

Switch Configuration

Choosing the second item – **Set Configuration** - in the *Configuration* menu when the switch is selected (an individual port is not selected) causes the following window to open.



There are four tabs running along the top – *General, Console, Servers, Advanced* – which allow you to configure a number of settings for the switch.

General

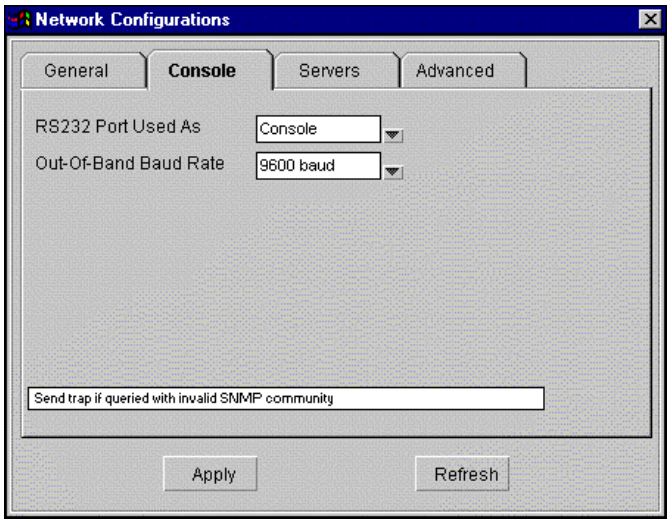
As shown in the **Information** window, the switch maintains the `SysName`, `SysLocation`, and `SysContact` variables to assist with tracking and accounting. You can set these fields in the Network Configurations dialog box in this window.

The *Send Authentication Fail Trap* setting, if checked, enables a trap to be sent to the network manager whenever an attempt is made to access the switch using an invalid SNMP login password.

After making changes in the window, be sure to click on the *Apply* button to activate them on the switch before clicking on another tab or closing the window.

Console

The Console tab of the Network Configuration dialog allows you to set parameters for the Diagnostics RS232 port located on the front of the switch.



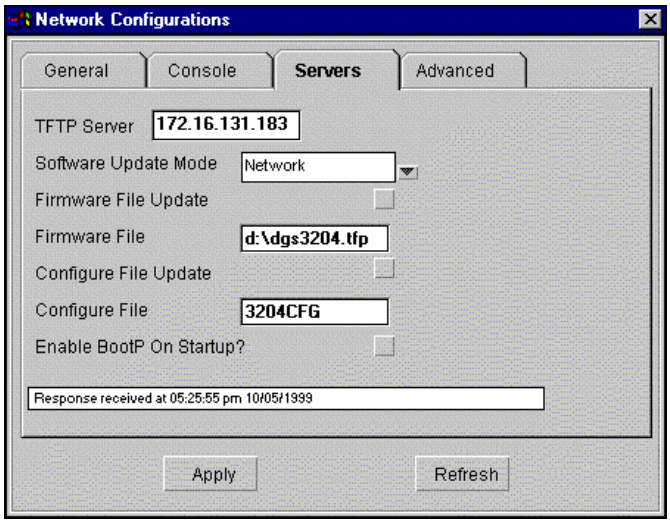
Each field is described below:

- **RS-232 Port Used As** Sets the Diagnostic RS232 port to either *Console* or *SLIP*. The *Console* setting allows the port to be used for terminal-based console management. The *SLIP* setting configures the RS232 port for SLIP communications.
- **Out-of-band Rate** Determines the bit rate of the RS232 port. When being used in Console mode, it should be set to 9600 baud.

Changes will not take affect unless the Apply button is clicked on.

Servers

The DGS-3204 Ethernet switch stores its internal software (firmware) in flash memory, which allows you to update the switch with new versions of the firmware when they become available. In addition, many of the switch's operational parameters can be set using a flexible configuration file stored on a centralized server.



Each item is described below:

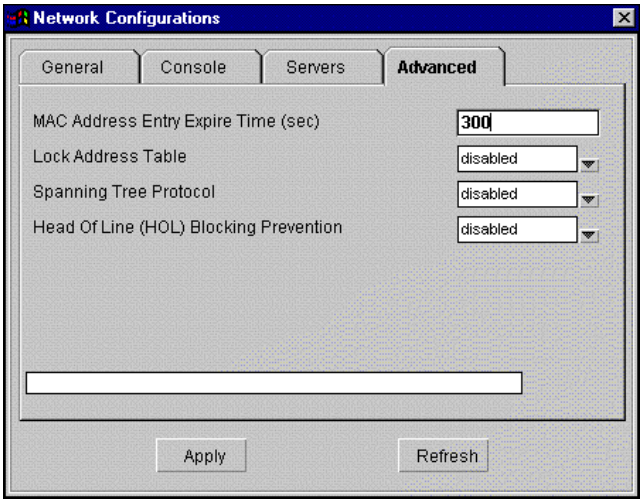
- **TFTP Server** This box should contain the IP address of the TFTP server, if any, you are using on your network.
- **Software Update Mode** Defines the method you wish to use to upload new runtime switching software onto the switch. Choosing *Network* causes the switch to look for the software image file on the TFTP server defined above; choosing *SLIP* allows the software to be uploaded from a SLIP workstation or server directly connected to the RS232 port.
- **Firmware File Update** Clicking on the box to the right so that a check (✓) appears in it, tells the switch to upload new runtime switching software the next time it is restarted or rebooted.
- **Firmware File** This field should contain the complete path and filename for the switching software image file.
- **Configuration File Update** Clicking on the box to the right so that a check (✓) appears in it, tells the switch to upload settings from a configuration file the next time it is restarted or rebooted.

- **Configuration File** This field should contain the complete path and filename for the configuration file you wish to use to upload settings to this switch.
- **Enable BootP On Startup** When checked (✓), the server will utilize the BootP protocol to get its IP address, subnet mask and gateway IP the next time it is restarted or rebooted.

For more information about DGS-3204 configuration files, consult the appendix to the DGS-3204 hardware *User's Guide*, or the samples included on the management module installation disk. For more information about using the TFTP and BOOTP servers, consult the D-View *User's Guide*.

Advanced

Clicking on the Advanced tab displays the following window and allows you to configure the switch for more advanced functions.



Each of the fields is described below:

- **MAC Address Entry Expire Time (sec)** This field allows you to set the aging time for entries in the Forwarding table.
- **Lock Address Table** When *Enabled*, the forwarding table will not learn any more addresses and all entries in the forwarding table will be static

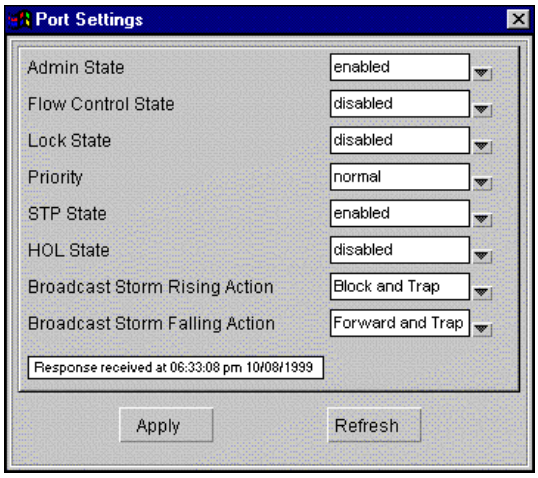
and will not age out. When *Disabled*, the automatic learning function of the switch will be turned on.

- **Spanning Tree Protocol** *Enables/Disables* Spanning Tree on the switch.
- **Head Of Line (HOL) Blocking Prevention** *Enables/Disables* Head-Of-Line Blocking on the switch.

For more detailed explanations, please refer to the Port Configuration section below.

Port Configuration

Choosing the second item – **Set Configuration** - in the *Configuration* menu when an individual port is selected (colored blue) causes the following window to open:



Tip: Double-clicking on the port will also cause the above window to open.

Items in the above window are described as follows:

- **`Admin State`** When you *disable* the Admin State, the port will be partitioned from the rest of the network. In this partitioned state, it will only be able to accept management packets. All other packets will be dropped.

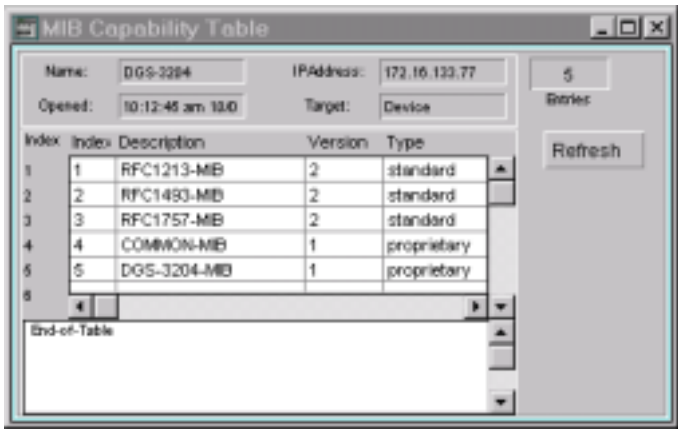
- **Flow Control State** *Enables* or *disables* IEEE 802.3x flow control on the port. Flow control allows the port to send a Pause packet to a transmitting IEEE 802.3x-compliant device, so that it's buffers don't overflow and data is not lost.
- **Lock State** When *locked*, automatic learning for all stations connected to this port will stop and entries in the Forwarding Table for all devices residing on this port will age out. The only traffic this port will allow is traffic from machines whose MAC address is manually entered in the Static Forwarding Table.
- **Priority** Sets the priority for traffic arriving at this port to high, normal or low. Higher priority packets are processed first in the switch's packet queue.
- **STP State** *Enables* or *disables* Spanning Tree on this port. Spanning Tree allows backup connections and prevents signal loops on the network.
- **HOL State** *Enables* or *disables* Head-Of-Line Blocking Prevention on this port. Head-of Line blocking occurs when a packet originating on Port 1, for instance, needs to be forwarded to Ports 2 and 3. If Port 2 is occupied (causing the packet to be held in memory until the port is free), the packet destined for Port 3 will also be delayed. Cumulatively, these delays can have a noticeable effect on overall network performance. Enabling the HOL State prevents Head-of-Line blocking from occurring.
- **Broadcast Storm Rising Action** This setting will be activated when the switch detects that 80% of packets on the segment connected to the port are broadcast packets and the port surpasses 30% utilization. When these criteria are met, the port can be configured to *Do Nothing*, *Block* or *Block and Trap*. The *Do Nothing* setting causes the switch to operate normally, in other words, ignore the broadcast storm condition. The *Block* setting causes the port to drop all broadcast frames, thus isolating the broadcast storm. *Block and Trap* performs the same action as *Block*, except it also sends a trap to the designated Trap Recipient informing them of the situation.
- **Broadcast Storm Falling Action** This setting will be activated when a Broadcast Storm Rising Action has occurred and the switch detects that port utilization has dropped below 10%. This setting

can be configured to *Do Nothing*, *Forward* or *Forward and Trap*. The *Do Nothing* setting causes the switch to operate normally, in other words, ignore the situation. If the port had met the Broadcast Storm Rising Action criteria and started *Blocking* broadcast packets, it will continue doing so. The *Forward* setting causes the port to begin forwarding broadcast frames, thus removing the *Blocking* state imposed by the Broadcast Storm Rising Action. *Forward and Trap* performs the same action as *Forward*, except it also sends a trap to the designated Trap Recipient informing them of the situation.

MIB Capability Table

The **MIB Capability Table** shows which MIBs are used by the DGS-3204 switch.

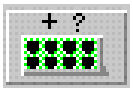
o view the **MIB Capability Table**, choose **MIB Capability** from the **Configuration** menu. The **MIB Capability Table** dialogue box will appear.



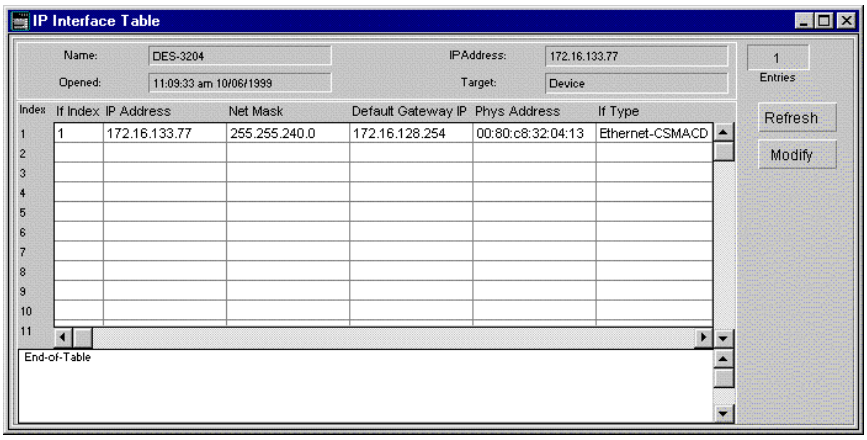
Press the Refresh button to force the display to match the switch's current status.

IP Interfaces

IP parameters can be viewed and changed from the management modules when necessary. After changing the IP address, your connection to the switch will be cut off. Change the settings in the D-View map by selecting the DGS-3204 icon in the map and clicking on the *Add/Modify a device on the map* button (shown below) to update the IP address to the new setting.



Clicking on IP Intefaces in the *Configuration* menu displays the following window:

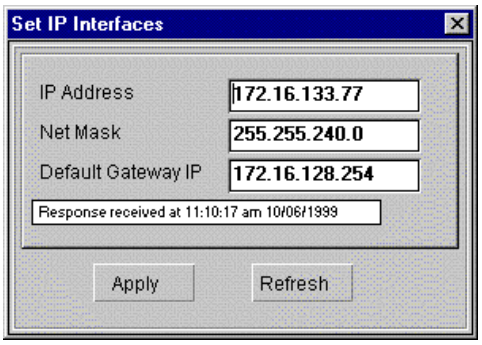


The fields displayed in the table are:

- **IF Index** Displays the IP Interface which the other settings are used on. The DGS-3204 contains only one IP Interface.
- **IP Address** Shows the IP address of the given Interface.
- **Net Mask** Shows the subnet mask for the network that the switch is connected to.

- **Default Gateway IP** Shows the IP Address of the gateway router where packets destined for IP addresses outside of the local network should be sent for forwarding.
- **Phys Address** Shows the physical (MAC) address of the switch.
- **If Type** Describes the type of IP Interface. The DGS-3204 supports CSMA/CD the standard Ethernet protocol.

To change the switch's IP settings, press the *Modify* button in the IP Interface Table window. The *Set IP Interfaces* (shown below) window will be displayed:



When all changes have been made, press **Apply** then **restart** the switch to let the changes take effect.

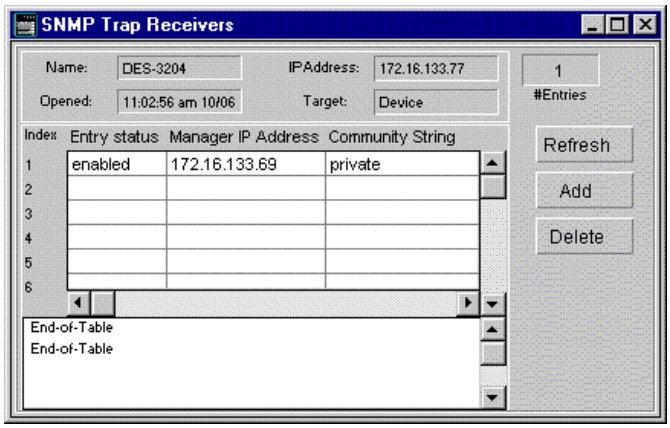
NOTE *Changing the IP settings may make the switch temporarily inaccessible from the management station. Be sure to update the switch's map entry after changing its IP address.*

Trap Receivers

Your DGS-3204 Ethernet switch can send SNMP *traps* to network management stations when exceptional events happen. These include:

- When the switch is powered on.
- Whenever a user-defined threshold condition occurs.

The switch requires you to designate the network management stations that will receive these traps. To view the trap recipients, select **Trap Receivers** from the **Configuration** menu.



The fields displayed are:

- **Entry Status** Shows whether or not this entry is valid.
- **Manager IP Address** The IP address of the trap recipient.
- **Community** Shows the SNMP community name that will be used for the traps sent to this recipient.

To Add a new trap receiver to the table, click on the Add button to the right.

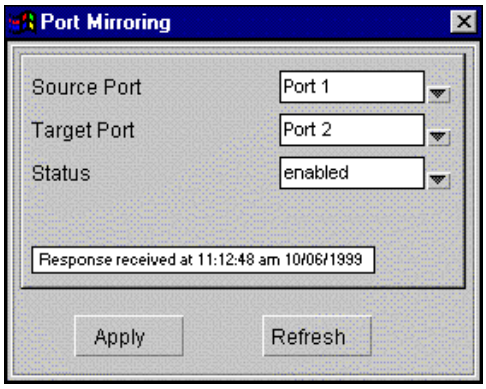
To modify the Manager IP address or community string for an entry, click on the entry so that it is highlighted and then click on the Add button to the right. The *Set Trap Receiver* dialog box will be displayed:

When all changes have been made, click on the **Add** button if adding a new entry, or click on the Modify button when modifying an existing entry.

For more information about changing the switch's trap configuration, see the DGS-3204 hardware User's Guide.

Port Mirroring

The DGS-3204 allows you to mirror traffic on one port to another port for analysis. Once setup and enabled, the switch will take all traffic from the **Source** port and mirror it on the **Target** port.



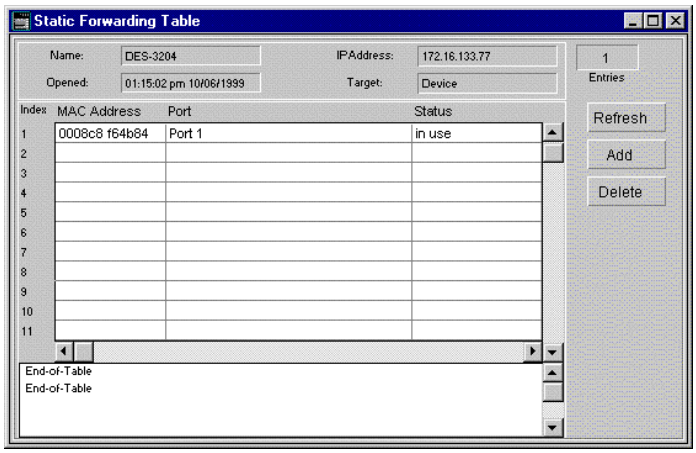
Each of the fields is described below:

- **Source Port** This is the port whose traffic you wish to analyze.
- **Target Port** The port where you have a **sniffer** or PC with packet analysis software directly attached to analyze data packets.
- **Status** *Enables/disables* port mirroring.

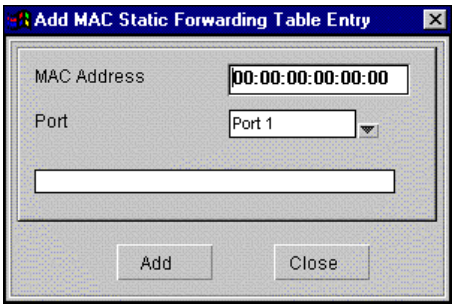
Static Fwd Table

The Static Forwarding Table allows you to assign permanent forwarding criteria for specific MAC addresses. Thus, whenever the switch receives a packet destined for a MAC address in the table, it will always be forwarded to the associated port.

To view the **Static Forwarding Table**, select **Static Fwd Table** from the **Configuration** menu. This causes the following window to appear:



To add an entry to the table, click on the *Add* button on the on the right side of the **Static Forwarding Table** window. The **Add MAC Static Forwarding Table Entry** dialog box will be displayed:



The fields displayed are:

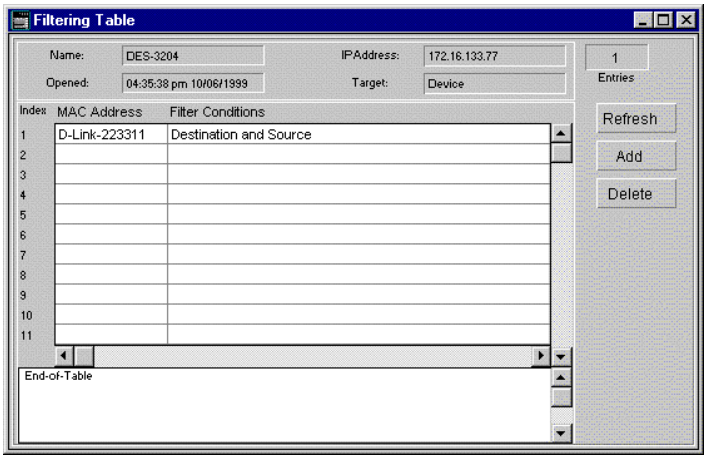
- **MAC Address** The MAC Address for the device you wish to create a static forwarding entry for.
- **Port** The port through which packets destined for the MAC address will always be forwarded.

When all changes have been made, Click **Apply** to let the change take effect.

Filtering Table

To prevent a particular machine from accessing the network, you can filter that machine's MAC address by entering it in the filtering table. The switch will then neither accept packets from, nor forward packets to, the device with that MAC address.

To view or edit the filtering table, choose **Filtering Table** from the **Configuration menu**. The Filtering Table window will appear:



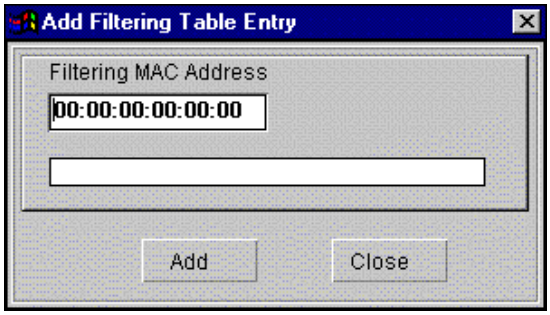
The items in the window are described as follows:

- **MAC Address** All packets containing this MAC address will be dropped by the switch.

- **Filter Conditions** Automatically set by the DGS-3204 to *Destination and Source*, meaning that all packets having a destination or source MAC address defined in the MAC Address field will be dropped.

To remove an entry from the Filtering Table, simply click on the desired entry so that it is highlighted and then click on the *Delete* button on the right side of the window.

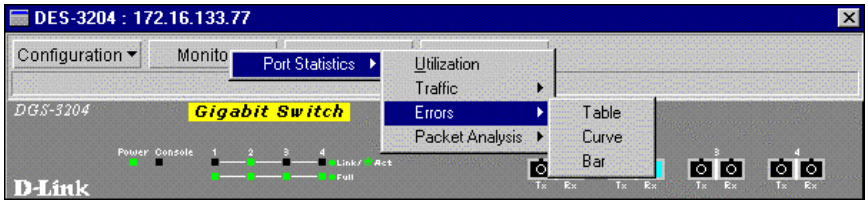
To add an entry to the filtering table click on the *Add* button on the right side of the window. The following window will appear:



Enter the MAC address you wish to filter from the network in the appropriate box. Click on the Add button to add it to the Filtering Table.

Monitor Menu Button

The DGS-3204 management module allows you to collect network statistics and to display them in several easy-to-read forms. This section describes how you can use the module to observe conditions on each individual port.



Port Statistics

The module allows you to display four network statistics:

- Port Utilization
- Traffic
- Errors
- Packet Analysis

Except for *Port Utilization*, Ethernet statistics for a given port can be displayed in:

- ◊ table form,
- ◊ line curve form, or
- ◊ bar graph form.

You can display statistics for a particular port by selecting that port and choosing the appropriate **Monitor** menu item. When the switch itself selected (as opposed to a particular port), the management module will not display statistics.

Statistics Collected by the Switch

The management module can display the following network statistics:

- **Utilization** The percentage of network bandwidth that is being utilized.
- **Good Bytes Sent (Bytes Tx)** Counts the number of bytes successfully sent from the port.
- **Good Bytes Received (Bytes Rx)** Counts the total number of bytes (octets) included in valid (readable) frames.
- **Total Bytes Received (Total Bytes Rx)** Counts the total number of bytes received on the port, whether valid or invalid frames.
- **Good Frames Sent (Frames Tx)** Counts the total number of frames transmitted from the port.

- **Good Frames Received (Frames Rx)** Counts all valid frames received on the port.
- **Total Frames Rx** Counts the total number of frames received on the port, whether valid or invalid frames.
- **CRC Error** Counts frames that fail the CRC frame integrity check. CRC errors are usually indicative of hardware problems.
- **Oversize Frames** Counts packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets) limit set by the Ethernet standard that were otherwise well formed. This is likely caused by a software problem.
- **Fragments** Counts packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Errors). These are normally the result of collisions.
- **Jabber** Counts frames longer than the maximum 1518 bytes (octets) with either bad framing or an invalid CRC. This may be due to a hardware problem such as a malfunctioning NIC. A jabber condition can halt all traffic on a segment.
- **Late Collision** Counts collisions that occur at or after the 64th byte (octet) in the frame. This may indicate that delays on the Ethernet are too long, and you have either exceeded the repeater count or cable segment length specified in the IEEE 802.3z Ethernet standard.
- **Dropped Frames** Number of frames dropped by the switch.
- **Undersized Frames** The number of frames detected that are less than the minimum permitted frame size of 64 bytes and have a good CRC. Undersized frames usually indicate collision fragments, a normal network event.
- **Collisions** A collision occurs when two devices try to transmit at the same time. This counter tracks the number of times packets have collided on the collision domain connected to this port. Collisions are normal in an Ethernet network and tend to increase as network utilization rises. Therefore, is the collision rate increases without an increase in network utilization, it can indicate a problem.

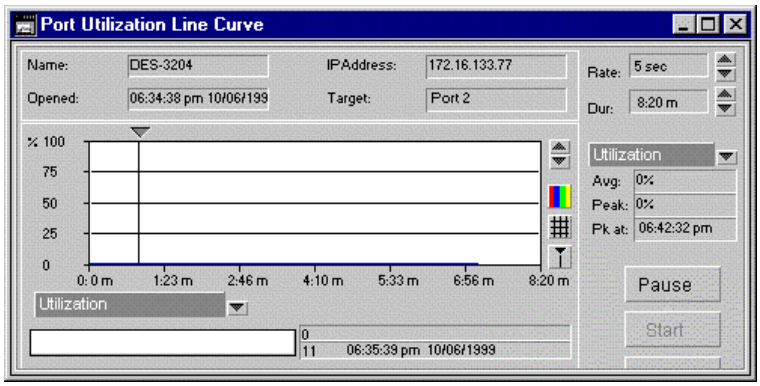
- **Frames 64Bytes** Displays the number of frames with 64 bytes of information.
- **Frames 65~127Bytes** Displays the number of frames with 65 to 127 bytes of information.
- **Frames 128~255Bytes** Displays the number of frames with 128 to 255 bytes of information.
- **Frames 256~511Bytes** Displays the number of frames with 256 to 511 bytes of information.
- **Frames 512~1023Bytes** Displays the number of frames with 512 to 1023 bytes of information.
- **Frames 1024~1518Bytes** Displays the number of frames with 1024 to 1518 bytes of information.
- **Multicast Rx** The number of multicast packets received on this port.
- **Multicast Tx** The number of multicast packets transmitted on this port.
- **Broadcast Rx** The number of broadcast packets received on this port.
- **Broadcast Tx** The number of broadcast packets transmitted on this port.

Port Utilization

This display permits you to observe the utilization of each individual port. Select the port that you wish to display statistics for.

To display the **Port Utilization Line Curve**:

1. Select a port by clicking on it. It should turn blue in color.
2. Choose **Monitor** from the main menu.
3. Choose **Port Statistics** from the **Monitor** menu**.**
4. Choose **Utilization** from the **Port Statistics** menu. The **Port Utilization Line Curve** will be displayed.

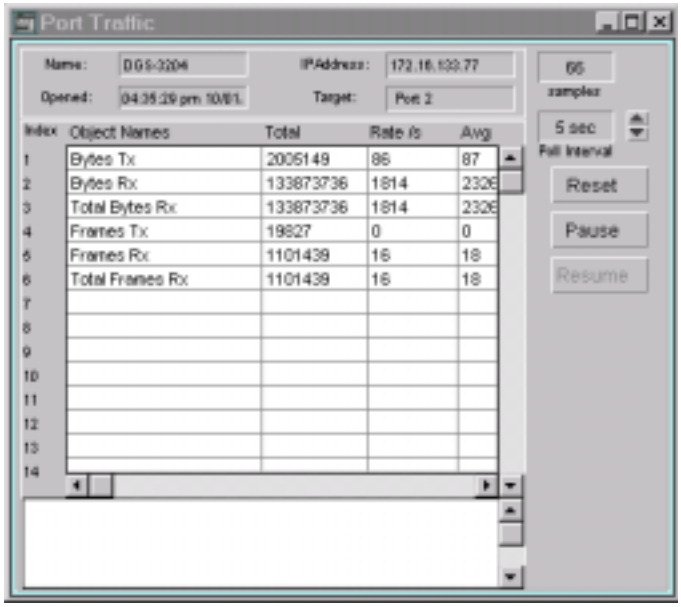


Port Traffic

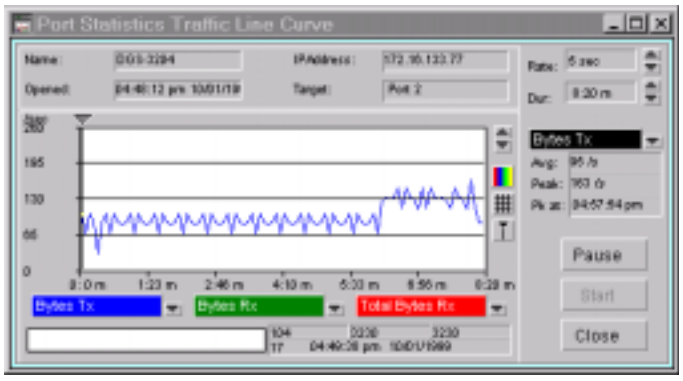
This display permits you to observe the network traffic on each individual port. Select the port that you wish to display statistics for.

To display the **Port Traffic**:

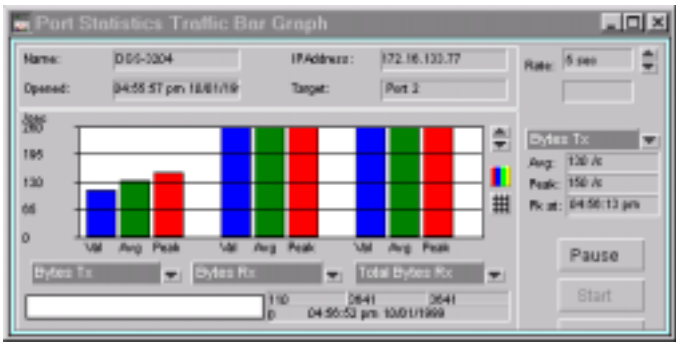
1. Choose **Monitor** from the main menu.
2. Choose **Traffic** from the **Monitor** menu**.**
3. Choose **Table** from the **Traffic** menu. The **Port Traffic Table** will be displayed.



Choose Curve from the Traffic menu and the Port Statistics Traffic Line Curve will be displayed.



Choose Bar from the Traffic menu and the Port Statistics Traffic Bar Graph will be displayed.



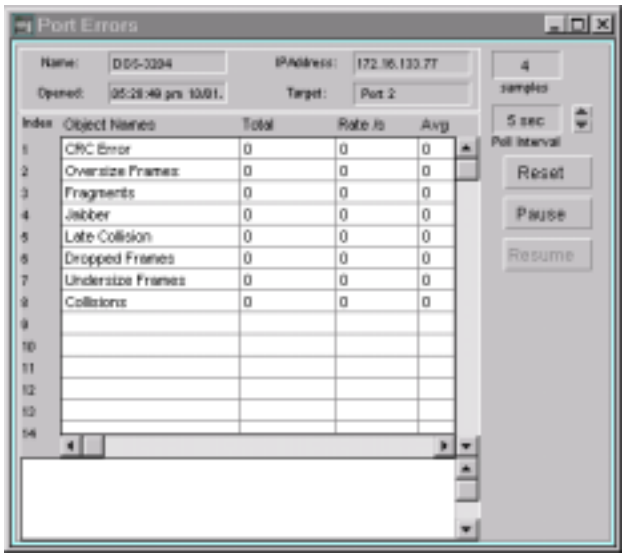
Port Errors

This display permits you to observe the various errors on each individual port. Select the port that you wish to display statistics for.

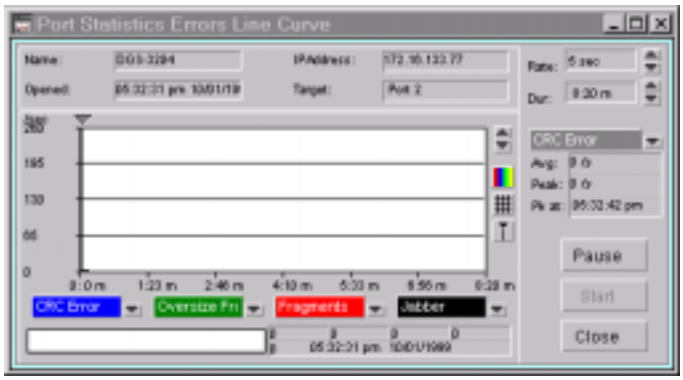
To display the **Port Errors**:

1. Choose **Monitor** from the main menu.
2. Choose **Port Statistics** from the **Monitor** menu**.**
3. Choose **Errors** from the **Port Statistics** menu**.**

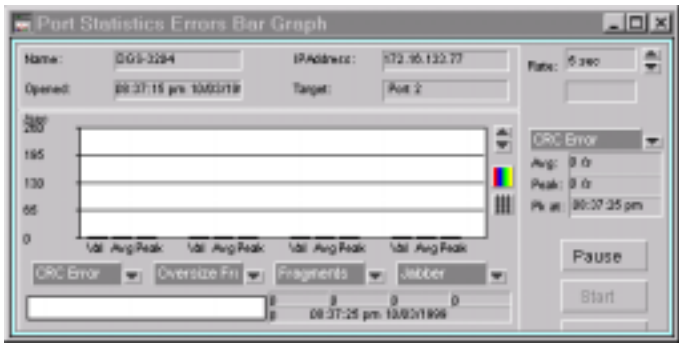
Choose **Table** from the **Errors** menu. The **Port Errors table** will be displayed.



Choose Curve from the Errors menu. The Port Statistics Errors Line Curve will be displayed.



Choose **Table** from the **Errors** menu. The **Port Errors table** will be displayed.

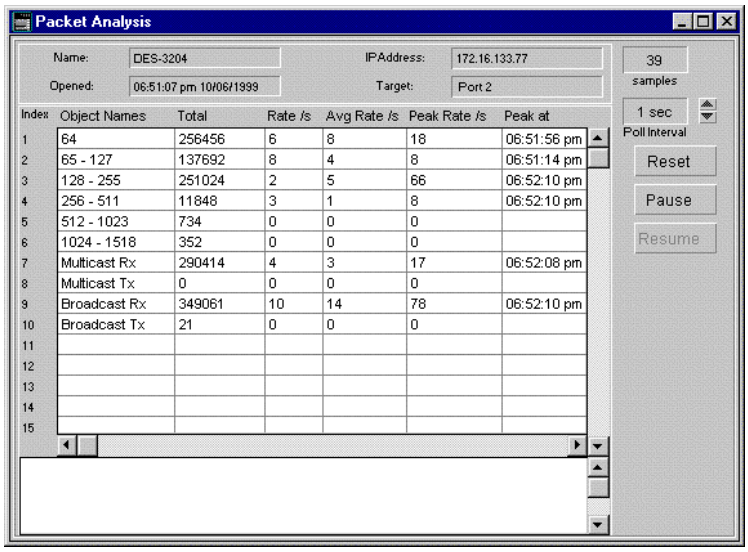


Packet Analysis

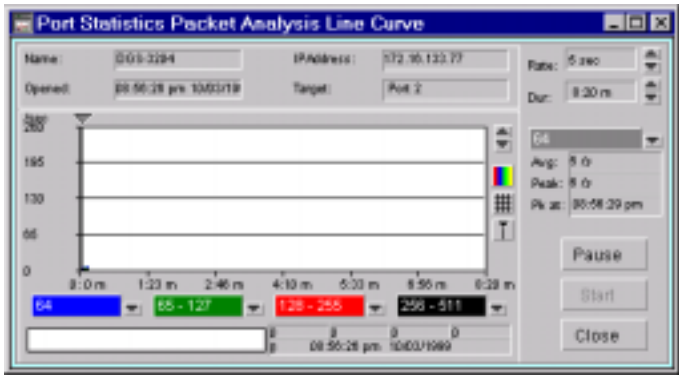
This display permits you to observe the frequency that different types of packets arrive at an individual port. Select the port that you wish to display observe.

To display the **Packet Analysis**:

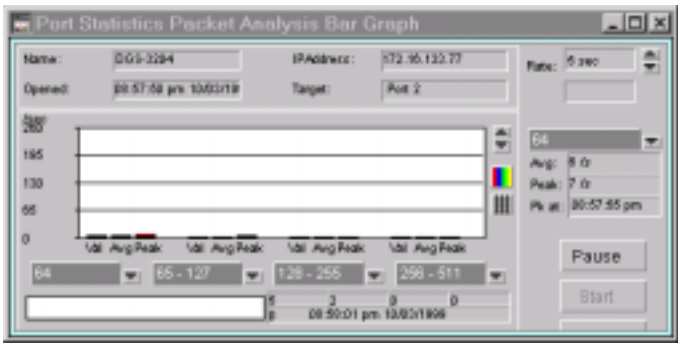
1. Choose **Monitor** from the main menu.
2. Choose **Port Statistics** from the **Monitor** menu**.**
3. Choose **Packet Analysis** from the **Port Statistics** menu**.**
4. Choose **Table** from the **Packet Analysis** menu. The **Packet Analysis table** will be displayed.



Choose Curve from the Packet Analysis menu. The Port Statistics Packet Analysis Line Curve will be displayed.

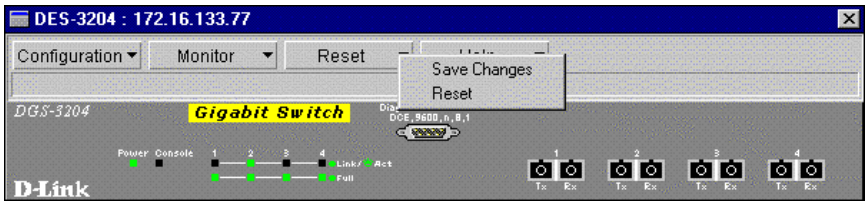


Choose Bar from the Packet Analysis menu. The Port Statistics Packet Analysis Bar Graph will be displayed.



Reset Menu Button

Resetting the switch will restart the switch using any new configuration settings that have been saved. It also resets all counters and tables.



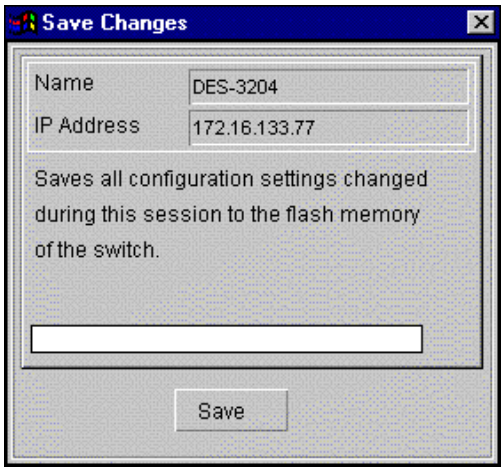
Save Changes

When configuration settings are changed using the Apply button in the various windows, the changes will take effect until the switch is reset or powered off. Using the Save Changes feature writes the settings onto flash memory in the switch thereby becoming the new default settings. Settings stored in flash memory are impervious to system resets or loss of power.

To save changes,

1. Click on the **Reset** menu button.

2. Select **Save Changes** from the drop-down menu.



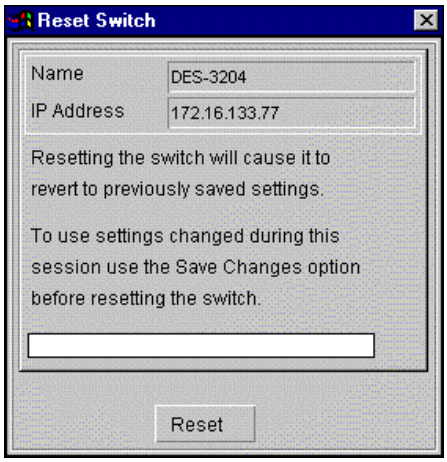
Click **Save** to save all changes made to configuration settings in the switch.

Reset

The management module allows you to reset the switch remotely. Doing a reset is equivalent to turning the switch off and on again, which resets all statistic counters and restores settings to the values stored in flash memory.

To perform a reset,

1. Click on the **Reset** menu button.
2. Choose **Reset** from the drop-down menu.



Click **Reset** to initiate a system reset.

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