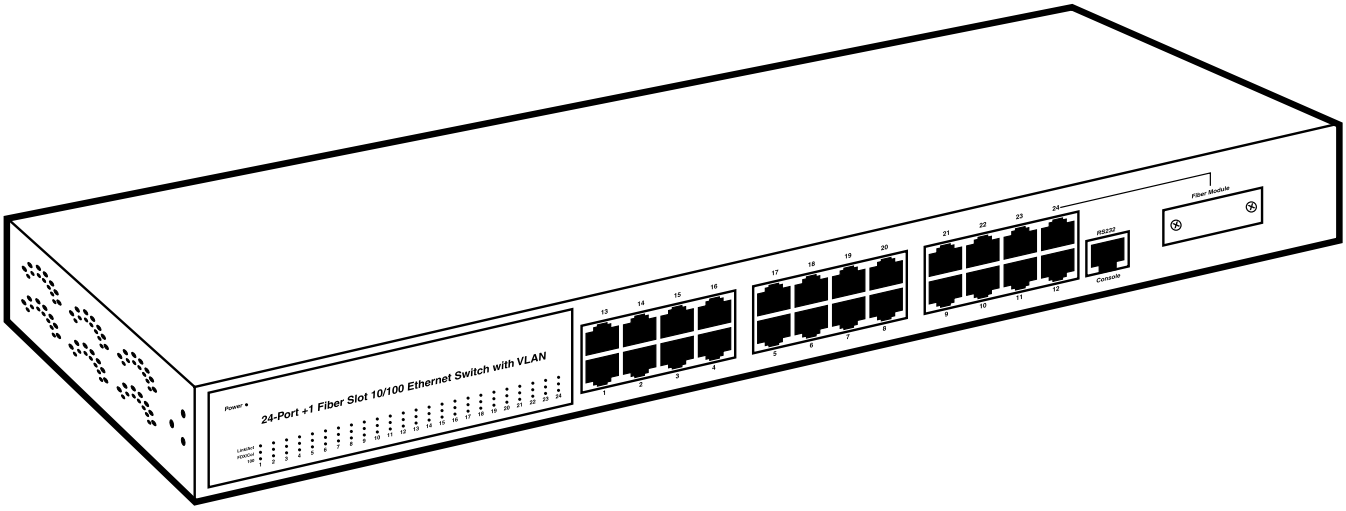



*1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746*

BLACK BOX®
NETWORK SERVICES

OCTOBER 2005
LGB2007A

# 24-Port +1 Fiber Module Slot Fast Ethernet Switch with VLAN

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Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
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## FEDERAL COMMUNICATIONS COMMISSION
## AND
## INDUSTRY CANADA
## RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.*

*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.*

## INSTRUCCIONES DE SEGURIDAD (Normas Oficiales Mexicanas Electrical Safety Statement)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
    - A: El cable de poder o el contacto ha sido dañado; u
    - B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    - C: El aparato ha sido expuesto a la lluvia; o
    - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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# Contents

**Chapter** **Page**

# 1. Specifications

**Standards:** IEEE 802.3 10BASE-T Ethernet, IEEE 802.3u 100BASE-TX/FX Fast Ethernet, ANSI/IEEE 802.3x flow control for full duplex

**Protocol:** CSMA/CD

**Topology:** Star

**Transmission Method:** Store-and-forward

**Distance (Maximum):** LGB2007A: 328 ft. (100 m) over Category 3, 4, or 5 UTP cable;
LGB2007C-SC, LGB2007C-ST: 1.3 mi. (2.1 km) over 50-, 62.5-, or 125-µm multimode fiber;
LGB2007C-SSC: 12.6 mi. (20.3 km) over 8-, 9-, or 125-µm single-mode fiber

**Speed:** Ethernet: 10 Mbps (half-duplex), 20 Mbps (full duplex);
Fast Ethernet: 100 Mbps (half-duplex), 200 Mbps full duplex

**Media:** 10BASE-T: UTP Category 3, 4, or 5;
100BASE-TX: UTP Category 5

**Port Module Option:** Slide-in slot for 100-Mbps fiber module (LGB2007C-SC, LGB2007C-ST, or LGB2007C-SSC)—see separate module manual

**RAM Buffer:** Total 2.5 M bits per device

**Filtering Address Table:** 8 K

**Packet Filtering/Forwarding Rate:** 148,800 or 14,800 pps, wire speed per port (for 100 Mbps and 10 Mbps)

**Connectors:** (24) 10-/100-Mbps RJ-45, (1) RJ-45 RS-232 console, (1) fiber slide-in slot for multimode or single-mode module with (2) SC or ST, (1) power

**Indicators:** (73) LEDs: (1) Power, (24) Link/Act, (24) FDX/Col, (24) 100

**Temperature Tolerance:** Operating: 32 to 113°F (0 to 45°C); Storage: 32 to 140°F (0 to 60°C)

**Humidity Tolerance:** Operating: 10 to 90%; Storage: 5 to 95%

**Power:** 90–264 VAC, 47–63 Hz, 10 watts maximum

**Size:** 1.75"H (1U) x 17.5"W x 6"D (4.4 x 44.5 x 15.2 cm)

# 2. Overview

## 2.1 Introduction

Now small businesses and corporate branch offices can take advantage of 100-Mbps Fast Ethernet *without* making changes to PCs, NICs, cabling, drivers, or PC configurations! Connect up to 24 UTP devices to the 24-Port +1 Fiber Module Slot Fast Ethernet Switch with VLAN. It provides high performance in an environment where traffic on the network and the number of users increase continuously. The switch is easy to install and supports auto MDI/MDI-X, so you can use either crossover or straight-pinned cable for your RJ-45 connections. The switch also includes one fiber slide-in slot for a multimode or single-mode module (choose from multimode modules with SC or ST connectors [LGB2007C-SC or LGB2007C-ST] or a single-mode module with SC connectors [LGB2007C-SSC]). With a fiber module installed, you can expand the workgroup distance to 1.3 miles (2.1 km, multimode) or 12.6 miles (20.3 km, single-mode). Configuration is easy via the switch's COM port.

Store-and-forward switching capability supports rate adaptation. It also ensures that all error packets will be filtered, plus it maintains maximum data integrity even under heavy loading. Autonegotiation on each RJ-45 port allows for autosensing speed (10 or 100 Mbps) and autodetecting mode (full or half-duplex). The switch provides flow control in full duplex and backpressure in half-duplex mode. It also detects and corrects for incorrect polarity on the received twisted pair. And it features a nonblocking data forwarding rate of 14,800 or 148,800 pps per port at 100% wire speed.

The switch conforms to many popular standards, including IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX/FX, and IEEE 802.3x flow control for full duplex. It provides 8 K MAC address and 2.5 Mbits SSRAM buffer per device. Diagnostic LEDs indicate power, link/activity, full duplex/collision, and speed (10-/100-Mbps) status. This switch supports up to 32 VLAN groups entries for port-based LAN, and up to seven trunk groups function with load balance and fault tolerance.

## 2.2 Components

### 2.2.1 Front Panel

The switch's front panel is shown in Figure 2-1. The LEDs shown (for a closer look, see Figure 2-2) include a power indicator and three sets of per-port LEDs. The per-port LEDs include Link/Act, FDX/Col, and 100. The switch has 24 RJ-45 port connectors, 1 RJ-45 RS-232 console connector, and 1 fiber slide-in slot for multimode or single-mode module with 2 SC or ST connectors. The circled numbers labeling the indicators and connectors in Figure 2-1 correspond to the numbers listed in Table 2-1.

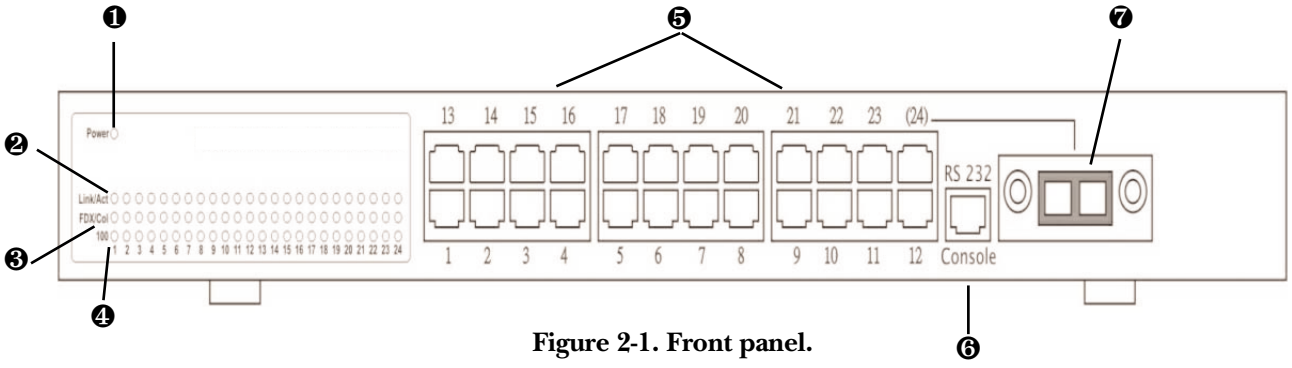


**Figure 2-1. Front panel.**

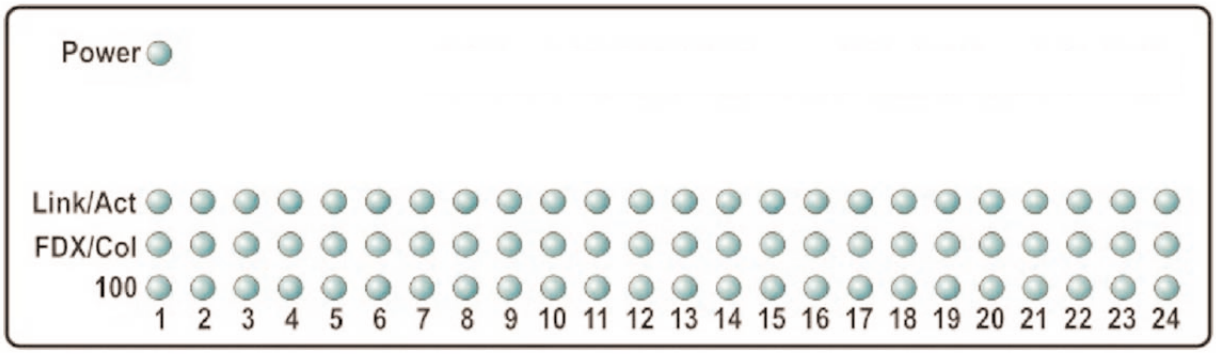


**Figure 2-2. LEDs.**

**Table 2-1. Front-panel indicators and connectors.**

| Component | Description |
|---|---|
| ❶ Power LED | This indicator lights when the switch is powered on. |
| ❷ Link/Act LEDs | These per-port indicators light when there's a functioning network link with an attached device through the corresponding port.<br><br>Link/Act LEDs blink to indicate that the switch is actively sending or receiving data over the corresponding port. |
| ❸ FDX/Col LEDs | These per-port indicators light when the connected port is operating in full duplex mode.<br><br>The LEDs remain off when the connected port is operating in half-duplex mode.<br><br>They blink when the connected port is under collision status. |
| ❹ 100 LEDs | These indicators light when the connected port is operating at 100 Mbps.<br><br>When the LEDs stay dark, the port is operating at 10 Mbps while the network is on. |
| ❺ RJ-45 ports | 24 RJ-45 connectors for links to network devices. |
| ❻ RS-232 console port | One RJ-45 connector that attaches to a user console for out-of-band management. |
| ❼ Fiber slot | Install a multimode or single-mode fiberoptic module (LGB2007C-SC, LGB2007C-ST, or LGB2007C-SSC) in this slot. Each module has two SC or ST® connectors. A module is shown installed in Figure 2-1. |

### 2.2.2 Rear Panel

The switch's rear panel contains a 90–264-VAC, 47–63-Hz power connector.


**Figure 2-3. Rear panel.**

## 2.3 What's Included

Your package should include the following items. If anything is missing or damaged, contact Black Box at 724-746-5500.

- (1) 24-Port +1 Fiber Module Slot Fast Ethernet Switch with VLAN
- (1) power cord
- (2) mounting brackets
- (1) RJ-45 cable for COM port
- (1) RS-232 transfer to RJ-45 connector
- (1) CD-ROM containing this user's manual

# 3. Installation

The switch has 24 10BASE-T/100BASE-TX RJ-45 ports. All of these ports support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. Each port also supports autonegotiation, so the optimum transmission mode (full or half-duplex) and data rate (10 or 100 Mbps) can be selected automatically.

## 3.1 Rackmounting the Switch

To mount the switch in a 19" rack, use the included rackmount brackets. Attach two screws (not included) on each side to connect the mounting brackets to the sides of the switch. Then place the switch (with mounting brackets installed) in the rack. Use two more screws (not included) on each side of the switch to hold the mounting bracket in place on the rack. Then connect the PC or server and switch or hub cables to the switch as described in **Sections 3.3** and **3.4**. Once all cable connections are made, power on the switch.

## 3.2 Installing the Switch on a Desktop

Place the switch on a desktop, then connect the PC or server and switch or hub cables to the switch as described in **Sections 3.3** and **3.4**. Once all cable connections are made, power on the switch.

## 3.3 Connecting to a PC or Server

You can connect any RJ-45 station port on the switch to a PC via twisted-pair cable with RJ-45 plugs at both ends. Use Category 3, 4, or 5 cable for standard 10-Mbps Ethernet connections or Category 5 cable for 100-Mbps Fast Ethernet connections. See Figure 3-1.

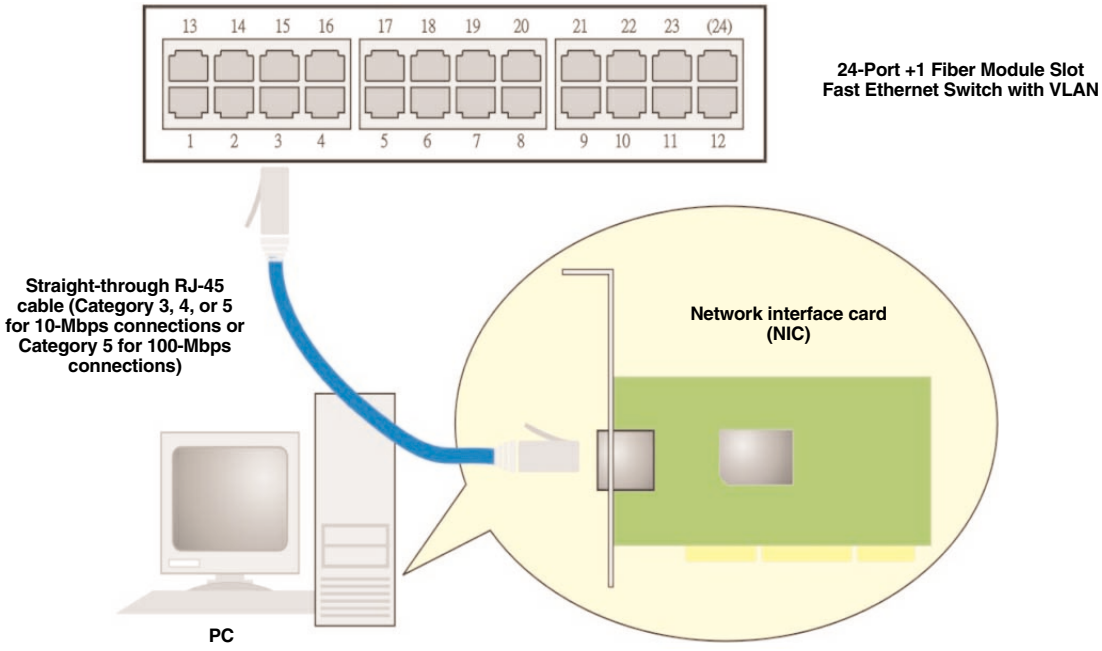


**Figure 3-1. Connecting a PC's network interface card to the switch.**

Make sure you have installed a 10BASE-T or 100BASE-TX network interface card for connecting a PC to the switch's RJ-45 (MDI-X) station ports. If LEDs don't light after powering on the switch, check to see if the LAN card, the cable, and connectors are properly attached to the switch.

When an attached PC is powered on or reset:

1. The Link/Act LED will light.
2. The FDX/Col LED may light; this depends on the installed LAN card's capabilities for the PC and the switch connection.
3. The 100 LED will light for a 100-Mbps connection; otherwise it will stay dark, indicating a 10-Mbps connection.

## 3.4 Connecting to a Switch or Hub

You can also connect any RJ-45 station port on the switch to a hub's uplink port or to another switch's port via straight cable with RJ-45 plugs at both ends. See Figure 3-2.

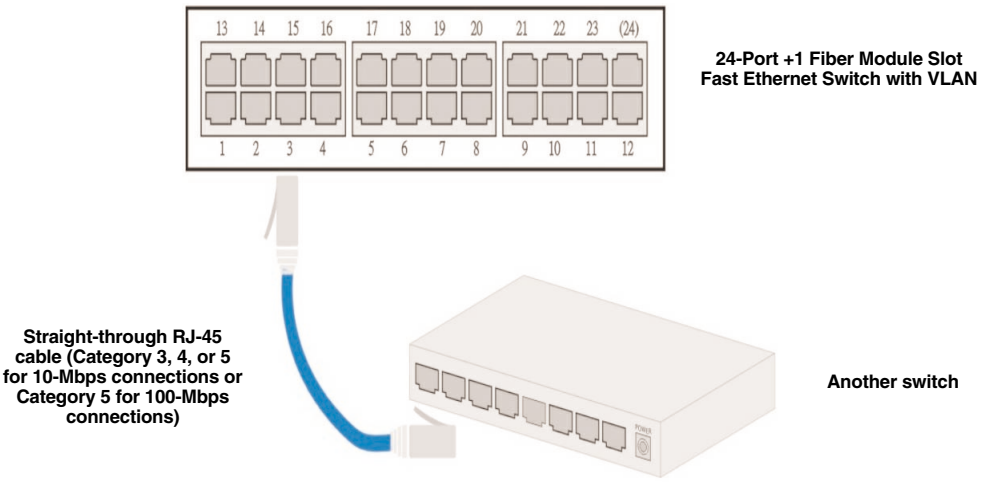


**Figure 3-2. Connecting a hub or another switch to the Fast Ethernet Switch with VLAN.**

When an attached 10BASE-T/100BASE-TX hub is powered on or reset:

For a 10BASE-T hub:

- the Link/Act LED will light,
- the FDX/Col LED will not light, and
- the 100 LED will not light.

For a 100BASE-TX hub:

- the Link/Act LED will light,
- the FDX/Col LED will not light, and

- the 100 LED will light.

When a switch or other connected device is powered on:

- the Link/Act LED will light,
- the FDX/Col LED may light; this depends on the attached switch's or other devices' capabilities, and
- the 100 LED will light for 100-Mbps connection, otherwise it will stay dark to indicate a 10-Mbps connection.

# 4. COM Port Configuration

This chapter explains how to set up the 24-Port +1 Fiber Module Slot Fast Ethernet Switch with VLAN through a terminal-emulation program. (An emulation program is required to communicate with the switch's internal software.) Before you can access the switch, you *must* configure the terminal-emulation program. Suitable programs include Windows® HyperTerminal or other third-party programs such as Telix and ProComm®.

Using the included RS-232 transfer to RJ-45 connector, connect the included RJ-45 cable for COM port between a COM port on your PC and the switch's console port as shown in Figure 4-1.

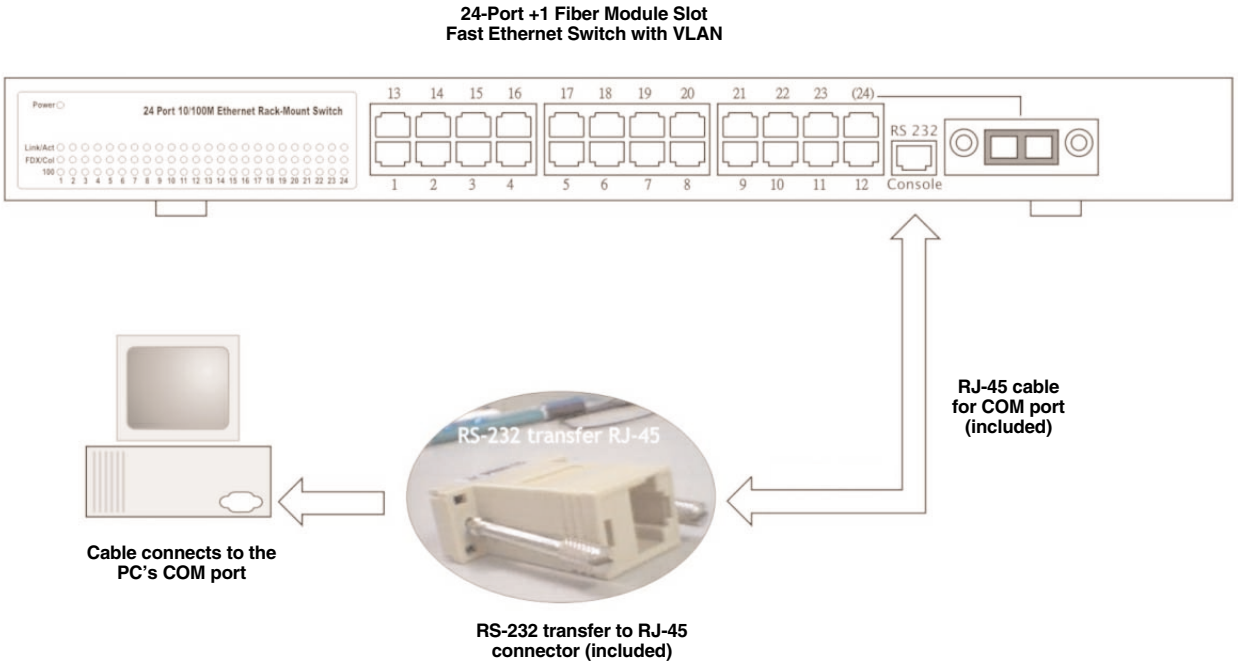


**Figure 4-1. Typical console connection.**

Once you connect the console to the switch, you're ready to set up the terminal-emulation program. In this manual, we use HyperTerminal as an example emulation program. Other terminal-emulation programs may work; the setup principles are the same. Simply follow the menu prompts for setup.

1. When you type `Hyperterminal` in the Windows operating system status line, the Connection Description screen appears. See Figure 4-2.


**Figure 4-2. Connection Description screen.**

2. Type in a name to identify the connection (you can type any alphanumeric characters here). Then click on one of the Windows default descriptive icons below the name panel. (Thes icons do not mean anything; randomly assign one to identify the connection as an icon on your desktop.) Click on the **OK** button to save your selections or the **Cancel** button to start over. If you click on **OK**, Figure 4-3 appears.


**Figure 4-3. Selecting the COM port.**

3. Since you won't dial out via a modem, you only need to set the COM port. Select the available COM port (usually COM1) from the drop-down menu in Figure 4-3. Click on the **OK** button to save the COM port selection, or click on the **Cancel** button to start over. If you click on **OK**, the screen shown in Figure 4-4 appears.

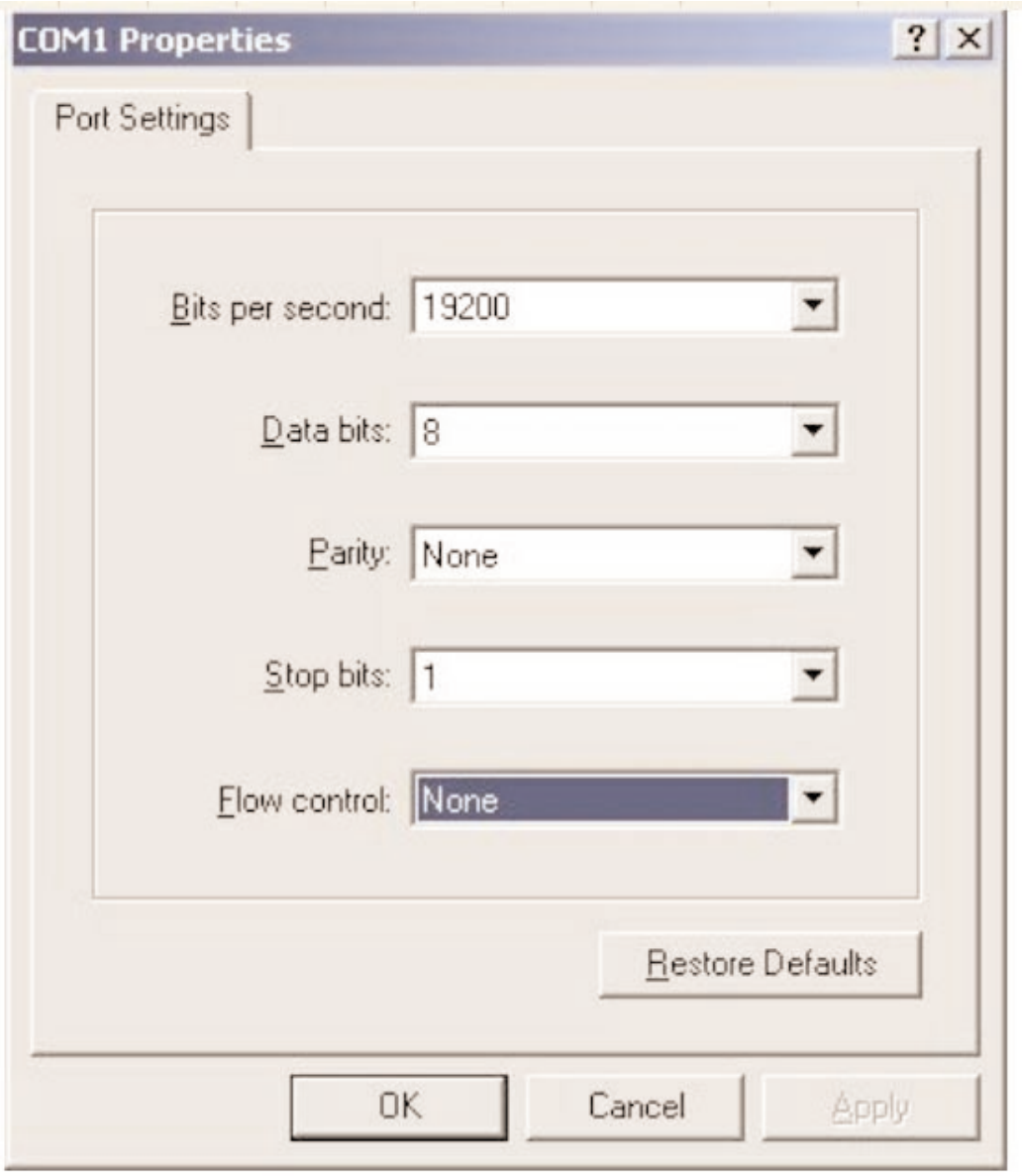


**Figure 4-4. COM1 Properties screen, Port Settings tab.**

4. Select the Bits per second, Data bits, Parity, Stop bits, and Flow control parameters from the drop-down menus. The default values are as follows.

   Bits per second: 19200
   Data bits: 8
   Parity: None
   Stop bits: 1
   Flow control: None

   Click on the **Restore Defaults** button to restore the parameters to the factory defaults.

   Or, select new values from the drop-down menus, then click on the **Apply** button. Click on the **OK** button to save the selections or the **Cancel** button to clear the selections. If you click on **OK**, Figure 4-5 appears.

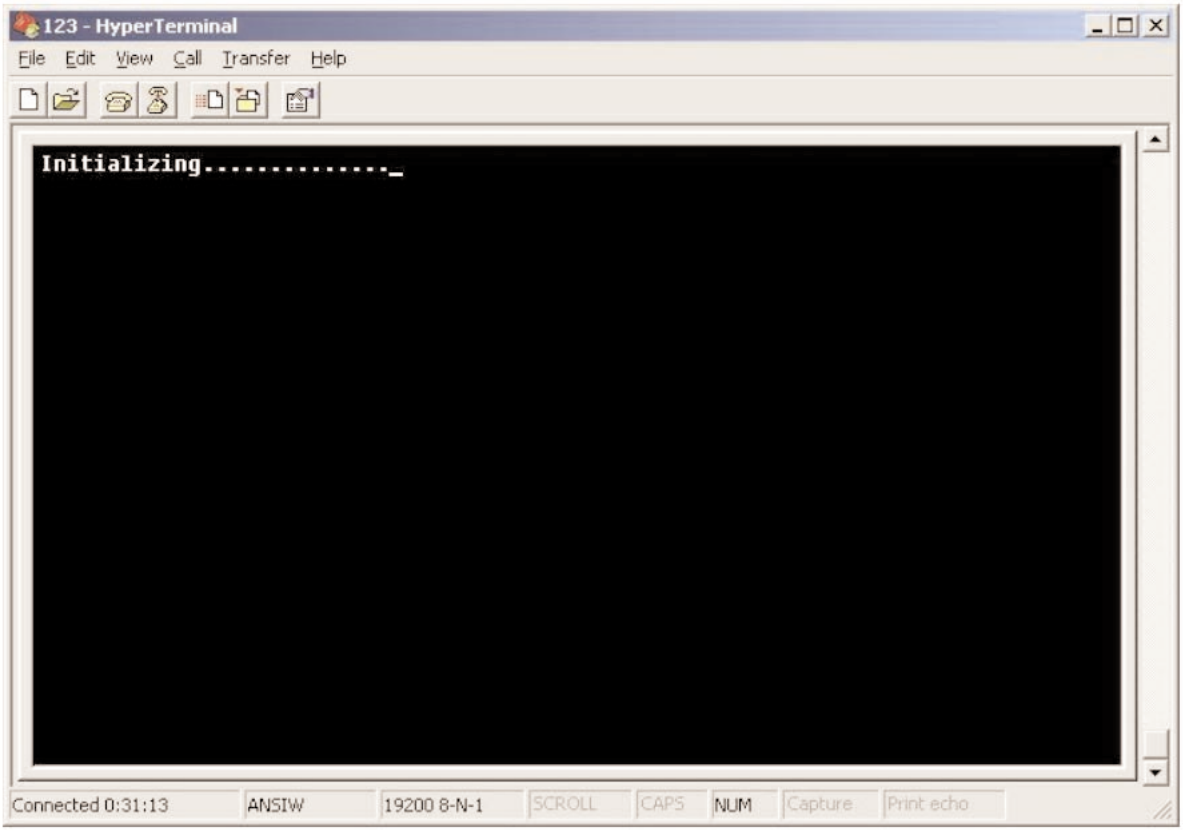


**Figure 4-5. Initializing screen.**

This screen displays while the Hyperterminal program initializes, then Figure 4-6 appears.


**Figure 4-6. Main Menu access screen.**

5. Type any key in Figure 4-6, and the Main Menu screen appears (see Figure 4-7).

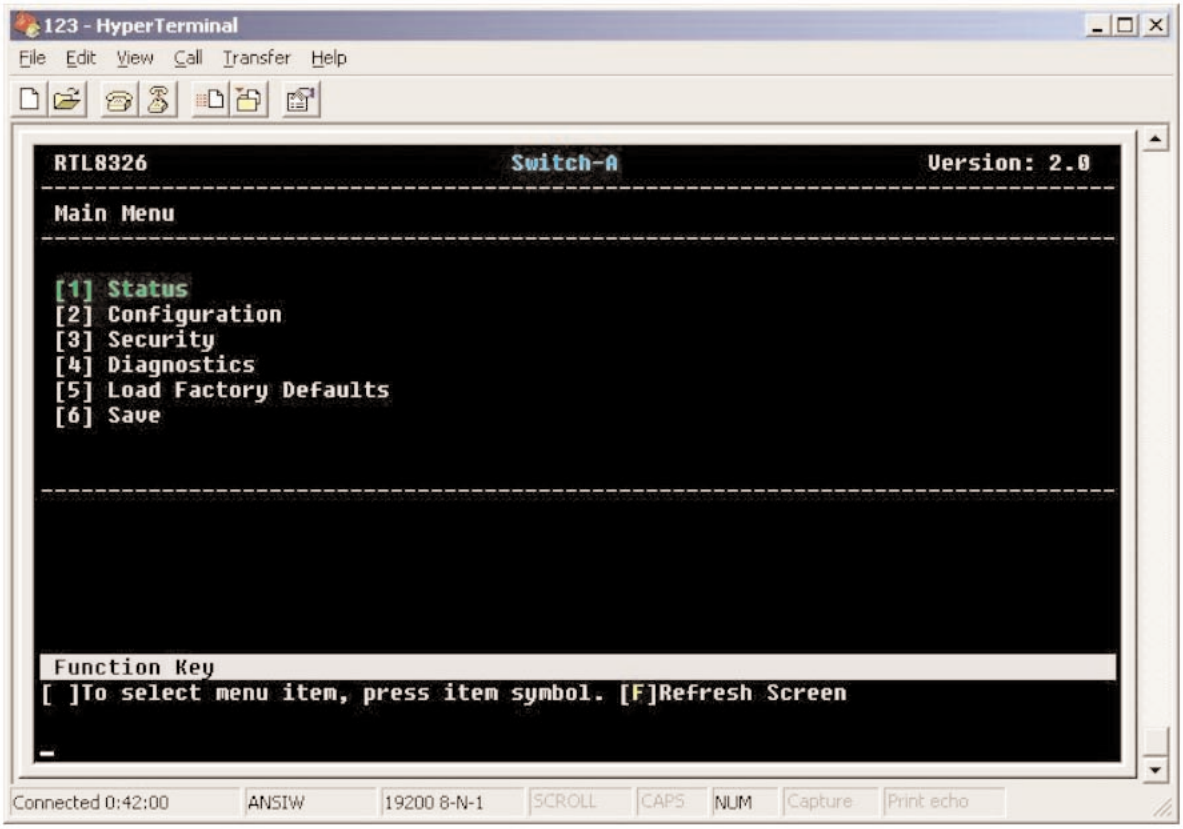


**Figure 4-7. Main Menu screen.**

6. To select from six options in the Main Menu (Status, Configuration, Security, Diagnostics, Load Factory Defaults, and Save), press the corresponding number key (**1–6**). To refresh the screen, press the **F** key.

## 4.1 Status

Press the **1** key to select the Status option from the Main Menu screen (Figure 4-7). The Status menu shown in Figure 4-8 appears. You can check each port's link status and configuration information in this screen.

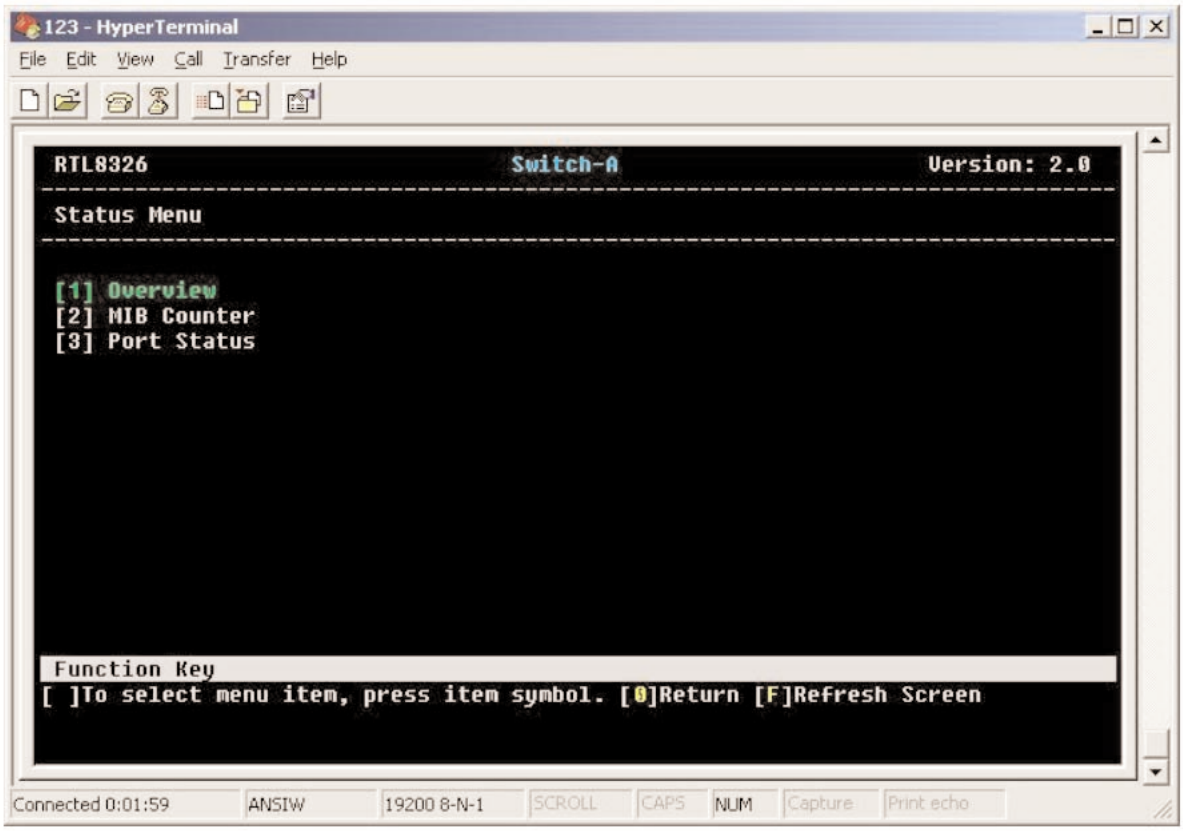


**Figure 4-8. Status menu.**

Press the **1**, **2**, or **3** key to select Overview, MIB Counter, or Port Status. These options are described in **Sections 4.1.1** through **4.1.3**.

Press the **F** key to refresh the screen.

Press the **0** key to return to the previous screen.

### 4.1.1 Overview

To get to the Overview screen, press the **1** key in the Status menu (Figure 4-8). Figure 4-9 appears. This application shows one switch's information at one time.

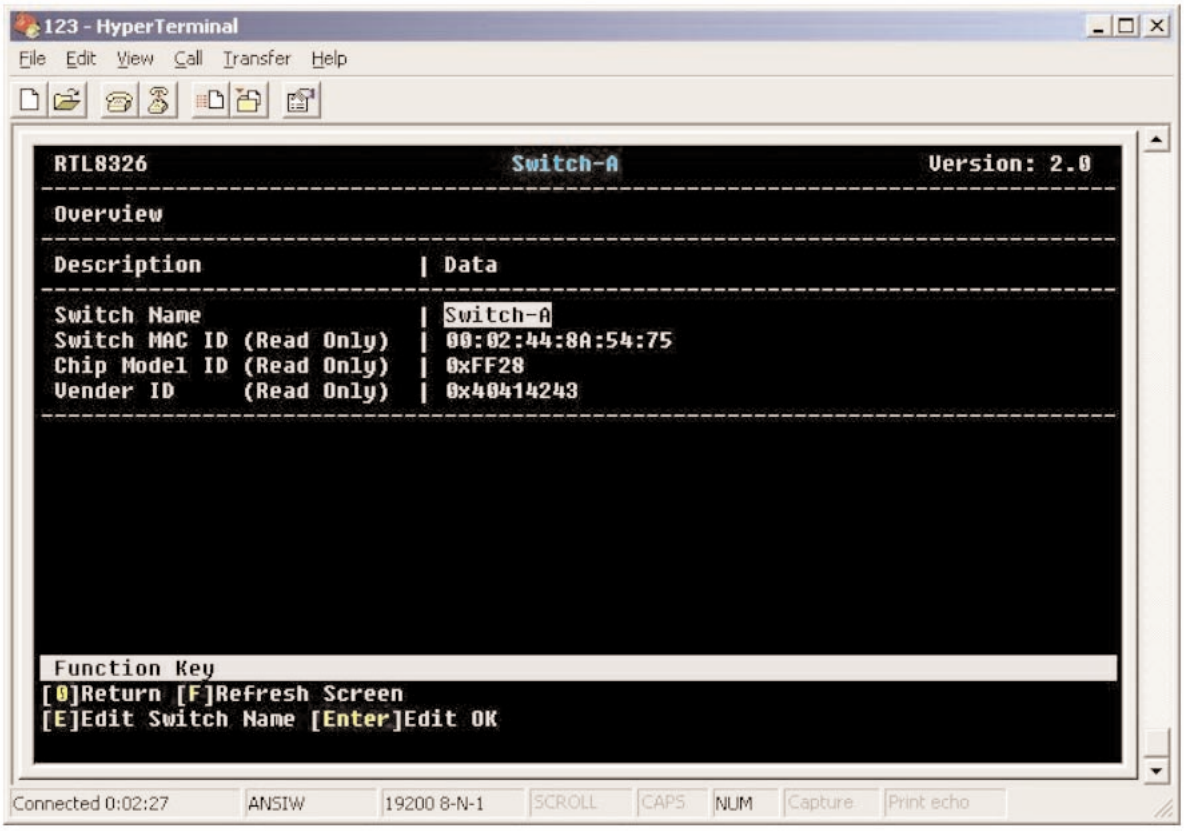


**Figure 4-9. Overview screen.**

Type in the switch's name. The switch's description (Switch MAC ID, Chip Model ID, and Vendor ID) appears in the Overview screen. Press the **0** key to return to the previous screen, or press the **F** key to refresh the screen. Press the **E** key to edit the switch name and the **Enter** key to save the switch name.

If you press the **E** key, Figure 4-10 appears.

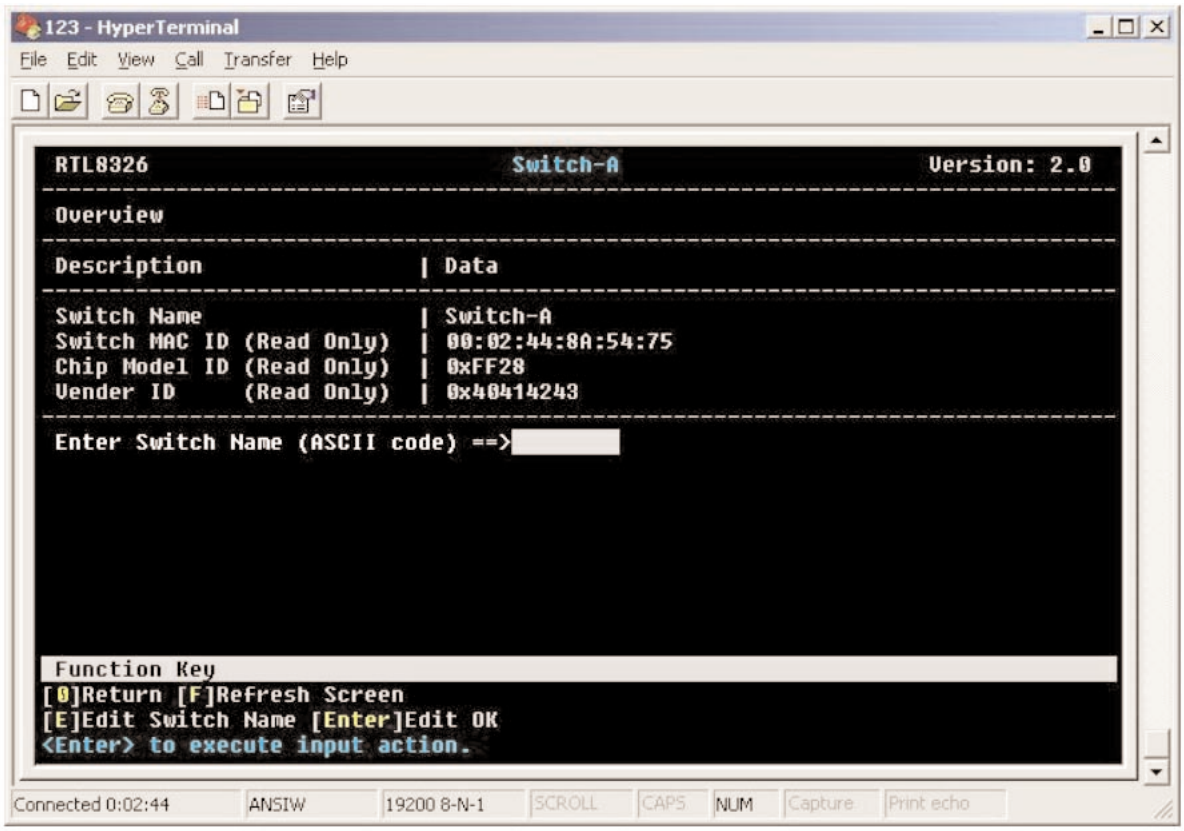


**Figure 4-10. Enter Switch Name screen.**

Type in the switch's name, then press the **Enter** key. Press **0** to return to the previous screen, or press **F** to refresh the screen.

### 4.1.2 MIB Counter

The MIB Counter screen shows information about the RX, TX, and diagnostic counters. To get to this screen, press the **2** key in the Status menu (Figure 4-8). Figure 4-11 appears.

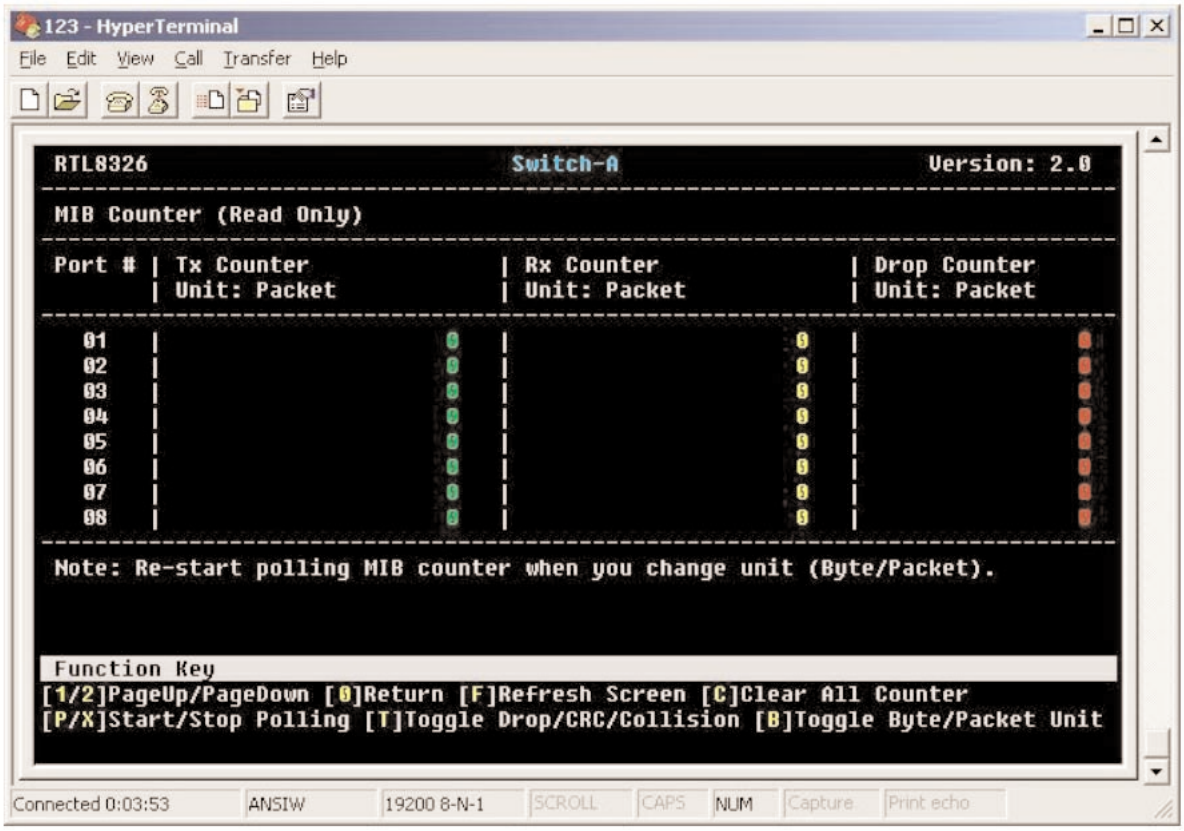


**Figure 4-11. MIB Counter screen.**

The screen displays the Tx counter packets, Rx counter packets, and Drop counter packets for each port.

To scroll through the page, press the **1** key for PageUp or the **2** key for PageDown. To return to the previous screen, press the **0** key. To refresh the screen, press the **F** key. To clear all counters, press the **C** key. To start polling, press the **P** key, or press the **X** key to stop polling. Toggle between Drop, CRC, and Collision by pressing the **T** key. To display either byte counter (not shown) or packet counter (shown in Figure 4-11) information, toggle between Byte and Packet Unit by pressing the **B** key. The byte counter shows the number of each port's sent and received bytes. The packet count shows the number of each port's sent and received packets.

### 4.1.3 Port Status

You can check each port's link status and configuration information in the Port Status screen. To get to the Port Status screen, press the **3** key in Figure 4-8. Figure 4-12 appears.

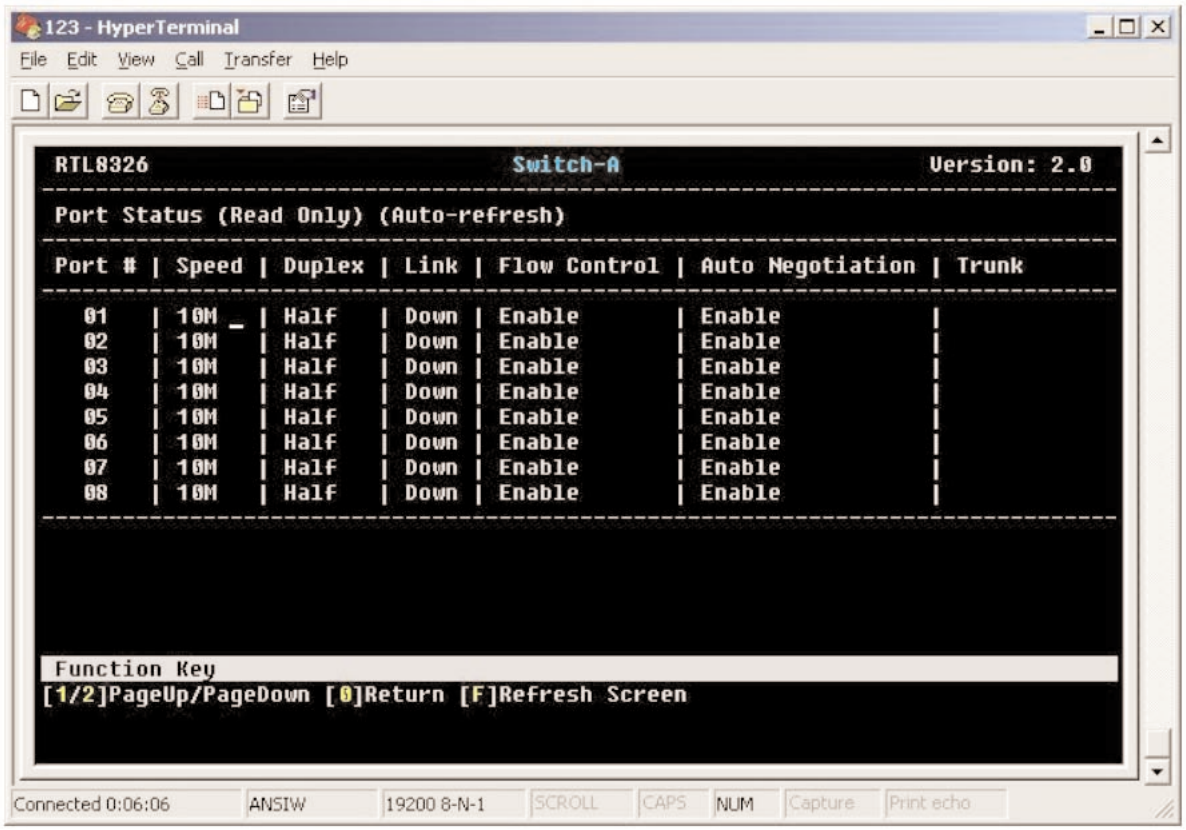


**Figure 4-12. Port Status screen.**

The Port Status screen displays the port number, speed, duplex, link, flow control, autonegotiation, and trunk values for each port. To scroll up through the page, press the **1** key. To scroll down, press the **2** key. To return to the previous screen, press the **0** key. To refresh the screen, press the **F** key.

## 4.2 Configuration

The Configuration screen (Figure 4-13) allows you to configure the port, trunking, global, QoS, priority tag insert/remove, VLAN global control, VLAN member setup, and device features settings. To get to this menu, press the **2** key in the Main Menu screen (Figure 4-7).

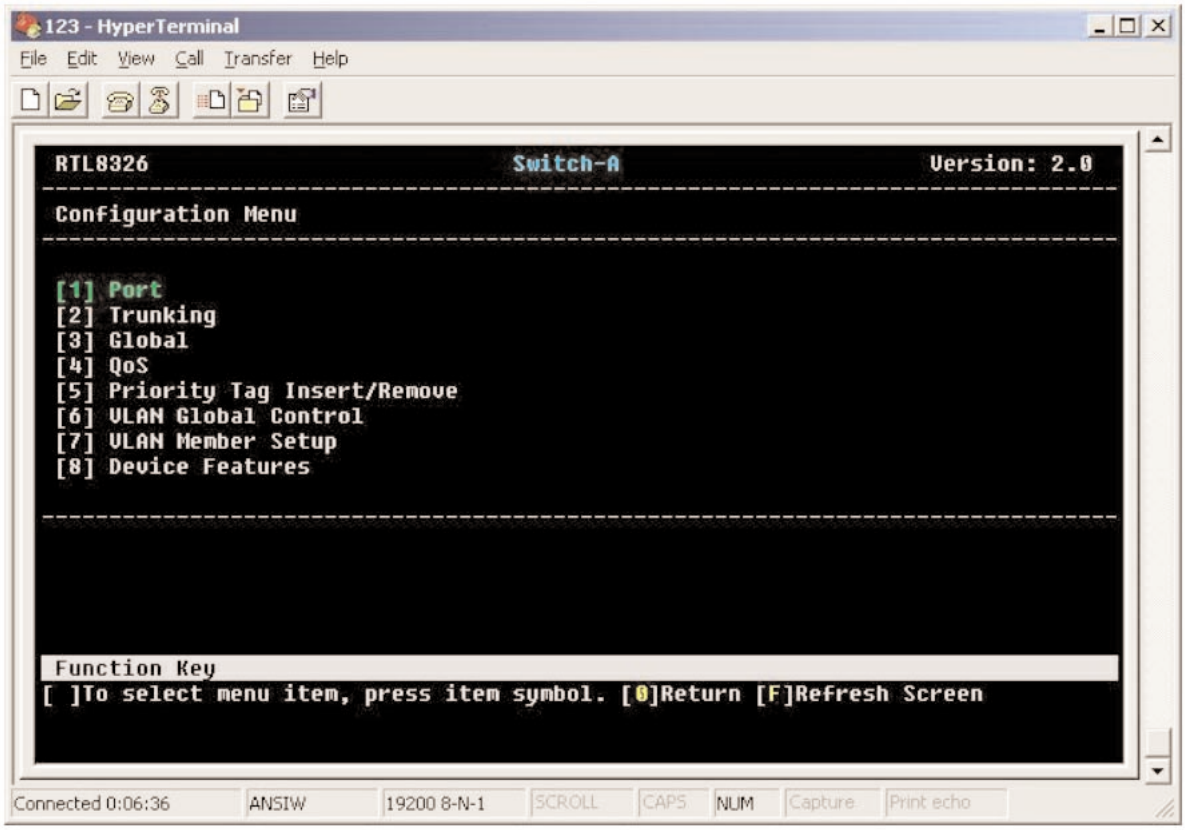


**Figure 4-13. Configuration screen.**

To select Port, press the **1** key. For trunking, press the **2** key. For global, press the **3** key. To select QoS, press the **4** key. To select priority tag insert/remove, press the **5** key. For VLAN global control, press the **6** key. For VLAN member setup, press the **7** key. To select device features, press the **8** key.

Press the **0** key to return to the previous screen.

Press the **F** key to refresh the screen.

### 4.2.1 PORT

When you press **1** in the Configuration screen (Figure 4-13), Figure 4-14 appears. Port information listed in the Port screen includes port number, enabled or disabled status, speed, flow control, RX bandwidth, and TX bandwidth.

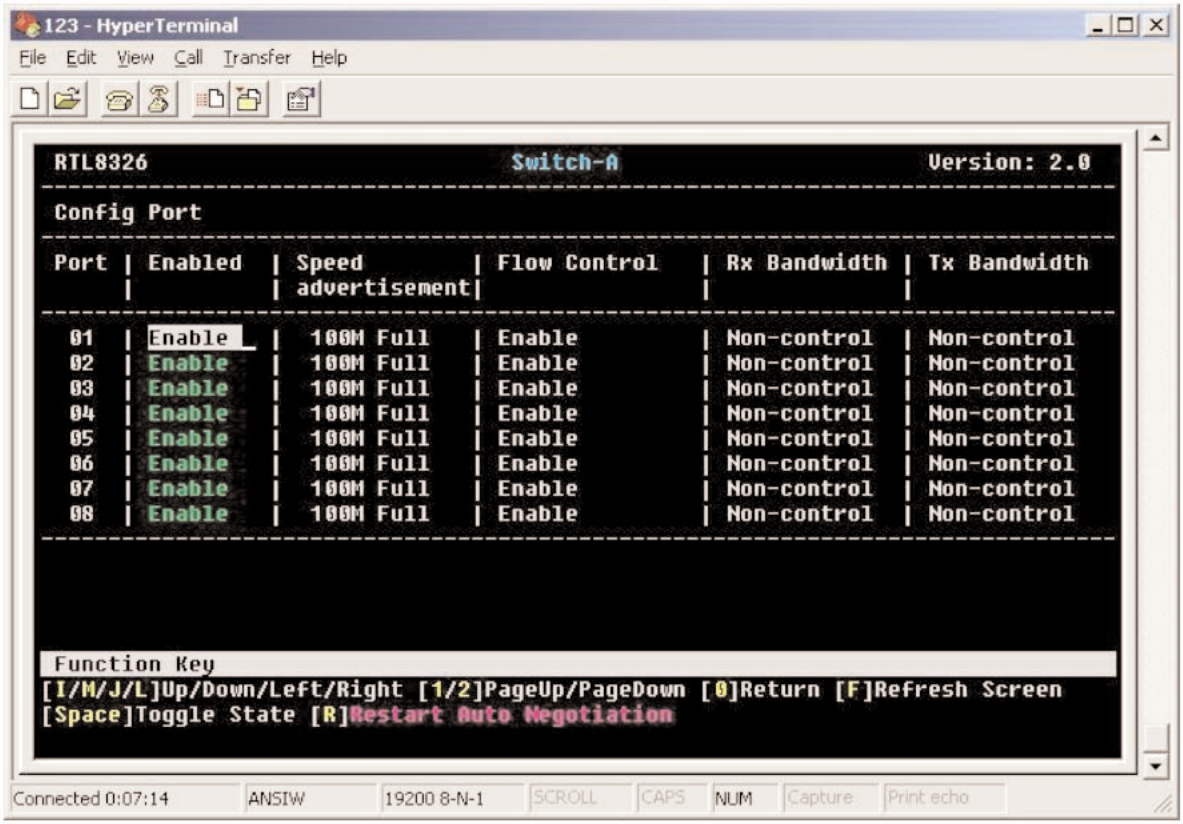


**Figure 4-14. Config port screen.**

Press the **I**, **M**, **J**, and **L** keys to move the cursor up, down, left, or right. To scroll to the top of the screen, press the **1** key. To scroll to the bottom of the screen, press the **2** key. Press the **0** key to return to the previous screen or **F** to refresh the screen. Press the space bar to toggle between options in any field. Press the **R** key to restart autonegotiation.

When you toggle to enable in the Enabled field, the port is set to enable. If you toggle to disable in this field, the port is set to disable. (The LED will still be lit—even if the port is set to disable—if a hardware connection still exists between the network interface card and the switch.)

In the speed field, you can toggle the space bar to choose what mode you want on each port. Options include 100M Full, 100M Half, 10M Full, and 10M Half. Toggle to the desired selection, then press **R** to save the selection. We recommend setting the speed to 100M Full.

### 4.2.2 TRUNKING

Set up port trunks via the Enable Trunking screen. To get to this screen, press the **2** key in Figure 4-13. Figure 4-15 appears.

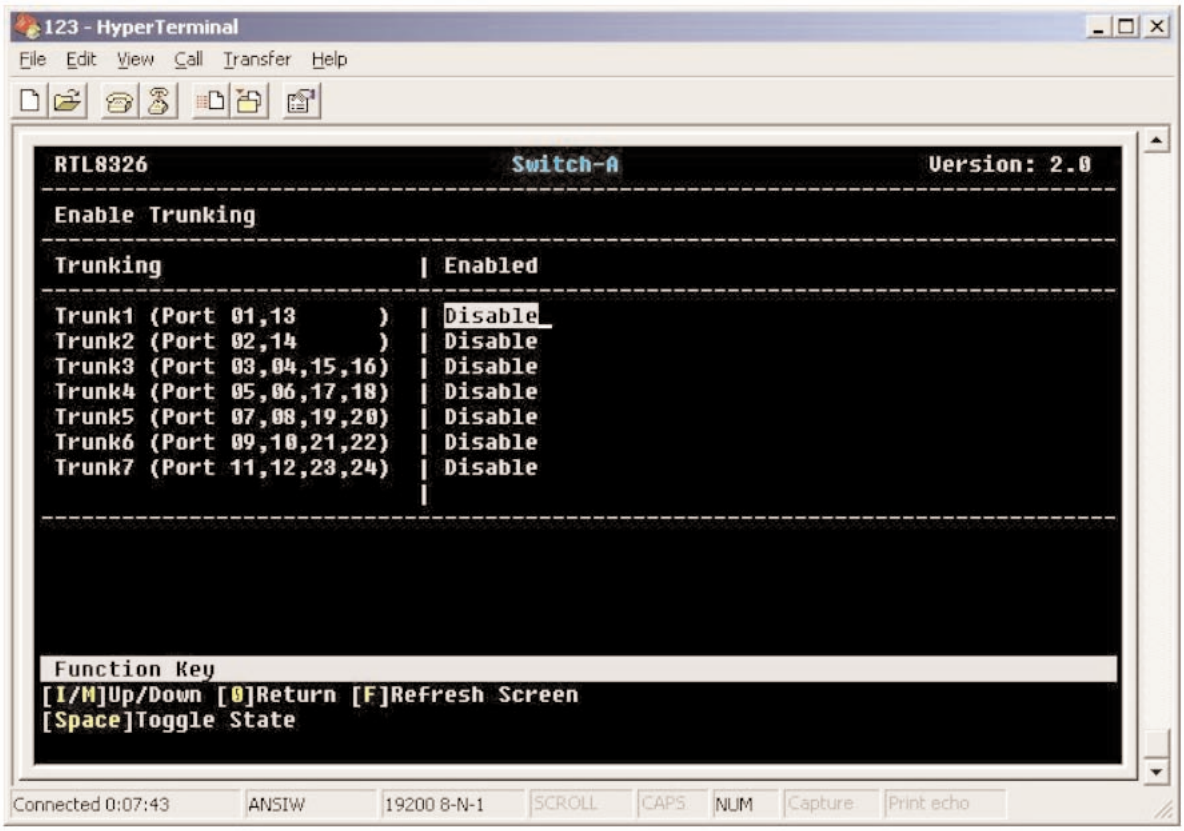


**Figure 4-15. Enable Trunking screen.**

Choose one trunk mode from the seven possible choices listed in Figure 4-15. You can only choose one Trunk mode for use (enable) at a time from the screen during configuration.

Press the **I** key to move the cursor up or the **M** key to move the cursor down. Press the **0** key to return to the previous screen. To refresh the screen, press the **F** button. Press the **Space** bar to toggle between enable and disable for each trunk group.

### 4.2.3 Global

Use the Global Configuration screen to set the global port control registers. To get to this screen, press the **3** key in Figure 4-13. Figure 4-16 appears.

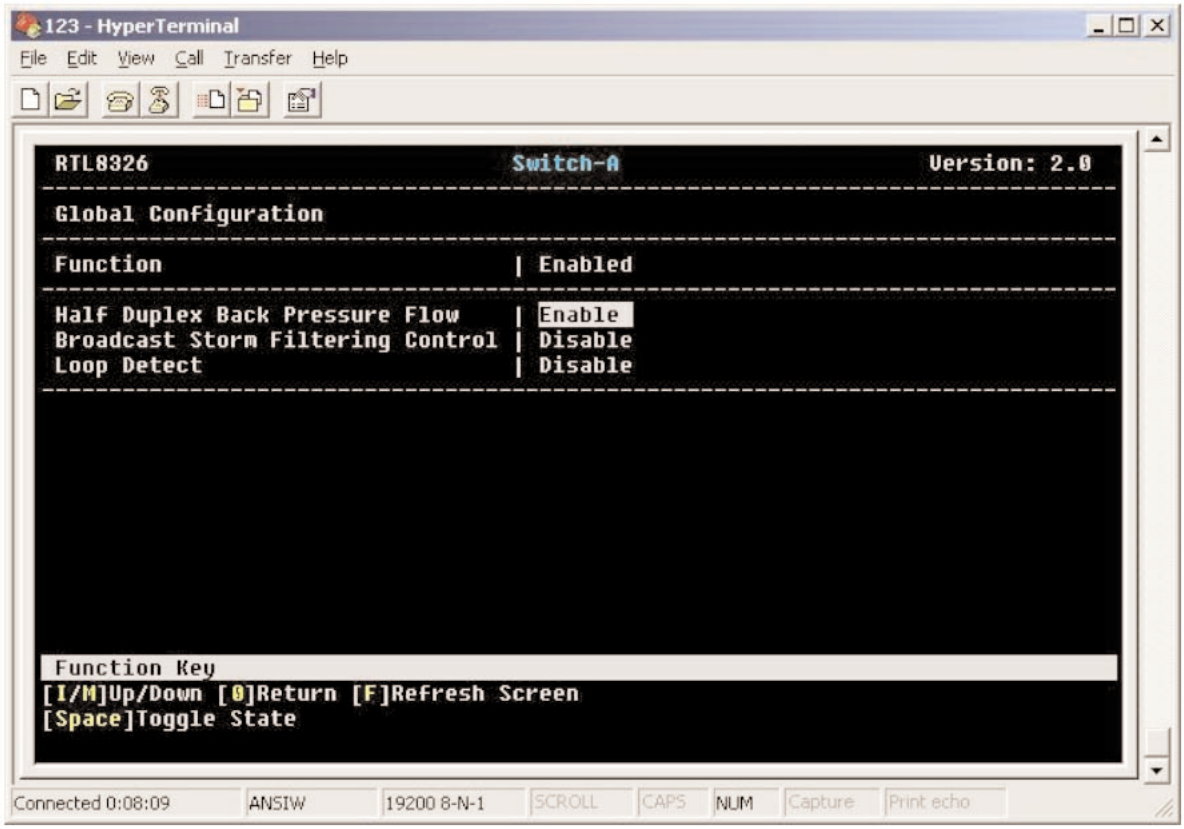


**Figure 4-16. Global Configuration screen.**

Enable or disable three functions in this screen: Half Duplex Back Pressure Flow, Broadcast Storm Filtering Control, and Loop Detect.

Press the **I** key to move the cursor up, or press the **M** key to move the cursor down. Press the **0** key to return to the previous screen. Press the **F** key to refresh the screen, or press the **Space** bar to toggle between Enable and Disable for any function.

**Table 4-1. Global Configuration screen options.**

| Option | Description |
|---|---|
| Half Duplex Backpressure Flow | In half mode, to prevent packet overflow (a problematic state in which packets received and transmitted in excess of buffer memory capacity are dropped), we recommend setting this option to Enable. |

**Table 4-1 (continued). Global Configuration screen options.**

| Option | Description |
|---|---|
| Broadcast Storm Filtering Control | A broadcast storm occurs when a large number of broadcast packets are received from a given port. Forwarding these packets can cause the network to slow down or time out. To avoid this, use broadcast storm control. We recommend setting this option to Enable. |
| Loop Detect | Enable this option to prevent undesirable loops in the network. This helps an Ethernet network function properly, since only one active path can exist between two stations. |

### 4.2.4 QoS

The QoS (Quality of Service) Configuration screen (Figure 4-17) is used to configure the QoS control registers. To get to this screen, press the **4** key in Figure 4-13.

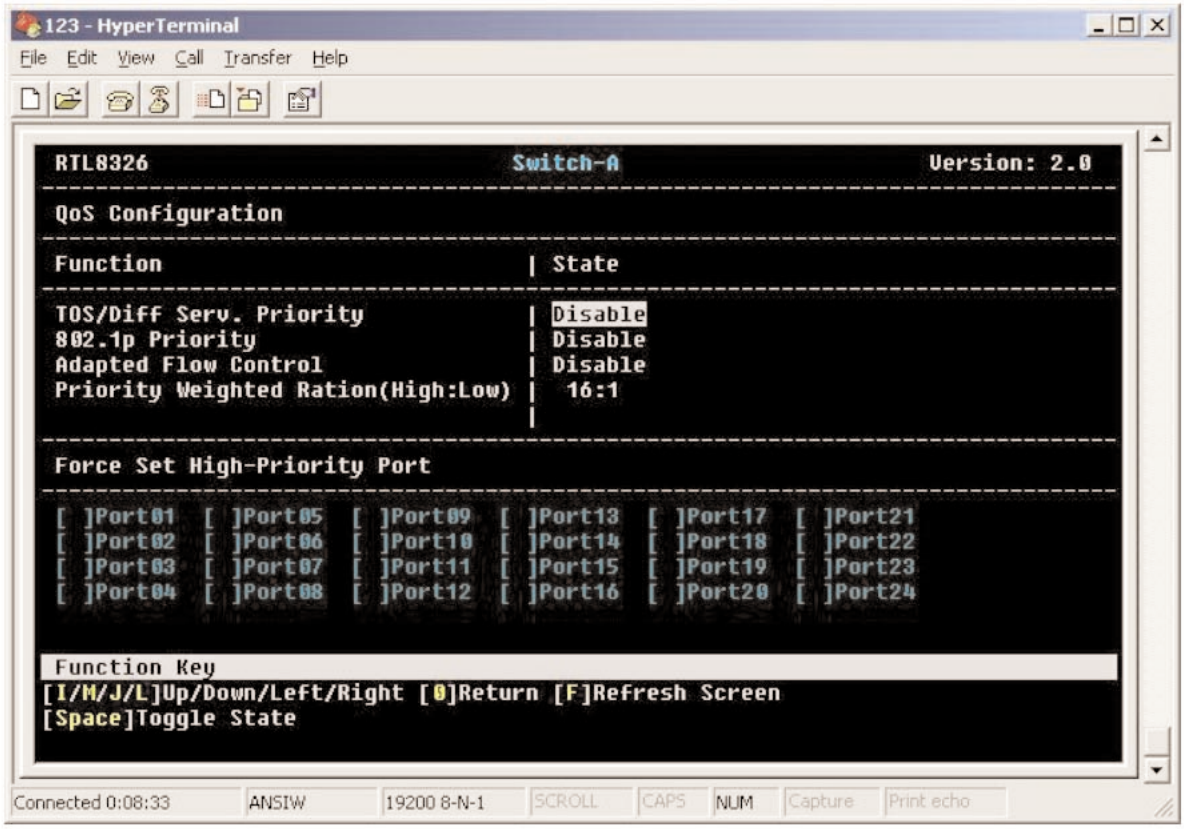


**Figure 4-17. QoS Configuration screen.**

Press the **I**, **M**, **J**, and **L** keys to move the cursor up, down, left, or right. Press the **0** key to return to the previous screen.

Press the **F** key to refresh the status of the registers. Press the **Space** key to toggle between Enable and Disable.

Table 4-2 describes the options shown in Figure 4-17.

**Table 4-2. QoS functions.**

| Option | Description |
|---|---|
| TOS/Diff Serv. Priority | When you enable this function, the switch can recognize TCP/IP Differentiated Services Codepoint (DSCP) priority information from the DS field defined in RFC2474. The DS field byte for IPv4 is the Type-of-Service (TOS) octet, and for IPv6, it is the Traffic-Class octet. The recommended DiffServ Codepoints are defined in RFC2597 to classify the traffic into different service classes. This switch can extract the codepoint value of the DS field from IPv4 and IPv6 packets and identify the priority of the incoming IP packet according to the following definitions.<br><br>High priority: DS field = EF (Expected Forwarding): 101110; AF (Assured Forwarding): 001010; 010010; 011010; 100010; Network Control: 11x000<br><br>Low priority: DS field = other values |
| 802.1p Priority | When 802.1p tag priority is enabled, the switch can recognize the 802.1Q VLAN tag frames and extract the 3-bit user priority information from the VLAN tag. The default user priority threshold setting is 3. VLAN-tagged frames with a user priority value of 4–7 will be treated as high-priority frames, and VLAN-tagged frames with user priority values of 0–3 will be treated as low-priority frames. |
| Adapted Flow Control | The switch can automatically turn off 802.3x flow control and backpressure flow control for 1 to 2 seconds whenever the port receives high-priority frames. The flow control is re-enabled when no priority frames are received for 1 to 2 seconds. |
| Priority Weighted Ratio (High:Low) | This switch supports 2 level priority queues. The queue service rate is based on the packet-based Weighted Round Robin algorithm. The packet-based service weight ratio of high-priority and low-priority queuing can be set as 4:1, 8:1, 16:1, or Always high priority first. The default setting is 16:1. |
| Force Set High-Priority Port | When port-based priority is applied, any packet received from the high-priority port will be treated as a high-priority frame. |

### 4.2.5 Priority Tag Insert/Remove

To get to the Priority Tag Insert/Remove screen (Figure 4-18), press the **5** key in Figure 4-13.

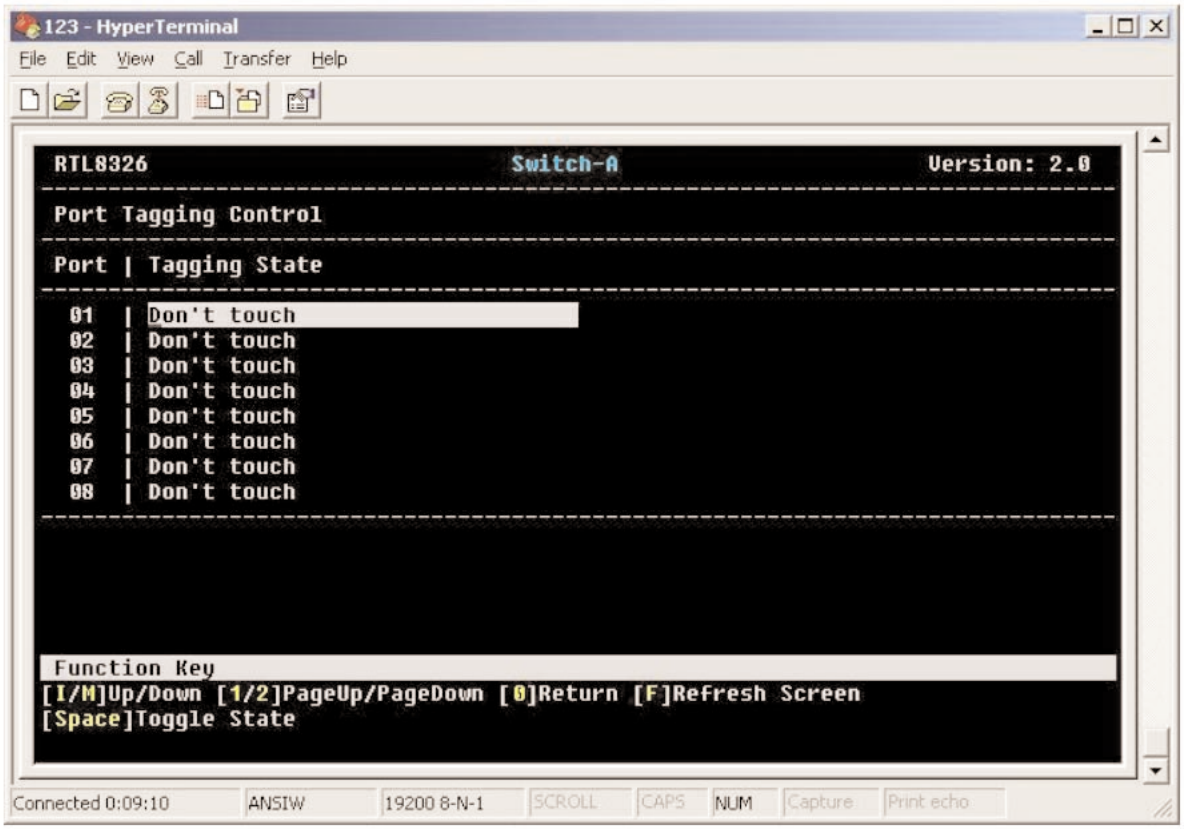


**Figure 4-18. Priority Tag Insert/Remove screen.**

Press the **Space** bar to toggle between the four VLAN Tag Control states described in Table 4-3.

**Table 4-3. Priority tag states.**

| Option | Description |
|---|---|
| Remove | Remove the VLAN tag from all tagged frames. |
| Insert tag into high-priority frame | Insert a priority tag into the untagged high-priority frame. (Set priority field = 7, VID field = 0 for high-priority frame.) |
| Insert tag into all untagged frames | Insert a priority tag into all untagged frames. (Set priority field = 7, VID field = 0 for high-priority frame; Set priority field = 0, VID field = 0 for low-priority frame.) |
| Don't touch | Do not modify the packet. |

## NOTE

**The function can be enabled even when the VLAN function is not enabled.**

Press the **I** key to move the cursor up to the previous field, or press the **M** key to move the cursor down to the next field. Press the **1** key to page up or press the **2** key to page down. Press the **0** key to return to the previous screen. Press the **Space** bar to toggle between tagging states. Press the **F** key to refresh the screen.

### 4.2.6 VLAN Global Control

This screen sets VLAN control registers. To get to this screen, press the **6** key in Figure 4-13. Figure 4-19 appears.

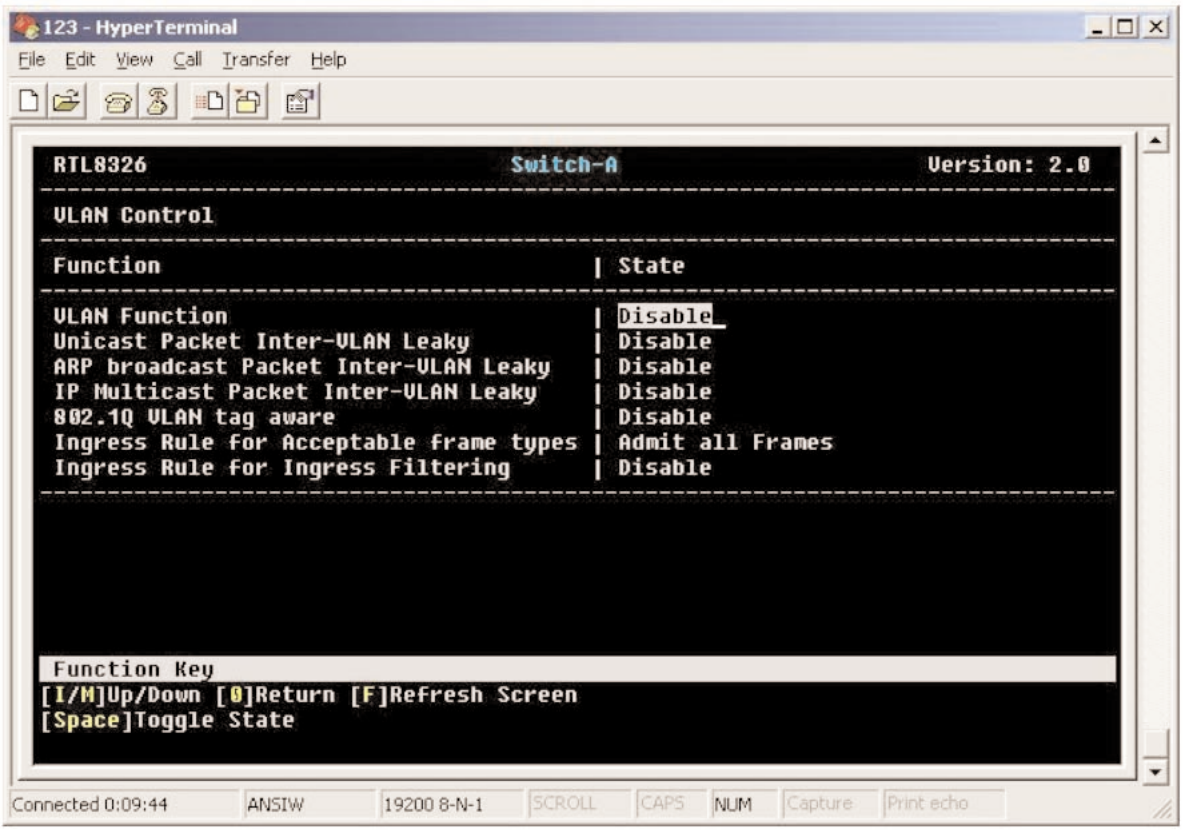


**Figure 4-19. VLAN Control screen.**

To move the cursor up, press the **I** key. To move the cursor down, press the **M** key. To return to the previous screen, press the **0** key. To refresh the screen, press the **F** key. To toggle between state fields (enable or disable), press the **Space** bar.

Table 4-4 describes the options shown in Figure 4-19.

**Table 4-4. VLAN Control screen options.**

| Parameter | Description |
|---|---|
| VLAN Function | Toggle between Enable/Disable to enable or disable the VLAN state. |
| Unicast Packet Inter-VLAN Leaky | A received unicast frame will be forwarded to the destination port when its destination port is in the same VLAN as the source port (if this function is enabled). The frame will be discarded when the destination port and source port belong to different VLANs. |
| ARP Broadcast Packet Inter-VLAN Leaky | The packets with ARP frames will broadcast to all switch ports (if this function is enabled). |
| IP Multicast Packet Inter-VLAN Leaky | This function causes IP multicast packets to be flooded to all the multicast address group members set. The VLAN member set domain limitation will be ignored. |
| 802.1Q VLAN Tag Aware | This function enables/disables 802.1Q VLAN Tag. |
| Ingress Rule for Acceptable Frame Types | This function admits only VLAN-tagged frames. |
| Ingress Rule for Ingress Filtering | This function enables filtering of the frame received from a port that is not included in the classified VLAN group. |

### 4.2.7 VLAN Member Setup

This screen (Figure 4-20) allows you to set the VLANs. To get to this screen, press the **7** key in the Configuration screen (Figure 4-13). This switch supports port-based and 802.1Q VLAN.

This switch supports a maximum of 32 VLAN group entries for setting in default, but less than 32 entries can be used (this depends on whether or not you set the VLAN with an overlap port [An overlap port is one user port in two VLAN groups.]).

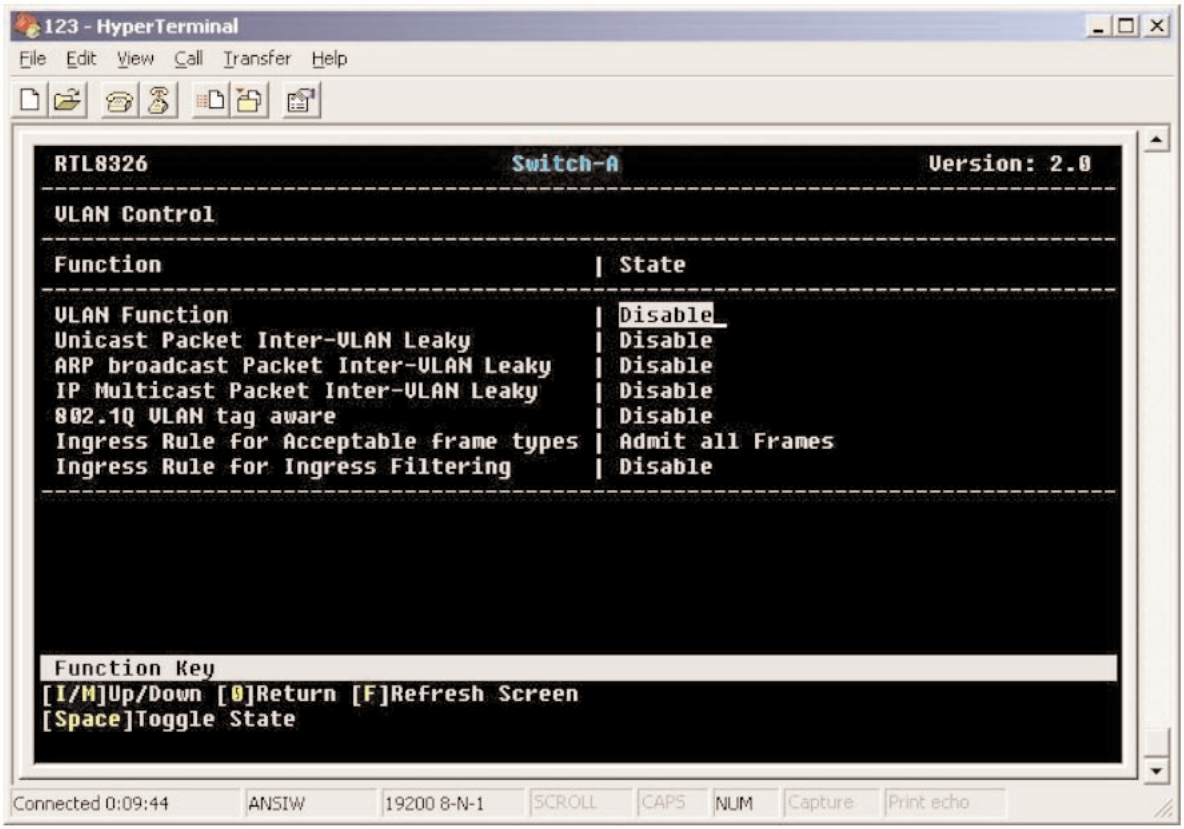


**Figure 4-20. VLAN Control screen.**

Table 4-5 describes the options shown in Figure 4-20. Toggle the space bar to enable or disable an option.

**Table 4-5. VLAN Control options.**

| Option | Description |
|---|---|
| VLAN Function | If you want to support up to 32 VLAN group entries, this will need to be Enabled. |
| Unicast Packet Inter-VLAN Leaky | When enabled, a received unicast frame will be forwarded to the destination port when the destination port is in a different VLAN than the source port. When disabled, the frame will be discarded. |

**Table 4-5 (continued). VLAN Control options.**

| Option | Description |
|---|---|
| ARP Broadcast Packet Inter-VLAN Leaky | When enabled, packets with ARP frames will broadcast to all switch ports. When disabled, packets with ARP frames won't broadcast to all switch ports. |
| IP Multicast Packet Inter-VLAN Leaky | When enabled, IP multicast packets will be sent to all multicast address group numbers, and the VLAN member set domain limitation will be ignored. When disabled, no IP multicast packets will be sent. |
| 802.1Q VLAN Tag Aware | When enabled, VLAN tags are active; when disabled, VLAN tags aren't active. |
| Ingress Rule for Acceptable Frame Types | When enabled, admit all frames. When disabled, admit only VLAN-tagged frames. |
| Ingress Rule for Ingress Filtering | When enabled, the frames received from a port that is not included as a classified VLAN group member will be filtered. When disabled, the frames won't be filtered. |

Press the **I** or **M** keys to move the cursor up or down. Press the **0** key to return to the previous screen. Press the **F** key to refresh the screen. Press the **Space** bar to toggle the state between enable and disable. When you toggle to Enable in the VLAN Function field, Figure 4-21 appears.

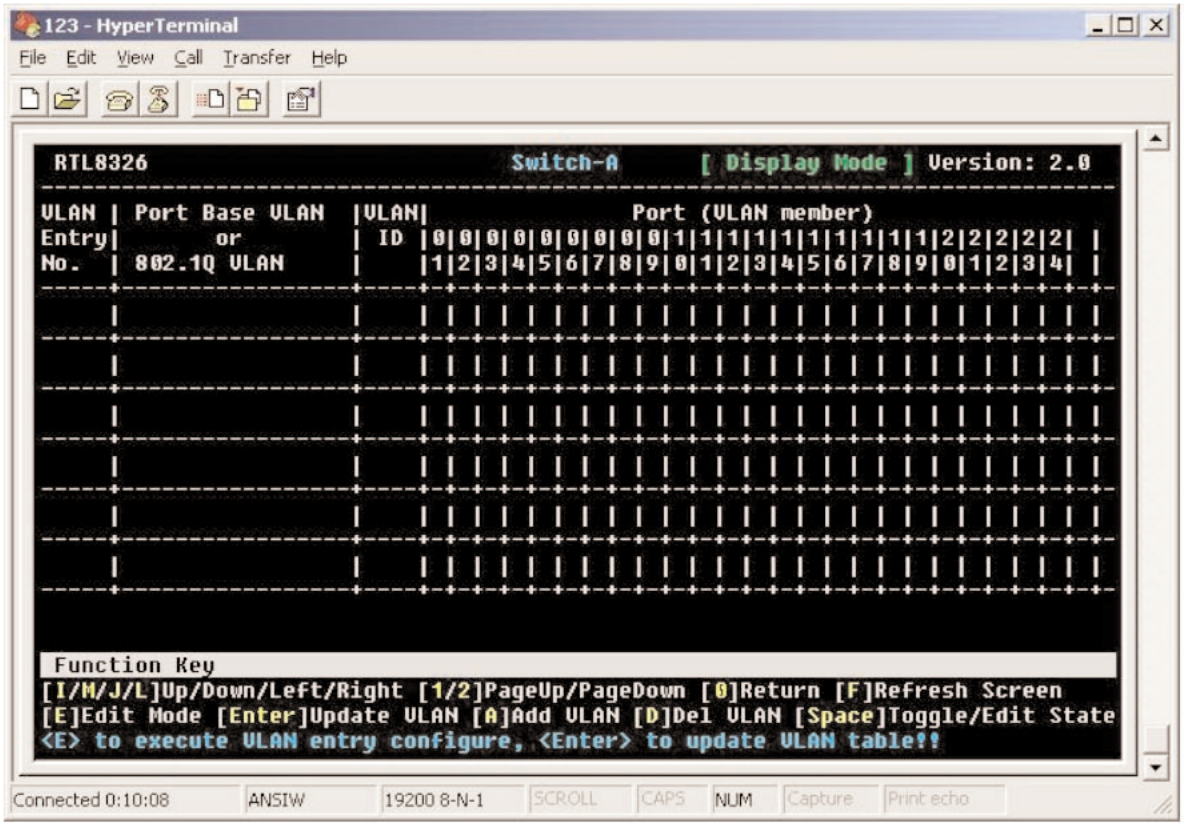


**Figure 4-21. VLAN Configuration screen.**

Press the **I**, **M**, **J**, and **L** keys to move the cursor up, down, left, or right. Press the **1** key to move the page up, or press the **2** key to move the page down. Press the **Return** key to go back to the previous screen. Press the **F** key to refresh the screen. Press the **E** key to enter Edit mode. Press the **Enter** key to update the VLAN. Press the **A** key to add a VLAN, or press the **D** key to delete a VLAN. Press the **Space** bar to toggle between Edit states. Press **E** to execute a VLAN configuration, and press **Enter** to update the VLAN table.

### 4.2.8 Device Features

To get to this screen (Figure 4-22), press the **8** key in Figure 4-13.

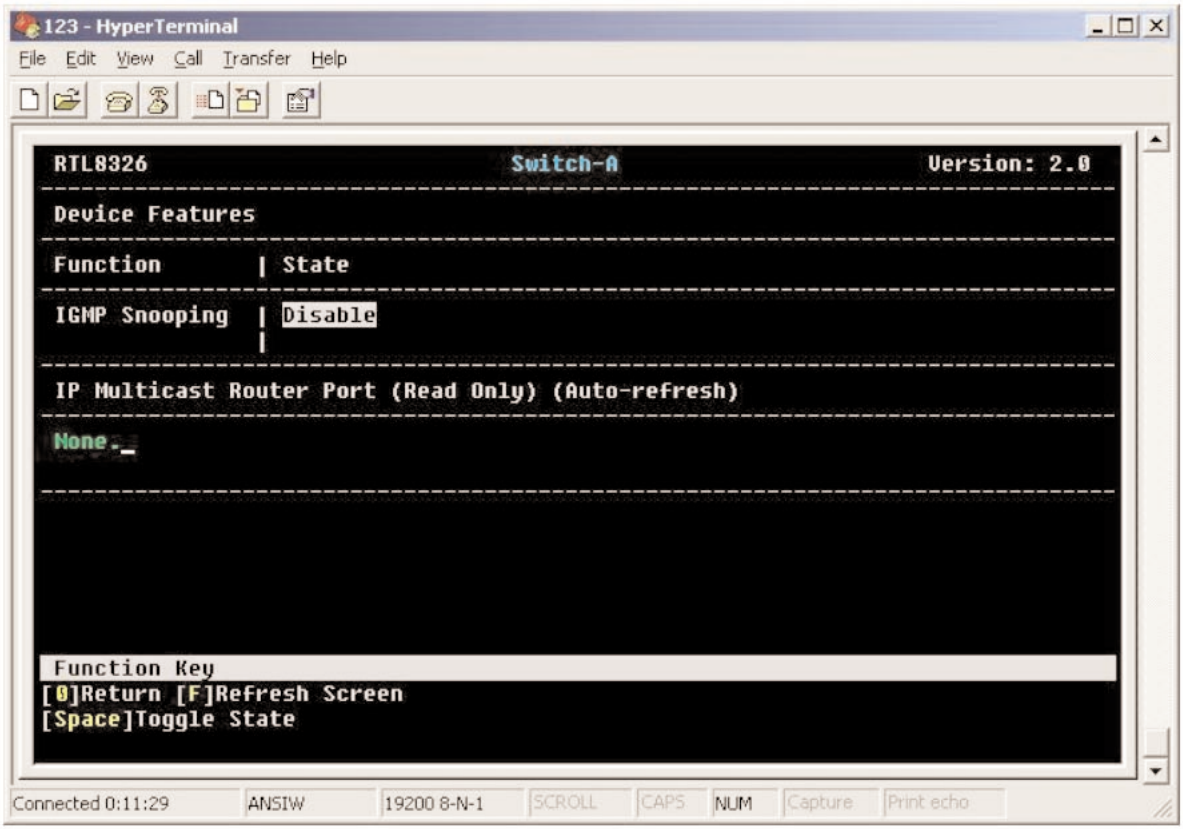


**Figure 4-22. Device Features screen.**

Press the **0** key to return to the previous screen.

Press the **Space** bar to toggle between Enable and Disable IGMP Snooping control.

Press the **F** key to refresh the screen.

## 4.3 Security

To get to the screen shown in Figure 4-23, press the **3** key in the Main Menu screen (Figure 4-7).

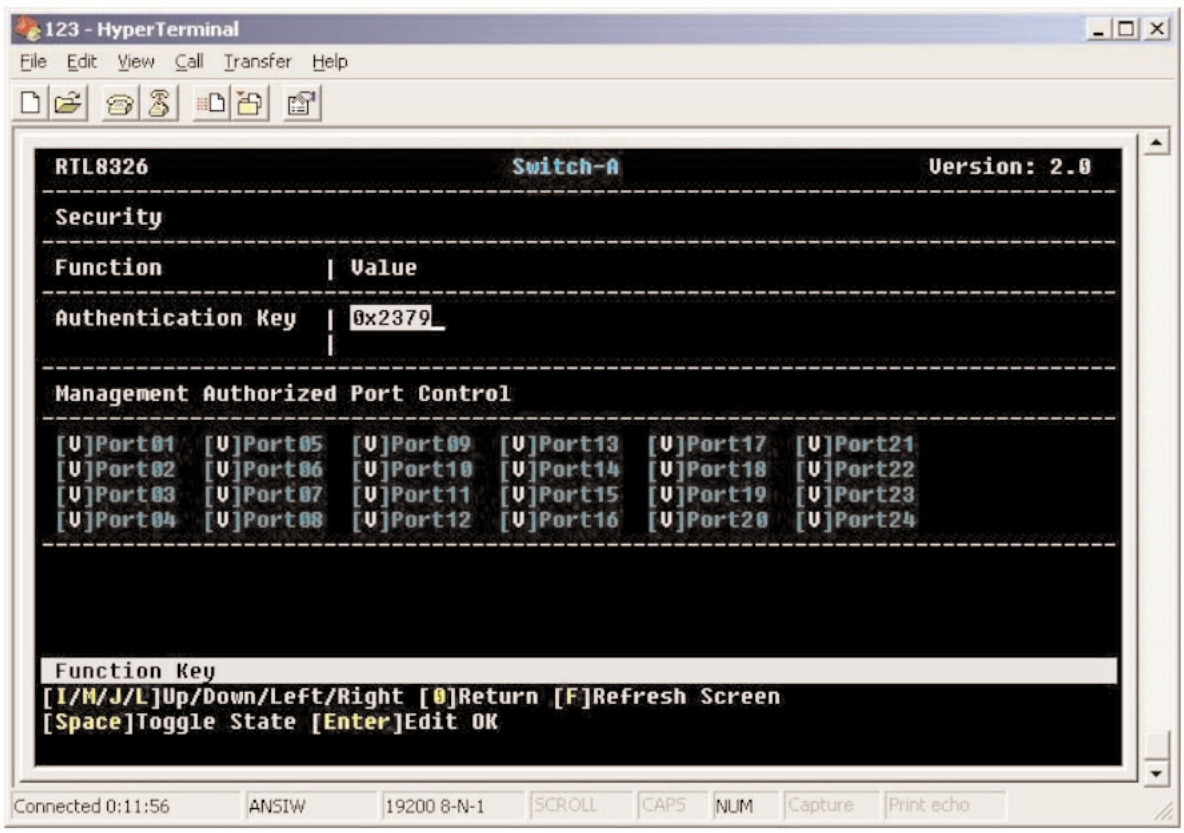


**Figure 4-23. Security screen.**

Type in the appropriate Authentication Key value.

Press the **I**, **M**, **J**, and **L** keys to move the cursor up, down, left, or right. Press the **0** key to go back to the previous screen. Press the **F** key to refresh the screen. Press the **Space** bar to toggle between states. Press the **Enter** key to update authentication key.

## 4.4 Diagnostics

This screen (Figure 4-24) shows diagnostics information. To get to this screen, press the **4** key in the Main Menu screen (Figure 4-7).

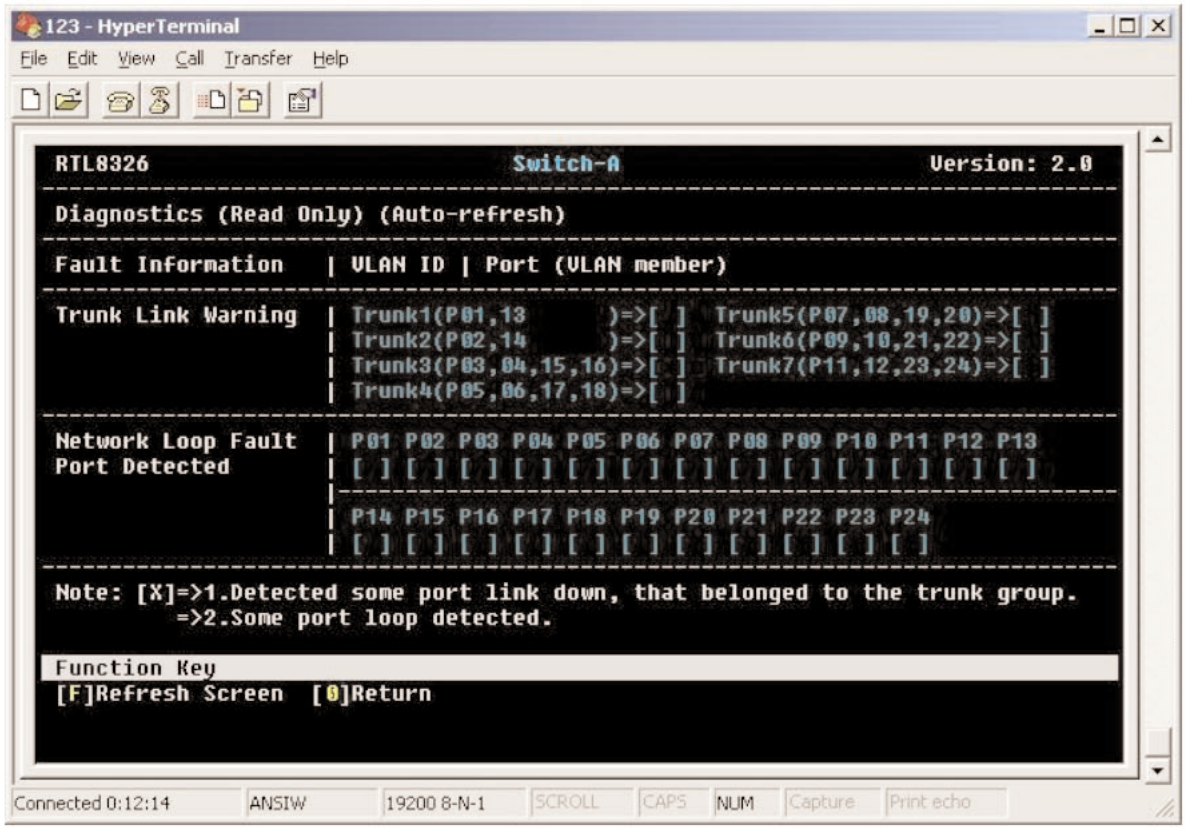


**Figure 4-24. Diagnostics screen.**

Table 4-6 describes the screen shown in Figure 4-24. This is a read-only screen, so you won't be able to change any values on it.

**Table 4-6. Diagnostics screen parameters.**

| Parameter | Description |
|---|---|
| Trunk Link Warning | X appears when the corresponding trunk port does not link to the switch after the Trunk function is enabled. |
| Network Loop Fault Port Detected | X appears when there is an undesirable loop in the network caused by a cable that's plugged into the corresponding port. |

Press the **F** key to refresh the screen, or press the **0** key to return to the previous screen.

## 4.5 Load Factory Defaults

Press the **5** key in the Main Menu screen (Figure 4-7) to load the factory-default settings. Figure 4-25 appears. Press the **Y** key to load the factory defaults and reset the hardware, or press **N** to cancel. Then press the **6** key to save the setting. Or, press the **F** key to refresh the screen.

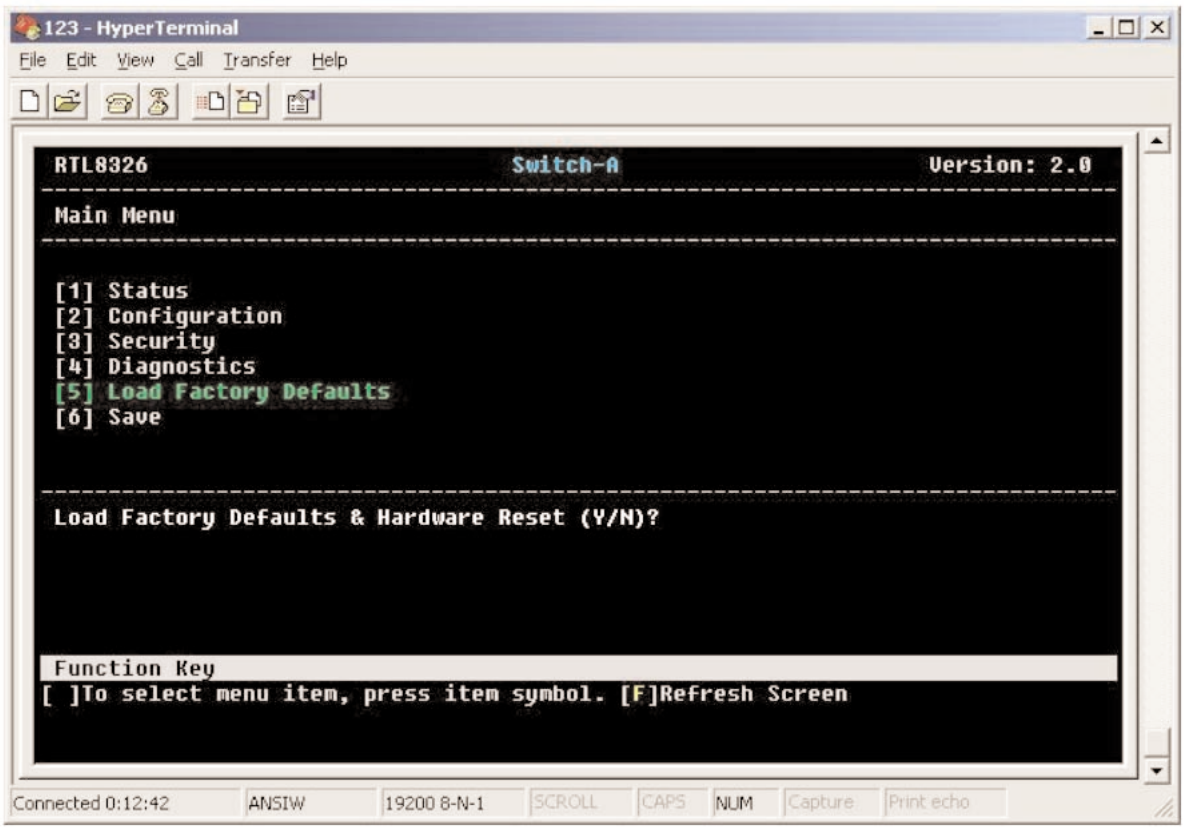


**Figure 4-25. Load Factory Defaults screen.**

## 4.6 Save

Save your configuration after making any changes. See Figure 4-26. Press the **6** key in the Main Menu screen (Figure 4-7). Then press the **Y** key to save the changes, or press the **N** key to cancel. Press the **F** key to refresh the screen.

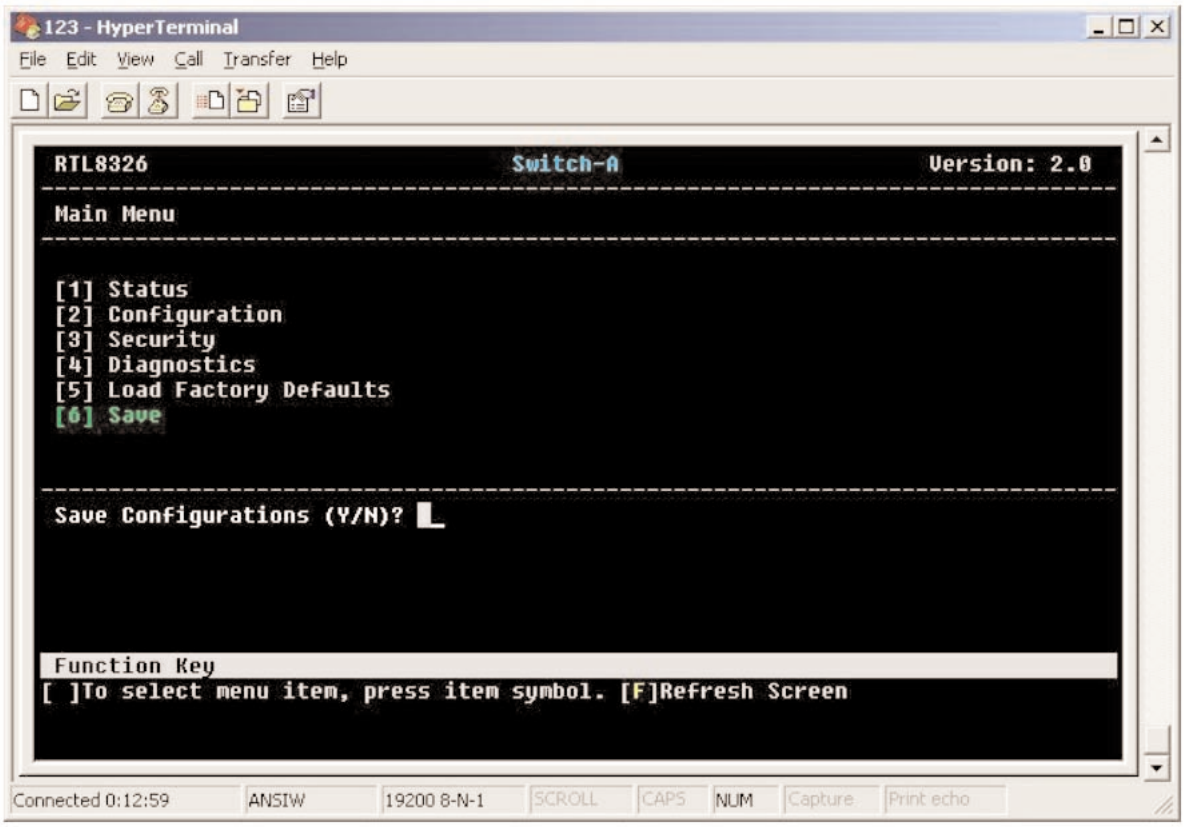


**Figure 4-26. Save Configuration screen.**

# 5. Troubleshooting

## 5.1 Calling Black Box

If you determine that your 24-Port +1 Fiber Module Slot Fast Ethernet Switch with VLAN is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box at 724-746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.

## 5.2 Shipping and Packaging

If you need to transport or ship your 24-Port + 1 Fiber Module Slot Fast Ethernet Switch with VLAN:

- Package it carefully. We recommend that you use the original container.
- If you are shipping the 24-Port + 1 Fiber Module Slot Fast Ethernet Switch with VLAN for repair, make sure you include everything that came in the original package. Before you ship, contact Black Box to get a Return Authorization (RA) number.