BLACK BOX®
NETWORK SERVICES

Managed Express Switches

LB9032A

**FEDERAL COMMUNICATIONS COMMISSION AND
CANADIAN DEPARTMENT OF COMMUNICATIONS
RADIO FREQUENCY INTERFERENCE STATEMENT**

Class B Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an experienced radio/TV technician for help.

Caution:

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

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B certified device.

This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

Normas Oficiales Mexicanas (NOM)
INSTRUCCIONES DE SEGURIDAD

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.

Preface

This manual describes how to install and use the Manageable 8-Port 10/100BASE-TX Compact Switch. This switch introduced here provides eight 10/100 RJ-45 ports or seven 10/100 RJ-45 ports plus one fiber port in a compact size box, and integrates full wire speed switching technology with SNMP/RMON web-based management functions. This switch brings a simple answer to today's complicated networking environments.

To get the most out of this manual, you should have an understanding of Ethernet networking concepts.

In this manual, you will find:

Features on the switch
Illustrative LED functions
Installation instructions
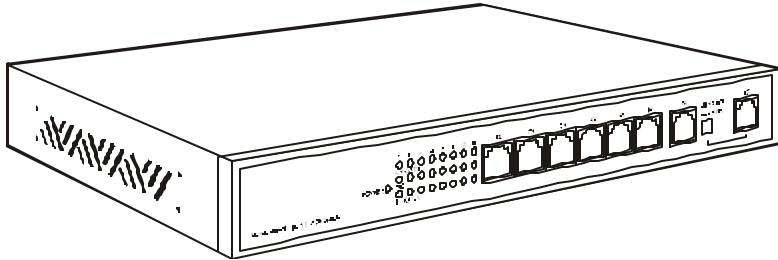Management Configuration
SNMP, DHCP…
Specifications

Table of Contents

Product Overview

Manageable 8-Port 10/100TX Compact Switch

Front View

Package Contents

When you unpack the product package, you shall find the items listed below. Please inspect the contents, and report any apparent damage or missing items immediately to your authorized reseller.

- ☞ *This Management Switch*
- ☞ *User's Manual*
- ☞☞ *AC power cord (eight 10/100 RJ-45 ports and seven 10/100 RJ-45 ports plus one fiber port)*
- ☞ **External power adapter (seven 10/100 RJ-45 ports plus one fiber port)**

Product Highlights

Basic Features

Provides eight 10/100 RJ-45 ports or seven 10/100 RJ-45 ports plus one fiber port
Multi-mode fiber using SC, ST, VF-45, or MT-RJ connector up to 2km; single-mode fiber using SC connector up to 75km
Auto-negotiation for speed and duplexity on all ports
Full wire-speed forwarding rate
Store-and-forward mechanism
Back-pressure and IEEE 802.3x compliant flow control
Supports 12K MAC addresses
Provides 2 Mbytes memory buffer
Front panel port status LEDs
? ? Wall-mountable compact size

Management Support

VLAN
802.1Q tagged VLAN (up to 64 VLANs)

TRUNKING
MAC-based Trunking, up to four groups with a maximum of four ports each group
Load sharing based on source and destination MAC addresses

PORT-MIRRORING
Port-mirroring provided through dedicated port, Port 1

INTERNETWORKING PROTOCOLS
Bridging:
    802.1D Spanning Tree
802.1P/Q – GARP/GVRP
IP Multicast:
    IGMP Snooping
IP Multicast Packet Filtering
Maximum of 256 VLANs and IP multicast sessions

NETWORK MANAGEMENT METHODS
Console port access via RS-232 cable
Telnet remote access
SNMP agent:
MIB-2 (RFC1213)
Bridge MIB (RFC1493)
RMON MIB (RFC1757) – statistics, history, alarm and events
VLAN MIB (802.1Q/RFC2674)
Private MIB
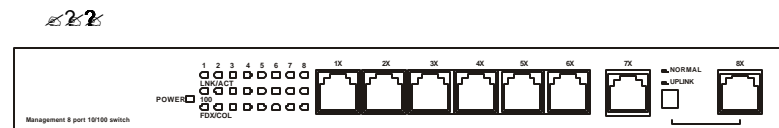Java applet-based MIB browser
Web browser support based on HTTP server and CGI parser
TFTP software-upgrade capability

Front Panel Display

✍ POWER
This LED comes on when the switch is properly connected to power and turned on.

✍ Port Status LEDs
The LEDs are located at the left side of each section, displaying status for each respective port. Please refer to Table 1 for more details.

LED	State	Indication
LNK/ACT	Steady	A valid network connection established. LNK stands for LINK.
	Flashing	Transmitting or receiving data. ACT stands for ACTIVITY.
100	Steady	A valid 100Mbps network connection established. 100 stands for 100Mbps.
	Off	A valid 10Mbps network connection established. 10 stands for 10Mbps.
FDX/COL	Steady	Connection in full duplex mode. FDX stands for FULL-DUPLEX.
	Flashing	Collision occurred. COL stands for COLLISION.
	Off	Connection in half-duplex mode.

✎ Uplink button (for eight 10/100 RJ-45 ports)

The uplink button is located at the left side of port 8X on the switch. Connect port 8X to another switch or hub, and depress the button for the uplink function.

PHYSICAL PORTS

This switch provides eight 10/100 RJ-45 ports or seven 10/100 RJ-45 ports plus one fiber port:

CONNECTIVITY
- RJ-45 connectors
- One MDIX port for uplink (for eight 10/100 RJ-45 ports)
- ST, SC, MT-RJ, or VF-45 connector on fiber port.

<Note>   Refer to the table on page 14 for cabling requirements.

MODE SELECTION

- 10BASE-T full-duplex mode

- 10BASE-T half-duplex mode

- 100BASE-TX full-duplex mode

- 100BASE-TX half-duplex mode

- 100BASE-FX full-duplex mode

- 100BASE-FX half-duplex mode

- Auto-sensing mode

<Note>
i.   Half-duplex mode uses back pressure flow control to prevent the receiving buffer from being overrun by data from a source node.
ii.   Full-duplex mode uses 802.3x flow control standard to prevent fast data traffic from overrunning slow data traffic.
iii.   Auto-sensing mode is in use after auto-negotiating with the other end of the link.

Basic Functions

In general, the switch is responsible for switching both VLAN tagged and untagged frames from a receiving port to one or more transmitting ports. The switch performs multiple steps during the switching process:

VLAN CLASSIFICATION

LEARNING

FILTERING

FORWARDING

AGING

Below is additional information about tasks that the switch performs during unicast and multicast switching.

UNICAST SWITCHING

VLAN CLASSIFICATION
When the switch receives a frame, it classifies the frame in one of two ways:

- If the frame is untagged, the switch classifies the frame to an associated VLAN.
- If the frame is tagged, the switch uses the tagged VLAN ID to identify the broadcasting domain of the frame.

LEARNING
After VLAN classification, the switch checks the <source MAC address, VLAN> pair in the switching database (SDB) to see whether the <source MAC address, VLAN> pair is known.

- If it is unknown, the switch inserts the <source MAC address, VLAN> into the SDB and learns the <source MAC address, VLAN>.
- If it is known, the switch checks the <source MAC address, VLAN> for a mismatched port ID. If the port ID associated with the <source MAC address, VLAN> pair in the SDB is different than the receiving port, the switch modifies the port ID in the SDB and modifies its management database (MDB) accordingly.

FILTERING
After learning the address, the switch checks:

- Whether the source port or destination port is in the forwarding state.
- Whether the source MAC address or destination MAC address is to be filtered.
- Whether the source port ID is the same as destination port ID.

If any of these conditions are met, the switch drops the receiving. Otherwise, it continues with the forwarding process described below.

FORWARDING
During the forwarding process, the switch checks whether the <destination MAC address, VLAN> pair is unknown.

- If it is unknown, the switch floods the receiving frame to all ports in the VLAN, excluding the source port.
- If it is known, the switch forwards the receiving frame to the port associated with the <destination MAC address, VLAN> pair. At the same time, the switch ascertains the individual's port's VLAN tagging/untagging configuration and corresponding VLAN ID to render the appropriate frame tagging when the frame is ready to be transmitted.

MULTICAST SWITCHING

For multicast switching, the switch checks whether the received frame is a BPDU. If a BPDU is received, the switch forwards the frame to the CPU for processing by the spanning tree protocol. Otherwise, the switch performs the following processes:

VLAN CLASSIFICATION
Same as for unicast switching.

LEARNING
Same as for unicast switching.

FILTERING
After learning the address, the switch checks:

- Whether the source port or destination port is not in the forwarding state.
- Whether the source MAC address or destination MAC address is to be filtered.

If any of these conditions are met, the switch drops the receiving. Otherwise, it continues with the forwarding process described below.

FORWARDING

The switch floods the received multicast frame to all ports that are in forwarding state within the VLAN, excluding the source port. At the same time, the switch ascertains the individual port's VLAN tagging/untagging configuration and corresponding VLAN ID to render the appropriate frame tagging when the frame is ready to be transmitted.

AGING

The switch performs the aging process for the <MAC addresses, VLAN> pair in the switching database. Once a <MAC address, VLAN> pair is aged out, the SDB is modified.

SPANNING TREE

The switch supports one Spanning Tree per bridged network

VLAN

A virtual LAN (VLAN) is a network of computers that behave as if they are connected to the same wire, even though they may actually be physically located on different segments of a LAN. VLANs are analogous to a group of end stations, perhaps on multiple physical LAN segments that are not constrained by their physical location and can communicate as if they were on a common LAN.

VLANs are configured through software rather than hardware, which makes them extremely flexible. One of the biggest advantages of VLANs is that when a computer is physically moved to another location, it can stay on the same VLAN without any hardware reconfiguration.

Because VLANs are not limited by the hardware constraints that physically connect traditional LAN segments to a network, they can define a network into various logical configurations. For example, VLANs can define a network by application. In this scenario, a company might create one VLAN for multimedia users and another for email users. VLANs can also define a network by department. For example, a company might have one VLAN for its Engineering Department, another for its Marketing Department, and another for its Account Payable Department.

VLANs can also be set up according to the organization structure within a company. For example, the company president might have his/her own VLAN, the executive staff might have a different VLAN, and the remaining employees might have yet a different VLAN.

As these examples show, VLANs offer unparalleled flexibility. The following sections describe how deploying VLANs can benefit organizations and reduce administration costs.

Broadcast Containment

In traditional networks, traffic broadcasts to all network devices, whether they are the intended recipients or not. However, VLANs can be set up to contain only those devices that need to communicate with each other. As a result, VLANs significantly reduce network congestion. In addition, VLANs prevent broadcast storms from causing network meltdown due to volumes of traffic.

Multicast-Based Multimedia Applications

Multimedia applications, such as interactive training, video conferencing, and news-video transmissions, require large amounts of bandwidth. These applications are also extremely sensitive to variable delays, which are unavoidable on a shared Ethernet network. By defining a VLAN based on the IP multicast address for all subscribing members on the VLAN, sufficient bandwidth will be available for these application, providing true multimedia on Ethernet.

Enhanced Security

Because VLANs are self-contained, only the devices within the same VLAN can communicate with each other. If a device in one VLAN wants to communicate with a device in another VLAN, the traffic must go through a router.

VLAN Membership

VLAN implementation allows:

Up to 64 VLANs in one switch.
VLANs across multiple switches by using explicit or implicit tagging and the GARP/GVRP protocol defined in IEEE802.1p and
    802.1Q.
An end station's network interface card belong to multiple VLANs.
A switch port to be associated with multiple VLANs.

DEFINITIONS OF VLAN MEMBERSHIP
VLAN implementation allows VLAN membership to be defined based on ports. Port-based VLANs are organized by physical port
    number. For example, switch ports 1, 2, 4 and 6 can be grouped on VLAN, while server ports 3, 5, 7 and 8 can be on
    another VLAN. Broadcasts from servers within each group would only go to the members of its own VLAN. This ensures
    that broadcast storms cannot cause a network meltdown due to volumes of traffic.

VLAN MEMBERSHIP LEARNING
Port-based VLAN is defined using a static binding between a VLAN and its associated ports. The switch's forwarding decision is
    based on the destination MAC address and its associated port ID. Therefore, to make valid forwarding and flooding
    decisions, the switch learns the relationship of the MAC address to its related port – and thus to the VLAN – at runtime.

REMOTE VLAN LEARNING
In addition to providing network management tools that allow network administrators to statically add and delete VLAN member
    ports, the switch also supports GVRP (GARP VLAN Registration Protocol). GVRP allows for dynamic registration of VLAN
    port members within switch and across multiple switches.

Other than supporting dynamic updating of registration entries in a switch, GVRP is used to communicate VLAN registration
    information to other VLAN-aware switches, so that a VLAN member can cover a wide span of switches on a network.

GVRP allows both VLAN-aware workstations and switches to issue and revoke VLAN memberships. VLAN-aware switches register
    an propagate VLAN membership to all ports that belong to the active topology of the VLAN.

VLAN CONFIGURATION

The switch provides a Local/Remote Management Console Interface for VLAN configuration and management An SNMP-based
    VLAN MIB is also provided.

Intra-VLAN Communication

The switch supports intra-VLAN communication through hardware, as described in "Basic Functions" section.

Inter-VLAN Communication

The switch supports inter-VLAN communication using CPU-based routing software.

GVRP

In addition to network management tools that allow network administrators to statically add and delete VLAN member ports, the routing switch supports GARP VLAN Registration Protocol (GVRP). GVRP supports dynamic registration of VLAN port members within a switch and across multiple switches.

In addition to dynamically updating registration entries within a switch, GVRP is used to communicate VLAN registration information to other VLAN-aware switches, so that members of a VLAN can cover a wide span of switches on a network.

GVRP allows both VLAN-aware workstations and switches to issue and revoke VLAN memberships. VLAN-aware switches register and propagate VLAN membership to all ports that are part of the active topology of the VLAN.

IGMP Snooping and IP Multicast Filtering

The Internet Group Management Protocol (IGMP) runs between hosts and their immediately neighboring multicast routers. The protocol's mechanisms allow a host to inform its local router that it wants to receive transmissions addressed to a specific multicast group.

Routers periodically query the LAN to determine if known group members are still active. If there is more than one router on the LAN performing IP multicasting, one of the routers is elected "querier" and assumes the responsibility of querying the LAN for group members.

Based on the group membership information learned from the IGMP, a router can determine which (if any) multicast traffic needs to be forwarded to each of its "leaf" subnetworks. Multicast routers use this information, along with a multicast routing protocol, to support IP multicasting across the Internet.

IGMP provides the final step in an IP multicast packet delivery service since it is only concerned with the forwarding of multicast traffic from the local route to group members on directly attached subnetworks.

Routing switches support IP Multicast Filtering by:
- Passively snooping on the IGMP Query and IGMP Report packets transferred between IP Multicast Routers and IP Multicast host groups to learn IP Multicast group members, and
- Actively sending IGMP Query messages to solicit IP Multicast group members.

The purpose of IP multicast filtering is to optimize a switched network's performance, so multicast packets will only be forwarded to those ports containing multicast group hosts members and routers instead of flooding to all ports in the subnet (VLAN).

Routing switches with IP multicast filtering/switching capability not only passively monitor IGMP Query and Report messages, DVMRP Probe messages, PIM, and MOSPF Hello messages; they also actively send IGMP Query messages to learn locations of multicast routers and member hosts in multicast groups within each VLAN.

Note, however, IGMP neither alters nor routes any IP multicast packets. Since IGMP is not concerned with the delivery of IP multicast packets across subnetworks, an external IP multicast router is needed if IP multicast packets have to be routed across different subnetworks.

Switch Management

ADMINISTRATION CONSOLE VIA RS-232 SERIAL PORT
The switch provides an onboard serial port, which allows the switch to be configured via a directly connected terminal or a Telnet session.

WEB-BASED BROWSER INTERFACE
The switch also boasts a point-and-click browser-based interface that lets users access full switch configuration and functionality from a Netscape or Internet Explorer browser.

EXTERNAL SNMP-BASED NETWORK MANAGEMENT APPLICATION
The switch can also be configured via SNMP.

For more information on switch management, refer to the "Switch Management" section.

Installation

This chapter gives step-by-step instructions about how to install the switch:

Selecting a Site for the Switch

As with any electric device, you should place the switch where it will not be subjected to extreme temperatures, humidity, or electromagnetic interference. Specifically, the site you select should meet the following requirements:

- The ambient temperature should be between 32 and 104 degrees Fahrenheit (0 to 40 degrees Celsius).

- The relative humidity should be less than 90 percent, non-condensing.

- Surrounding electrical devices should not exceed the electromagnetic field (RFC) standards for IEC 801-3, Level 2 (3V/M) field strength.

- Make sure that the switch receives adequate ventilation. Do not block the ventilation holes on each side of the switch or the fan exhaust port on the rear of the switch.

- The power outlet should be within 1.8 meters of the switch.

Connecting to Power

Internal power (eight 10/100 RJ-45 ports or seven 10/100 RJ-45 ports plus one fiber port):
Step 1:   Connect the supplied AC power cord to the receptacle on the back of the switch, and then plug it into a standard AC outlet with a voltage range from 100 to 260 Vac.

Step 2:   Turn on the switch by flipping the ON/OFF switch on the rear of the unit to **I (ON)** position.

Step 3:   The **O** position is **OFF**.
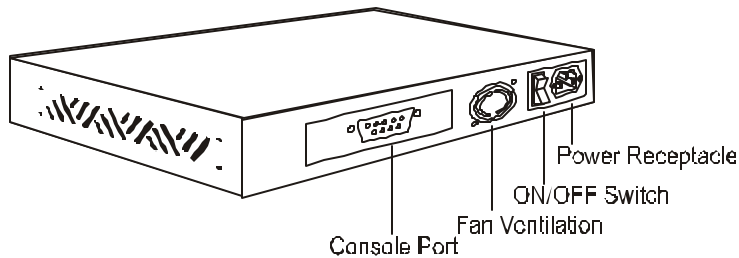
Figure 3-1: Rear view

External power (seven 10/100 RJ-45 ports plus one fiber port):
Step 1:   Connect the supplied AC to DC power adapter to the receptacle at the back of the switch.

Step 2:   Attach the plug into a standard AC outlet with the appropriate AC voltage.

Figure 3-2: Rear view

Power-on Self test (POST)

The Switch performs its Power-On Self Test (POST) when the power is switched on. During the POST, the switch CPU will:

- perform a series of diagnostic procedures to make sure the basic system is functioning integrity

- decompress the main switching software runtime image from the flash ROM into DRAM area

- begin executing the main switching software

A command line prompts when you press the Esc key on a terminal connected to the switch serial port during the POST process. Then you can execute the following options:

DOWNLOAD RUNTIME SOFTWARE FROM SERIAL PORT0
This will download the runtime system image to the switch via the serial port. Before selecting this option, make sure:

- A host system is running a terminal emulation program that supports the Kermit file transfer protocol.
- The host system's hard drive has the required binary file that will be downloaded to the switch.

CONFIGURE THE SYSTEM
This option lets you modify any configurable parameter in the switch's flash ROM before the switch system boots.

RUN MANUFACTURING DIAGNOSTICS
This option is to download the manufacturer's diagnostics. Refer to Download Runtime Software for download requirements.

When the file transfer is completed, the target system jumps to the entry point of the diagnostic program and starts executing the diagnostic code. The Main Menu of the diagnostic program appears, where you can initiate tests or obtain system information. Note that user intervention is not required when a test runs, unless an error occurs. If an error occurs during testing, you are given the choice of continuing the diagnostics or skip the error.

Connecting to Your Network

Cable Type & Length

It is necessary to follow the cable specifications below when connecting the switch to your network. Use appropriate cables that meet your speed and cabling requirements.

Table 3: Cable Specifications

Speed	Connector	Port Speed Half/Full Duplex	Cable	Max. Distance
10BASE-T	RJ-45	10/20 Mbps	2-pair UTP/STP Cat. 3, 4, 5	100 m
100BASE-TX	RJ-45	100/200 Mbps	2-pair UTP/STP Cat. 5	100 m
100BASE-FX	ST, SC, MT-RJ, VF-45	100/200 Mbps	MMF (50 or 62.5 μm)	2 km
100BASE-FX	SC	100/200 Mbps	SMF (9 or 10μm)	15, 40, or 75 km

Cabling

Step 1: First, ensure the power of the switch and end devices is turned off.

<Note> Always ensure that the power is off before any installation.

Step 2: Prepare cable with corresponding connectors for each type of port in use.

<Note> To connect two regular RJ-45 ports between switches or hubs, you need a cross-over cable.

Step 3: Consult Table 3 in previous section for cabling requirements based on connectors and speed.

Step 4: Connect one end of the cable to the switch and the other end to a desired device.

Step 5: Once the connections between two end devices are made successfully, turn on the power and the switch is operational.

Switch Management

This chapter explains the methods that you can use to configure management access to the switch. It describes the types of management applications and the communication and management protocols that deliver data between your management device (workstation or personal computer) and the system. It also contains information about port connection options.

This chapter covers the following topics:

- Management Access Overview
- Key Concepts
- Key Guidelines for Implementation
- Administration Console Access
- Web Management Access

- SNMP Access

- Standards, Protocols, and Related Reading

Management Access Overview

The switch gives you the flexibility to access and manage the switch using any or all of the following methods.

The administration console and web browser interface support are embedded in the switch software and are available for immediate use.

- Administration console via RS-232 serial port

  Advantages

  - No IP address or subnet needed
  - Text-based
  - Telnet functionality and HyperTerminal built into Windows
            95/98/NT/2000 operating systems

  Disadvantages

  - Must be near switch or use dial-up connection
  - Inconvenient for remote users
  - Modem connection may prove to be unreliable or slow

- Web-based browser interface

  Advantages

  - Ideal for configuring the switch remotely
  - Compatible with all popular browsers
  - Can be accessed from any location
  - Most visually appealing

  Disadvantages

  - Security can be compromised (hackers need only know the IP address and subnet mask)
  - May encounter lag times on poor connections

- External SNMP-based network management application

  Advantages

  - Communicates with switch functions at the MIB level
  - Based on open standards

  Disadvantages

  - Requires SNMP manager software
  - Least visually appealing of all three methods
  - Some settings require calculations
  - Security can be compromised (hackers need only know the community name)

Administration Console

The administration console is an internal, character-oriented, menu-driven user interface for performing system administration such as displaying statistics or changing option settings.

Using this method, you can view the administration console from a terminal, personal computer, Apple Macintosh, or workstation connected to the switch's console port.

There are two ways to use this management method: direct access or modem access. The following sections describe these methods.

Direct Access

Direct access to the administration console is achieved by directly connecting a terminal or a PC equipped with a terminal-emulation program (such as HyperTerminal) to the switch console port.

When using the management method, configure the terminal-emulation program to use the following parameters (you can change these settings after login):

[DEFAULT PARAMETERS] **115,200BPS**
8 DATA BITS
NO PARITY
1 STOP BIT

This management method is often preferred because you can remain connected and monitor the system during system reboots. Also, certain error messages are sent to the serial port, regardless of the interface through which the associated action was initiated. A Macintosh or PC attachment can use any terminal-emulation program for connecting to the terminal serial port. A workstation attachment under UNIX can use an emulator such as TIP.

Modem Access

You can access the switch's administration console from a PC or Macintosh using an external modem attached to the console port. The switch management program provides **Console Port** screen, accessible from the **Basic Management** screen, that lets you configure parameters for modem access.

When you have configured the external modem from the administration console, the switch transmits characters that you have entered as output on the modem port. The switch echoes characters that it receives as input on the modem port to the current administration console session. The console appears to be directly connected to the external modem.

Web Management

The switch provides a browser interface that lets you configure and manage the switch remotely.

After you set up your IP address for the switch, you can access the switch's web interface applications directly in your web browser by entering the IP address of the switch. You can then use your web browser to list and manage switch configuration parameters from one central location, just as if you were directly connected to the switch's console port.

Web Management requires either Microsoft Internet Explorer 4.01 or later or Netscape Navigator 4.03 or later.

Netscape Navigator

If you use Netscape Navigator 4.03 or 4.04, install the Netscape JDK 1.1 Patch. Download the patch from:

http://help.hetscape.com/filelib.html#smartupdate

If you encounter problems accessing Help files when you use Netscape, clear the browser memory cache and disk cache, and restart the browser.

Internet Explorer

If you use Internet Explorer, install the latest 4.01 Service Pack 1. This service pack makes Internet Explorer Year 2000 compliant and fixes other product-support issues. Download the 4.01 Service Pack 1 from the following location:

http://www.microsoft.com/msdownload/iebuild/ie4sp1_win32/en/ie4sp1_win32.htm

If the above link is unavailable, download the service pack from the Microsoft home page:

http://www.microsoft.com

SNMP-Based Network Management

You can use an external SNMP-based application to configure and manage the switch. This management method requires the SNMP agent on the switch and the SNMP Network Management Station to use the same community string. This management method, in fact, uses two community strings: the get community string and the set community string. If the SNMP Network management station only knows the set community string, it can read and write to the MIBs. However, if it only knows the get community string, it can only read MIBs. **The default get and set community strings for the switch are public.**

Protocols

The switch supports the following protocols:

VIRTUAL TERMINAL PROTOCOLS, SUCH AS TELNET
A virtual terminal protocol is a software program, such as Telnet, that allows you to establish a management session from a Macintosh, a PC, or a UNIX workstation. Because Telnet runs over TCP/IP, you must have at least one IP address configured on the switch before you can establish access to it with a virtual terminal protocol.

<Note>   Terminal emulation is different from a virtual terminal protocol in that you must connect a terminal directly to the console port.

SIMPLE NETWORK MANAGEMENT PROTOCOL (SNMP)
SNMP is the standard management protocol for multivendor IP networks. SNMP supports transaction-based queries that allow the protocol to format messages and to transmit information between reporting devices and data-collection programs. SNMP runs on top of the User Datagram Protocol (UDP), offering a connectionless-mode service.

Management Architecture

All of the management application modules use the same Messaging Application Programming Interface (MAPI). By unifying management methods with a single MAPI, configuration parameters set using one method (e.g. console port) are immediately displayed the other management methods (e.g. SNMP agent of web browser).

The management architecture of the switch adheres to the IEEE open standard. This compliance assures customers that the switch is compatible with, and will interoperate with other solutions that adhere to the same open standard.

Menu-Driven Console Management

The switch provides a menu-driven console interface for configuration purposes. The switch can be configured either locally through its RS-232 port or remotely via a Telnet session.

This chapter describes how to configure the switch using its menu-driven console.

Logging on to the switch

At the screen prompt

```
Switch Console Login:
Password:
```

LOGIN NAME
Enter the console interface factory default console name **admin**.

PASSWORD
Enter the factory default password (no password, **press <Enter> directly**). Or enter a user-defined password if you followed the instructions later and changed the factory default password.

Factory Default Password: no password, press **<Enter>** directly.

<Note> Only one console and three telnet users can log on to the switch concurrently. However, it is not recommended that multiple users modify the configuration at the same time.

Switch Management Screen
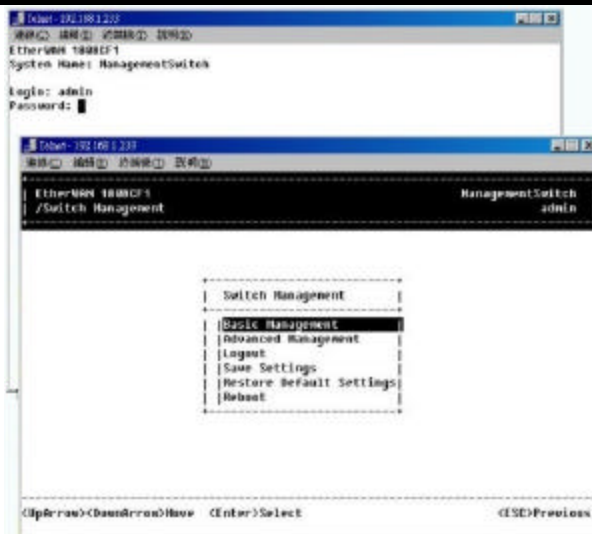
BASIC MANAGEMENT
Refer to page 20 for performing basic management activities.

ADVANCED MANAGEMENT
Refer to page 25 for performing advanced management activities.

LOGOUT
Highlight this option and press Enter to log out.

SAVE SETTINGS
Highlight this option and press Enter to save the current settings and remain in the configuration program.

RESTORE DEFAULT SETTINGS
Highlight this option and press Enter to restore the factory default settings.

REBOOT
Highlight this option and press Enter to reboot.

Navigating Through the Console Interface

The console interface consists of a series of menu boxes. Each menu box has several options, which are listed vertically. Move the highlight to select an option as you wish; press the Enter key to activate that option.

Press this key…	To
Up Arrow or K*	Move the highlight one line up in a menu box
Down Arrow or J*	Move the highlight one line down in a menu box
Tab	Move the highlight between screens
Enter	Select the highlighted option
Esc	Move to a previous menu

<Note> * Remember to release the <Caps Lock> key if you press <K> or <J> and cannot move the highlight on the screen.

Performing Basic Management Activities

Basic management activities consist of General, LAN Port, and Console Port tasks.

To Perform Basic Management Activities:

Step 1: Highlight [Basic Management] from [Switch Management] screen and press <Enter>. The [Basic Management] screen appears:
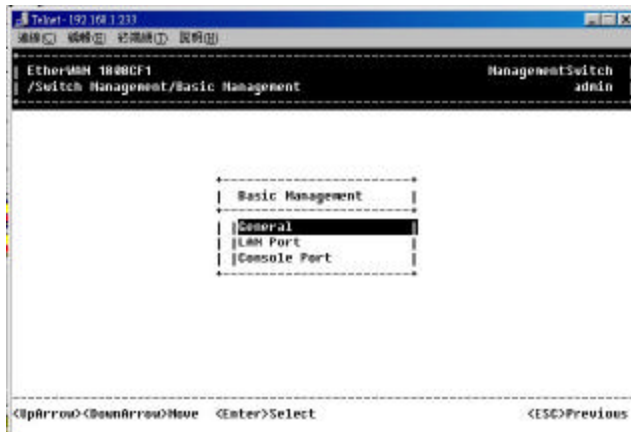
Step 2: Highlight a desired option and press <Enter>. Or press <Esc> to exit.
GENERAL MANAGEMENT CONFIGURATIONS

Step 1: Highlight [General] from [Basic Management] screen and press <Enter>.
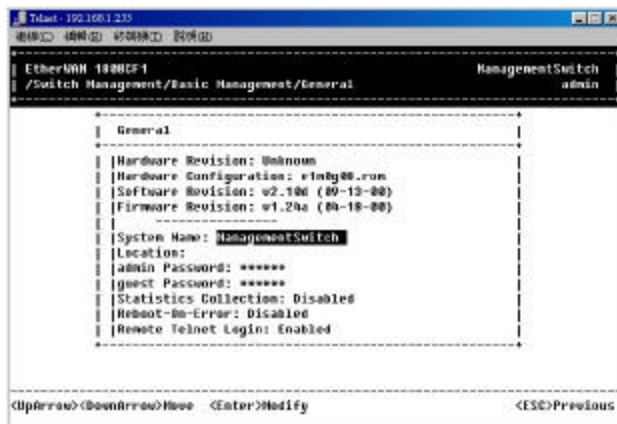
System Name

Step 2: **System Name** is highlighted. Press <Enter> if you want to change it.

Step 3: Move to highlight **Location** and press <Enter> if you want to change it.

Step 4: Move to highlight **admin Password** and press <Enter> if you want to change it.

Step 5: Move to highlight **guest Password** and press <Enter> if you want to change it.

Step 6: Move to highlight **Statistics Collection** and press <Enter> if you want to change it, Disabled or Enabled.

Step 7: Move to highlight **Reboot-On-Error** and press <Enter> if you want to change it, Disabled or Enabled.

Step 8: Move to highlight **Remote Telnet Login** and press <Enter> if you want to change it, Disabled or Enabled.

Step 9: Press <Esc> to return to [Basic Management] screen when completed.

LAN PORT CONFIGURATIONS

Step 1: Highlight [LAN Port] from [Basic Management] screen and press <Enter>.

Speed & Flow Control

Step 2: **Speed & Flow Control** is highlighted. Press <Enter> if you want to set speed or flow control on port.

Step 3: Highlight **All Ports** and press <Enter> to configure at one time. Or move to highlight each port and press <Enter> to configure individually.
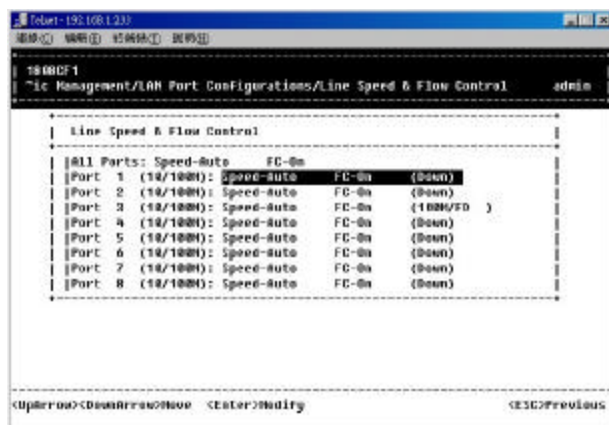
Step 4: **Port Setting Options** screen appears. Highlight **Speed & Flow Contro**l and press <Enter>.
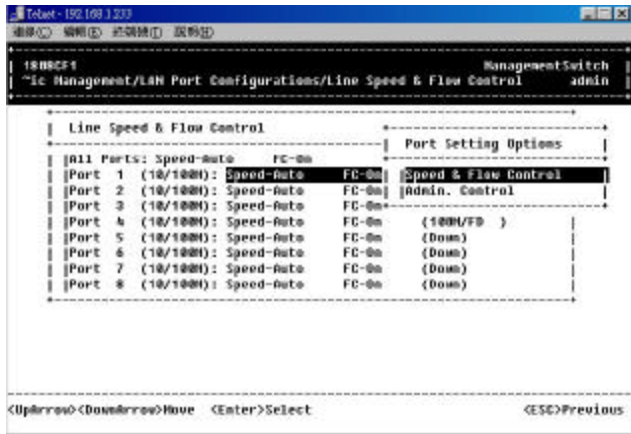
Step 5: For **Line Speed**, move to highlight a desired setting from **Speed Options** and press <Enter>.
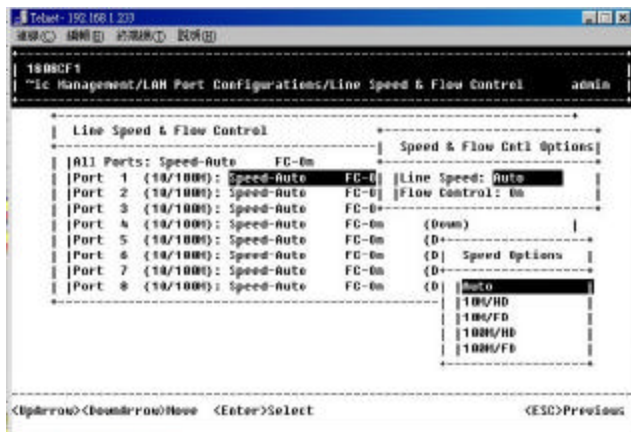
<Note>	In the Speed Options, HD denotes half-duplex and FD denotes full-duplex.

Step 6: Press <Esc> to previous screen. Highlight Flow Control and press <Enter>

Step 7: For **Flow Control**, move to highlight a desired setting from the **Flow Cntl Options** and press <Enter>.
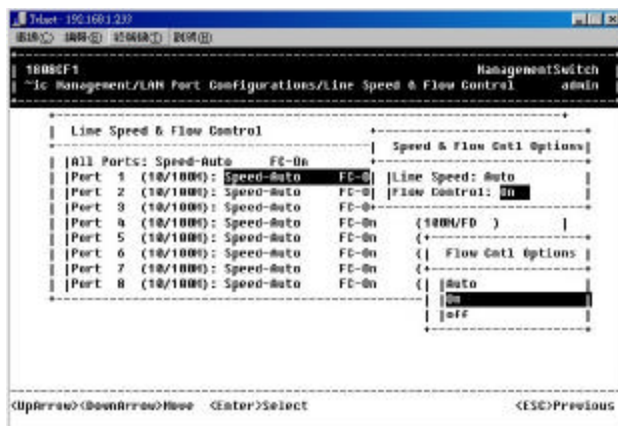
Step 8:	Press <Esc> to a previous screen as shown in Step 3.

Step 9: Highlight **All Ports** and press <Enter> to configure at one time. Or move to highlight each port and press <Enter> to configure individually.

Step 10:For **Admin Control**, move to highlight Up or Down from **admin Status Options**.
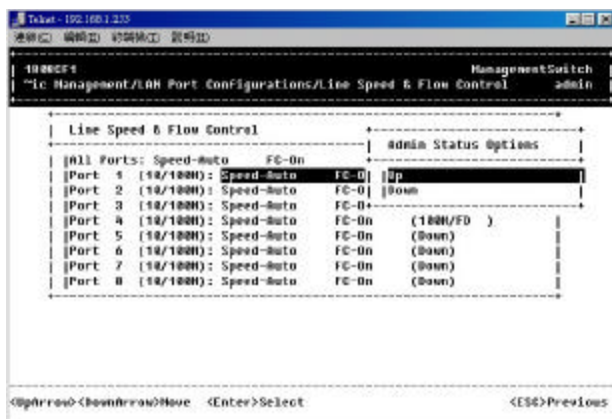
Step 11:E.g. Port 4 is set as **Admin Down** to stop TX/RX transmission.
To allow TX/RX transmission on Port 4, move to highlight Up from the options in Step 10.
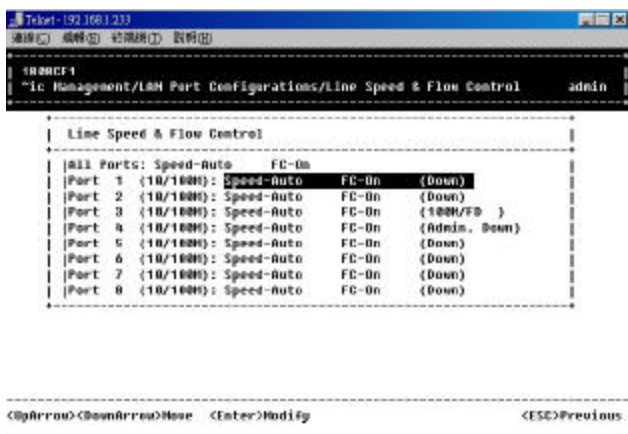
<Note>   The other ports are set Admin Up: only Port 3 is linked at 100Mbps/Full-duplex; no link on rest ports (Down denotes no link).

Physical Port Address

Step 12: Press <Esc> to a previous screen as shown in Step 1.

Step 13: Move to highlight **Physical Address** to view physical port address.

Return to Basic Management

Step 14: Press <Esc> to return to [Basic Management] screen when completed.
CONSOLE PORT CONFIGURATIONS

Step 1: Move to highlight [Console Port] from [Basic Management] screen.
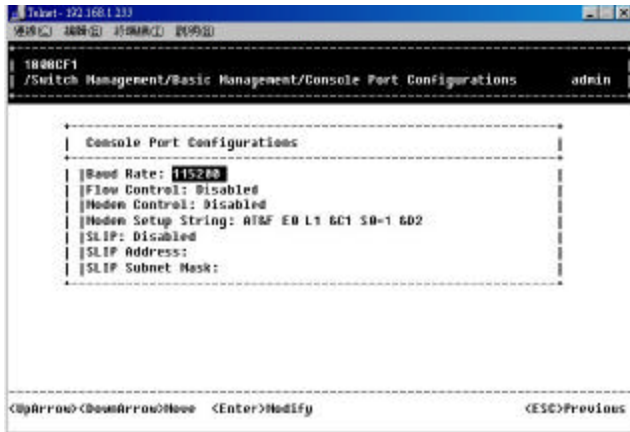
Step 2: **Baud Rate** is highlighted. Press <Enter> if you want to change the current console baud rate.

Step 3: Move to highlight **Flow Control** and press <Enter> if you want to change the current flow control method.

Step 4: Move to highlight **Modem Control** and press <Enter> to decide a console modem connection, Disabled or Enabled.

Step 5: When a modem connection is enabled, move to highlight **Modem Setup String** and press <Enter>. Decide whether you want to use Default or Custom Setup String.

<Note> Default Setup String configures the modem to auto answer. It works for all Hayes compatible modems.

Step 6: Move to highlight **SLIP** and press <Enter> if you want to change it, Disabled or Enabled.

<Note> If you enable SLIP, a message tells you that the console port becomes accessible only through the SLIP protocol after you logout from the current console screen.

Step 7: Move to highlight **SLIP Address** and press <Enter> if you want to set it.

Step 8: When SLIP IP address is entered, move to highlight **SLIP Subnet Mask** and press <Enter>. Enter a suitable subnet mask.

<Note> You must enter a SLIP address before you can enter a SLIP subnet mask.

Step 9: Press <Esc> to return to [Basic Management] screen when completed.

Performing Advanced Management Activities

Advanced management activities consist of L2 Switching DataBase / IP Networking / Bridging / Static Filtering / Spanning Tree / SNMP / Other Protocols / Port Trunking / Port Mirroring / File Transfer.

To Perform Advanced Management Activities:

Step 1:   Highlight [Advanced Management] from [Switch Management] screen and press <Enter>. The [Advanced Management] screen appears:
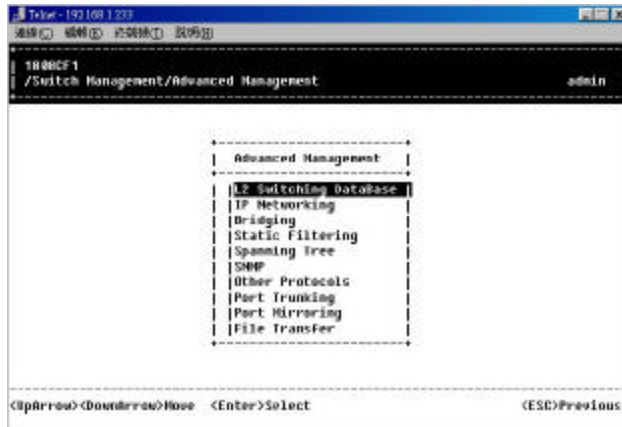
Step 2:   Move to highlight a desired option and press <Enter>.
Or press <Esc> to exit.

L2 SWITCHING DATABASE
View and change VLAN, MA C address, IP multicast group, and port perspectives.

IP NETWORKING
View and change IP settings, ARP and routing table parameters, DHCP gateway settings, and ping settings.

BRIDGING
View and change the aging period for a MAC address and the flood limit for all ports.

STATIC FILTERING
View / add / delete / search all source or destination MAC addresses to be filtered.

SPANNING TREE
View and change spanning tree configurations, ports states, path costs, and port priorities.

SNMP
View and change the SNMP configuration.

OTHER PROTOCOLS
View and change GVRP and IGMP settings.

PORT TRUNKING
Assign a range of ports to trunking groups.

PORT MIRRORING
Mirror one port to Port 1.

FILE TRANSFER
Send files using the TFTP or Kermit protocol.

L2 SWITCHING DATABASE
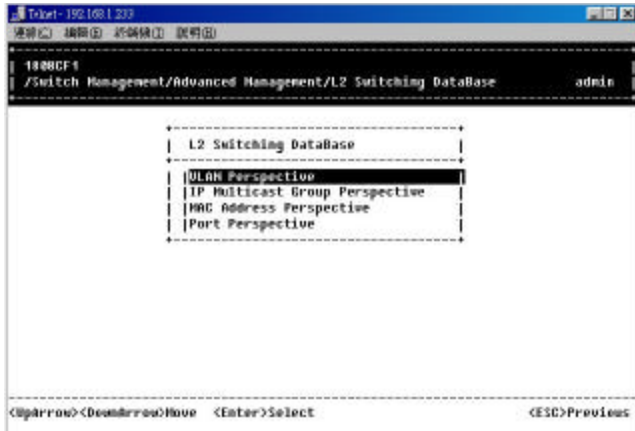
VLAN Perspective

Step 1: Highlight [L2 Switching DataBase] from [Advanced Management] screen and press <Enter>.

Step 2: The VLAN Perspective is highlighted. Press <Enter> to view VLAN info of the default VLAN or if you want to obtain a VLAN perspective instead of the default VLAN.

<Note> Default VLAN:
The IEEE802.1Q standard defines VLAN ID #1 as the default VLAN. The default VLAN includes all the ports as the factory default. The default VLAN's egress rule restricts the ports to be all untagged, so it can, by default, be easily used as a simple 802.1D bridging domain. The default VLAN's domain shrinks as untagged ports are defined in other VLANs.

The VLAN ID appears as both decimal and hexadecimal values side by side in the VLAN Perspective screen.

[+] to create VLAN: press [+] on keypad
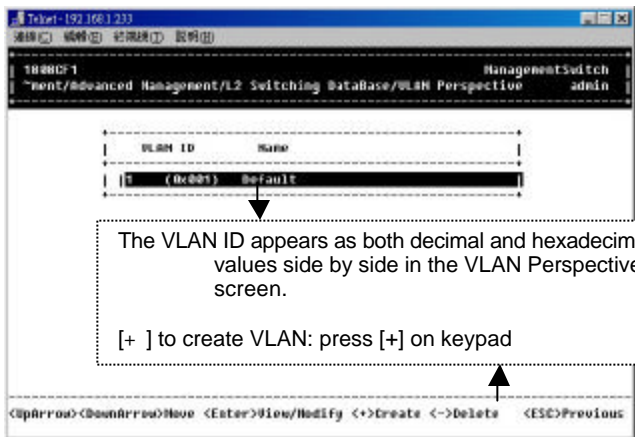
Create VLAN

Step 3: Press [+] on keypad to enter **New VLAN Settings**.
Enter new VLAN ID and VLAN name.

Enter a new VLAN ID as either a 12-bit decimal
or hexadecimal value.
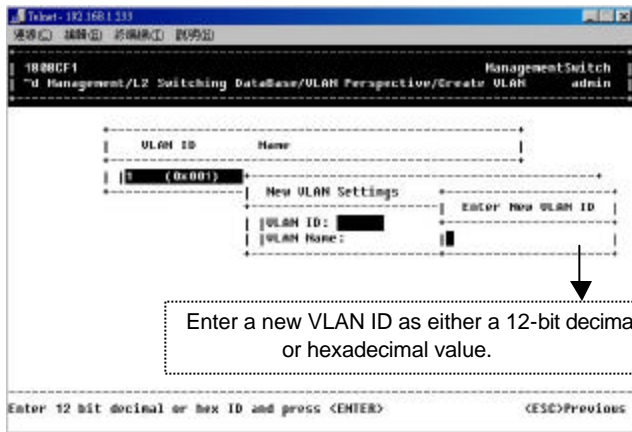
<Note> "Remote" is appended to the VLAN ID automatically if the VLAN is learned from a remote switch.

Add New Switch Ports

Step 4:   Press <Esc> and appears the following screen. Press [+] to add new switch ports to the newly created VLAN.

[+] to add switch ports: press [+] on keypad
[-] to delete switch ports: press [-] on keypad
* No precautionary message appears before you delete a switch port.
* Be sure you want to delete it before doing so.
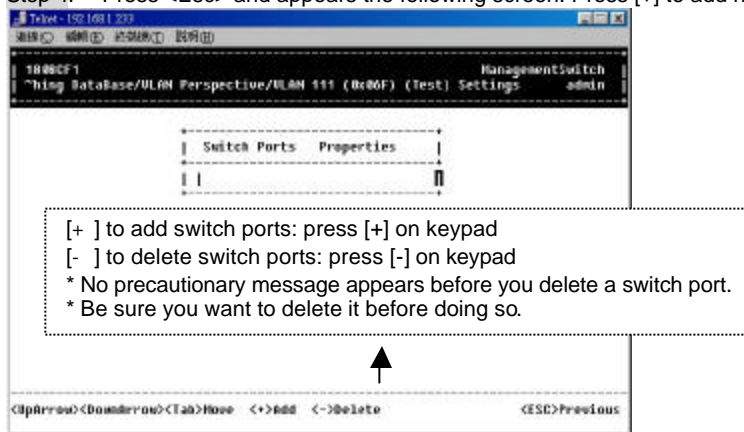
Step 5:   Move to highlight a suitable option from **Port Options** and press <Enter>, e.g. Untagged Ports.
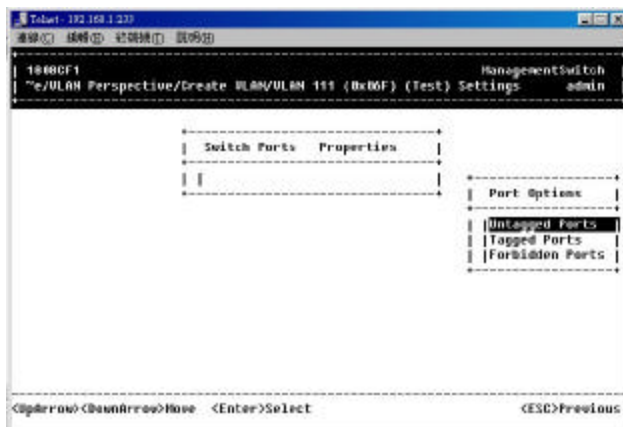
Step 6:   From **Select Untagged Ports**, press <Enter> to select **All Ports** or move to highlight each port individually and press
             <Enter>. Similar procedure when you select Tagged Ports and Forbidden Ports in Step 5.
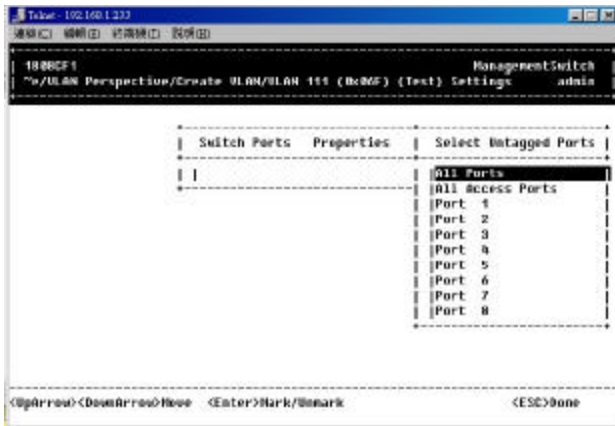
27

Step 7:   Press <Esc> to a previous screen as shown in Step 2.

Delete VLAN

Step 8:   Delete VLAN: highlight a VLAN ID and press [-] to delete it.
Note that you cannot delete the default VLAN.

* No precautionary message appears before you delete a VLAN.
* Be sure you do not need the VLAN before doing so.
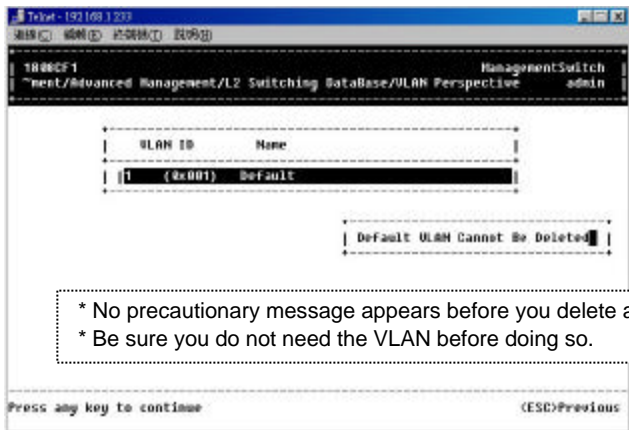
Step 9:   Press <Esc> to a previous screen as shown in Step 2 when completed with deleting a VLAN.

VLAN Info

Step 10:Highlight an existing VLAN and press <Enter> to view VLAN information.
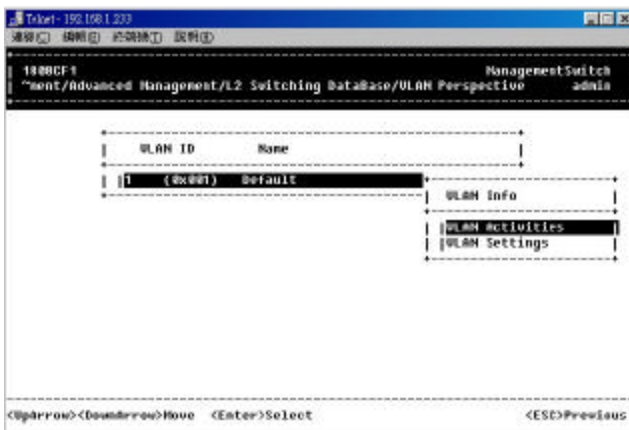
Step 11: Move to highlight **VLAN Activities** and press <Enter> to view or search activity information.
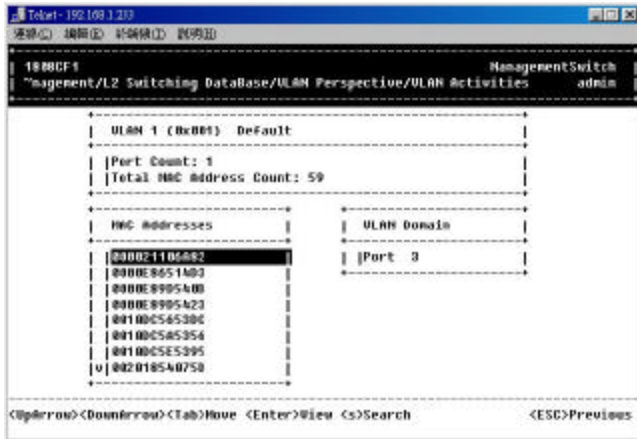
Step 12: Return to Step 6. Move to highlight **VLAN Settings** and press <Enter>. The screen appears as shown in Step 4 for adding or deleting switch ports.

IP Multicast Group Perspective
Step 1:   Move to highlight [IP Multicast Group Perspective] from [L2 Switching DataBase] screen on page 26, and press <Enter>.

Step 2:   Move to highlight an address to view information associated with this IP multicast group.

MAC Address Perspective
Step 1:   Move to highlight [MAC Address Perspective] from [L2 Switching DataBase] screen on page 26, and press <Enter>.

Step 2:   Enter a MAC address to view characteristics information, corresponding VLANs, and corresponding ports in the switching database.

Port Perspective
Step 1:   Move to highlight [Port Perspective] from [L2 Switching DataBase] screen on page 26, and press <Enter>.
You can view VLAN activities and RMON statistics here.

Per Port VLAN Activities
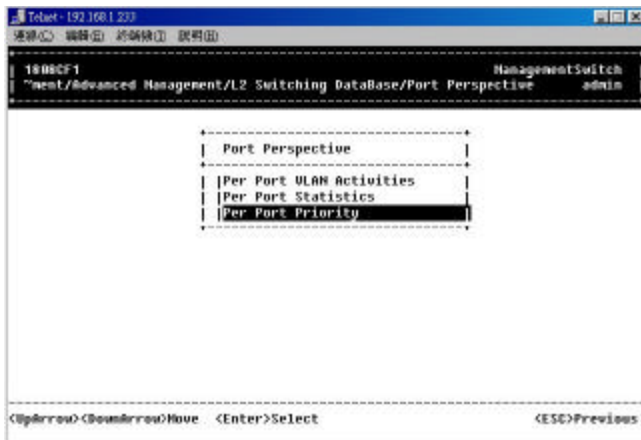
Step 2:   **Per Port VLAN Activities** is highlighted. Press <Enter>.
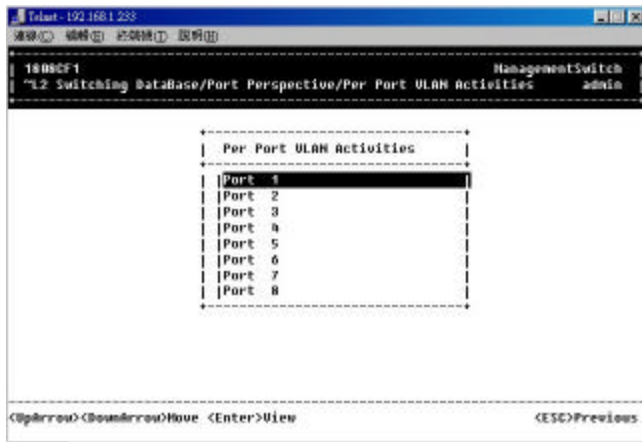
Step 3:   Move to highlight a port and press <Enter>.
E.g. select Port 1 to view corresponding VLAN Activities.
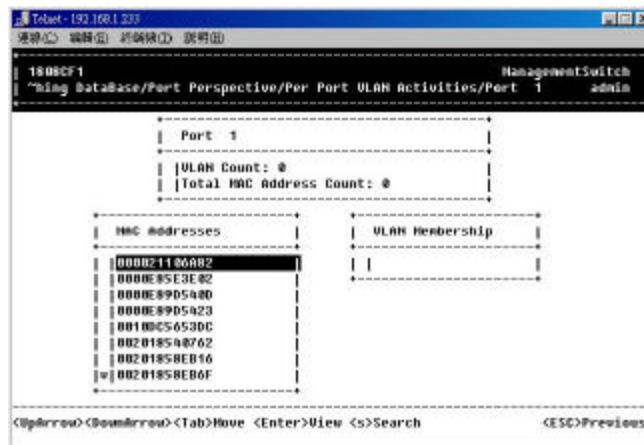
Step 4:   View or search by MAC address individually.

Step 5:   Press <Esc> to return to a previous screen as shown in Step 1.

Per Port Statistics

Step 6:   Move to highlight **Per Port Statistics** and press <Enter>.
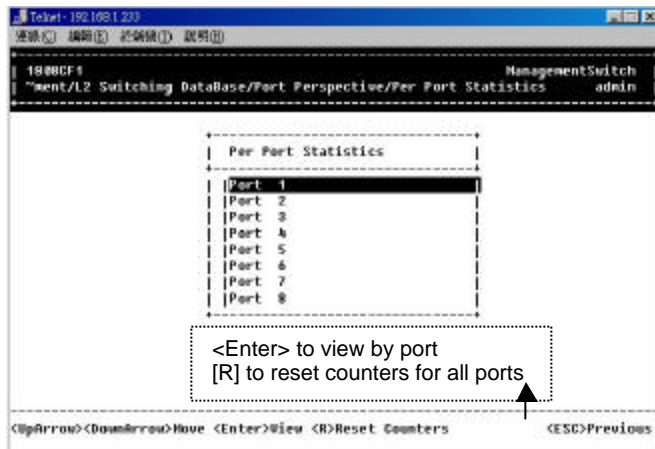
Step 7:   Move to highlight a port and press <Enter>.
E.g. select Port 1 to view corresponding VLAN Activities.
     Press [R] to reset counter for this port.
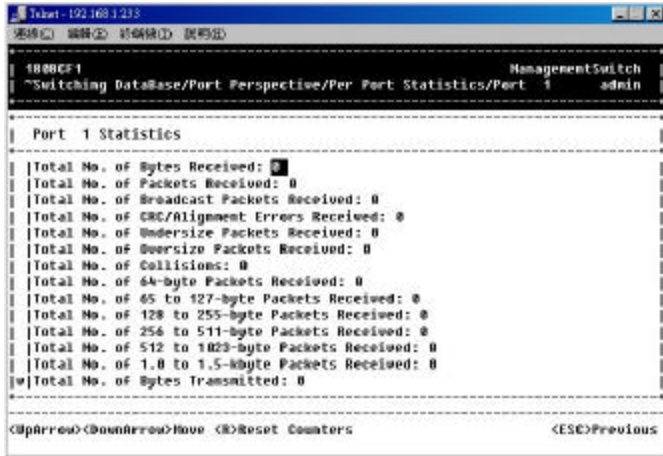
Step 8:   Move to highlight **Per Port Priority** and press <Enter>.
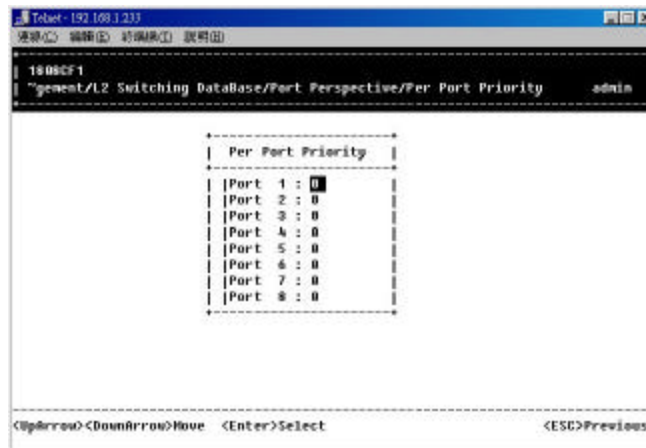
Step 9:   Move to highlight a port and press <Enter>.
E.g. select Port 1 to view corresponding priority level.
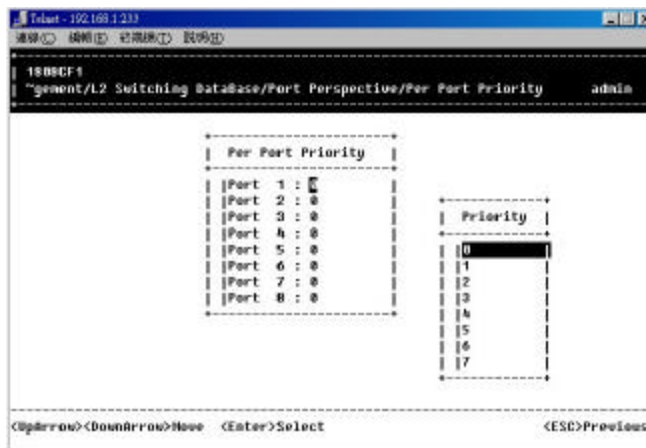
IP NETWORKING

Step 1: Move to highlight [IP Networking] from [Advanced Management] screen and press <Enter>.

IP & RIP Settings

Step 2: Highlight [IP & RIP Settings] from [IP Networking] and press <Enter>.
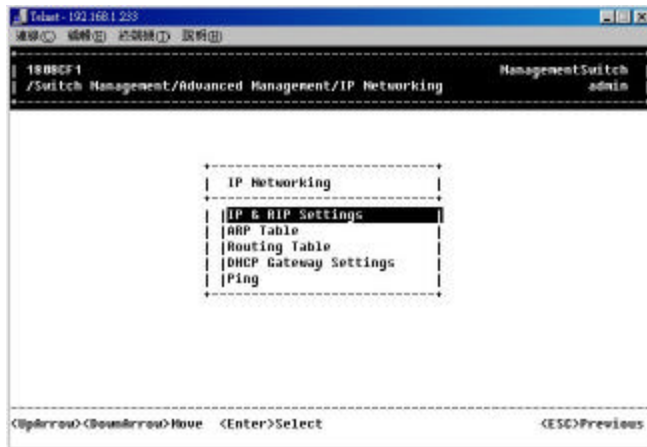
Step 3: The screen shows a list of VLAN IDs, IP addresses, subnet masks, proxy ARPs, and RIPs currently defined.

Before you can define a VLAN's IP settings, you must first create a VLAN as described in previous section.
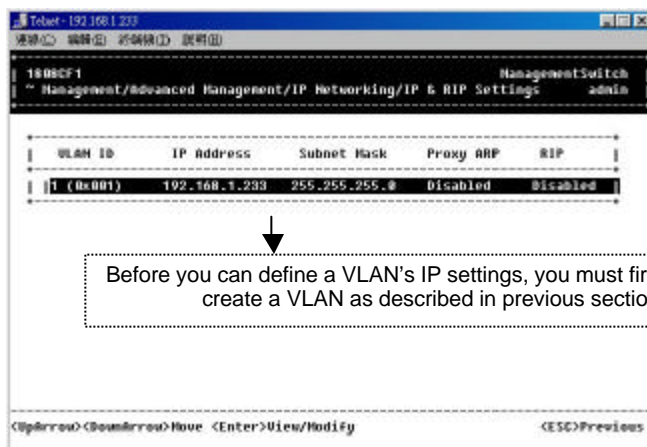
Step 4: Move to highlight the row that contains the parameters you want to change, and then press <Enter>.
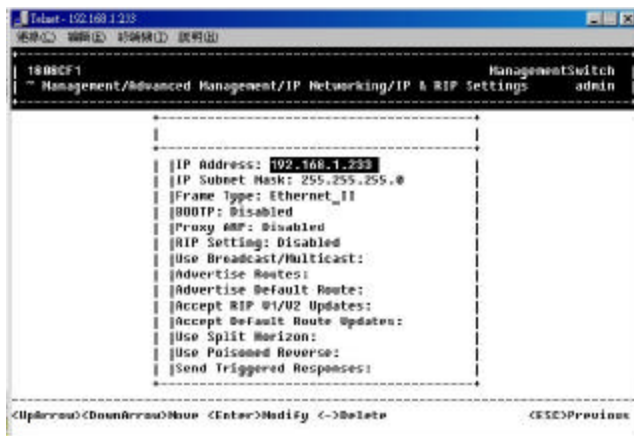
ARP Table Setting
Step 1:   Move to highlight [ARP Table] from [IP Networking] and press <Enter>. The screen shows the ARP table entries that have been defined or learned.

```
Telnet - 192.168.1.233                                      _ □ ×
連線(C)  編輯(E)  終端機(T)  說明(H)

1808CF1                                        ManagementSwitch
/Switch Management/Advanced Management/IP Networking/ARP Table    admin

 +-----------------------------------------------------------+
 | Internet Address   Physical Address   VLAN ID    Type     |
 +-----------------------------------------------------------+
 | |192.168.1.56        00E0AC3961E8   1 (0x001)   dynamic|  |
 +-----------------------------------------------------------+




<UpArrow><DownArrow>Move <+>Add <->Delete <s>Search        <ESC>Previous
```
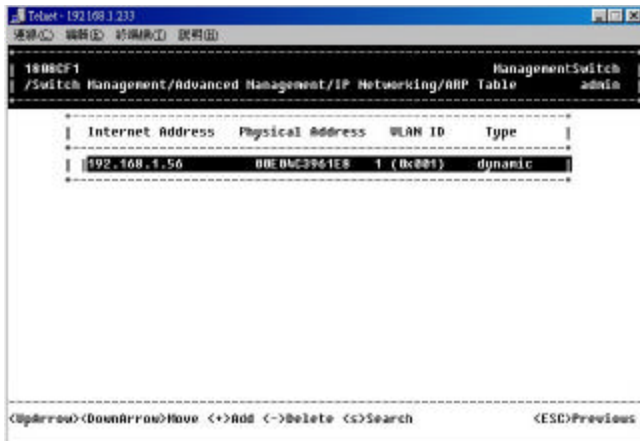
Add/Delete Static ARP Table Entries

Step 2:   Press [+] on keypad to add an entry into the ARP Table.
           Enter Internet/Physical Addresses then.

```
Telnet - 192.168.1.233                                      _ □ ×
連線(C)  編輯(E)  終端機(T)  說明(H)

1808CF1                                        ManagementSwitch
/Switch Management/Advanced Management/IP Networking/ARP Table    admin

 +-----------------------------------------------------------+
 | Internet Address   Physical Address   VLAN ID    Type     |
 +-----------------------------------------------------------+
 | |192.168.1.56        00E0AC3961E8   1 (0x001)   dynamic|  |
 +-----------------------------------------------------------+

        +---------------------------------------------+
        | Static ARP Specifications                   |
        +---------------------------------------------+
        | |Internet Address:  ████████████████    |   |
        | |Physical Address:                      |   |
        +---------------------------------------------+



<UpArrow><DownArrow>Move  <Enter>Modify  <->Delete        <ESC>Previous
```
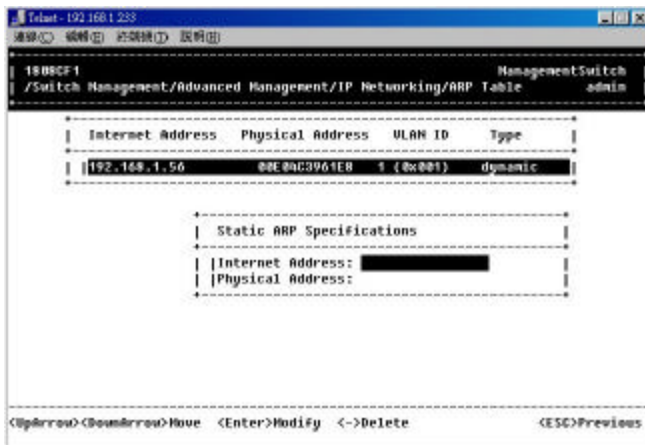
Step 3:   Press [-] on keypad if you want to delete a static entry from the ARP Table.

> * No precautionary message appears before you delete an entry from the
>   ARP table.
> * Be sure you want to delete it before doing so.

Search for ARP Table Entries

Step 4:   Press [S] to search a static entry. You can search by Internet address or physical address.
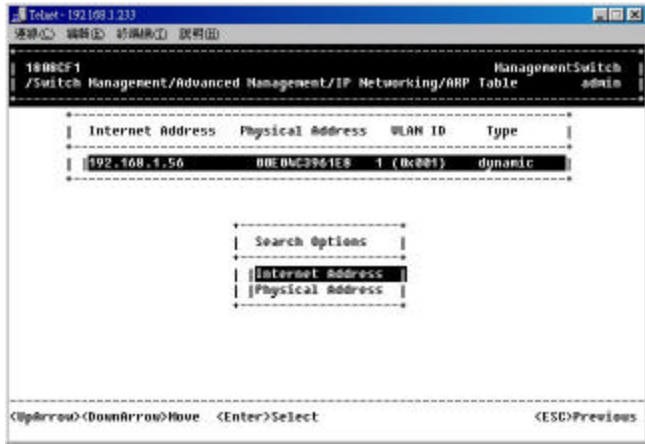
Routing Table

Step 1: Move to highlight [Routing Table] from [IP Networking] and press <Enter>. The screen shows the Routing Table allows you to view, add, delete or search a particular routing path.
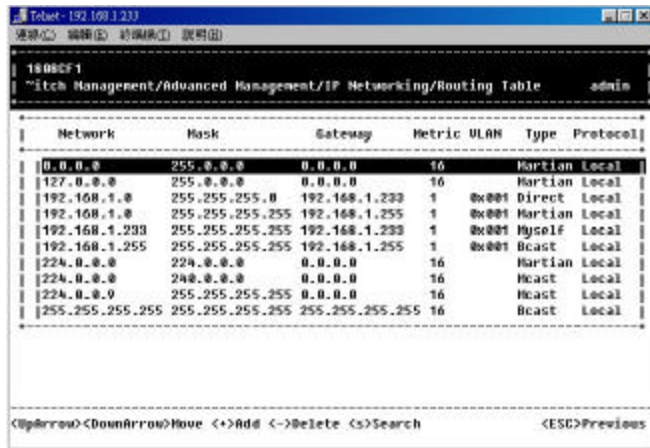
Routing Table Columns

Column	Description	
Network	The IP subnetwork address to which the switch can route packets.	
Mask	The related IP subnetwork mask to which the switch can route packets.	
Gateway	The IP address of the router at the next hop.	
Metric	The number of hops needed between the switch and the destination network.	
VLAN	The VLAN within which the gateway or destination resides.	
Type	The IP route type for the IP subnetwork. There are six IP route types:	
	Direct	A directly connected subnetwork.
	Remote	A remote IP subnetwork or host address.
	Myself	A switch IP address on a specific IP subnetwork.
	Bcast	A subnetwork broadcast address.
	Mcast	An IP multicast address.
	Martian	An illegal IP address to be filtered.
Protocol	Indicates one of the following:	
	Local	A manually configured routing entry.
	NetMgmt	A routing entry set via SNMP.
	ICMP	A routing entry obtained via ICMP redirect.
	RIP	A routing entry learned via the RIP protocol.
	Other	A protocol other than one of the other four listed above.

Step 2: Press [+] on keypad to enter **Route Options** as shown below.

Step 3: Press [-] to delete an entry in the routing table.

> * No precautionary message appears before you delete an entry from
>   the routing table.
> * Be sure you want to delete it before doing so.

Step 4:   Press [S] to search a network address. Enter the network address you want you are looking for.

DHCP Gateway Settings

Step 1:   Move to highlight [DHCP Gateway Settings] from [IP Networking] and press <Enter>.

Step 2:   Move to highlight a row you want to change the DHCP Gateway Settings, and press <Enter>

36
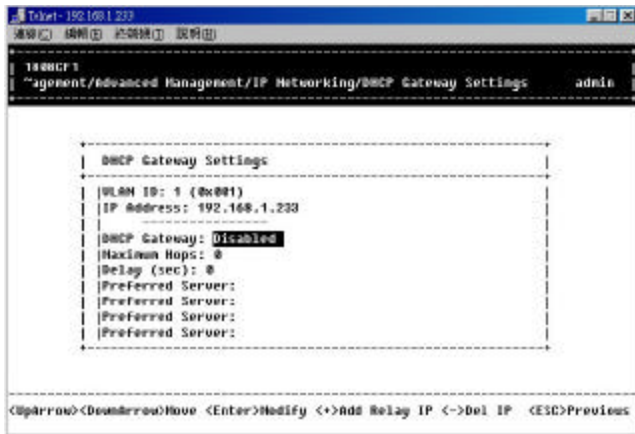
Step 3: Press [+] on keypad to add a relay IP. Choose a suitable interface or All Interfaces from Select Outbound Relay Interfaces.
Press [-] on keypad to delete a relay IP.

* No precautionary message appears before you delete a relay IP.
* Be sure you want to delete it before doing so.

Step 4: Move to highlight **DHCP Gateway** and press <Enter>.
Decide to have it Disabled or Enabled.
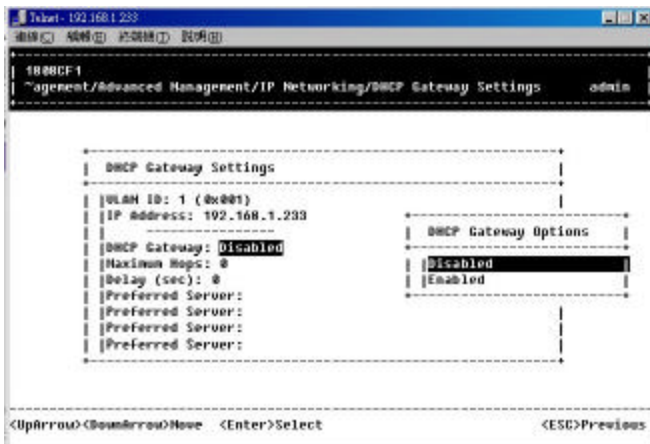
Step 5: Move to highlight **Maximum Hops** and press <Enter>

Step 6: Enter decimaI number (1-16) to configure the maximum number of hops.

Step 7: Move to highlight **Delay (sec)** and press <Enter>.

Step 8: Enter decimal number (0-65535) configure the delay in seconds.

Step 9: Move to highlight **Preferred Server** and press <Enter>.

Step 10: Enter IP address for the Preferred Server.

Step 11: To specify up to three more Preferred Servers, repeat the above steps.

Ping Settings
Step 1:   Move to highlight [Ping] from [IP Networking] and press <Enter>.
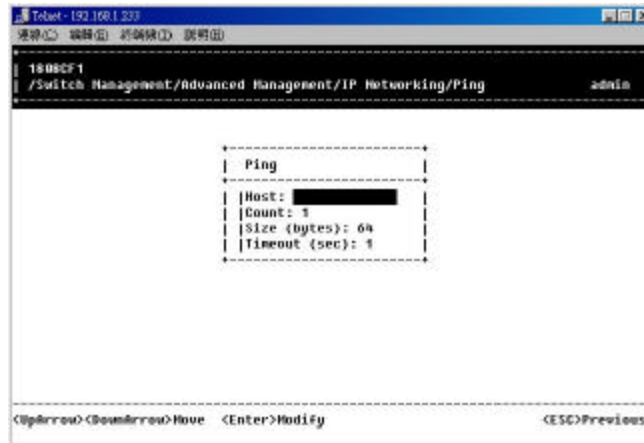
Host

Step 2: Move to highlight **Host** and press <Enter>.

Step 3: Enter 4 decimal bytes (dot separated) as the IP address to ping.

Count

Step 4: Move to highlight **Count** and press <Enter>.

Step 5: Specify a packet count number from 1 to 999, or type 0 for an infinite packet count. Press <Enter>.

Size (bytes)

Step 6: Move to highlight **Size** and press <Enter>.

Step 7: Specify a packet size from 0-1500. Press <Enter>.

Timeout (sec)

Step 8: Move to highlight **Timeout** and press <Enter>.

Step 9: Specify a timeout value from 1-999. Press <Enter>.

Step 10: Press <Esc> to start to ping when completed with the ping parameters.

BRIDGING
Step 1:   Move to highlight [Bridging] from [Advanced Management] screen, and press <Enter>.
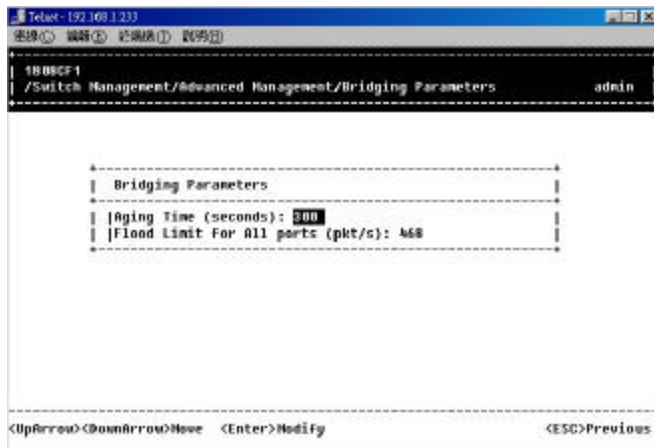
Aging Time

Step 2:   Move to highlight [Aging Time] and press <Enter>.
          Enter a decimal number as bridge aging period in seconds.
          Or, enter 0 for no aging.

Flood Limit for All ports

Step 3:   Move to highlight [Flood Limit for All ports] and press <Enter>.
          Enter a decimal number as flood limit in packets per second.
          Or, enter 0 for no limit.

STATIC FILTERING

Step 1:   Move to highlight [Static Filtering] from [Advanced Management] screen, and press <Enter>.
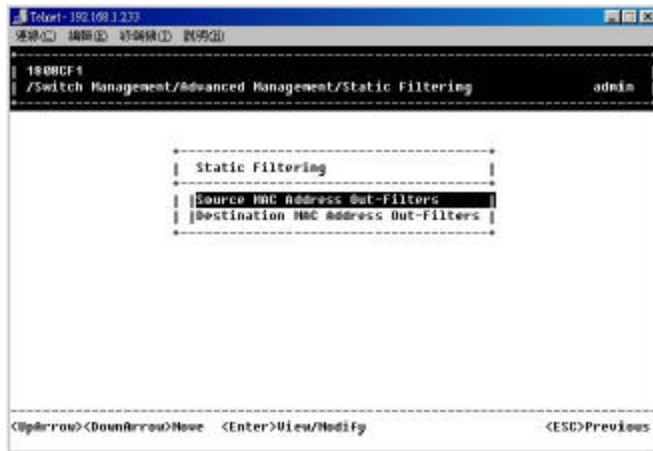
Source/Destination MAC Address Out-Filters

Step 2:   Move to highlight source MAC addresses or destination MAC addresses for static filtering, and press <Enter>.
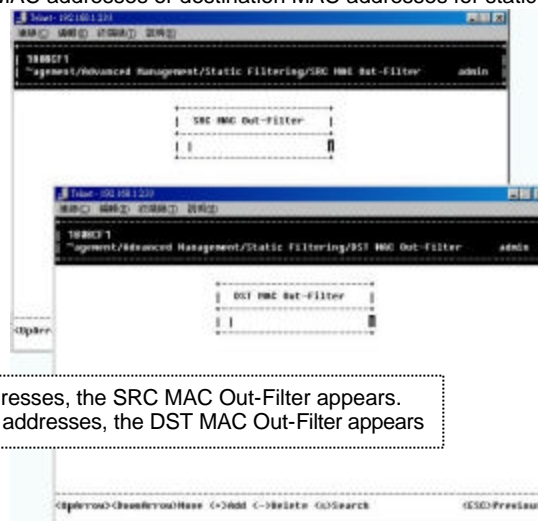
    If you select source MAC addresses, the SRC MAC Out-Filter appears.
    If you select destination MAC addresses, the DST MAC Out-Filter appears

Add/Delete/Search

Step 3:   Press [+] on keypad to add a specific MAC address to be filtered.
          Press [-] to delete a specific MAC address from being filtered.
          Press [S] to search through current list of MAC addresses in the static filtering database. The static filtering database maximum
          capacity is 64

SPANNING TREE FUNCTIONS

    * No precautionary message appears before you delete a specific MAC address   and press <Enter>.
          from being filtered.
    * Be sure you want to delete it before doing so.
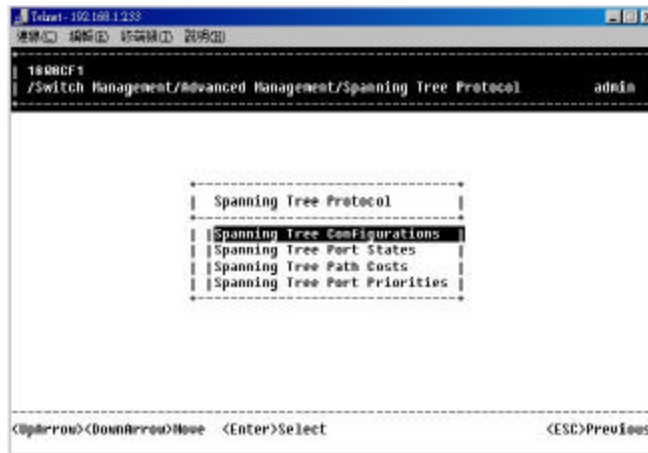
Spanning Tree Configurations

Step 2:   Move to highlight [Spanning Tree Configurations] if you want to change Spanning Tree Protocol Configurations.
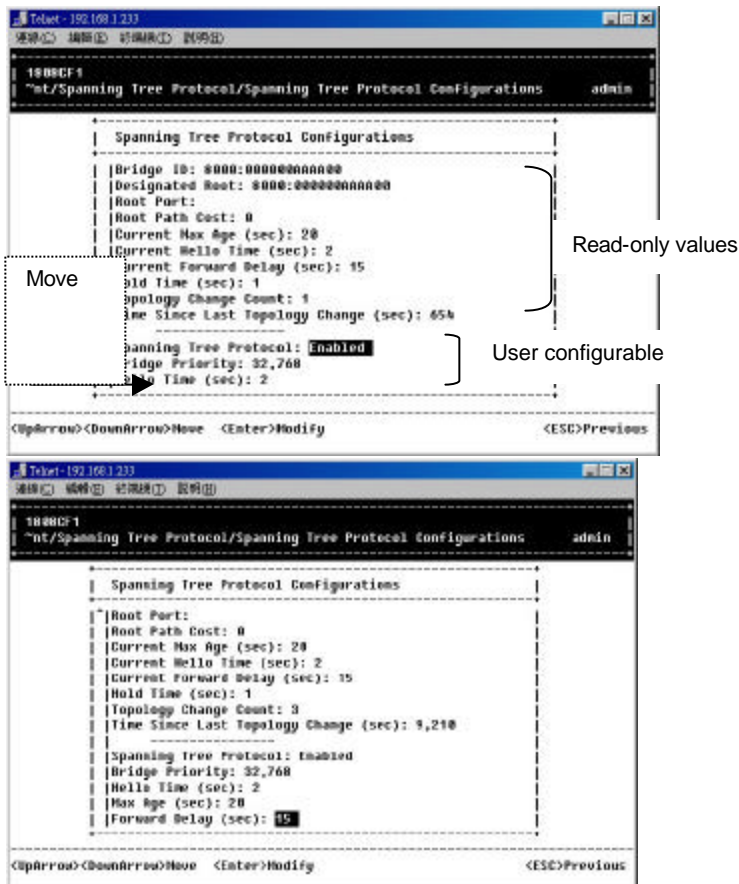
Step 3:   Press <Enter> to enter **Spanning Tree Options**.
           Decide to have it Disabled or Enabled.

Step 4:   Move to highlight **Bridge Priority** and press <Enter>.
           Type a decimal number for the bridge priority and press <Enter>.

Step 5:   Move to highlight **Hello Time** and press <Enter>.

Type a decimal number for the hello time and press <Enter>.

Max Age (sec)

Step 6:   Move to highlight **Max Age** and press <Enter>.
Type a decimal number for the max age

Forward Delay (sec)

Step 7:   Move to highlight **Forward Delay** and press <Enter>.
Type a decimal number for the forward delay

Spanning Tree Port States
Step 1:   Move to highlight [Spanning Tree Port States] if you want to change per port administration status, and press <Enter>.
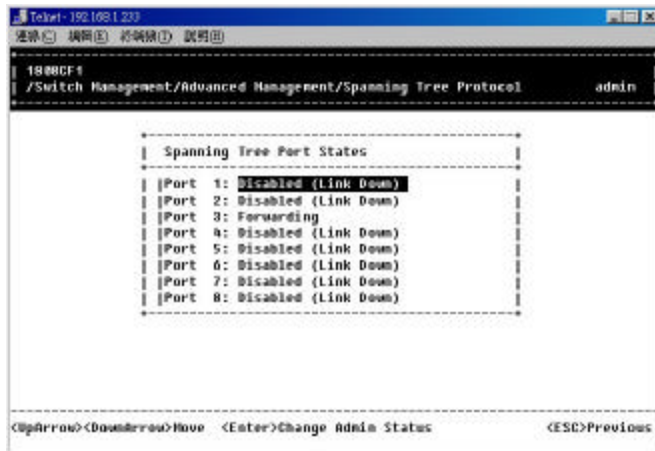
Step 2:   Move to highlight a port if you want to change its administration status, and press <Enter>.
            'Disabled (Link Down)' denotes Admin Status Up without a link.
            'Forwarding' denotes Admin Status Up with a link.
            'Admin Status Down' denotes no TX/RX transmission allowed
            'Admin Status Up' denotes TX/RX transmission allowed.

Spanning Tree Path Costs
Step 1:   Move to highlight [Spanning Tree Path Costs] if you want to change the path cost, and press <Enter>.
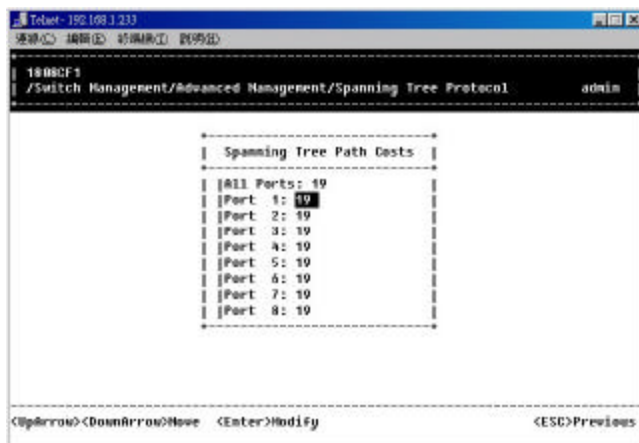
Step 2:   Move to highlight **All Ports** or each port individually, and press <Enter>. For new path cost, type a decimal number and
            press <Enter>.

Spanning Tree Port Priorities
Step 1:   Move to highlight [Spanning Tree Port Priorities] if you want to change the priority level per port, and press <Enter>.
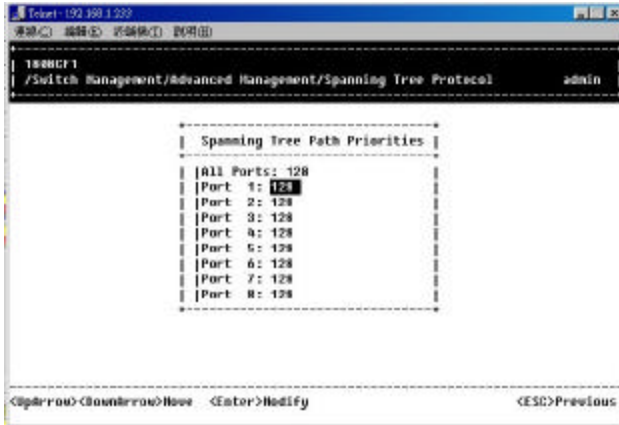
Step 2: Move to highlight **All Ports** or each port individually, and press <Enter>. For new priority value, type a decimal number from 0-255, and press <Enter>. A low value gives the port a greater likelihood of becoming a Root port.

SNMP FUNCTIONS
Step 1: Move to highlight [SNMP] from [Advanced Management] screen, and press <Enter>.

Factory-default values
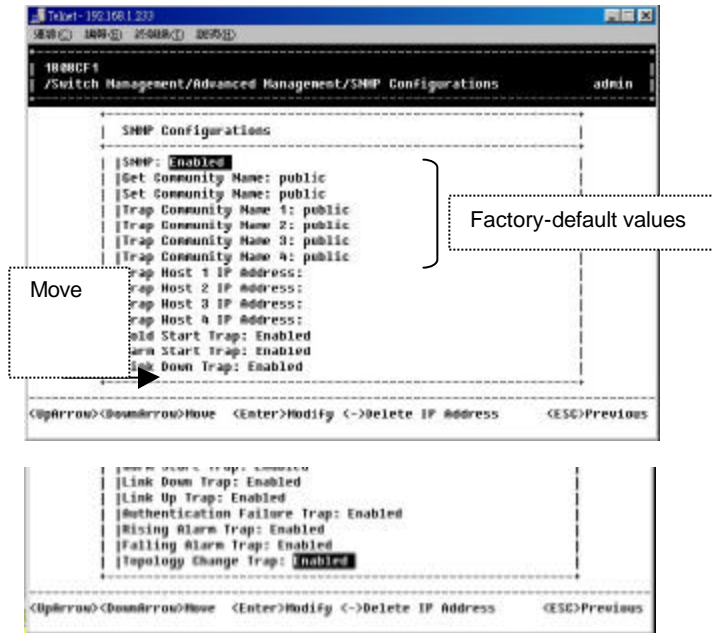
Move

Step 2: Move to highlight **SNMP** and press <Enter>.
Decide to have it Disabled or Enabled.

Get Community Name

Step 3: Move to highlight **Get Community Name** and press <Enter>.
Enter text and press <Enter>.

Trap Community Name

Step 4: Move to highlight **Trap Community Name 1** and press <Enter>.
Enter text and press <Enter>.
Repeat to specify up to three more trap community names.

Trap Host IP Address

Step 5: Move to highlight **Trap Host 1 IP Address** and press <Enter>.
Type an IP address for trap host 1 and press <Enter>
Repeat to specify up to two more trap host IP addresses

Cold Start Trap

Step 6: Move to highlight **Cold Start Trap** and press <Enter>.

Decide to have it Disabled or Enabled.

Warm Start Trap

Step 7:   Move to highlight **Warm Start Trap** and press <Enter>.
           Decide to have it Disabled or Enabled.

Link Down Trap

Step 8:   Move to highlight **Link Down Trap** and press <Enter>.
           Decide to have it Disabled or Enabled.

Link Up Trap

Step 9:   Move to highlight **Link Up Trap** and press <Enter>.
           Decide to have it Disabled or Enabled.

Authentication Failure Trap

Step 10:Move to highlight **Authentication Failure Trap** and press <Enter>.
           Decide to have it Disabled or Enabled.

Rising Alarm Trap

Step 11:Move to highlight **Rising Alarm Trap** and press <Enter>.
           Decide to have it Disabled or Enabled.

Falling Alarm Trap

Step 12:Move to highlight **Falling Alarm Trap** and press <Enter>.
           Decide to have it Disabled or Enabled.

Topology Change Trap

Step 13:Move to highlight **Topology Change Trap** and press <Enter>.
           Decide to have it Disabled or Enabled.

OTHER PROTOCOLS
Step 1:   Move to highlight [Other Protocols] from [Advanced Management] screen, and press <Enter>.
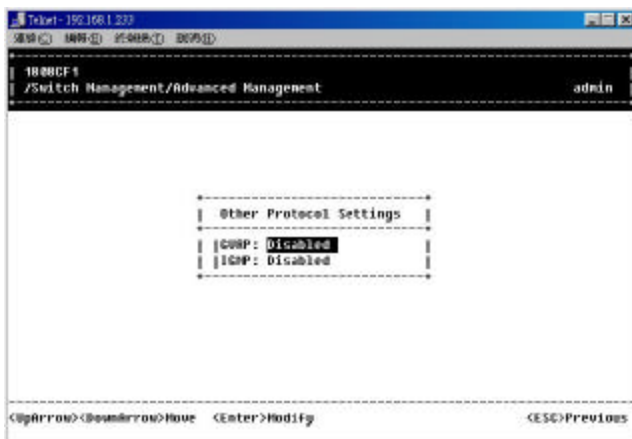
GVRP

Step 2:   Move to highlight **GVRP** and press <Enter>.
           Decide to have it Disabled or Enabled.
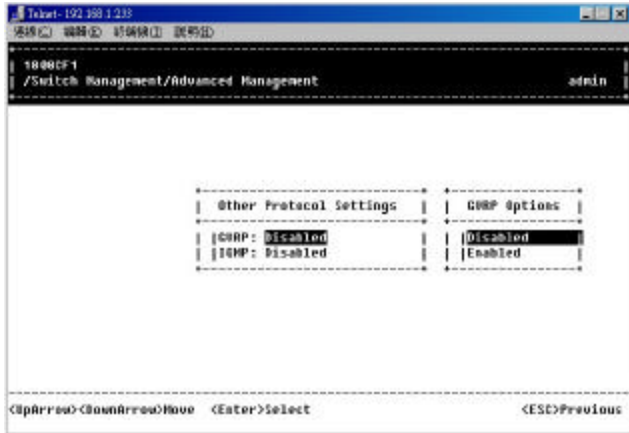
Step 3:   Move to highlight **IGMP** and press <Enter>.
Decide to have it Disabled or set in either Passive or Active mode.
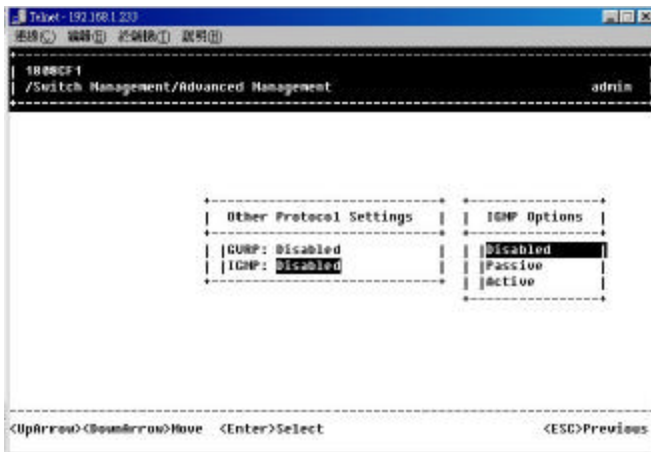
PORT TRUNKING
Step 1:   Move to highlight [Port Trunking] from [Advanced Management] screen, and press <Enter>.
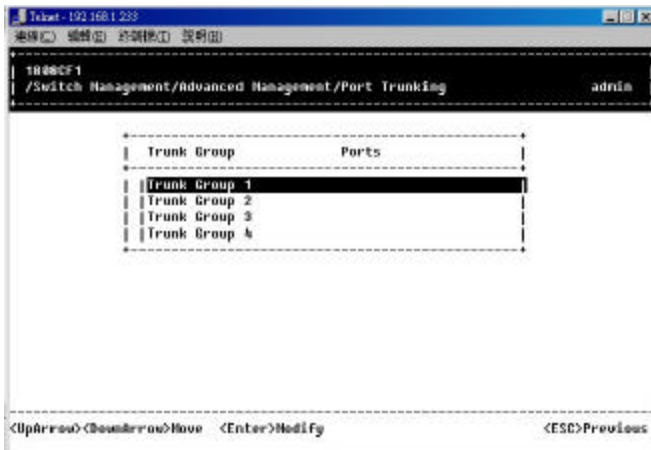
Step 2:   Move to highlight a trunk group to which you want to assign ports, and press <Enter> to enter **Select Range**.
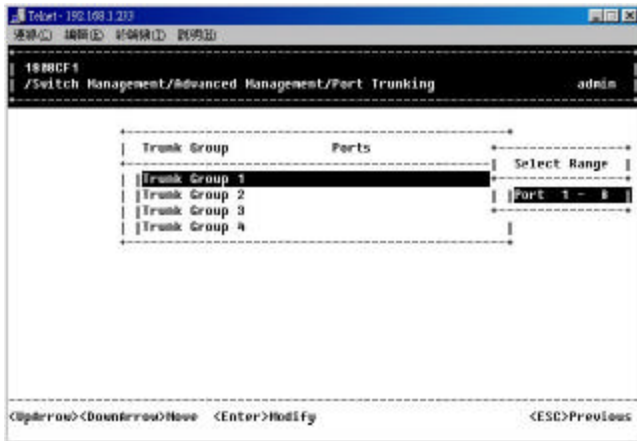
Step 3:   Press <Enter> to select each trunk port.
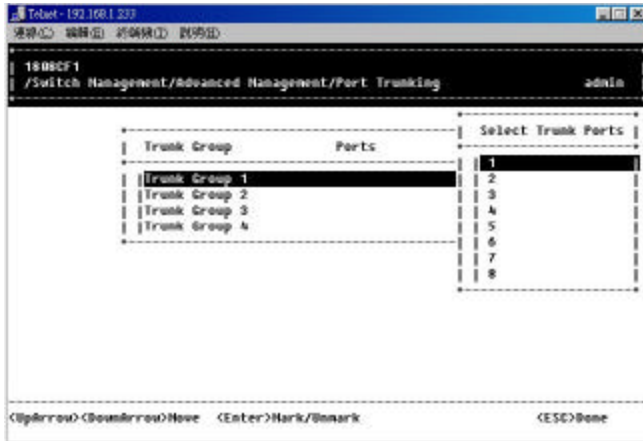
Step 4:   Press <Esc> when completed with selecting ports
.
PORT MIRRORING
Step 1:   Move to highlight [Port Mirroring] from [Advanced Management] screen, and press <Enter>. You can mirror one port to Port 1.
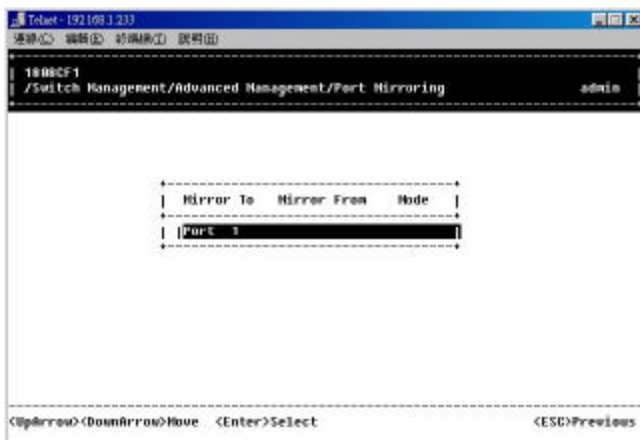
Step 2:   Press <Enter> to enter **Port Mirroring Options**.
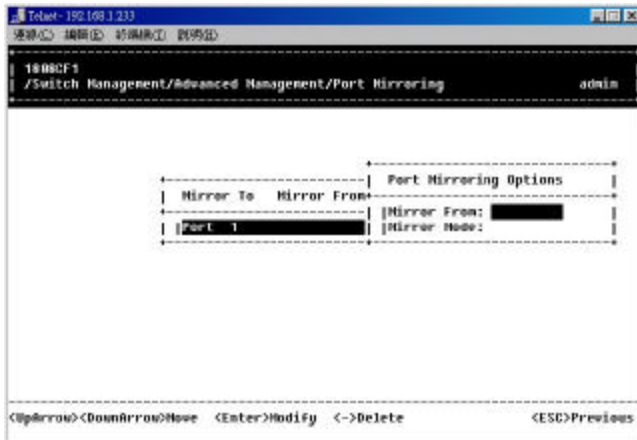
Mirror From

Step 3: Press <Enter> to enter **Mirror From Options**, listing the ports that can be mirrored from.
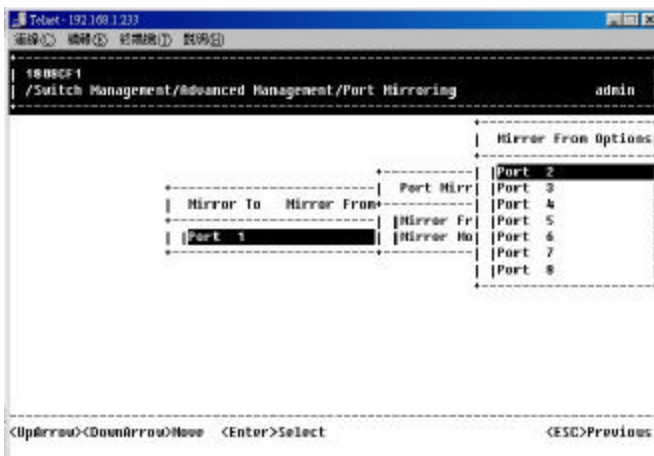
Step 4: Move to highlight the port you want to mirror from and press <Enter>.

Mirror Mode

Step 5: Move to select **Mirror Mode**. From **Mode Options**, decide whether the port to be mirrored from will be receiving or transmitting.

Step 6: Press <Esc> when completed

SENDING AND RECEIVING FILES

The TFTP protocol is used to download upgraded software to the switch.

A VLAN with the proper IP address and routing path to the TFTP server must be configured for the switch to access the specified TFTP server.

Step 1:   Move to highlight [File Transfer] from [Advanced Management] screen, and press <Enter>.
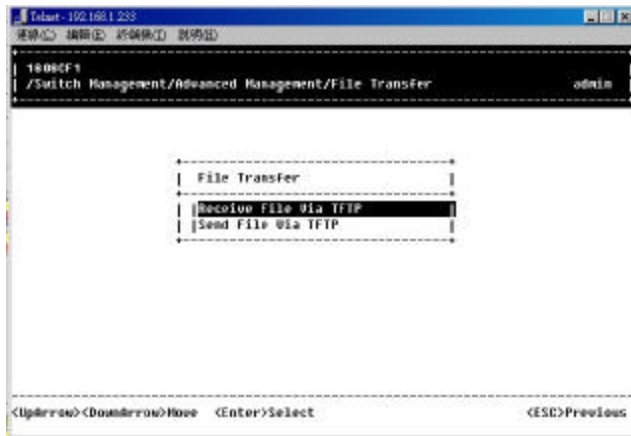
Step 2:   Move to highlight **Receive File Via TFTP** and press <Enter>.
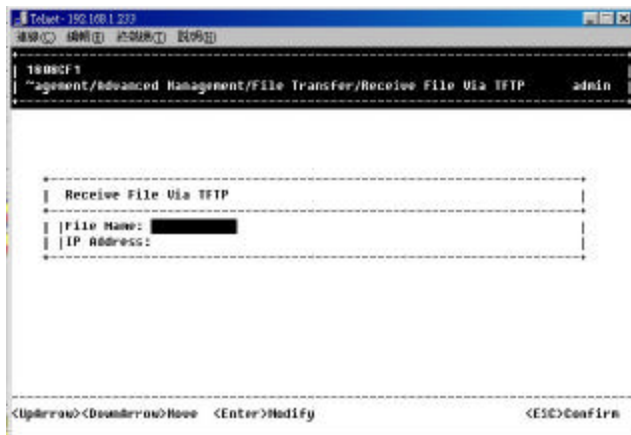
Step 3:   If the default **File Name** is not the one you intend to receive, press <Enter>. Type the name of the file you intend to receive and press <Enter>.

Step 4:   Move to highlight **IP Address** and press <Enter>.
Type the IP address from where the file will be obtained.

Step 5:   Press <Esc> when completed.

Step 6:   A dialog box appears to ask if you want to transfer file now.
Highlight [Yes] and press <Enter> to start file transfer.
Or move to highlight [No] and press <Enter> to deny it.
Or press <Esc> to exit.

Step 7:   Move to highlight **Send File Via TFTP** and press <Enter>.
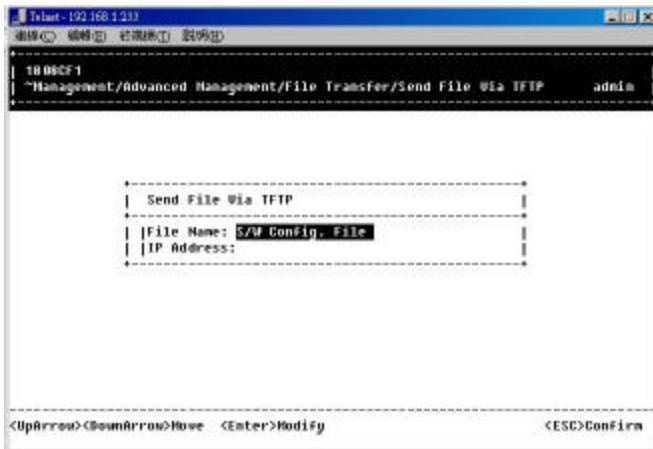
Step 8:   If the default **File Type** is not the one you intend to send, press <Enter>. Select the file type you intend to send and press <Enter>.
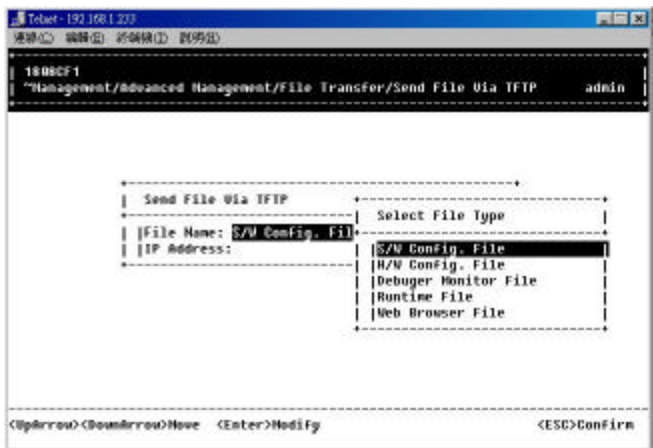
Step 9: Repeat Step 4-6.

Logout

To log out, highlight [Logout] from [Switch Management] screen and press <Enter>. Please remember to save settings you have changed before you log out.

Save Settings

To save the current settings and remain in the configuration program, highlight [Save Settings] from [Switch Management] and press <Enter>.

Restore Default Settings

To restore the factory default settings, highlight [Restore Default Settings] from [Switch Management] and press <Enter>.

The switch will be rebooted after confirming Yes as to restore the default settings.

Reboot

To reboot the switch, highlight [Reboot] from [Switch Management] and press <Enter>.

Web-Based Browser Management

The switch provides a web-based browser interface for configuring and managing the switch. This interface allows you to access the switch using a preferred web browser.

This chapter describes how to configure the switch using its web-based browser interface.

Logging on to the switch

SWITCH IP ADDRESS
In your web browser, specify the IP address of the switch.

LOGIN ID
Enter the factory default login ID: **admin**.

PASSWORD
Enter the factory default password (no password, **press Enter directly**).
Or enter a user-defined password if you followed the instructions later and changed the factory default password.
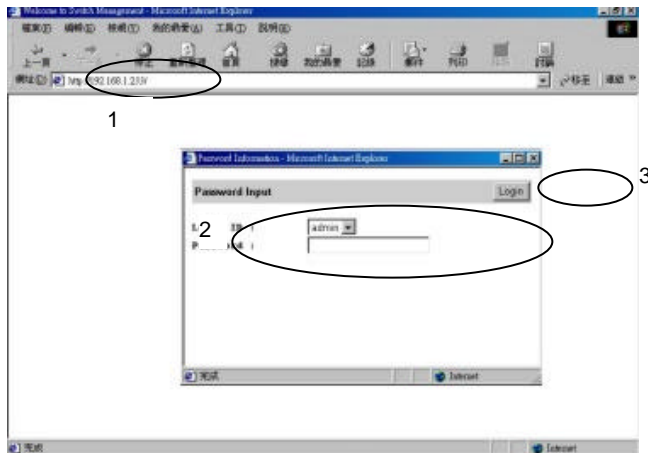
Understanding the Browser Interface

The web browser interface provides three point-and-click buttons at the upper field of the screen for configuring and managing the switch.

In addition, you can click the RJ-45 connectors on the switch image to view the switch's current speed, duplex, and activity status.

The **Basic Setup/General** parameters appear at the lower field of the screen. These parameters can also be displayed by clicking **Basic Setup** button and select **General** in sub-menu.

```
Point

click
```

RJ-45

c
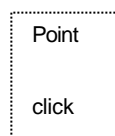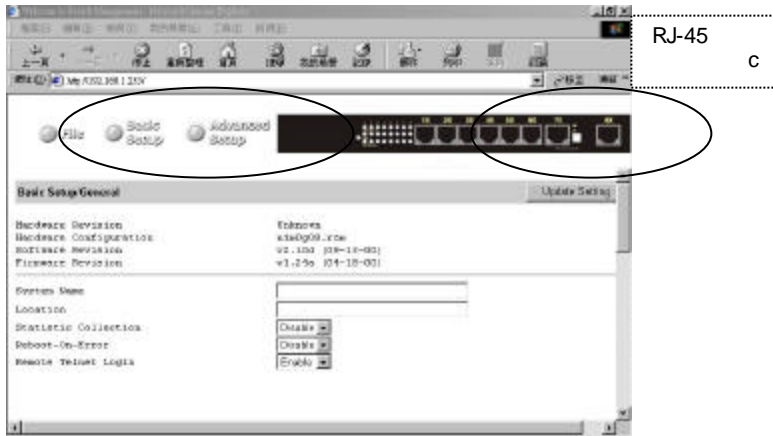
FILE

Save settings configured in the browser interface / download upgraded software via TFTP / reboot the switch / logout of the browser interface.

BASIC SETUP

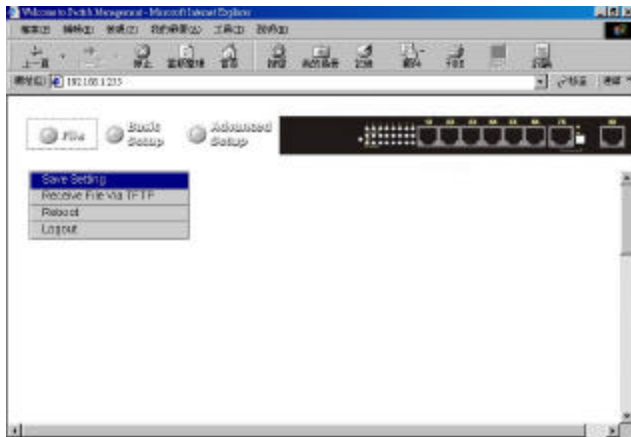Perform general, LAN port, and console port activities.

ADVANCED SETUP

Perform MAC address management / IP networking / per port statistics / static MAC filters / SNMP / port trunking / port mirroring…tasks.

Performing File Activities

To perform File Activities:

Click the [File] button at the upper field of the main display, the menu options appear.

Saving Setting

Step 1:   Click **Saving Setting** to save your configuration settings.

Step 2:   When you click it, a message asks "**Are you sure you want to save setting?** ", click **OK** to save it or **Cancel** to abort it.

Step 1:   Click **Receive File Via TFTP** on the [File] display

<Note>   The TFTP protocol is used to download upgraded software to the switch.
         A VLAN with the proper IP address and routing path to the TFTP server must be configured for the switch to access the specified
         TFTP server.

Step 2:   For **File Name**, type the name of the file you intend to receive.

Step 3:   For **IP Address**, type the IP address from where the file will be obtained.

Step 4:   Click **Receive Now!** .
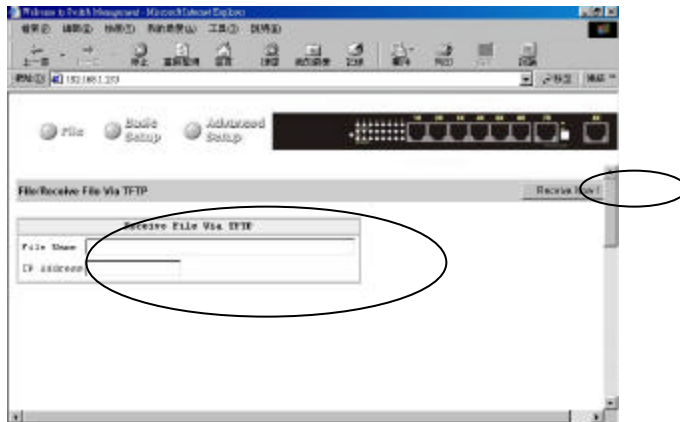
Step 1:   Click **Reboot** on the [File] display.

Step 2:   When you click it, a message asks "**Are you sure you want to save setting?** ", click **OK** to save it or **Cancel** to abort it.

Step 1:   Click **Logout** on the [File] display.

Step 2:   When you click it, a message asks "**Are you sure you want to save setting?** ", click **OK** to save it or **Cancel** to abort it.

Performing Basic Setup Activities

To perform Basic Setup Activities:

Click the [Basic Setup] button at the upper field of the main display, the menu options appear.
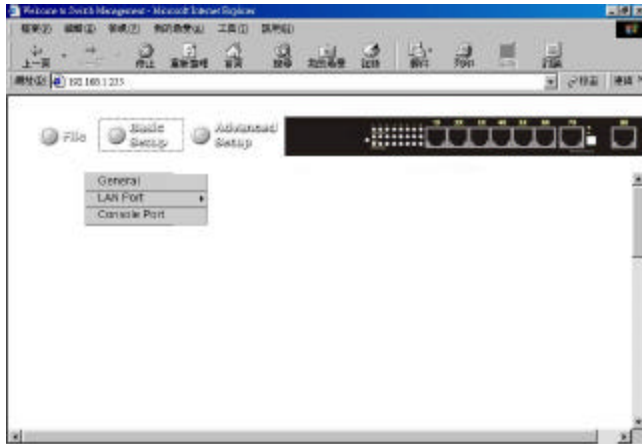
General Management Configuration

Step 1:   Click **General** and the screen shows the Basic Setup/General parameters. The screen here is the same as shown on page 49 when you first access the switch browser interface.
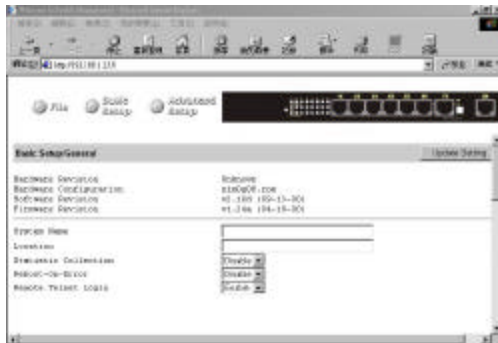
Read-only information

System Name

Step 2:   Click in **System Name** text box on the field of **Basic Setup/General**.

Step 3:   Type a system name if it is blank, or replace the current system name with a new one.

System Name | Management Switch |

Location

Step 4:   Click in **Location** text box on the field of **Basic Setup/General**.

Step 5:   Type a location name if it is blank, or replace the current location name with a new one.

Location | EtherWAN Taiwan |

Statistic Collection

Step 6:   To enable or disable statistics collection at the switch, click the appropriate option from **Statistic Collection** drop-down menu.

Statistic Collection | Disable ▼ |

Reboot-On-Error

Step 7:   To allow or prevent the switch from rebooting when a fatal error is detected, click the appropriate option from **Reboot-On-Error** drop-down menu.

Reboot-On-Error   Disable ▾

Step 8:   To enable or disable access to the switch management program via Telnet, click the appropriate option from **Remote Telnet Login** drop-down menu.
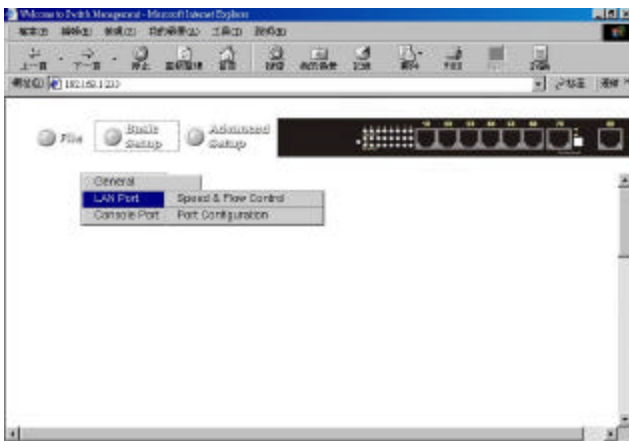
Remote Telnet Login   Enable ▾

Step 9:   Click **Update Setting**. A confirmation window appears as show below.
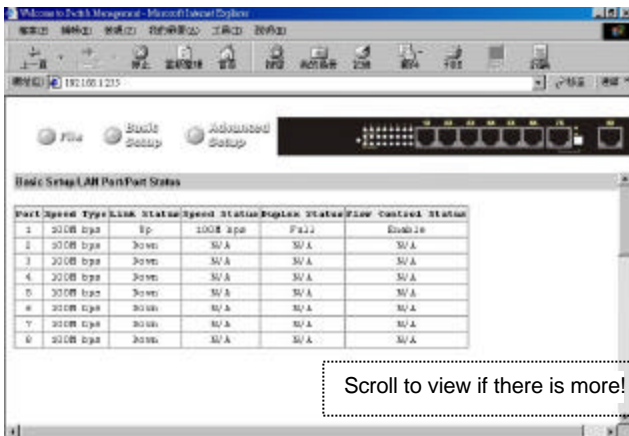

LAN Port Configuration

Step 1:   To access the LAN configuration parameters, click **Basic Setup** button first and then point to **LAN Port** and click a suitable option.

Step 2:   Click **Speed & Flow Control** to view the line speed and flow control for all ports.

Scroll to view if there is more! ➡

<Note>   The information displayed automatically updates every 15 seconds, without requiring you to refresh the window.

Step 3:   Click **Port Configuration** to access the configuration information for all ports.
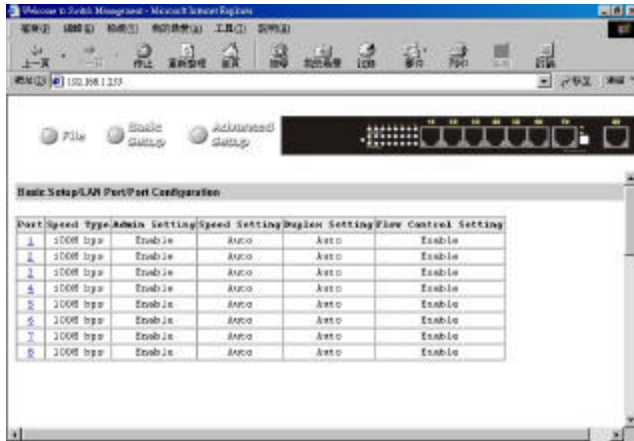
Step 4:   In the **Port** column, click the port you want to configure. E.g. click Port 1.

Step 5:   Click the drop-down menu under **Admin Setting**, decide to disable or enable it.

<Note>   Disable: places the port in DOWN state. In this state, packets cannot be switches to and from the port
             Enable: places the port in UP state, In this state, packets can be switched to and from the port.

Step 6:   Click the drop-down menu under **Speed/Duplex Options** if you want to change the line speed and duplex settings.

<Note>   Auto: allows the switch to automatically ascertain the line speed and duplex mode.
             All the other selections force the port to use a specific line speed and duplex mode.
             'HD' denotes half-duplex mode; FD denotes full-duplex mode.

Step 7:   Click the drop-down menu under **Flow Control Options** if you want to configure the flow control for this port.

<Note>   Auto: allows the switch to automatically ascertain whether or not to use flow control.
             Disable: turns off flow control at all times.
             Enable: turns on flow control at all times.

Step 8:   Click **Update Setting** when completed. A confirmation window appears.

<Note>   For your convenience, click the LEDs on the image of the switch and view its current speed, duplex, and link activity.

Console Port Configuration
Step 1:   To access the console port configuration parameters, click **Basic Setup** button first and then click **Console Port**.
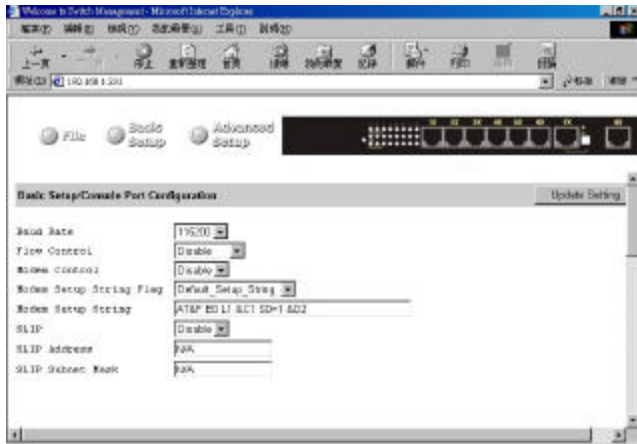
Step 2:   Click an appropriate speed from **Baud Rate** drop-down menu on the field of **Basic Setup/Console Port Configuration**.

<Note>   Auto: allows the switch to autobaud between 9600bps and 115,200bps
        All the other selections force a specific console baud rate.

Step 3:   Click a flow control method from **Flow Control** drop-down menu.

Step 4:   Click an appropriate option from **Modem Control** drop-down menu to disable or enable a modem connection to the
        console port.

Step 5:   If you enabled a modem connection to the console port, click in **Modem Setup String Flag** drop-down menu to decide
        whether you want to use a Default_Setup_String or Custom_Setup_String.

Step 6:   If you select Custom_Setup_String, enter the string in the **Modem setup String** text box.

<Note>   The default modem setup string configures the modem to auto answer. It works for all Hayes-compatible modems.

Step 7:   Click an appropriate option from **SLIP** drop-down menu to disable or enable SLIP.

Step 8:   If you enable SLIP, type a SLIP address in **SLIP Address** text box.

Step 9:   If you enable SLIP, type a SLIP subnet mask in **SLIP Subnet Mask** text box.

Step 10:Click **Update Setting** when completed. A confirmation window appears.

<Note>   If you enable SLIP, a message tells you that the console port becomes accessible only through the SLIP protocol after you click
        Update Setting.
        If you enabled SLIP but did not specify a SLIP address and SLIP subnet mask, a message tells you to enter these parameters.

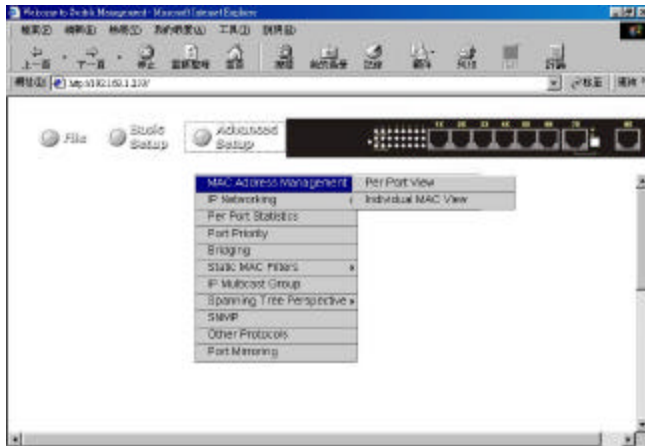# Performing Advanced Setup Activities

To perform Advanced Setup Activities:

Click the [Advanced Setup] button at the upper field of the main display, the menu options appear.
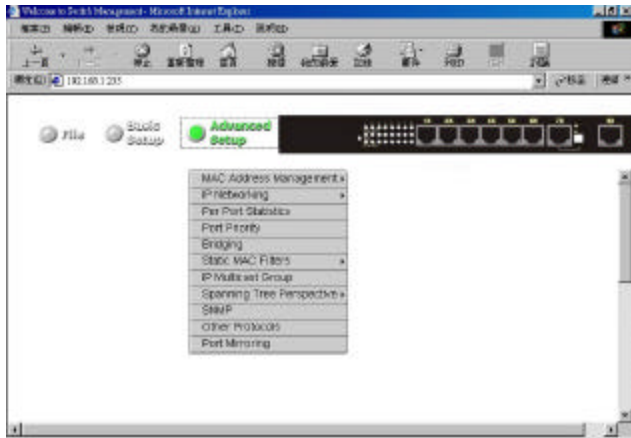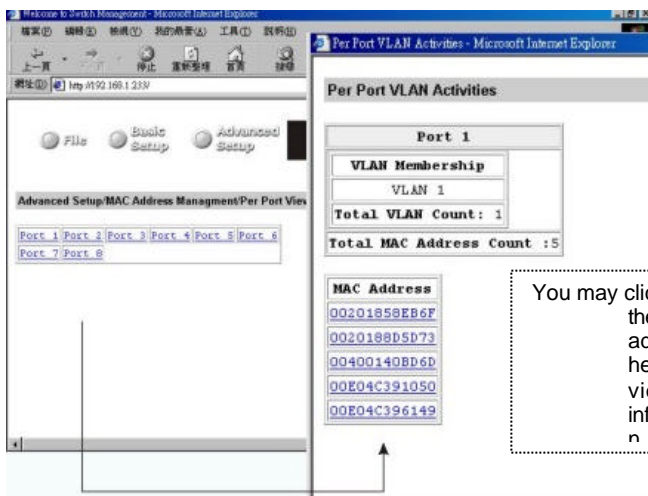
MAC Address Management

Step 1:   From the **Advanced Setup** menu, point to **MAC Address Management** to view VLANs and their associated MAC addresses.


Per Port View

Step 2:   Click **Per Port View** first and click on the port that you want to view.
              Close the **Per Port VLAN Activities** window when finished viewing.

Step 3:   From the **Advanced Setup** menu as shown in Step 1, point to **MAC Address Management**. Click **Individual MAC View** then.
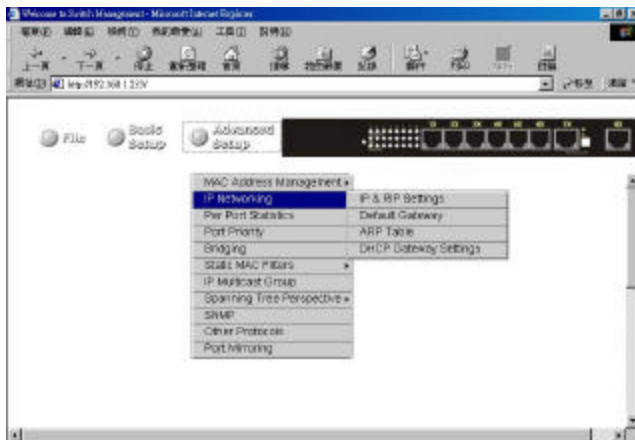
Step 4:   Click in the **Enter MAC Address** text box and type the MAC address that you want to view. Then click on the **Get Information** button.
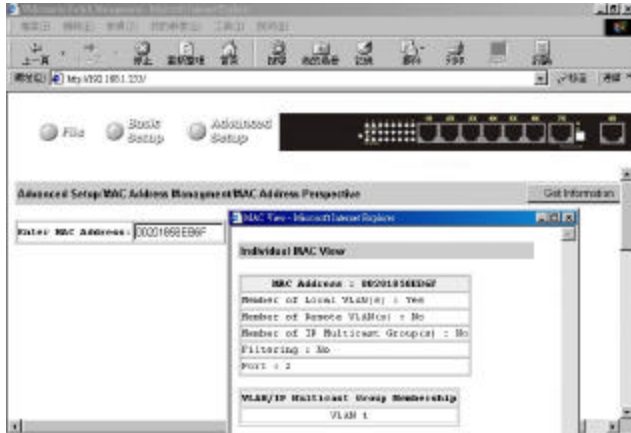
Step 5:   Close the **Individual MAC View** window when finished viewing.

IP Networking

To access the IP networking parameters, click the **Advanced Setup** button, and
Point to **IP Networking** from the selection menu.

Step 1:   Click **IP & RIP Settings** to access IP and RIP settings. A list of VLAN Ids appears, along with their corresponding IP address and subnet mask.
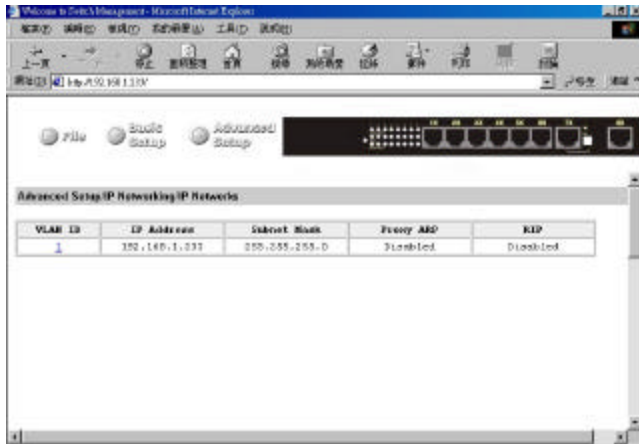
Step 2: In the **VLAN ID** column, click a VLAN ID whose settings you want to view and/or change.
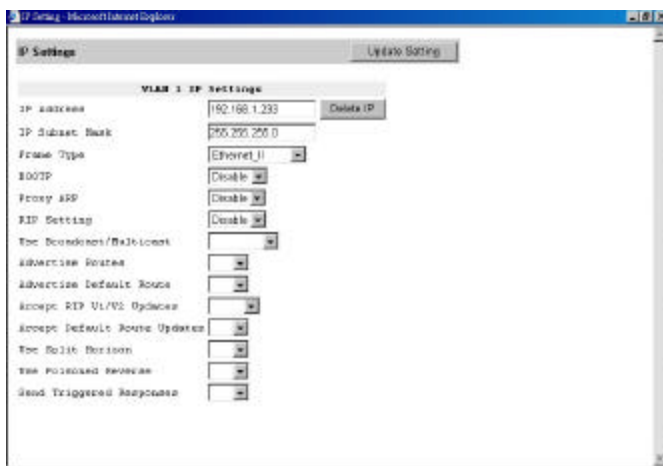
Step 3: To change the **IP Address**, click in the text box and type a new address. Alternatively, you can use the **Delete IP** button to delete the IP address.
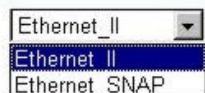


```
* No precautionary message appears before you delete the IP address.
* Be sure you want to delete it before doing so.
* The IP address is not deleted until you click Update Setting.
```
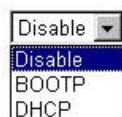
Step 4: To change the **IP Subnet Mask**, click in the text box and type a new address.

Step 5: To change the **Frame Type**, click a value from the drop-down list.

Step 6: To change the **BOOTP** selection, click a value from the drop-down list.

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Step 7:   To change the **Proxy ARP** selection, click a value from the drop-down list.

```
Disable  ▼
Enable
Disable
```

Step 8:   To change the **RIP Setting**, click a value from the drop-down list.

```
Disable  ▼
Disable
RIP_V1
RIP_V2
```

Step 9:Specify whether you want to broadcast, multicast, or neither from the drop-down list.

```
          ▼

Broadcast
Multicast
```

Step 10:Specify whether you want to advertise routes.

```
    ▼
Yes
No
```
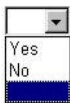
Step 11:Specify whether you want to advertise the default route.

```
    ▼
Yes
No
```
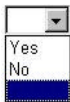
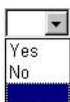Step 12:Specify whether you want to accept RIP V1/V2 updates.

```
    ▼
None
V1
V2
V1/V2
```
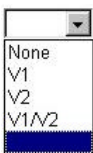
Step 13:Specify whether you want to accept default route updates.

```
    ▼
Yes
No
```

Step 14:Specify whether split horizon is to be used.

```
    ▼
Yes
No
```
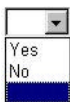
Step 15:Specify whether poisoned reverse is to be used.

```
    ▼
Yes
No
```

Step 16: Specify whether the switch is to send triggered responses.
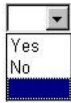
Step 17: When you finished with these selections, click Update Setting.
A confirmation window appears. Click to close the confirmation window.

Default Gateway

Step 1: Click the **Advanced Setup** button, and point to **IP Networking** from the selection menu. Click **Default Gateway** to access gateway settings.
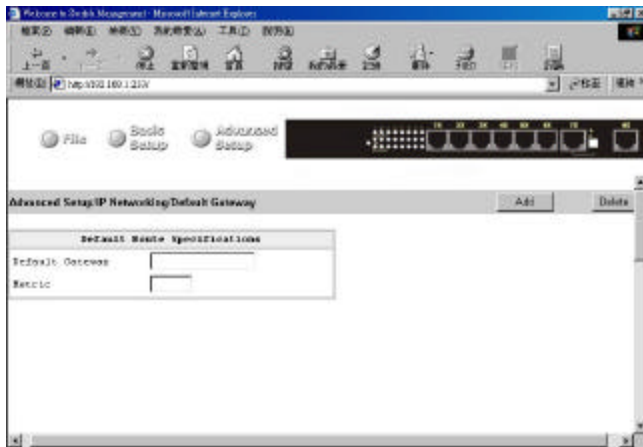

Step 2: For **Default Gateway**, click in the text box and type the IP address of the router at the next hop.

Step 3: For **Metric**, click in the text box and type the number of hops needed between the switch and the destination network.
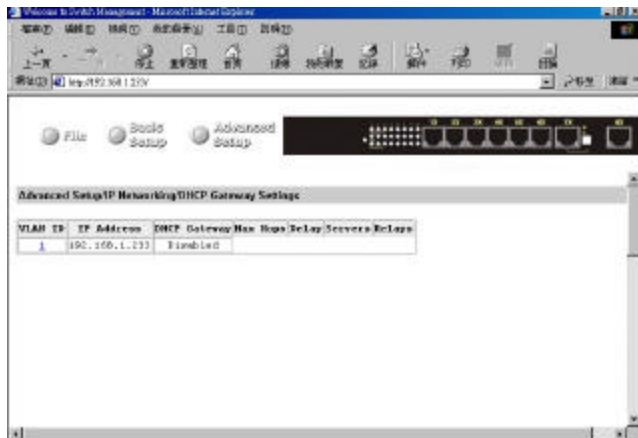
ARP Table

Step 1: Click the **Advanced Setup** button, and point to **IP Networking** from the selection menu. Click **ARP Table** to view ARP table settings.
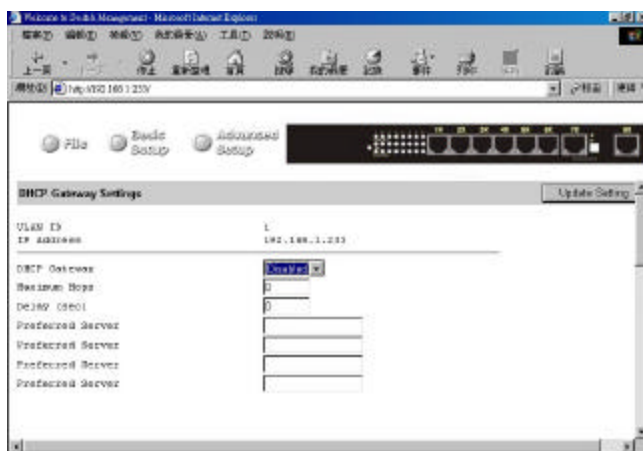The information here is read-only.
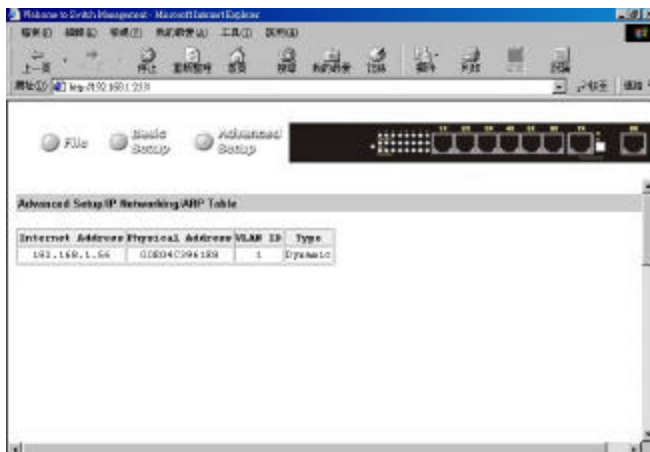
DHCP Gateway Settings

Step 1: Click the **Advanced Setup** button, and point to **IP Networking** from the selection menu. Click **DHCP Gateway Settings** to view and/or change settings.

Step 2:   In the **VLAN ID** column, click on a port that you want to view or change its DHCP gateway settings.

Step 3:   For **DHCP Gateway**, click the drop-down list and decide to have it Disabled or Enabled.

Step 4:   For **Maximum Hops**, click in the text box and type a decimal number to configure the maximum number of hops.

Step 5:   For **Delay**, click in the text box and type a decimal number to configure the delay in seconds.

Step 6:   For **Preferred Server**, click in the text box and type an IP address for it.
Repeat to specify up to three more Preferred Servers.
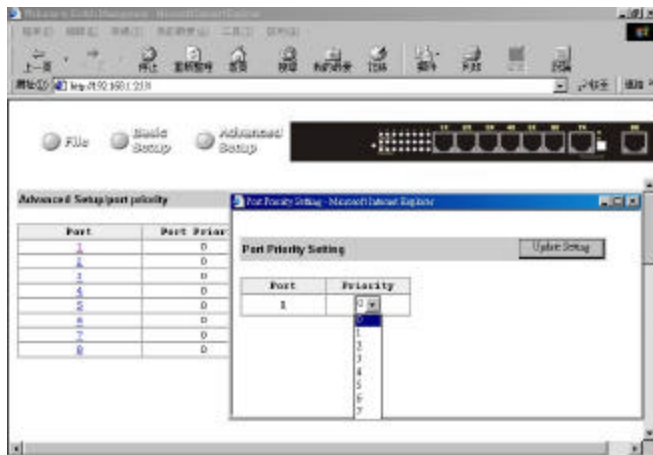
Per Port Statistics
Step 1:   To access per port statistics, click the **Advanced Setup** button, and then click **Per Port Statistics** from the selection menu.

Step 2:   Click a port to view statistic data.
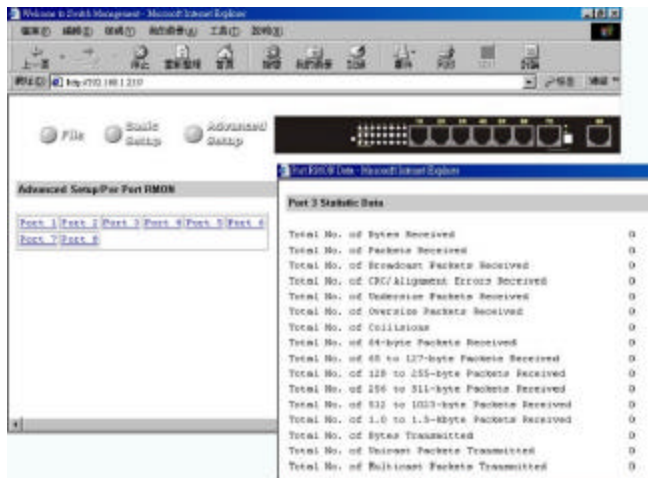
Port Priority

Step 1: To access port priority, click the **Advanced Setup** button, and then click **Port Priority** from the selection menu.
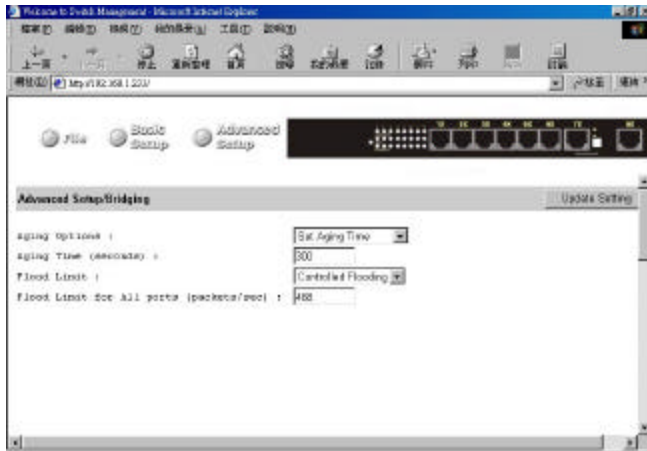

Step 2: Click a port to change the priority level.

Step 3: Click the drop-down list for setting a proper priority level.

Step 4: Click **Update Setting** when completed.

Bridging

Step 1: To access bridging parameters, click the **Advanced Setup** button, and then click **Bridging** from the selection menu.

Step 2:   Click the drop-down list for **Disabled (No Aging)** or **Set Aging Time**.

Step 3:   Click the text box and type a decimal number as bridge aging period in seconds.

Step 4:   Click the drop-down list for No Flooding, Controlled Flooding, Unlimited Flooding.
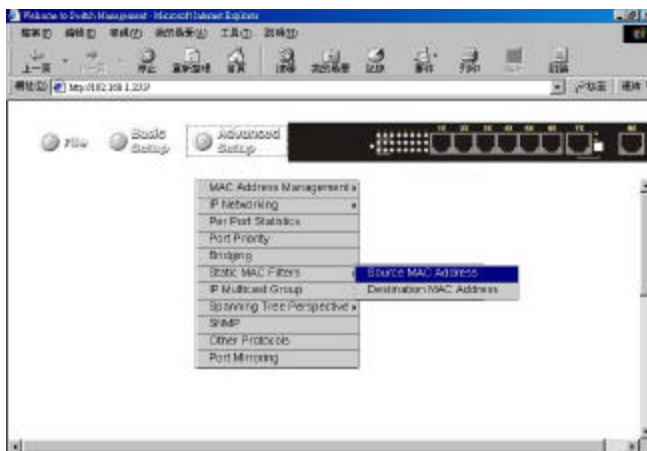
Step 5:   Click the text box and type a decimal number as flood limit in packets per second.
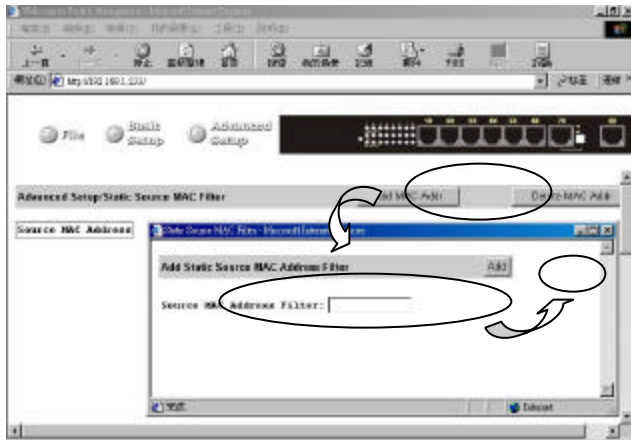
Static MAC Filter

To access the static MAC filter parameters, click the **Advanced Setup** button, and
point to **Static MAC Filter** in the selection menu.
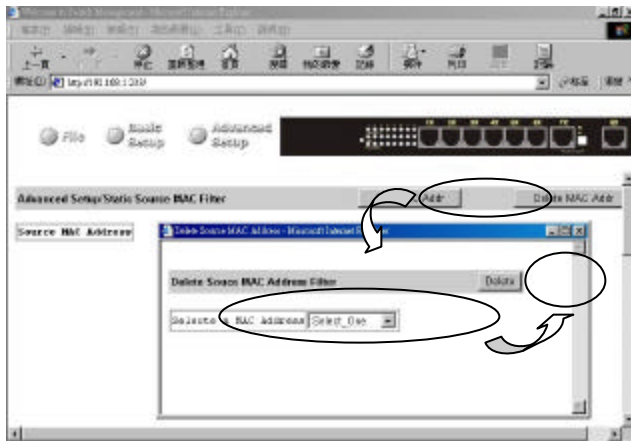
Step 1:   Click Source MAC Address.

Step 2: Click **Add MAC Addr** button to add a source MAC address for static filtering.

Step 3: The **Static Source MAC Filter** window appears. Click in the **Source MAC Address Filter** text box and type a unique MAC source address you want to add. Then click the **Add** button.

Step 4: A confirmation window appears. Close the confirmation window.

Step 5: If you no longer need a source MAC address, click **Delete MAC Addr** button to delete it in Step 2.

Step 6: The **Delete Source MAC Address** window appears. Click the **Select a MAC Address** drop-down list and select the source MAC address you want to delete. Then click the **Delete** button.

Step 7: A confirmation window appears. Close the confirmation window.

Destination MAC Address

Step 1: Click the **Advanced Setup** button, and point to **Static MAC Filter** in the selection menu. Click **Destination MAC Address**.

Step 2: Click **Add MAC Addr** button to add a destination MAC address for static filtering. Refer to Step 2~4 in **Source MAC Address** section for similar procedure.

Step 3: Click **Delete MAC Addr** button to delete a destination MAC address for static filtering. Refer to Step 5~7 in **Source MAC Address** section for similar procedure.

IP Multicast Group
To view the IP multicast group addresses, click the **Advanced Setup** button, and click **IP Multicast Group** in the selection menu. The information is read-only.

Spanning Tree Perspective
To view the spanning tree perspective parameters, click the **Advanced Setup** button, and point to **Spanning Tree Perspective** in the selection menu.
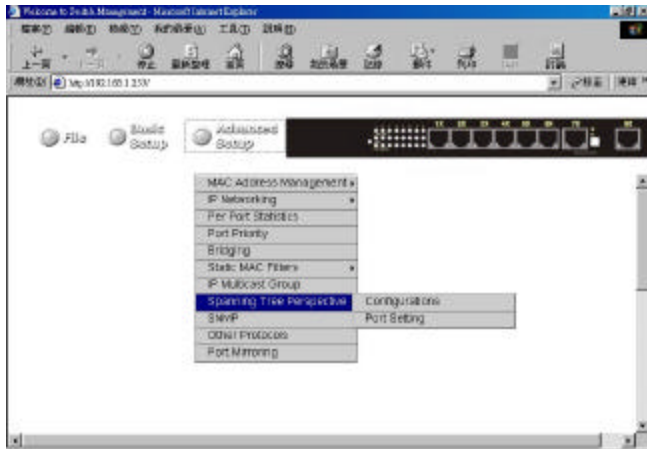
Step 1:   To view and/or change the Spanning Tree configurations, click **Configurations** from the above screen.

Step 2: For **Spanning Tree Protocol**, specify whether you want to have it Disabled or Enabled by clicking the drop-down list.

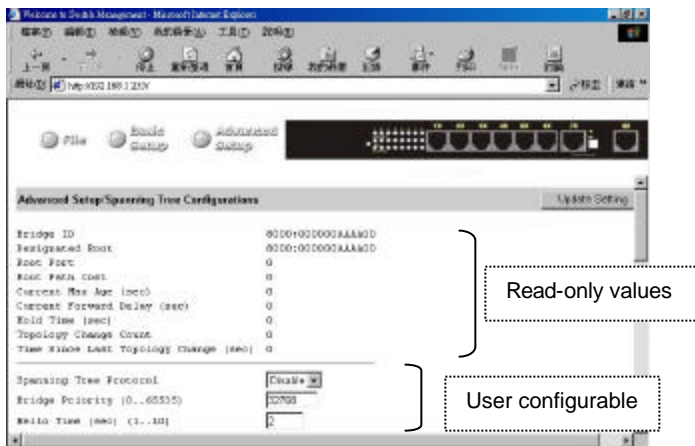Step 3: For **Bridge Priority**, click in the text box and type a decimal number between 0 and 65535.

Step 4: For **Hello Time**, click in the text box and type a decimal number between 0 and 10.

Step 5: For **Max Age**, click in the text box and type a decimal number between 6 and 40.

Step 6: For **Forward Delay**, click in the text box and type a decimal number between 4 and 30.

Step 7: Click **Update Setting**. A confirmation window appears. Close the confirmation window.

Step 1:   To view and/or change the Spanning Tree configurations by port, click the **Advanced Setup** button, point to **Spanning Tree Perspective** in the selection menu, and click **Port Setting**.
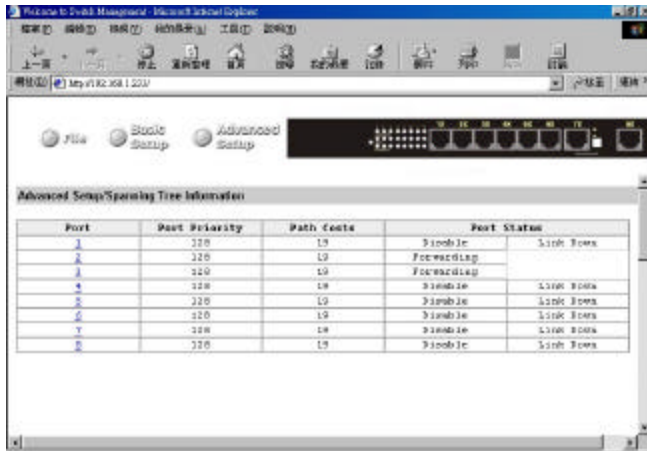
Step 2:   In the **Port** column, click the port whose Spanning Tree information you want to view.

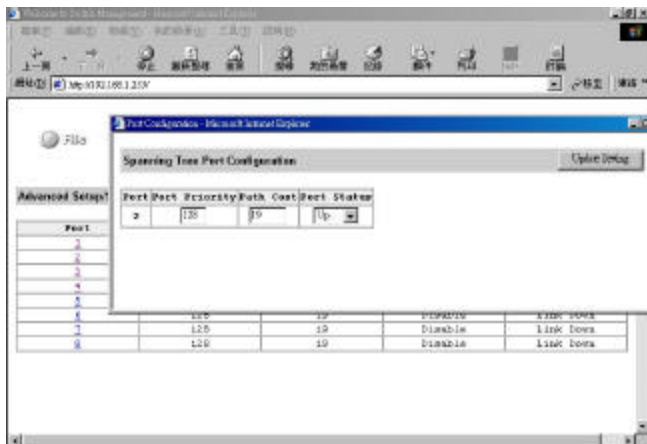Step 3:   For **Port Priority**, click in the text box and type a decimal number between 0 and 255. A low value gives the port a greater likelihood of becoming a Root port.

Step 4:   For **Path Cost**, click in the text box and type a decimal number as a new path cost value.

Step 5:   For **Port Status**, specify whether the port is up or down by clicking the drop-down list.

Step 6:   Click **Update Setting**. A confirmation window appears. Close the confirmation window.

SNMP

To view and/or change all SNMP-related information, click the **Advanced Setup**
button, and click **SNMP** in the selection menu.

The **SNMP Configurations** window appears. As shown below, the factory-default
SNMP value is **Enabled** and the factory-default **Community Name** value is
public.
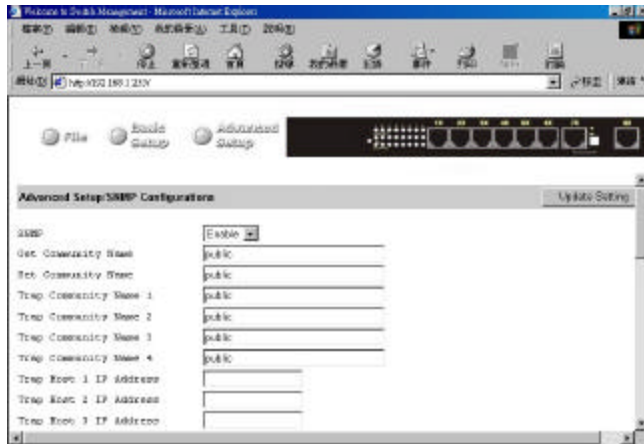
Step 1:   For **SNMP**, specify whether it is Disabled or Enabled by clicking the drop-down list.

Step 2:   For **Get Community Name**, click in the text box and type a get community name.

Step 3:   For **Set Community Name**, click in the text box and type a set community name.

Step 4:   For each **Trap Community Name**, click in the text box and type a trap community name.

Step 5:   For each **Trap Host IP Address**, click in the text box and type a IP address for trap host 1~4.

Step 6:   For **Cold Start Trap**, specify whether it is Disabled or Enabled by clicking the drop-down list.

Step 7:   For **Warm Start Trap**, specify whether it is Disabled or Enabled by clicking the drop-down list.

Step 8:   For **Link Down Trap**, specify whether it is Disabled or Enabled by clicking the drop-down list.

Step 9:   For **Link Up Trap**, specify whether it is Disabled or Enabled by clicking the drop-down list.

Step 10:For **Authentication Failure Trap**, specify whether it is Disabled or Enabled by clicking the drop-down list.

Step 11:For **Rising Alarm Trap**, specify whether it is Disabled or Enabled by clicking the drop-down list.

Step 12:For **Falling Alarm Trap**, specify whether it is Disabled or Enabled by clicking the drop-down list.
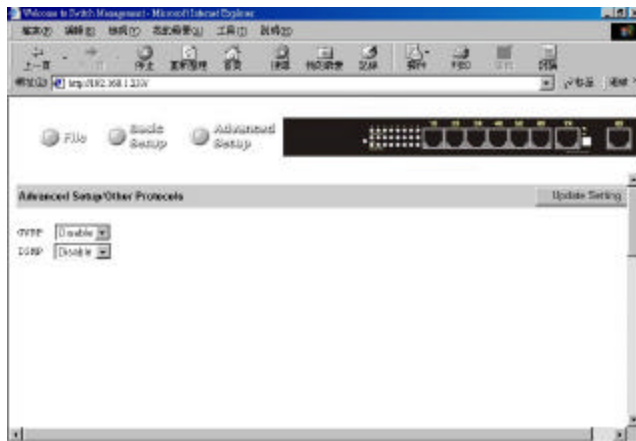
Step 13:For **Topology Alarm Trap**, specify whether it is Disabled or Enabled by clicking the drop-down list.

Step 14:Click **Update Setting** when completed. A confirmation window appears. Close the confirmation window.

Other Protocols

To enable or disable the GVRP and/or IGMP protocols, click the **Advanced Setup**
button, and click **Other Protocols** in the selection menu.

GVRP

Step 1: For **GVRP**, specify whether it is Disabled or Enabled by clicking the drop-down list.

IGMP

Step 2: For **IGMP**, specify whether it is Disabled or Passive or Active by clicking the drop-down list.

Update Setting

Step 3: Click **Update Setting** when completed. A confirmation window appears. Close the confirmation window.

Port Mirroring

To use the switch's mirroring capability to mirror one port to Port 1, click the
Advanced Setup button, and click **Port Mirroring** in the selection menu.

Click **Port 1** in the **Mirror To** column.

Mirror From

Step 1: In the **Mirror From** column, select a "mirror from" port by clicking the drop-down list. Data traffic from this port will mirror
to **Port 1**.

Mirror Mode

Step 2: In the **Mirror Mode** column, specify whether the "mirrored from" port will be receiving or transmitting data by clicking the
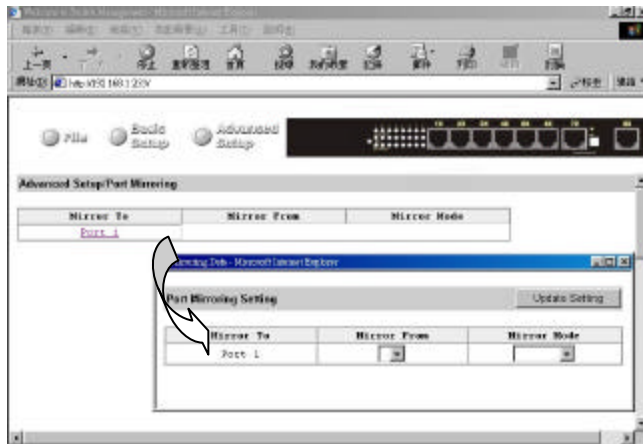drop-down list.

Update Setting

Step 3: Click **Update Setting** when completed. A confirmation window appears. Close the confirmation window.

SNMP & RMON Management

This chapter describes the switch's Simple Network Management Protocol (SNMP) and Remote Monitoring (RMON) capabilities.

Overview

RMON is an abbreviation for the Remote Monitoring MIB (Management Information Base). RMON is a system defined by the Internet Engineering Task Force (IETF) document RFC 1757, which defines how networks can be monitored remotely.

RMONs typically consist of two components: an RMON probe and a management workstation:

- The RMON probe is an intelligent device or software agent that continually collects statistics about a LAN segment or VLAN. The RMON probe transfers the collected data to a management workstation on request or when a pre-defined threshold is reached.

- The management workstation collects the statistics that the RMON probe gathers. The workstation can reside on the same network as the probe, or it can have an in-band or out-of-band connection to the probe.

The switch provides RMON capabilities that allow network administrators to set parameters and view statistical counters defined in MIB-II, Bridge MIB, and RMON MIB. RMON activities are performed at a Network Management Station running an SNMP network management application with graphical user interface.

SNMP Agent and MIB-2 (RFC 1213)

The SNMP Agent running on the switch manager CPU is responsible for:

- Retrieving MIB counters from various layers of software modules according to the SNMP GET/GET NEXT frame messages.

- Setting MIB variables according to the SNMP SET frame message.

- Generating an SNMP TRAP frame message to the Network Management Station if the threshold of a certain MIB counter is reached or if other trap conditions (such as the following) are met:

WARM START
COLD START
LINK UP
LINK DOWN
AUTHENTICATION FAILURE
RISING ALARM
FALLING ALARM
TOPOLOGY ALARM

MIB-2 defines a set of manageable objects in various layers of the TCP/IP protocol suites. MIB-2 covers all manageable objects from layer 1 to layer 4 and, as a result, is the major SNMP MIB supported by all vendors in the networking industry. The switch supports a complete implementation of SNMP Agent and MIB-2.

RMON MIB (RFC 1757) and Bridge MIB (RFC 1493)

The switch provides hardware-based RMON counters in the switch chipset. The switch manager CPU polls these counters periodically to collect the statistics in a format that complies with the RMON MIB definition.

RMON Groups Supported

The switch supports the following RMON MIB groups defined in RFC 1757:

- RMON Statistics Group – maintains utilization and error statistics for the switch port being monitored.

- RMON History Group – gathers and stores periodic statistical samples from the previous Statistics Group.

- RMON Alarm Group – allows a network administrator to define alarm thresholds for any MIB variable. An alarm can be associated with Low Threshold, High Threshold, or both. A trigger can trigger an alarm when the value of a specific MIB variable exceeds a threshold, falls below a threshold, or exceeds or falls below a threshold.

- RMON Event Group – allows a network administrator to define actions based on alarms. SNMP Traps are generated when RMON Alarms are triggered. The action taken in the Network Management Station depends on the specific network management application.

Bridge Groups Supported

The switch supports the following four groups of Bridge MIB (RFC 1493):

- The dot1dBase Group – a mandatory group that contains the objects applicable to all types of bridges.

- The dot1dStp Group – contains objects that denote the bridge's state with respect to the Spanning Tree Protocol. If a node does not implement the Spanning Tree Protocol, this group will not be implemented. This group is applicable to any transparent only, source route, or SRT bridge that implements the Spanning Tree Protocol.

- The dot1dTp Group – contains objects that describe the entity's transparent bridging status. This group is applicable to transparent operation only and SRT bridges.

- The dot1dStatic Group – contains objects that describe the entity's destination-address filtering status. This group is applicable to any type of bridge which performs destination-address filtering.
-

Specifications

Compact Manageable 8-Port Switch	Eight 10/100BASE-T/TX auto-negotiating ports with RJ-45 connectors or Seven 10/100BASE-T/TX auto-negotiating ports with RJ-45 connectors plus one fiber port
Applicable Standards	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX/FX
Switching Method	Store-and-Forward
Forwarding Rate 10BASE-T: 100BASE-TX:	10 / 20Mbps half / full-duplex 100 / 200Mbps half / full-duplex
Performance	148,80pps for 10Mbps 148,800pps for 100Mbps
CABLE 10BASE-T: 100BASE-TX: 100BASE-FX:	2-pair UTP/STP Cat. 3, 4, 5 2-pair UTP/STP Cat. 5 Both up to 100m (328ft) MMF (50 or 62.5μm), SMF (9 or10μm)
LED Indicators	Per unit – Power status Per port – LNK (Link) /ACT (Activity) 100(Mbps) FDX/COL
Dimensions	W254 mm × D135 mm × H35mm
Net Weight	1.6kg (3.5lb) approx.
AC Input	100~260VAC, 47~63Hz universal power supply External power adapter 12V DC; 1A
Input Fuse	2A
Power Consumption	11W max.
Operating Temperature	0°C to 40° C (32°F to 104°F)
Storage Temperature	-25°C to 70°C (-13°F to 158°F)
Humidity	10%-90% non-condensing
Emissions	FCC part 15 Class B, CE Mark Class B, VCCI Class B

Appendix A – Connector Pinouts

Pin arrangement of RJ-45 connectors:
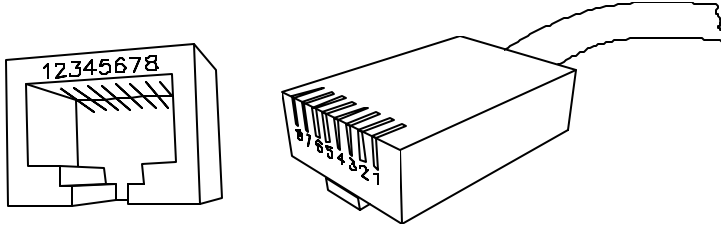
RJ-45 Connector and Cable Pins

The following table lists the pinout of 10/100BASE-T/TX ports.

Pin	Regular Ports	Uplink port
1	Input Receive Data +	Output Transmit Data +
2	Input Receive Data -	Output Transmit Data -
3	Output Transmit Data +	Input Receive Data +
4	NC	NC
5	NC	NC
6	Output Transmit Data -	Input Receive Data -
7	NC	NC
8	NC	NC