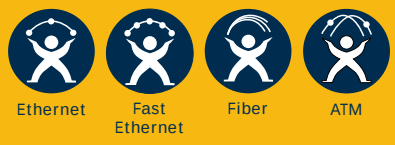

FORMULA 8200™

Fast Ethernet Workgroup Switch

USER'S GUIDE

VERSION 1.4.3

PN 613-10611-00 Rev. A

Allied Telesyn

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Preface

This guide includes information about configuring and operating Allied Telesyn International Corp.'s FORMULA 8200™ 10/100 Mbps Fast Ethernet Workgroup Switch with any of the following configurations:

- AT-8208 or AT-8216, the FORMULA 8200 switch with either 8 or 16 10/100 Mbps TX ports with firmware version 1.4.3 or later
- AT-8208F/SC or AT-8216F/SC, the FORMULA 8200 switch with either 8 or 16 100 Mbps FX ports with firmware version 1.4.3 or later
- Any of the above switch models with one of the following uplink cards:
    - AT-8202 ATM uplink card
    - AT-8203 FDDI uplink card

This guide assumes that a FORMULA 8200 switch has been installed and is operational. For more information on installing the switch, refer to the **FORMULA 8200 Installation Guide**.

Who Should Use This Guide

This guide is designed for you, the network administrator, to help you configure, operate, and manage the FORMULA 8200 switch as a device on your local area network. It assumes that you understand some of the basic concepts of local area networks, including:

- Ethernet MAC addresses
- Collision domains
- Broadcast domains
- CSMA/CD
- Differences between repeaters, bridges, and routers
- Spanning Tree Protocol
- Virtual LANs (VLANs)
- TCP/IP and associated protocols and applications

For detailed information about any of the above topics, see **Recommended Reading** at the end of this Preface.

If you have any uplink card installed, you must be familiar with the ATM or FDDI technology.

How This Guide Is Organized

This guide consists of the following sections:

Chapter 1, **Overview**, provides a product overview and a list of common features that apply to all switch models.

Chapter 2, **Accessing the Command Line Interface (CLI)**, provides information on attaching a console port and accessing the command line interface (CLI) to enter basic configuration parameters.

Chapter 3, **Configuring the FORMULA 8200 Switch**, provides procedures to configure the FORMULA 8200.

Chapter 4, **Operating and Managing the FORMULA 8200 Switch**, provides procedures to monitor the FORMULA 8200 and perform routine management tasks using the CLI.

Chapter 5, **Command Reference**, includes a description of all the commands and provides examples on where to use these commands.

Appendix A, **Command Summary**, is a table that lists all FORMULA 8200 commands in alphabetical order, their corresponding aliases, and the purpose of each command.

Appendix B, **RMON Configuration**, provides a sample procedure to configure your SNMP management station to manage and monitor the FORMULA 8200 switch.

Appendix C, **Downloading Software at the [VxWorks] Prompt**, provides the alternative procedures to upgrade switch software if the switch CLI is not accessible.

The Index at the back of this guide is according to subject matter.

For a definition of terms commonly used in Allied Telesyn technical publications, refer to the website glossary at **www.alliedtelesyn.com**.

Document Conventions Used in This Guide

This section describes the typographic conventions used in this guide.

Note

The command line interface (CLI) portion of the FORMULA 8200 is not case sensitive; however, this manual shows commands in uppercase letters. You may type your commands in either uppercase or lowercase, as shown in some of the examples.

Example	Meaning
`Local IP configuration`: The **VLAN/CONFIG/CREATE** command is used to configure a VLAN. Enter **BRIDGE <VLAN#>**. Press the **[Enter]** key to execute a command.	System prompts and messages are shown in COURIER font.. Commands or other input the user must supply are shown in **BOLDFACE** capital letters. Text in angle brackets after a command indicates user-defined input must follow the command. (Example: **BRIDGE 2**) Keys named in text are shown enclosed in square brackets. (**[Enter]** is used to denote both the **Enter** key and the **Return** key.)
Read Chapter 6 in the *User Guide*.	Book titles are shown in *italic* type.
To install the switch on a flat surface: 1. User action 2. User action	The Procedure icon denotes a series of numbered steps the user must perform. Each step may be followed by text that explains the result of the user action.

This guide uses the following symbols to highlight special messages:

Note

A note includes information of importance or special interest.

Caution

A caution includes information that will help you prevent **equipment failure or loss of data**.

Warning

A warning includes information that will help you prevent **injury or equipment damage**.

Related Documents

Refer to the following related publications from Allied Telesyn for additional information on the FORMULA 8200 switch:

- **FORMULA 8200 Installation Guide** for information on how to install and set up the switch

Note

There are two versions of the **FORMULA 8200 Installation Guide**: one for 10Bse-T/100Base-TX ports and one for 100Base-FX ports.

- **AT-8201 Installation Guide** for information on how to install the eight-port 10/100Base-TX expansion module
- **AT-8201 F/SC Installation Guide** for information on how to install the eight-port 100Base-FX fiber expansion module
- **AT-8202 and AT-8203 ATM and FDDI Uplink Installation Guide** for information on how to install the ATM or FDDI uplink card and the accelerator card
- **AT-8202 ATM Uplink User's Guide** for information about configuring and using the ATM uplink card
- **AT-8203 FDDI Uplink User's Guide** for information about configuring and using the FDDI uplink card
- Release Notes that may be included in the package or distributed from Allied Telesyn's website for the latest information about the product

These guides are available in PDF format from Allied Telesyn's website at **www.alliedtelesyn.com/manuals.htm**.

Recommended Reading

The following documents provide additional information on the topics described in this manual:

Interconnections: Bridges and Routers, Radia Perlman (1992).

Troubleshooting TCP/IP, Mark Miller (1992).

Internetworking with TCP/IP, Douglas Comer (1991).

IEEE 802.1D (Spanning Tree Protocol) (1990).

IEEE 802.3 (CSMA/CD) (1996).

IEEE 802.3u (Supplement to 802.3 100BT Operation) (1995).

RFC 791, Internet Protocol, J. Postel (1981).

RFC 951, Bootstrap Protocol, W. Croft, J Gilmore (1985).

RFC 1023, HEMS monitoring and control language, C. Partridge, G. Trewitt (1987).

RFC 1024, HEMS variable definitions, C. Partridge, G. Trewitt (1987).

RFC 1058, Routing Information Protocol, C. Hedrick (1988).

RFC 1122, Requirements for Internet hosts — application and support, R. Braden (1989).

RFC 1123, Requirements for Internet hosts — communication layers, R. Braden (1989).

RFC 1157, A Simple Network Management Protocol (SNMP), J. Case, M. Fedor, K. Schoffstall, and J. Davin (1990).

RFC 1350, The TFTP Protocol (Revision 2), K.R. Sollins (1992).

Allied Telesyn's Software Library

Allied Telesyn's website, **www.alliedtelesyn.com**, maintains a Software Library that contains Allied Telesyn's adapter drivers, system and management utilities, software updates, and ASCII documents.

You may also access the Software Library from Allied Telesyn's FTP server. Enter the following information to access the FTP server:

Address: **ftp.alliedtelesyn.com** [lowercase letters]
Login: **anonymous** [lowercase letters]
Password: **your e-mail address** [requested by the server at login]

Chapter 1
Overview

The FORMULA 8200™ switch provides a cost effective solution for improving Ethernet network performance by reducing communications traffic congestion. It is a high-speed, multi-protocol workgroup Fast Ethernet switch that can be configured with up to 16 Fast Ethernet (10/100 Mbps) LAN switch ports.

The FORMULA 8200 offers virtual LAN (VLAN) support, including virtual routing and Spanning Tree Protocol, as well as network management using Simple Network Management Protocol (SNMP).

Product Features

The FORMULA 8200 includes the following hardware and software product features:

- Eight 10/100 Mbps Fast Ethernet ports (IEEE 802.3u)
- Optional 8-port 10/100 Mbps expansion module
- Virtual LAN (VLAN) support for up to 16 port-based VLANs
- IP Routing to provide communication between VLANs
- Loop detection using Spanning Tree Protocol (IEEE 802.1d)
- Front panel LEDs that provide operating status and a Reset button for front panel control of switch
- RS232C console port interface for local switch management and Telnet support for remote switch management
- Rack mount or table mount capabilities (hardware for either option included)

- Support for multiple hardware configurations and provides support for the following port configurations:
  - — 10Base-T/100Base-TX expansion ports
  - — 100Base-FX expansion ports
  - — OC3 ATM uplink card (optional)
  - — FDDI uplink card (optional)
- Field-upgradeable expansion modules for maximum customization
- Autonegotiation on all 10/100 Mbps TX ports
- Full or half duplex on all 10/100 Mbps TX ports and 100 Mbps full duplex on FX ports
- Port mirroring to allow monitoring of one's port activities from any port
- Flow control to autosense buffer limits on the transmit port
- Support for RMON Groups 1, 2, 3, and 9
- Simple Network Management Protocol (SNMP) agent for Management Information Bases (MIB) II and private enterprise MIBs
- TFTP, FTP, and ZModem support for software upgrades and backup

For information about available configurations, see the *FORMULA 8200 Installation Guide*.

Chapter 2

Accessing the Command Line Interface (CLI)

This chapter describes how to access the CLI once you have completed the installation, as described in the **FORMULA 8200 Installation Guide**. The information provided here includes the following:

- Connecting the console
- Logging in (via preinstalled software)
- Entering commands
- Entering basic configuration parameters
- Accessing via Telnet

Connecting the Console

The RS232C console port permits you to connect a terminal or local workstation for system management. The console terminal interface is a DB9 (DCE) male connection.

Note

The console is required to confirm that the switch is configured and operating correctly after installation.

Connect a VT-100 terminal or equivalent to the FORMULA 8200 using a 9-pin null-modem RS232 serial cable. You can also use a DOS®, Windows®, or UNIX® workstation running in terminal emulation mode. The cable connection to the switch must have a female DB9 connector.

Terminal Configuration

To configure the terminal:

Use the following parameters:

- Baud rate: 9600
- Data bits: 8
- Stop bits: 1
- Parity: none
- Number of lines per page: 25

Viewing Terminal Configuration Using the CLI

Once you have completed the installation, you can then use the following command to show the console parameters:

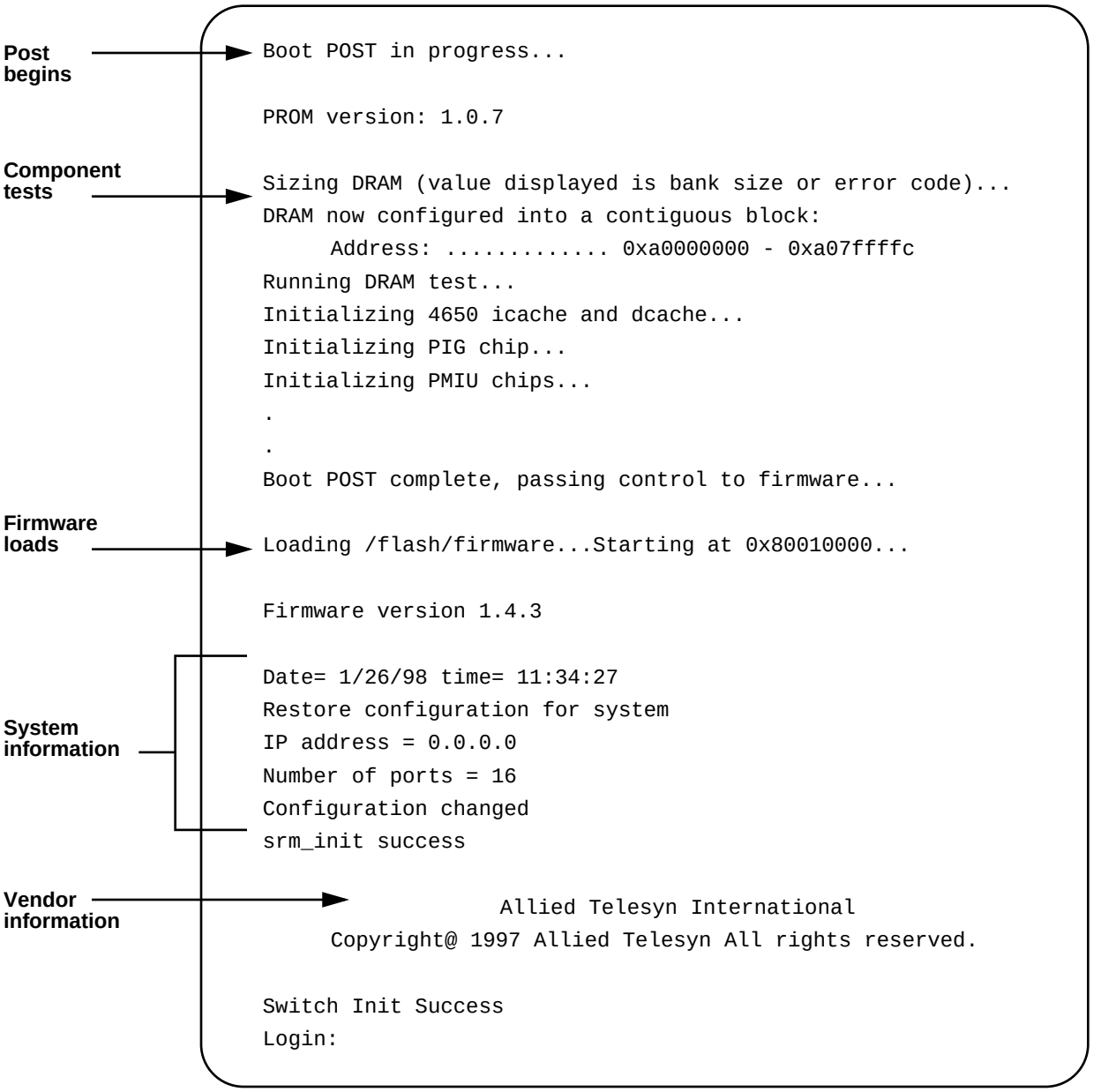
CONSOLE/SHOW - show console parameters

For a complete description and additional information about this and other commands, see Chapter 5, **Command Reference**.

Observing the Power-On Self Test

When the FORMULA 8200 is powered on, it automatically runs a power-on self-test (POST) to verify that all components are functioning normally.

As POST verifies the basic operation of the switch, it displays a series of messages on the console. A similar screen display appears:



If any error messages are displayed, report them to the Allied Telesyn's Technical Support (see Allied Telesyn's website at **www.alliedtelesyn.com**) or your reseller. The rest of the messages are for your information only; no action is required.

Observing the LEDs

You can verify proper operation by observing the LEDs. In Figure 2-1, three LEDs are shown as examples.

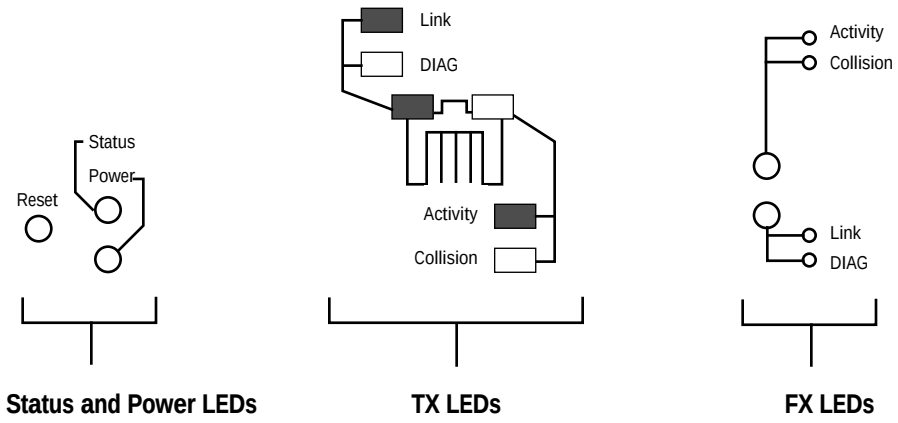


Figure 2-1 FORMULA 8200 LEDs

Table 2-1 provides information about what the LEDs mean in various states.

Table 2-1 FORMULA 8200 LED States

LED	LED Color	Status	Action Required
System Status Indicator	Flashing green	Normal operation	None. LED should flash every second. This indicates that the switch is functioning normally.
	Solid green	You probably cannot log in to the switch. This indicates the switch is locked up.	Reboot the switch.
	Flashing amber	Switch encountered abnormal condition	Reboot the switch.
	Solid amber	Switch is still functioning, but with problems; or boot is in process.	Determine if the switch is in the boot process; otherwise, reboot.
Power Indicator	Solid green	Normal operation when power is applied.	None
	Unlit	There is no power to switch.	Check the power plug and the state of the on/off switch in the back of the unit. If On, turn it off and reboot. If LED remains unlit, replace the switch.

Table 2-1 FORMULA 8200 LED States (Continued)

LED	LED Color	Status	Action Required
Port LED — Activity/ Collision (green/amber)	Flashing or solid green	Normal operation when port receives or transmits traffic.	None
	Unlit	No traffic	None. This state does not indicate any problems on the port.
	Flashing amber	Collisions in half-duplex mode Note: applies to TX ports only.	None. Intermittent collisions are normal.
Port LED — Link/Diag (green)	Solid green	Good cable link status	None
	Off or flashing	No link if off; a link problem if flashing	Try the following: Verify cable, verify port speed, verify the state of the autonegotiation to ensure the port speeds match (**ETHERNET/SHOW/ PORT**).

Logging In

The FORMULA 8200 switch ships from the factory with pre-installed software. Once the hardware has been installed, the switch displays the login prompt.

To begin using the CLI:

1. Log in by entering **admin** in lowercase letters, as follows:

```
Login: admin
```

The FORMULA 8200 displays the password prompt.

2. Enter **switch**, all in lowercase, as follows:

```
Password: switch
```

Note

When you type your password, the text does not appear on the screen.

After you have entered the password, the FORMULA 8200 command line interface (CLI) prompt is displayed:

```
Login: admin
Password: ******

/>
```

For security reasons, change the admin password as soon as possible. To do so, use the **SYSTEM/CONFIG/ADMINPW** command (explained in detail in Chapter 5).

Note

If you forget your administrator password, contact Allied Telesyn's Technical Support. Visit Allied Telesyn's website at **www.alliedtelesyn.com** for contact information.

Use the **EXIT** command to log out from the CLI session.

Logging In Without a Password

The FORMULA 8200 also provides you a "user login" feature. No password is required. It permits you to use commands to view the operating status and configuration, but you cannot configure the switch.

To log in without a password:

Enter the following at the login prompt in **lowercase** letters and press **[Enter]** at the password prompt:

```
Login: user
Password: [ENTER]
Logged in as USER (not ADMIN)
/>
```

Entering Commands

The FORMULA 8200 command line interface (CLI) is a hierarchical menu-driven interface with menus, submenus, and commands arranged in a tree structure.

To access the main command menu:

Enter **?** at the FORMULA 8200 prompt, as shown below.

```
                    == MAIN MENU ==

?               ALIAS             ALLCMD
[ATM]           [BOOT]            [CONSOLE]
[ELOG]          [ETHERNET]        EXIT
[FDDI]          [FILE]            [INET]
LOOKUP          [MODE]            [PORTSERV]
REBOOT          [SNMP]            [SYSTEM]
[TFTP]          TOP               UP
[VBRIDGE]       [VLAN]            [TRACE]

/ >
```

Enter commands by typing selections from each successive menu; then press [**Enter]**. You can also enter the entire command at the prompt or you can use an alias; both methods are described in this chapter in **Command Formats**.

Use of Square Brackets [ ]

Some commands in the main menu have square brackets around them to indicate that the command requires additional parameters. When you enter one of these commands, a submenu appears that lists the available parameters.

Note

Do not enter the brackets when you enter the command.

Use of Angle Brackets <>

This manual sometimes directs you to enter a command with a variable that is specific to your environment, such as IP addresses. The variables you must supply are enclosed in angle brackets.

For example, to configure a gateway address, enter:

/INET/CONFIG/ROUTE/DEFAULT <default route or gateway IP address>

where <default route or gateway address> can be in the format, 123.123.123.123.

Note

Do not enter the brackets when you enter the command.

The LOOKUP Command

Entering **LOOKUP** is a way to get a list of commands, their corresponding aliases, and descriptions.

Command Formats

The software allows you to enter commands in three ways:

- By entering the complete command
- By using a shortcut
- By using an alias

Separating Command Words

When you enter any command, you may separate the command words with a slash (/). For example:

/FDDI/SHOW/SMT

You may also use a space to separate the command words.

Shortcuts

Use a shortcut by typing the first few characters needed to distinguish the command from others that start with the same letters, such as:

/FD/SH/SMT

This works unless your shortened version is ambiguous, which causes an error message to appear.

Aliases

An alias is an abbreviated command that can be accessed from anywhere in the command line interface. For example, the following alias is equivalent to the **FDDI/SHOW/SMT** command:

fsmt

Aliases are listed in Appendix A, and are also listed in Chapter 5 with each command description.

Moving Through the Menus

The following commands allow you to navigate the menu structure (Figure 2-2):

- **UP** returns to the previous menu.
- **TOP** returns to the main menu.
- **?** displays the commands that are available at your current level

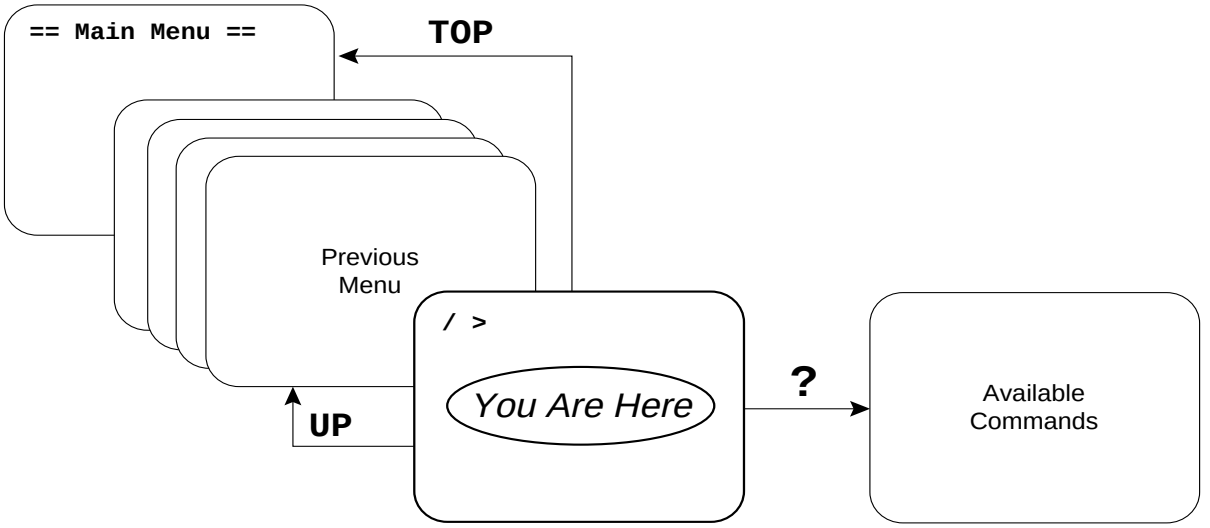


Figure 2-2 Navigating the Menus

For a complete list of commands, see Chapter 5.

Configuring IP Information

1. Use the **BOOT/IP/CONFIG** and **BOOT/IP/EEPROM** commands to configure Internet protocol information for the switch, including:

   - ❑ IP address
   - ❑ Local host name
   - ❑ Default gateway
   - ❑ Subnet mask

   The IP command displays the local IP configuration parameters. After each parameter is displayed, the system prompts you for any changes. If you don't want to change any parameter, press **[Enter]** at each prompt.

```
/BOOT/IP/CONFIG
Local IP configuration:
   IP address (149.35.101.31) :
   Local Host name (SWITCH#1) :
   Default gateway (149.35.27.1) :
   Net mask (255.255.255.0) :
OK to write config to flash (y/n) ? Y
Writing new configuration to flash ...

/BOOT/IP/EEPROM
EEPROM IP:
  IP address (149.35.27.1) :
OK to write config to EEPROM (y/n) ? Y
```

2. Enter the default gateway address again using the **INET/CONFIG/ROUTE/DEFAULT** command:

   INET/CONFIG/ROUTE/DEFAULT
   gateway address ( ) : **149.35.27.1**

3. Confirm your entry with the following command:

   INET/SHOW/ROUTE

   A similar table displays on the screen:

```
/INET/SHOW >route
ROUTE NET TABLE:
 Address           Gateway           Metric     VLAN       Type
 ===============   ===============   =======    =======    =======
 0.0.0.0           149.35.27.1       1          1          DEFAULT
 149.35.27.0       149.35.27.30      1          1          VLAN INTERFACE
 ROUTE HOST TABLE:
 Address           Gateway           Metric     VLAN       Type
 ===============   ===============   =======    =======    =======
 127.0.0.1         127.0.0.1         1                     LOOPBACK
```

Verifying Firmware Information

To ensure that you have the latest information about product features and fixes, verify that the version of any release notes you have received match the version of the firmware installed on the unit.

You also need to verify that the Internet protocol information you entered is correct.

To display firmware information:

Use the **SYSTEM/SHOW** command.

This displays your overall system configuration. For more information about using this command, see **Displaying the System Configuration** in Chapter 4; also see the **SYSTEM** command in Chapter 5.

Updating Your Ethernet Ports

Before you connect the FORMULA 8200 to your network, use the **ETHERNET/SHOW/PORT** command to display, and if necessary, the **ETHERNET/CONFIG/PORT** command to modify your port configuration. For more details, see the **ETHERNET** command in Chapter 5.

Updating System Information

Use the **SYSTEM/CONFIG** command to update your system information, including date, time, and admin password. It is especially important to ensure the security of your configuration by updating the admin password as soon as possible.

Using Telnet to Access the Switch

In addition to local console access, you can access the switch from a remote location by using Telnet to make a TCP/IP connection.

The Telnet command syntax depends on the type of terminal or TCP/IP software you are using. Check the appropriate manual for information about connecting to a host using Telnet. Telnet requires the FORMULA 8200's IP address information has been configured.

To use Telnet to access a remote switch (example):

The following steps initiate a Telnet session to the switch at IP address 123.126.22.77.

1. Enter the Telnet command and the IP address at the system prompt:

   telnet 123.126.22.77

2. Enter **admin** at the login prompt.

   Login: **admin**

3. Enter the password at the password prompt. (If you have not yet changed the default password, enter **switch**.)

   The system prompt now appears, giving you full access to the command line interface.

   / >

4. Use the **EXIT** command to log out from the CLI session.

Note

The **EXIT** command does not end the Telnet session. On certain systems, pressing the **CTRL-6**, **CTRL-]**, and [**Enter]** keys in sequence disconnects the Telnet session. Refer to your current Telnet manual for the correct command to disconnect the Telnet session.

Resetting and Rebooting the Switch

You may occasionally need to reset the FORMULA 8200. You can do this in one of three ways:

- The **Reset** button on the front panel permits you to perform a "hardware reset," and does not require you to use the command line interface.
- The **REBOOT** command permits you to reset the switch via the command line interface, either from the local console, or from a remote location via Telnet. The current Telnet session is disconnected by this command.
- The On/Off switch in the rear panel recycles the power to the switch.

Either method initializes the hardware, loads the system software from the flash, restores the switch to the current (saved) configuration settings, and restarts the switch. Upon restart, the POST and other diagnostic information appear on the local console, followed by the login and password prompts.

Where to Go Next

Go to Chapter 3, **Configuring the FORMULA 8200 Switch**, for information about the default switch configurations, to reconfigure the switch for your particular application, or to create VLANs.

Chapter 3
Configuring the FORMULA 8200 Switch

This chapter describes:

- System default configurations
- An overview of virtual LANs (VLANs) and related parameters, including Spanning Tree (virtual bridges) and virtual routers, and how to configure them

Default Configurations

The FORMULA 8200 is shipped from the factory with the following default configurations:

- Console speed is **9600**
- Login is **admin** and password is **switch**
- Autonegotiation is **ON** (enabled) for 10/100 Mbps TX ports
- Ethernet statistics are **disabled**
- All ports belong to the default **VLAN 1**
- Spanning Tree is **enabled**
- RIP (virtual routing) is **silent**

These settings provide for switching a single broadcast domain. To display and configure port settings, refer to Chapter 4 beginning on page 4-5.

Optimizing Functionality for Your Application

The FORMULA 8200, unlike shared media switching hubs, allows you to divide your LAN into smaller segments. This increases and uses full LAN bandwidth for each segment. By providing high end devices such as workstations, servers, and routers their own dedicated connections to the switch, you can significantly increase throughput and decrease latency.

In addition to creating one or more VLANs to reduce broadcast traffic, you can also customize the configuration to meet your specific needs. Use the information in the remainder of this chapter; you can also review the command set in Chapter 5 for more specific information.

Virtual LANs

A Virtual LAN (VLAN) is a *logical* group of LANs or individual devices, established without regard to their physical location on the network. You can group any collection of ports on one or more FORMULA 8200 switches into a VLAN.

Since you can connect either a LAN or a device to a port in the FORMULA 8200, any group of LANs or individual devices connected to the switch can be connected together in a VLAN.

The LAN segments that comprise a VLAN can be distributed among multiple switches that are interconnected by a backbone network. This grouping of LAN segments into VLANs reduces the amount of work required when moving an end station from one LAN segment to another.

VLANs also maximize the efficient use of the bandwidth on any given LAN segment, since packets are forwarded only between segments as required. The separation of segments into VLANs also provides security, since data from a workgroup on one VLAN will not be seen on the VLANs for other workgroups. VLANs also create smaller broadcast domains, which reduce broadcast traffic across the network.

Note

To communicate between VLANs, the FORMULA 8200 must be configured to enable RIP for IP routing. If additional protocols are required, a connection on each VLAN must go to an external router.

FORMULA 8200 Implementation of VLANs

The FORMULA 8200 consists of up to 16 physical network interfaces. In its simplest configuration, all of these network interfaces are grouped together into a single bridged virtual LAN (VLAN). Traffic flowing between end stations on separate LAN segments is switched by a **virtual bridge**.

You may configure up to 16 VLANs.

Each FORMULA 8200 has a default VLAN, called VLAN 1 (Figure 3-1). The default VLAN cannot be removed. It contains all virtual interfaces not assigned to other VLANs. Initially, all interfaces are members of the default VLAN.

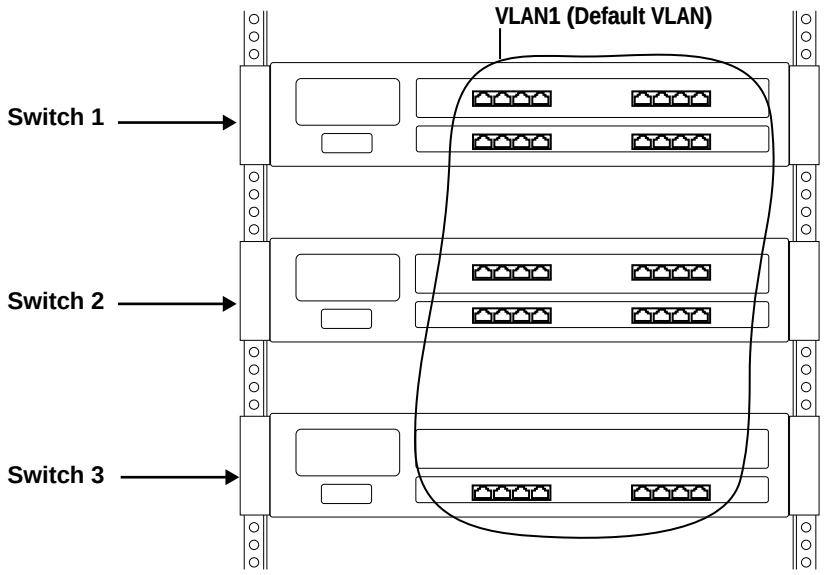


Figure 3-1: Default VLAN 1

You can, however, create up to 16 VLANs on each switch on a per-port basis. This feature allows you to move network interfaces from the default VLAN to other VLANs (see Figure 3-2). Traffic can then flow between VLANs by using either an external router or by using the virtual router service provided internally by the FORMULA 8200.

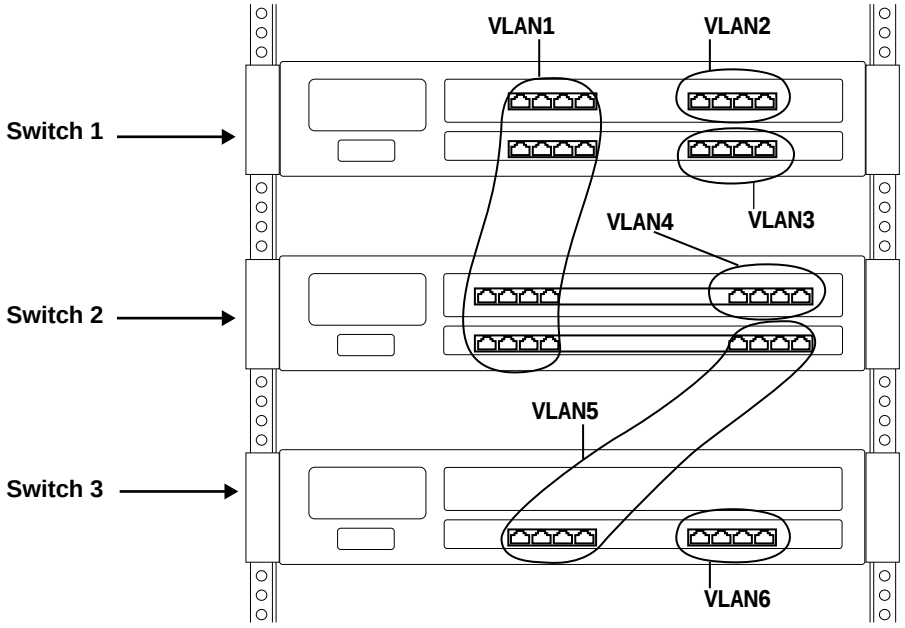


Figure 3-2: Multiple VLANs

FORMULA 8200 VLANs are port-based. A port cannot be part of more than one VLAN. That is, if your FORMULA 8200 is configured for 8 ports, the switch can support up to 8 VLANs; if your switch includes an 8-port expansion module, it supports up to 16 VLANs.

Use the **VLAN/SHOW/VPORT** command to see the virtual port information. Refer to Chapter 5 for details on the command.

Each VLAN represents one IP subnet. Unlike a traditional router, where each interface represents a different subnet, FORMULA 8200 VLAN switching allows multiple interfaces to share an IP subnet. If you move an end station from one LAN segment to another within the same VLAN, whether it is a local segment or a remote one, there is no need to reconfigure its IP address.

Virtual Bridges, Virtual Interfaces, Virtual Routers

Each VLAN has a **virtual bridge** that maintains the locations of the end stations on each segment and controls the switching hardware. Each of the interfaces on a virtual bridge is called a **virtual interface**.

Each VLAN is identified by a number. These numbers are global to all FORMULA 8200 switches that are connected by a backbone network. Traffic can be exchanged over a backbone network in order to allow a VLAN to have segments that are distributed among multiple FORMULA 8200 switches. Traffic can be exchanged between VLANs by either internal or external routing.

Use the **VLAN/SHOW/VLAN** command to see the virtual VLAN information. Refer to Chapter 5 for details on the command.

An optional virtual router interface can be configured to forward traffic between VLANs by using the **VLAN/CONFIG** command; see **Configuring a Virtual LAN (VLAN)** later in this chapter.

Use the **VLAN/SHOW/VROUTER** command to see the virtual router information. Refer to Chapter 5 for details on the command.

To access the FORMULA 8200 management applications remotely via TCP/IP, the IP interface must be enabled on at least one VLAN (usually VLAN 1). The management applications may then be accessed from a station that has access to one of the LAN segments comprising that VLAN. If the interface over which management functions are taking place is disabled, it is possible to lose contact with the FORMULA 8200. In this case, you must use the console port to reestablish remote TCP/IP management capabilities.

Each VLAN has an associated virtual bridge. A distributed VLAN has one virtual bridge on each FORMULA 8200 that has interfaces participating in the VLAN. The virtual bridge implements the IEEE 802.1-D Spanning Tree Algorithm and Protocol, described in the next section.

Use the **VLAN/SHOW/VPORT** command to view the virtual port information, and **VLAN/SHOW/VSTATS** command to view the virtual port statistics.

Spanning Tree

Spanning Tree is a configuration algorithm and protocol that ensures that no data loops exist within a single broadcast domain. For example, Figure 3-3 shows bridges 1 and 2 in a loop; in this configuration without Spanning Tree, the network is unusable.

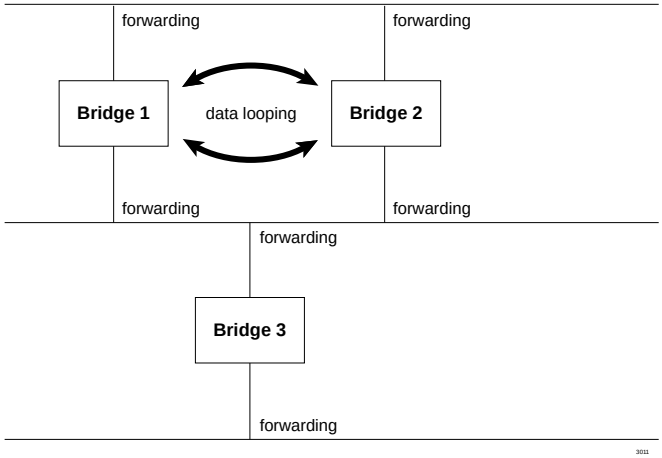


Figure 3-3: Data Looping

When Spanning Tree is implemented, redundant bridge ports are blocked and looping is eliminated, as shown in Figure 3-4.

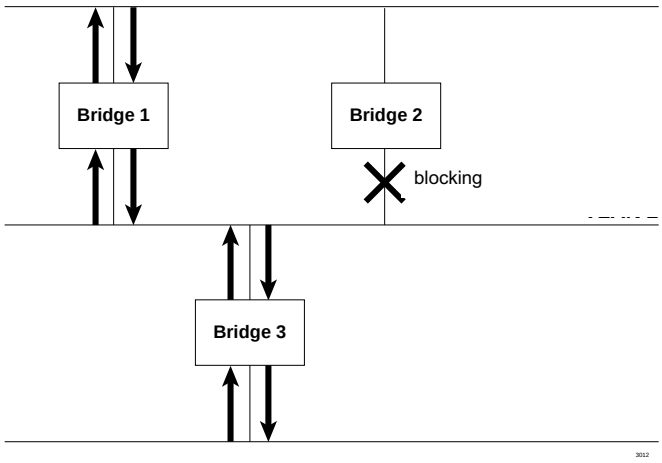


Figure 3-4: Spanning Tree Eliminating Data Looping

By blocking the port at Bridge 2, data can pass to all three segments. In this example, either Bridge 1 or Bridge 3 becomes the "root" bridge, depending on priority or MAC address, and the remaining bridge then becomes a "standby" bridge, ready to function if a failure should occur in the Bridge 1.

In addition to preventing looping, Spanning Tree provides the following functions:

- Automatic reconfiguring of the topology in the event of a failure or the addition of a bridge or a bridged port
- Topology stability, regardless of the size of the bridged VLAN
- Configuration management, by displaying statistics and user-specified bridge and port priorities, parameters, and timers

Spanning Tree performs the above functions by exchanging BPDUs (Bridge Protocol Data Units) packets between bridges. When the topology changes, the time it takes for Spanning Tree to stabilize depends on the size of the bridged network and several user-configurable parameters.

Spanning Tree Protocol functions by putting its ports in the following modes or states:

Blocking State - In this state, ports do not forward packets and do not learn addresses. The ports are in standby mode until a topology change occurs.

Listening State - In this state, ports do not forward packets and do not learn addresses.

Learning State - In this state, ports do not forward packets in either direction, but they learn station addresses.

Forwarding State - In this state, ports forward and learn all packets in either direction.

The listening state and learning state are both temporary states as the port moves into forwarding state.

Use the **VBRIDGE/SHOW/BRIDGE<VLAN#>** command to view the current configuration settings.

To enable and configure Spanning Tree, use the **VBRIDGE/CONFIG/BRIDGE<VLAN#>** command, or refer to **Configuring a Virtual Bridge** later in this chapter.

Configuring a Virtual LAN (VLAN)

Use this procedure to assign ports to create a VLAN, including a virtual router, if desired. By default, all the ports on your FORMULA 8200 are assigned to VLAN 1. If this configuration suits your needs, use VLAN 1 to define port assignments. Otherwise, create more VLANs to establish user groups and manage network traffic.

As you create additional VLANs, the ports you assign to them are removed from VLAN 1 (that is, a port cannot be in two VLANs at the same time).

To configure a VLAN:

The following steps are for creating VLAN 2 and for assigning ports 4 and 5 to VLAN 2. If you use these steps to create a VLAN, be sure to assign your own VLAN name, port numbers, IP address, and so on.

1. From the switch on which the ports reside, enter:

   /VLAN/CONFIG

2. Create VLAN 2 by entering:

   CREATE 2

3. Answer each prompt as it appears, and then confirm with a **y** at the end. Refer to the following example (bolded text represents user entries):

```
/VLAN/CONFIG/CREATE 2
  VLAN ID : 2
  VLAN Description (VLAN 2) : TEST
  Initial Ports : 4 5
  VLAN enabled (yes) : y
  VLAN 2 is successfully created
```

In the example:

- The VLAN Description shown here is **TEST**, but you can enter any text up to 32 characters.
- The Initial Ports parameter allows you to specify which ports are included in the VLAN. This can be modified later by using one of the following commands:

  VLAN/CONFIG/ADDPORT<PORT#> <VLAN#> to add one or more ports.

VLAN/CONFIG/MOVPORT to move one or more ports.

VLAN/CONFIG/DELPORT<PORT#> <VLAN#> to delete one or more ports.

You can also use the following commands to change VLAN configuration:

VLAN/CONFIG/MODIFY <VLAN#> to modify a VLAN.

VLAN/CONFIG/REMOVE <VLAN#> to remove a VLAN.

VLAN/CONFIG/ENABLE <VLAN#> to enable the entire VLAN.

VLAN/CONFIG/DISABLE <VLAN#> to disable the entire VLAN.

4. Proceed to the next series of prompts to enable the IP interface and a virtual router. Refer to the following example (bolded text represents user entries) and to Table 1-1 for an explanation of each prompt:

```
VLAN 2 is successfully created
       Enable IP interface (yes): y
       Virtual router of VLAN 2
       IP address: 149.35.101.31
       IP Subnet Mask (255.255.255.0): [Enter]
       IP Broadcast Address: 149.35.101.255
       Router Desription (Router for VLAN2): TESTROUTER
       IP RIP mode (Active (a), Silent (s), Deaf (d), Inactive (i)) (s): a
A router is sucessfully configured for VLAN 2
....... Updating system/VLAN configuration ............
```

If you enter **n** at the first prompt, no virtual router is configured for the VLAN.

Table 1-1: IP Interface and Virtual Router Configuration

Prompt	Description
Enable IP interface	Enter y to enable virtual routing. Enter n if you have an external router.
IP address	This address must be on a separate subnet from other VLAN IP addresses.
Subnet mask	All subnet masks for the VLANs must be the same. The FORMULA 8200 does not support variable length subnet masks.
RIP mode	**Active** provides IP routing between VLANs with RIP, sends RIP messages every 30 seconds, and updates routing tables. **Silent** does not provide IP routing between VLANs or send IP messages, but updates routing tables. **Deaf** or **inactive** does not provide routing between VLANs, does not send RIP messages, and does not update routing tables.

Repeat the steps to create additional VLANs.

To display the configuration of a virtual LAN:

Use the **VLAN/SHOW/VLAN <VLAN#>** command.

The following is an example configuration display of the previously-created VLAN 2:

```
              VLAN/SHOW/VLAN 2
         VLAN ID:2
         VLAN Description:TEST
         Router Description:TESTROUTER
         Network Address:149.35.101.31
         Subnetwork Mask:255.255.255.0
         Broadcast Address:149.35.101.255
         Admin Status:EMABLE
         Operation Status:ACTIVE
         Port Members:
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Virtual Physical  VLAN  Port    Port             Bridge   Admin   Operation
 Port ID Port ID   ID    Type    MAC Address      State    Status  Status
 ======= =======   ====  ====    ===========      ======   ======  ==========

 4       4         2     Bridge  0:60:e8:ff:ff:23 Disable  Enable  Inactive

 5       5         2     Bridge  0:60:e8:ff:ff:24 Forward  Enable  Active

 18      33        2     Router  0:60:e8:ff:ff:50          Enable  Active
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

Configuring a Virtual Bridge

A virtual bridge is created when you create a VLAN.

To configure bridge parameters for an existing bridge:

1. Enter the **VBRIDGE/CONFIG/BRIDGE <VLAN#>** command.

   For example, enter:

   BRIDGE 1

   When you enter this command, a full menu of configurable choices appears, as shown below:

```
/VBRIDGE/CONFIG/BRIDGE 1

        Spanning Tree Parameters Modification for VLAN 1:

        1) Spanning tree Status is ON for this VLAN, set to OFF? (y/n)
        2) New Priority (0..65535) (current value is 32768):
        3) New Bridge Hello Time (1..10 secs) (current value is 2):
        4) New Bridge Max Age (6..40 secs) (current value is 20):
        5) New Bridge Forward Delay (4..30 secs)(current value is 15):
        6) New Aging Time (10..1000000 secs) (current value is 300):

        Enter selection (modification or 0 to commit, c to cancel) >
```

2. Enter the desired information by entering the item number with an equal sign (=) and the value.
3. Enter **0** at the prompt to save changes and exit the menu.

Caution

Do not change any of the values unless you are very familiar with spanning tree parameters and how they affect the status of your network. Incorrect settings can lead to serious network problems.

For more detailed information about this command and its parameters, refer to the **VBRIDGE** command in Chapter 5.

To optimize Spanning Tree functionality:

1. Use the **VBRIDGE/CONFIG/FILTER** command.

   This command permits you to modify the Static Entry Table by adding or deleting entries. Creating a static entry ensures that the MAC address does not age out. This is recommended for devices that require a permanent connection.

   For example, the following menu appears when you enter the **VBRIDGE/CONFIG/FILTER/ADD** command:

```
VBRIDGE/CONFIG/FILTER >add
Adding Static Filter Entry:

                        STATIC ENTRY TABLE
        VLAN
| vlan |  port |  dom |   mac_address       |  entryId |  flags |    age   |
|  0       7      0       00:00:00:00:00:00         0         —        1    |
|  1       33     0       00:60:e8:00:34:31         1         —        0    |

Enter port number (1..16) or Q=Quit:
```

   The table includes VLAN and ARL fields. (ARL, or Address Resolution Logic, performs the bridge learning functions.) Most of the information in this table is provided and used internally by the system.

2. Enter the port number, then provide the required information by following the prompts.

The **VBRIDGE/CONFIG/PARAPORT <VLAN#>** command permits you to set virtual bridge port parameters. This allows you to manually set, on a per port basis, the priority, path costs, and port status (block or forward) with or without Spanning Tree enabled. For example, a similar following screen appears when you enter the **VBRIDGE/CONFIG/PARAPORT <VLAN#>** command:

```
/VBRIDGE/CONFIG/PARAPORT


Port    Port          Path      Enable           Manual
Number  Priority (a)  Cost (b)  Spanning Tree(c) Mode (d)
   1      128           10           Y             f
```

To display virtual bridge parameters:

Use the **VBRIDGE/SHOW/BRIDGE <VLAN#>** command.

See Chapter 5, **Command Reference**, for more information.

Chapter 4

Operating and Managing the FORMULA 8200 Switch

This chapter provides an overview of tasks that you may want to perform in the course of normal operation, including displaying or configuring parameters related to the following:

- System configuration
- Internet Protocol (IP)
- Ethernet configuration
- Port mirroring
- Virtual LANs
- Virtual bridges
- Spanning Tree
- RIP
- Firmware upgrades

Using Online Help

Use the following command to obtain online information about the CLI:

ALIAS	Lists command shortcuts and briefly describes each.
ALLCMD	List available commands and briefly describes each.
LOOKUP	Displays information about a specific command.
HELP <COMMAND>	Provides brief descriptions of command usage.

For additional information about using these commands (and all FORMULA 8200 commands), see Chapter 5.

Displaying the System Configuration

The FORMULA 8200 **SYSTEM/SHOW** command displays system information, including the version numbers of your:

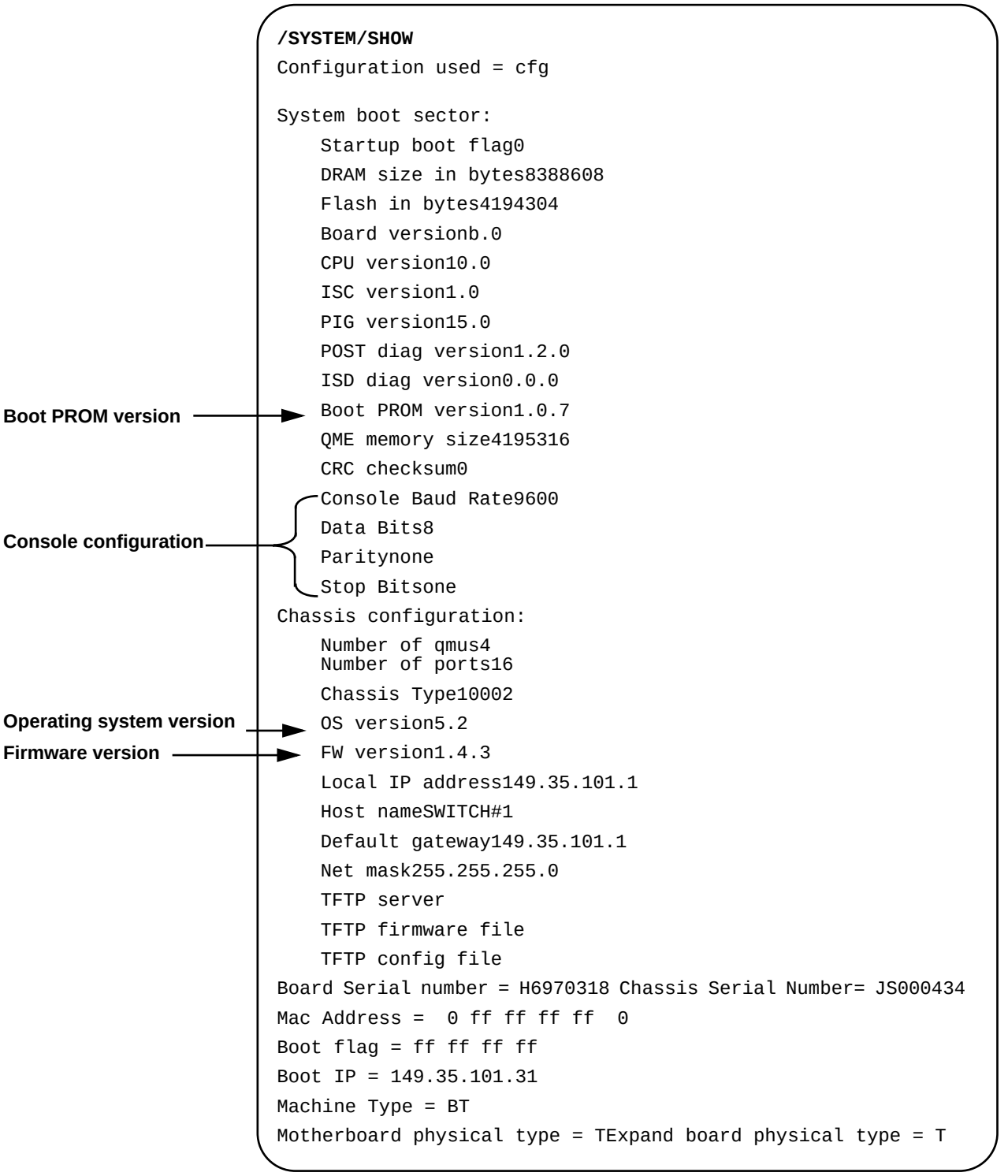
- Boot PROM
- Firmware
- Operating system
- Chassis type
- Board serial number
- Chassis serial number
- MAC address

The **SYSTEM** command also displays your Internet configuration data:

- Local IP address
- Host name
- Default gateway
- Subnet mask

To display system information:

Enter the **SYSTEM/SHOW** command. A similar screen appears:



In the last line, **T** indicates the switch has TX ports on the onboard and expansion modules. FX ports will be shown as **F**.

Note

Your firmware version number might be different from the example.

Displaying Console Port Parameters

To display the console parameters:

Use the **CONSOLE** command. You can perform the following functions:

CONSOLE/LOCK 1	Locks the console from remote sessions.
CONSOLE/LOCK 0	Unlocks the console from remote sessions.
CONSOLE/SHOW	Displays the console parameters.

For additional information about using these commands, refer to **CONSOLE Command** in Chapter 5.

Displaying Ethernet Port Settings Information

To display Ethernet port information:

Use the **ETHERNET/SHOW/PORT** command. The following screen shows the port configuration for a FORMULA 8200 switch with 8 TX ports and 8 FX expansion ports.

```
/ETHERNET/SHOW> port

Physical Port#    Autoneg     Speed       Duplex
==============    =======     =======     =======
  1               on          100MBPS     HALF
  2               on          100MBPS     HALF
  3               on          100MBPS     HALF
  4               on          100MBPS     HALF
  5               on          100MBPS     HALF
  6               on          100MBPS     HALF
  7               on          100MBPS     HALF
  8               on          100MBPS     HALF
  9               off         100MBPS     FULL
  10              off         100MBPS     FULL
  11              off         100MBPS     FULL
  12              off         100MBPS     FULL
  13              off         100MBPS     FULL
  14              off         100MBPS     FULL
  15              off         100MBPS     FULL
  16              off         100MBPS     FULL
```

FX ports

Configuring Ethernet Port Settings

Note

You cannot configure FX ports. They are fixed at 100 Mbps, full duplex.

You can configure the following parameters for TX ports:

- Autonegotiation
- Port speed
- Port duplex

To configure Ethernet port parameters:

1. Use the **ETHERNET/CONFIG/PORT** command.

```
/ETHERNET/CONFIG/PORT
Ethernet Port Configuration
(Press <Return> to take default value, Q to Quit)

Enter port(s) number to configure (1..16) (<port#-port#>):1 2 3
Autonegotiation enable? (y/n) (default=y):N
Port speed (1=10MBPS, 2=100MBPS) (default=100MBPS):1
Half duplex/Full duplex (1=Half, 2=Full) (default=Half):1
Transmission enable? (y/n) (default=y):Y
Receiving enable? (y/n) (default=y): Y

Enter (S=save, Q=quit): S
```

2. Enter new configurations, or accept the defaults.

   For example, if the screen shows autonegotiation as being disabled (**N**), and you want to keep it disabled, enter **N** again. Otherwise, if you just press **Enter**, the autonegotiation reverts to the default setting as enabled (**Y**).

Configuring Ethernet Port Statistics

Ethernet statistics disabled by default.

To enable or disable port statistics

1. Use the **ETHERNET/CONFIG/STAT** commands to enter the port number(s) for which statistics are enabled.
2. Enter **y** to confirm statistics gathering.

Note

Pressing **Enter** without entering a value does not change current settings.

See the following screen as an example:

```
/ETHERNET/CONFIG/STAT/PORT
   Ethernet Port Statistics Configuration (Press <Return> to take default
value,
Q to Quit)
   Enter port(s) number to configure (1..16) (<port#>, <port#-port#>):1
   Enable port statistics? (y/n) (default=n): y
```

3. Enter **s** to save the configuration, as in the following screen:

```
  Port(s) number to configure: 1
     Collect Port Statistics: Enabled
  Enter (S=save, Q=quit):s

  .... Updating system/VLAN configuration ....
```

Displaying Ethernet Port Statistics Information

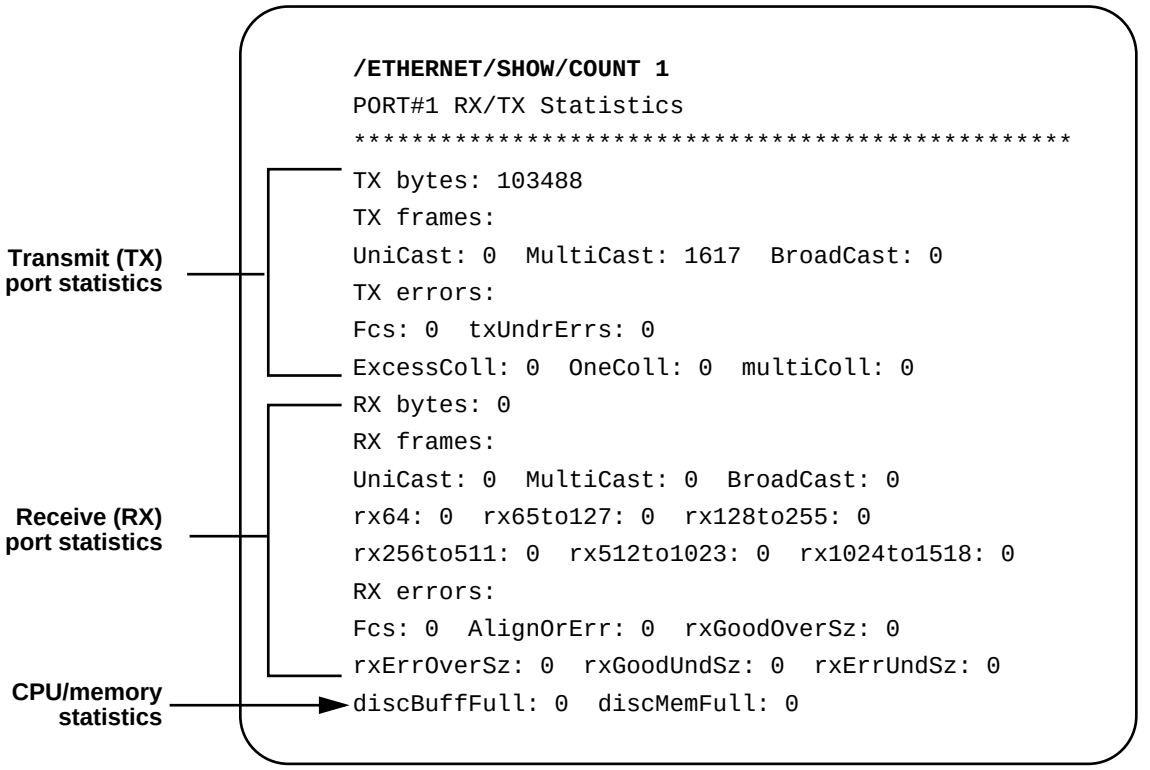
When enabled, you can display port statistics, such as transmit and receive frames and errors.

Note

Before using this command, ensure that statistics are enabled via the **ETHERNET/CONFIG/STAT** command (previous section).

To display Ethernet port statistics (when enabled):

Use the **ETHERNET/SHOW/STAT** command to determine if a port has its statistics gathering function on. Then use **ETHERNET/SHOW/COUNT <PORT#>** to display statistical information about a port.



Clearing a Port's Statistics Counters

To clear a port's statistics counters:

Use the **ETHERNET/CONFIG/CLEAR <PORT#>** command.

This command resets the port's statistics to 0. If polling is enabled, the counters begin to increment at the next polling interval.

Using Ethernet Port Mirroring

You need to provide a network analyzer to monitor traffic on the FORMULA 8200.

Port mirroring lets you nonintrusively monitor the network traffic on one port from another port. You can set up port mirroring for any pair of Ethernet ports within the same switch. When you enable port mirroring, the active or **mirrored** port transmits and receives normally, and the mirroring or **snoop** port receives a copy of the receive traffic of that active port.

Note

Before using the port mirroring feature, you must enable port statistics hardware and statistics polling by using the **ETHERNET/CONFIG/STAT** command.

The following procedure shows you how to configure port mirroring using four basic steps:

- ❑ Configure the snoop port to mirror receive (rx) traffic
- ❑ Configure the port to be monitored
- ❑ Verify the configuration
- ❑ View the mirrored information

At the end of this section, a procedure also shows you how to clear the snoop port.

To configure port mirroring:

1. Enter **ETHERNET/CONFIG/SETSNOOP <PORT# rxFLAG >** to configure the snoop port.

   The snoop can monitor receive (rx) traffic. After entering the port number (port#), enter one of the following two rxFLAG/ txFLAG combinations:

rxFLAG	txFLAG	Function
1	0	Receive
0	0	Reset (clear snoop port)

   For example, enter the following command to configure port 1 as the snoop port in receive-only (rx) mode:

   /ETHERNET/CONFIG > SETSNOOP 1 1 0

2. Configure Ethernet ports to be monitored by entering one of the following commands:

   If you specified the receive flag (1 0) in Step 1, enter:

   ETHERNET/CONFIG/RXMIRROR

   to see the following display:

```
Enter the mirror types, any combination of
u=unicast, b=broadcast, d=discarded, a= ARL,D=Disable:
```

3. Specify the type of traffic to be viewed on the monitored port (unicast, broadcast, and so on).

   For example, enter **u**.

4. Enter the number of the port to be the monitored.

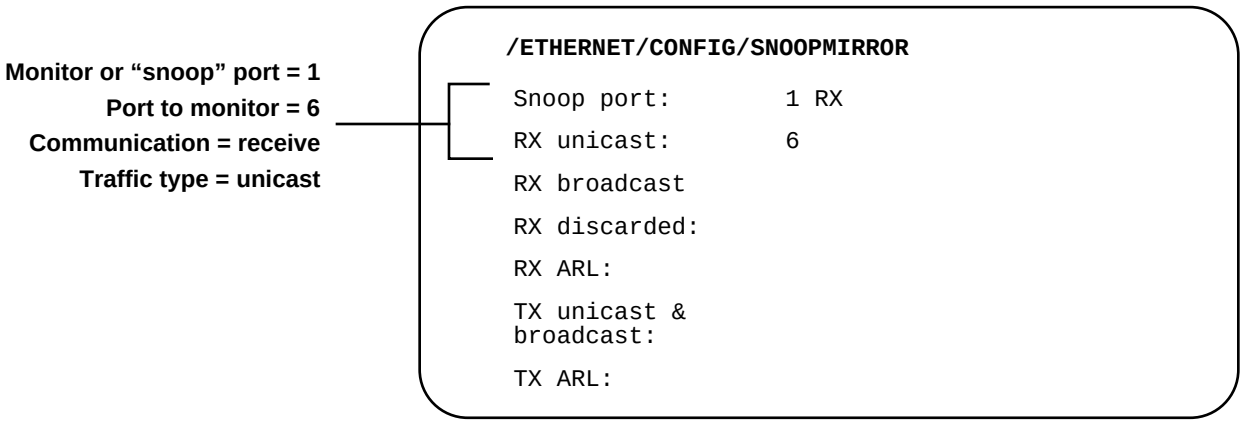
   For example, enter **6** as in the following display. You may also enter a series of ports by separating the numbers with a space.

```
Enter the mirror types, any combination of
u=unicast,b=broadcast,d=discarded,a=marked by ARL,D=Disable: U
Enter physical port number(s): 6
```

5. Display the port mirroring configuration to confirm the correct settings by entering the following command:

   ETHERNET/CONFIG/SNOOPMIRROR

This displays both the monitor port as well as the port to be monitored. In the following example, port 1 is set to monitor port 6's receive (rx) traffic of the unicast type:



6. View the mirrored information by entering:

   ETHERNET/SHOW/STAT <PORT#>

   where <**PORT#**> is the number of the snoop port.

To clear a snoop port:

1. Enter **ETHERNET/CONFIG/SETSNOOP <SNOOP PORT# 0 0>** to remove the flag from the snoop port.
2. Enter the following command:

   ETHERNET/CONFIG/RXMIRROR

   The following prompt is displayed:

```
>/ethernet/config/rxmirror

Enter the mirror types, any combination of
u=unicast, b=broadcast, d=discarded, a= ARL,D=Disable:
```

3. Enter **D** (uppercase) for Disable.
4. Enter **ETHERNET/CONFIG/SNOOPMIRROR** to make sure the display does not show any ports in the snoop mirror configuration.

Displaying Virtual LAN (VLAN) Information

To display the VLAN information:

Use the **VLAN/SHOW/VLAN** command.

```
/VLAN/SHOW/VLAN

Virtual LAN Information :

 VLAN    VLAN                IP Network        Admin     Operation    Port
 ID      Description         Address           Status    Status       Membership
 ====    ===============     ==============    ======    =========    ===========

 1       Default VLAN (#1)   137.168.24.190    ENABLE    ACTIVE       1-16
```

If this is the first time you are displaying VLAN information prior to configuring any VLANs, the screen shows all ports belonging to the default, VLAN 1.

Displaying Virtual Router Information

To display virtual router information:

Use the **VLAN/SHOW/VROUTER** command.

```
/VLAN/SHOW/VROUTER

 Virtual Router Information :

VLAN  Router       IP Network    Subnet         Virtual  Admin     Operation
ID    Description  Address       Mask           Port ID  Status    Status
====  ===========  ============  =============  =======  =======   =======

1     Default VLAN 137.168.28.0  255.255.255.0  17       ENABLE    ACTIVE
```

In addition, the following commands display or modify information about routing:

- **INET/SHOW/ROUTE** displays the routing table.
- **VLAN/CONFIG/MODIFY <VLAN#>** modifies VLAN parameters.
- **INET/CONFIG/ROUTE** adds or deletes routes.

For more information about these commands, see Chapter 5.

Displaying Virtual Port Information

To display virtual port information about a transparent bridge port:

Use the **VLAN/SHOW/VPORT** command.

```
/VLAN/SHOW/VPORT

 Virtual Port Information :

Virtual  Physical  VLAN  Port    Port              Bridge    Admin     Operation
Port ID  Port ID   ID    Type    MAC Address       State     Status     Status
=======  ========  ====  ======  ================  =======   =======   =======

1        1         10    BRIDGE  0:60:e8:ff:ff:20  FORWARD   ENABLE    ACTIVE
2        2         10    BRIDGE  0:60:e8:ff:ff:21  FORWARD   ENABLE    ACTIVE
3        3         2     BRIDGE  0:60:e8:ff:ff:22  FORWARD   ENABLE    ACTIVE
4        4         2     BRIDGE  0:60:e8:ff:ff:23  DISABLE   ENABLE    INACTIVE
5        5         10    BRIDGE  0:60:e8:ff:ff:24  FORWARD   ENABLE    ACTIVE
6        6         10    BRIDGE  0:60:e8:ff:ff:25  FORWARD   ENABLE    ACTIVE
7        7         10    BRIDGE  0:60:e8:ff:ff:26  FORWARD   ENABLE    ACTIVE
8        8         10    BRIDGE  0:60:e8:ff:ff:27  FORWARD   ENABLE    ACTIVE
9        9         9     BRIDGE  0:60:e8:ff:ff:28  DISABLE   ENABLE    INACTIVE
10       10        1     BRIDGE  0:60:e8:ff:ff:29  FORWARD   ENABLE    ACTIVE
11       11        1     BRIDGE  0:60:e8:ff:ff:2a  FORWARD   ENABLE    ACTIVE
12       12        9     BRIDGE  0:60:e8:ff:ff:2b  FORWARD   ENABLE    ACTIVE
13       13        9     BRIDGE  0:60:e8:ff:ff:2c  FORWARD   ENABLE    ACTIVE
14       14        15    BRIDGE  0:60:e8:ff:ff:2d  FORWARD   ENABLE    ACTIVE
15       15        15    BRIDGE  0:60:e8:ff:ff:2e  FORWARD   ENABLE    ACTIVE
16       16        15    BRIDGE  0:60:e8:ff:ff:2f  FORWARD   ENABLE    ACTIVE
17       33        1     ROUTER  0:60:e8:ff:ff:50            ENABLE    ACTIVE
```

The screen shows a 16-port FORMULA 8200 (`Physical Port ID`) and their VLAN assignments (`VLAN ID`) with spanning tree status (`Bridge State`). Ports that are linked and operational as shown as active (`Operation Status`), and VLAN is enabled on all ports (`Admin Status`).

The system automatically creates Virtual Port ID 17 and its corresponding Virtual Physical Port ID 33 for VLAN 1 routing functions. As you create additional VLANs and enable routing for them (Chapter 3, **Configuring a Virtual LAN (VLAN)** on page 3-8), the system creates additional Virtual Port IDs but assigns the same Physical Port ID number, 33, for the routing function.

Displaying Virtual Port Statistics

To display virtual port statistics:

Use the **VLAN/SHOW/VSTATS** command.

```
/VLAN/SHOW/VSTATS
Virtual Port Statistics:

                                                    INBOUND

Virtual
Port ID   Frames     Octets     Ucast    BCast    Mcast    BufDisc
=======   =======    =======    =======  =======  =======  =======

1         0          0          0        0        0        0

2         0          0          0        0        0        0

3         0          0          0        0        0        0

.

.

.

17        4          256        0        4        0        0

                                                   OUTBOUND

Virtual
Port ID   Frames     Octets     Ucast    BCast    Mcast    BufDisc
=======   =======    =======    =======  =======  =======  =======

1         0          0          0        0        0        0

2         0          0          0        0        0        0

3         0          0          0        0        0        0

.

.

.

17        2          84         0        2        0        0
```

You can enable or disable compiling of the virtual port statistics by using the **ETHERNET/CONFIG/STAT** command.

Displaying Virtual Bridge Information

You can display three types of virtual bridge parameters:

- Spanning tree bridge parameters
- Spanning tree port parameters
- The bridge forwarding table

To display spanning tree bridge parameters:

Use the **VBRIDGE/SHOW/BRIDGE <VLAN#>** command.

The following display is an example of what you might see when you enter the command for VLAN 1:

```
/VBRIDGE/SHOW/BRIDGE 1
Spanning Tree Parameters for VLAN 1

Spanning Tree Status : ON
Priority : 32768 (0x8000)
Bridge ID : 8000-0060e8ffff00
Designated Root : 8000-0060e8ffff00
Cost to Root Bridge : 0
Root Port : None
Hold Time : 1
Topology Changes : 0
Last Topology Change : No Topology Change So Far
Bridge Aging Timer : 300

Parameters System Uses When
Current Parameters          Attempting to Become Root:
-------------------------------------------------------
Max Age       20 secs       System Max Age    20 secs

Forward Delay 15 secs       System Forward Delay15 secs

Hello Time    2 secs        System Hello Time 2 secs
```

Global parameters

Local parameters

For more detailed information about this command, refer to the **VBRIDGE** command in Chapter 5.

Displaying Spanning Tree Port Parameters

To display spanning tree port parameters:

Use the **VBRIDGE/SHOW/PORT <VLAN#>** command.

The following display is an example of what you might see when you enter the command for VLAN 1:

```
/VBRIDGE/SHOW/PORT 1

   Spanning Tree Port Parameters for VLAN 1

Port                      Path   Desig  Desig    Root   Root Bridge ID
Number  Pri    State      Cost   Cost   Port     Port   Desig Bridge ID
------- ---    --------   -----  -----  -------  ----   --------------

16      128    FORWDING   10     0      8000-16  None   8000-0060e8ffff00
                                                       8000-0060e8ffff00

15      128    FORWDING   10     0      8000-15  None   8000-0060e8ffff00
                                                       8000-0060e8ffff00

14      128    FORWDING   10     0      8000-14  None   8000-0060e8ffff00
                                                       8000-0060e8ffff00

.

.

.

3       128    FORWDING   10     0      8000-03  None   8000-0060e8ffff00
                                                       8000-0060e8ffff00

2       128    FORWDING   10     0      8000-02  None   8000-0060e8ffff00
                                                       8000-0060e8ffff00

1       128    FORWDING   10     0      8000-01  None   8000-0060e8ffff00
                                                       8000-0060e8ffff00
```

For more detailed information about this command, refer to the **VBRIDGE** command in Chapter 5.

Displaying the Bridge Forwarding Table

The Bridge Forwarding Table displays the MAC addresses and their forwarding and filtering information for a given group. The transparent bridging function uses the information in the table to determine how to forward frames.

To display the bridge forwarding table:

Use the **VBRIDGE/SHOW/FWT** command.

A table similar to the following appears:

```
/VBRIDGE/SHOW/FWT

┌─────────────────────────────────────────────────────┐
│        VLAN          │                ARL                │
└─────────────────────────────────────────────────────┘
│ vlan │ port │ dom │ mac_address    │ flags │ age  │
├─────────────────────────────────────────────────────┤
│ 1      7      0     00:a0:d2:c1:55:01   –       5    │
│ 1      33     0     00:60:e8:ff:ff:50   –       0    │
└─────────────────────────────────────────────────────┘
```

For more detailed information about this command, refer to **VBRIDGE** in Chapter 5.

To display the total number of addresses in the table:

Use the command **ETHERNET/SHOW/MACADDRCOUNT** (alias **srccnt**) to display a screen similar to the following:

```
/ETHERNET/SHOW/SRCCNT

MAC address Count in Source Table = 22
```

Other related commands:

Refer to the **ETHERNET/CONFIG/FLUSH** example under the **ETHERNET** command in Chapter 5 for details.

Upgrading Firmware

This section describes the procedures for using **TFTP** to download the FORMULA 8200 system software (image file, binary) from your TFTP server to the FORMULA 8200 switch.

Prior to the TFTP download process:

1. Your TFTP server must be running the TFTP daemon (UNIX) or a TFTP process (DOS/Windows). Without the daemon or the process, your download from your server will fail.
2. If you have Solaris®, refer to Appendix B for the procedures to configure a TFTP server on that platform.
3. If you have DOS or Windows, you have several options:
   - ❑ Castle Rock's SNMPc® includes a TFTP server. Refer to the documentation for server setup.
   - ❑ Shareware TFTP servers are available for Windows®95 or WindowsNT®.
   - ❑ For other TCP/IP stacks, check your software applications for details.
4. The IP address of the switch and the TFTP server must be on the same subnet.
5. You need the latest FORMULA 8200's system software file from Allied Telesyn. The software is available from the World Wide Web or from Allied Telesyn's anonymous FTP server. For questions, please phone the Allied Telesyn's Technical Support. For information on how to contact the nearest Allied Telesyn location, refer to Appendix A.
6. Note the name of the FORMULA 8200 system software file that resides on your TFTP server. This is the software file you will download.
7. Make sure the software file on your server has read and write access. In UNIX, enter

   chmod 777 <filename>

   to give read and write access to the files. Then copy the software file to the appropriate directory on your TFTP server.
8. Verify the physical connection from your TFTP server to the FORMULA 8200.

Backing Up Your Current Configurations

The upgrade may change some settings to new defaults, and this may or may not cause a problem.

To ensure your ability to restore your current switch configurations after the software upgrade, you need to back up the following configuration files to your TFTP server:

- SYSTEM.CUR contains the majority of the configuration files
- AGENT.CNF contains location, contact, and SNMP management information (backup optional)

1. Log in to the switch and **PING** the TFTP server to verify communications:

```
/ >ping 192.48.127.124
192.48.127.124 is alive
```

2. Assign an IP address to the TFTP server:

```
/ >tftp/server
IP address of the tftp server ( ) :192.48.127.124
Save TFTP configuration to flash?  (y/n) y
Writing new TFTP configuration to flash...
Updating system/VLAN configuration...
```

3. If you are using a UNIX TFTP server, the file must exist (for example, `system.001`) in the directory path indicated in the `/etc/inetd.conf` file. It must also have read, write, and execute permissions for everyone:

```
cd /tftpboot
touch system.001
chmod 777 system.001
```

4. In your switch, backup the configuration files by using the **TFTP/UPLOAD/CFG** command. In this command, you need to specify the name of the file(s) you want to backup:

```
/>tftp/upload/cfg
    Name of file on switch ( )  :  system.cur
    Name of file on tftp server  ( )   :  system.001
    File "/flash/system.cur" on switch to be copied to server "192.48.127.124" as
"system.001"
    Are they correct?  (y/n) y
    Save TFTP configuration to flash?  (y/n)  n
    LF = /flash/system.cur, RF = system.001,  SRV = 192.48.127.124, op = put

/TFTP/UPLOAD>
```

Repeat the procedure to upload AGENT.CNF to a corresponding pre-existing file (for example, agent.001) in the server.

You are done backing up your files. You may proceed with the software upgrade.

Configuring for the Download Process

To configure the FORMULA 8200 for the TFTP download process:

The following steps provide the FORMULA 8200 with the IP address of your TFTP server:

1. Log in to the switch and enter:

   /TFTP/SERVER

2. Enter the IP address of your TFTP server.

   Enter **Y** in the Save the configuration to flash? (y/n) prompt to save the TFTP server configuration for later use.

```
/TFTP/SERVER


IP address of the tftp server () : 192.5.5.18
Save the configuration to flash? (y/n) Y
Writing new configuration to flash ...
Updating system/VLAN configuration....
```

3. Verify that you can **PING** the TFTP server from the FORMULA 8200.

   You are now ready to download software to your FORMULA 8200 switch.

Caution

There is only enough space on the switch to store one version of software. Do not attempt to download multiple versions on the switch.

Downloading the Firmware

To download:

The following steps provide the FORMULA 8200 with the name of the switch system file that resides on your TFTP server:

1. Enter:

   TFTP/DOWNLOAD/FIRMWARE

2. Verify that the information displayed on the screen is correct and enter **Y**. Then enter **Y** again to save the configuration to flash.

   A similar screen appears:

```
/TFTP/DOWNLOAD/Firmware
Name of file on tftp server (v13r28.z) : <filename>


File <filename> on server (192.5.5.18) is to be copied to switch as "/flash/
firmware"
    Are they correct? (y/n) Y
Save the configuration to flash? (y/n) Y
```

3. Verify that the information on the screen is correct. Confirmation of the above information invokes the TFTP download process. This process takes approximately 5 minutes.

   After the TFTP download process completes, the switch system software is saved to flash memory and you see the following prompt:

   ```
   /TFTP/DOWNLOAD >
   ```

4. Reboot the switch either by using the **REBOOT** command or by pressing the **Reset** button on the front of the switch.

   Rebooting enables the FORMULA 8200 to load the new system software from flash to running memory (DRAM). The system then runs and displays POST (power on self test) and other diagnostic information, as shown in the following example:

```
Boot POST in progress...

PROM version: 1.0.7

Sizing DRAM (value displayed is bank size or error code)...
DRAM now configured into a contiguous block:
        Address: ............. 0xa0000000 - 0xa07ffffc
Running DRAM test...
Initializing 4650 icache and dcache...
Initializing PIG chip...
Initializing PMIU chips...
        PMIU_0 revision: ..... 0x0000000f
        PMIU_1 revision: ..... 0x0000000f
        PMIU_2 revision: ..... 0x0000000f
        PMIU_3 revision: ..... 0x0000000f

Initializing PHY chips...

Initializing interrupt vectors in DRAM...
Running Extended DRAM test...

Boot POST complete, passing control to firmware...

Press the spacebar to stop auto-boot...
```

This completes the software upgrade on the switch. You must now restore the configuration files you backed up.

Restoring Your Configurations

After making sure the software upgrade is stable, you may restore your old configurations using the following procedure.

To restore your configurations;

1. Log in to the switch and **PING** the TFTP server to verify communications:

```
/ >ping 192.48.127.124
192.48.127.124 is alive
```

2. Assign an IP address to the TFTP server:

```
/ >tftp/server
IP address of the tftp server ( ) :192.48.127.124
Save TFTP configuration to flash?  (y/n) y
Writing new TFTP configuration to flash...
Updating system/VLAN configuration...
```

3. Restore the configuration files by using the **TFTP/DOWNLOAD/CFG** command. In this command, you need to specify the name of the file(s) you want to restore:

```
/ >tftp/download/cfg
Name of file on switch  (system.cur)  :
Name of file on tftp server  (system.001)  :
File  "system.001"  on server  (192.48.12.124)  is to be copied to switch as
flash/system.cur"
Are they correct?  (y/n) y
Save TFTP configuration to flash?  (y/n)  y
Writing new TFTP configuration to flash ...Updating system/VLAN configuratio
LF = /flash/system.cur,  RF = system.001,  SRV = 192.48.127.124,  op = get
/TFTP/DOWNLOAD>
```

4. Reboot the switch using the **REBOOT** command on the console prompt.

```
/ TFTP/DOWNLOAD>top
/ >reboot
Are you sure, you want to reboot ? [y/n]: y
```

In Case of Problems With the Software Upgrade

This section tells you what to do if the software upgrade fails due to interruptions or if you see error messages while rebooting the switch as part of the upgrade process.

Interruptions during the download process

Interrupting a software download (for example, rebooting the switch or disconnecting the power cord) creates files of 0 bytes. Attempts to download again will not succeed because the download process cannot write over these files.

If you encounter these problems:

1. Log in to the switch.
2. Manually delete the firmware file by entering:

   /FILE/DELETE firmware

3. Download the firmware again.

Error message during the boot process

If you see the following error message:

```
error uncompressing file
status=0X3D00Q can't load boot file.
```

this means you can not use the CLI to download. Refer to Appendix C, **Downloading Software at the [VxWorks] Prompt**, for alternate procedures on how to download software to the FORMULA 8200.

Displaying RIP Support Information

The FORMULA 8200 IP routing function is implemented on an individual-VLAN basis. When a VLAN is created, the FORMULA 8200 provides an option to configure its interface as an IP router and allows the network manager to choose from four RIP modes: active (send and receive RIP packets), deaf (send only), inactive (RIP disabled) or silent (receive only).

To display routes:

Use the **INET/SHOW/ROUTE** command.

```
/INET/SHOW/ROUTE
ROUTE NET TABLE:

Address         Gateway          Metric    VLAN      Type
============    =============    ======    =====     ==============
192.18.29.0     192.18.29.200    1         1         VLAN INTERFACE
192.18.30.0     192.18.30.200    1         2         VLAN INTERFACE


ROUTE HOST TABLE:
Address         Gateway          Metric    VLAN      Type
============    =============    ======    =====     ==============
132.10.10.1     192.18.29.200    2         1         STATIC
131.20.20.1     192.18.29.200    1         1         STATIC
193.10.10.1     192.18.29.200    1         1         STATIC
127.0.0.1       127.0.0.1        1         1         LOOPBACK
```

Modifying the IP RIP Mode

This section shows you how to modify the IP RIP mode once a VLAN has been created. You can set the RIP mode to one of four available states:

- Active (a) - to send and receive RIP packets
- Deaf (d) - to send only
- Inactive (i) - to disable RIP
- Silent (s) - to receive only

In the example below, the initial mode is silent and is modified to active. Use the same procedure to change the mode to any other state.

To modify the IP RIP mode:

1. Enter the **VLAN/CONFIG/MODIFY <VLAN#>** command.
   The following display appears:

```
      VLAN Modification :

VLAN 3 Configuration Parameters Current Value
-----------------------------------------------------
1) VLAN ID :- 3
2) Description :- VLAN 3
3) VLAN enabled :- Y
4) IP enabled :- Y
5) Network Address : - 192.18.31.200
6) Subnetwork Mask :- 255.255.255.0
7) Broadcast Address : - 192.18.31.255
8) Router Description :- Router for VLAN 3
9) IP RIP Mode (Active(a), Silent(s), Deaf(d), Inactive(i)) :  -
Silent
-----------------------------------------------------
Modification instruction :
 usage: <number of parameter> = <new vlaue>
 command example:   2 = Engineering VLAN(#1)
-------------------------------------------
Enter selection (0 to commit, c to cancel) >
```

2. Set RIP mode to Active by entering the following at the prompt:
   9=A
3. Confirm the change by entering **0** at the prompt:
   `Enter selection (0 to commit, c to cancel)>0`

Configuring Static Routes

To add static routes:

Use the **INET/CONFIG/ROUTE/ADD** command.

```
/INET/CONFIG/ROUTE/ADD

Add static route -
Host/network IP address: 132.10.10.1
Gateway IP address: 192.18.29.200
Metric: 2
Add route? (yes) y
Updating system/VLAN configuration....
Route has been added.
```

All static routes are saved into the FORMULA 8200 flash memory and downloaded at startup or system reset.

Deleting Static Routes

To delete a static route:

Use the **INET/CONFIG/ROUTE/DELETE** command:

```
/INET/CONFIG/ROUTE/DELETE

Delete static route -
Host/network IP address: 130.10.10.1
Gateway IP address: 192.18.29.200
Delete route? (yes) y
Updating system/VLAN configuration....
Static route has been deleted.
```

Removing an IP Default Gateway

To remove an IP default gateway:

Use the **INET/CONFIG/ROUTE/RMDEFAULT** command.

```
Remove default route -
  Gateway IP address: 192.18.29.200


Delete route? (yes) y
Route has been deleted.
Updating system/VLAN configuration....

Static route has been deleted from the flash.

Default route has been deleted.

/INET/CONFIG/ROUTE >VIR

ROUTE NET TABLE:
Address         Gateway          Metric    VLAN      Type
============    =============    ======    =====     ==============
192.18.29.0     192.18.29.200    1         1         VLAN INTERFACE
192.18.30.0     192.18.30.200    1         2         VLAN INTERFACE

ROUTE HOST TABLE:
Address         Gateway          Metric    VLAN      Type
============    =============    ======    =====     ==============
132.10.10.1     192.18.29.200    2         1         STATIC
131.20.20.1     192.18.29.200    1         1         STATIC
193.10.10.1     192.18.29.200    1         1         STATIC
127.0.0.1       127.0.0.1        1         1         LOOPBACK
```

Configuring SNMP Parameters

You can configure the FORMULA 8200 to communicate with a network management station via SNMP (SNMP v.1 only). To configure the FORMULA 8200 as an SNMP managed networking device, you can provide system description, system contact, system location, and both read and write community strings.

To configure the FORMULA 8200 as an SNMP managed device:

1. Use the **SNMP/CONFIG** command to configure SNMP parameters as in the following screen:

```
/SNMP/CONFIG
SNMP Agent configuration:
    system contact () : JOE ADMIN
    system location () : ENGINEERING LAB
    Read community string (public) :
    Write community string (private) :
    SNMP trap destination table is empty.
      Enter A=add, C=change, D=delete, Q=quit
```

2. Enter **A** to create a trap destination table and then respond to the prompts. For example:
   - Enter **192.2.150.49** as the destination IP address.
   - Press **Enter** to accept 162 as the default UDP port number.
   - Enter **public** as the community string.

   The screen displays the following similar information:

```
SNMP Trap Destination Table

Index     IP Address     UDP Port    Community
=====     ==========     ==========  ==========

 1.       192.2.150.49   162         public

Enter A=add, C=change, D=delete, Q=Quit:
```

3. Enter **q** to quit and then **y** to save the information to flash as in the following example:

```
Enter A=add, C=change, D=delete, Q=Quit: q
OK to write SNMP config file (y/n)? y
```

Displaying SNMP Parameters

To display system description, location and contact:

1. Use the **SNMP/SHOW/PARAM** command:

```
/SNMP/SHOW/PARAM
System Description:
System location :
System contact :
```

2. Enter the information at the prompts.

To display the read community string:

Use the **SNMP/SHOW/READCOMM** command.

To display the write community string:

Use the **SNMP/SHOW/WRITECOMM** command.

Chapter 5
Command Reference

The FORMULA 8200 command line interface (CLI) is a hierarchical menu-driven interface with menus, submenus, and commands arranged in a tree structure. This chapter includes:

- Information about how to enter commands
- A list of commands, subcommands, and aliases
- A description of each command, including syntax, default settings, and examples

To access the main command menu:

Enter **?** at the FORMULA 8200 prompt, as shown below:

```
                == MAIN MENU ==

?               ALIAS           ALLCMD
[ATM]           [BOOT]          [CONSOLE]
[ELOG]          [ETHERNET]      EXIT
[FDDI]          [FILE]          [INET]
LOOKUP          [MODE]          [PORTSERV]
REBOOT          [SNMP]          [SYSTEM]
[TFTP]          TOP             UP
[VBRIDGE]       [VLAN]          [TRACE]
/ >
```

Figure 5-1 illustrates the FORMULA 8200 CLI command tree.

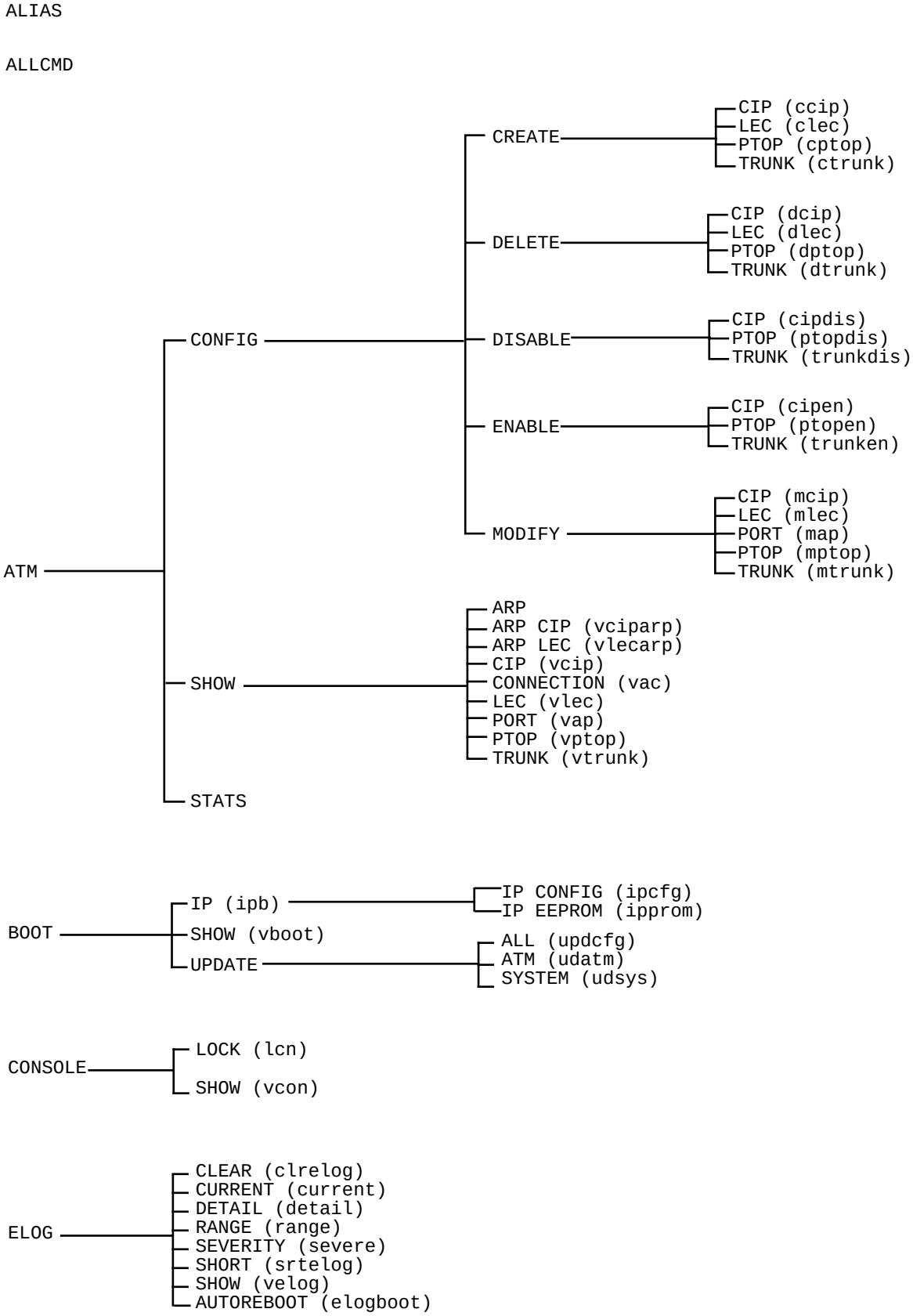


Figure 5-1: CLI Command Tree With Aliases, 1 of 3

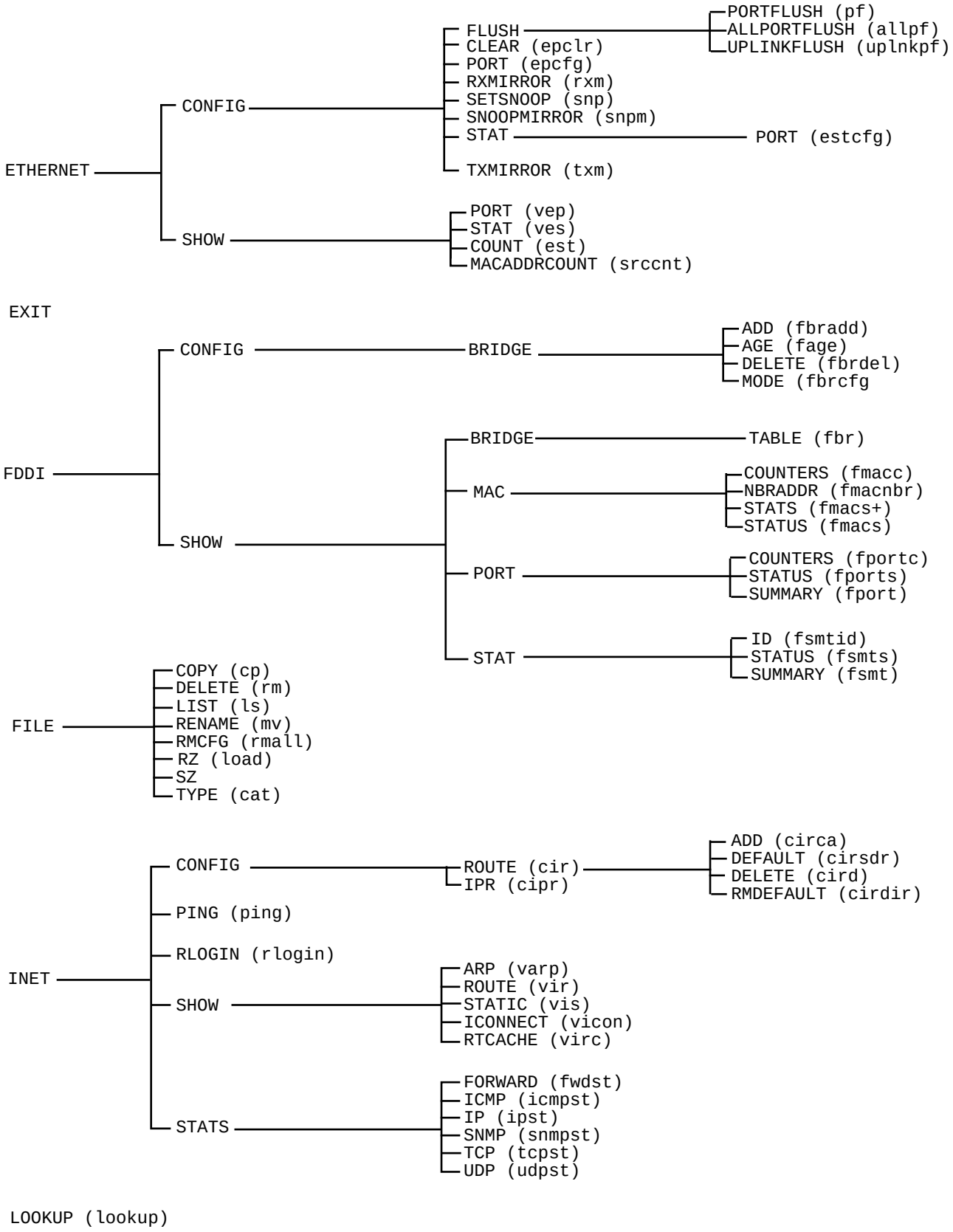


Figure 5-1. CLI Command Tree With Aliases, 2 of 3

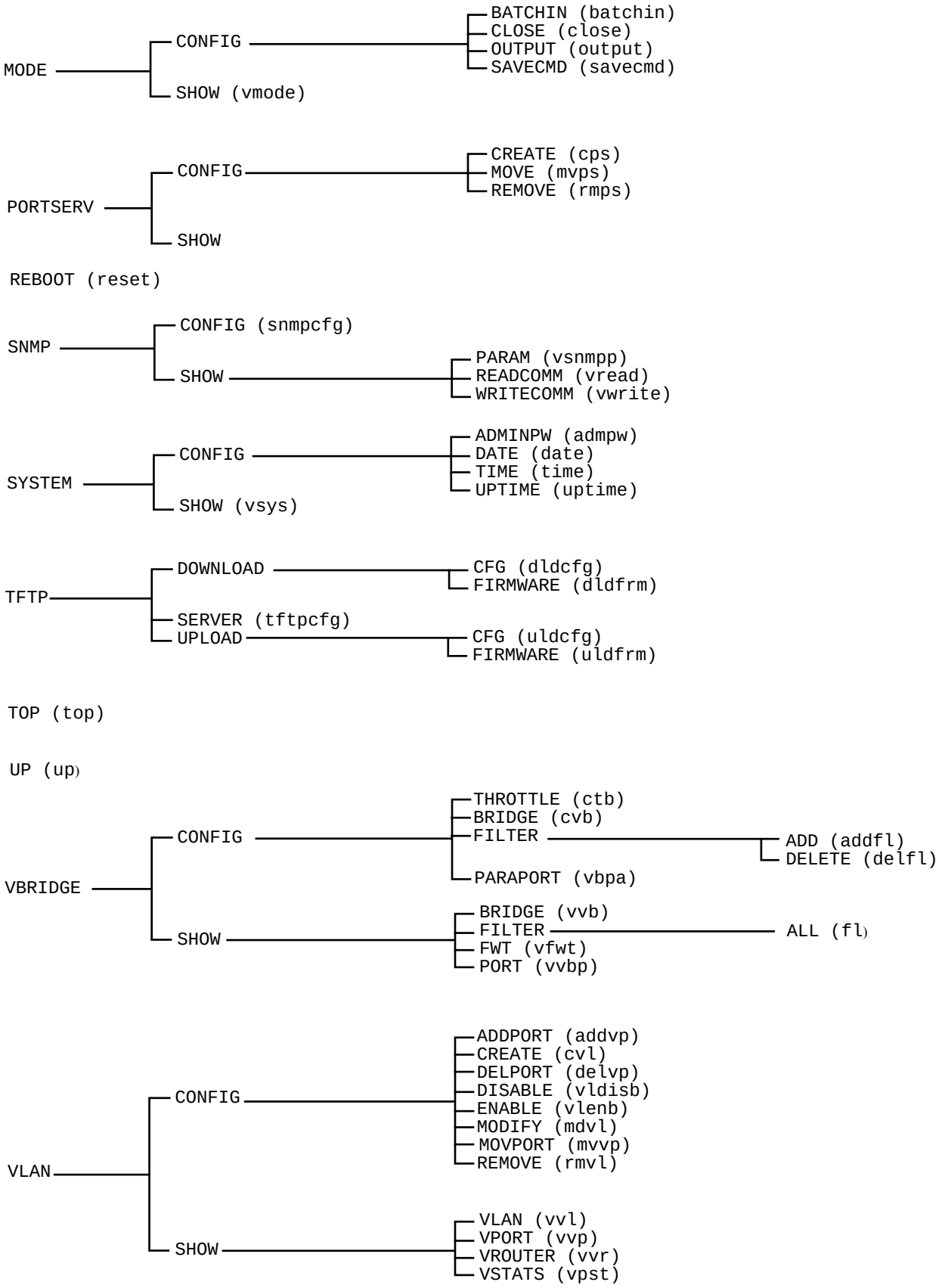


Figure 5-1. CLI Command Tree With Aliases, 3 of 3

ATM and FDDI Support

The ATM and FDDI commands in this chapter are enabled if you have the appropriate card installed in the uplink slot: the AT-8202 for ATM or the AT-8203 for FDDI connectivity.

For details about ATM commands, refer to the **AT-8202 ATM Uplink User's Guide**. For details about FDDI commands, refer to the **AT-8203 FDDI Uplink User's Guide**. These guides are available in PDF format from Allied Telesyn website at **www.alliedtelesyn.com/manuals.htm**.

Command Edit Mode

The command interface provides a history mechanism similar to the UNIX K-shell history facility, which allows you to automatically display and edit previously typed commands. This feature may help save time when entering frequently used commands.

Edit Mode Commands

Table 5-1 lists commonly used edit commands. There are other advanced commands available; however, only the most common are listed here. If you are familiar with the UNIX K-shell history facility, most of the same commands may be used in the FORMULA 8200 command line interface.

Table 5-1 FORMULA 8200 Edit Commands

Command	Action
Esc k	Display the previous command backward in history. Continue pressing k to scroll through the last 20 commands.
Esc j	Display the next command forward in history. Continue pressing **j** to scroll forward.
Esc l or **[Spacebar]**	Go right one character.
Esc h	Go left one character.
Esc dd	Delete entire line.
Esc i	Insert (characters typed after you press **i** are inserted from the cursor forward.) Press **[Escape]** to return to edit mode.
Esc x	Delete a character from cursor forward.
Esc /<sample>	Search for string *sample* backward in history.
Esc ?<sample>	Search for string *sample* forward in history.
Esc 0 (zero)	Go to beginning of line.
Esc cw	Change word (deletes the word your cursor is on and lets you type a new one).

Command Descriptions

The remainder of this chapter provides a description of each command, including its syntax, a description of the command and any subcommands, any default settings, and examples showing command usage.

ALIAS Command

Syntax

ALIAS

Menu

```
/ >alias

Alias          Description
=====          ===========
AAL5ST         Show AAL5 Layer Statistics
ADDFL          Add a static filter table entry
ADDVP          Add port(s) to a VLAN
ADMPW          Change password for admin
ALIAS          Look up aliases that match a pattern
ATMST          Show ATM Layer Statistics
BATCHIN        Read the command sequence from a file and execute one by one
BYE            Close host connection
CAT            Type a file to console
.
```

Description

The **ALIAS** command lists all available command aliases and provides a brief description for each.

Aliases are abbreviated versions of commands or command strings. For example, instead of entering the command **VLAN/CONFIG/ADDPORT**, you can enter the following alias:

addvp

The command aliases are shown in Figure 5-1 earlier in this chapter, and are also included in the description for each command.

Note

You cannot create an alias.

ALLCMD Command

Syntax

ALLCMD

Menu

```
/ >allcmd
Command/Path AlliasDescription
============ ==================
?             Display the current menu commands
ALIAS        (ALIAS )Look up aliases that match a pattern
ALLCMD        List all commands available in CLI
ATM                  Menu to configure/show ATM parameters/statistics
             CONFIG   Menu to configure ATM parameters
              CREATE Menu to create ATM specific services
                   CIP(CCIP)Create CIP logical subnet
                   LEC(CLEC)Create an ELAN
.
.
.
```

Description

The **ALLCMD** command provides a list of available commands and a brief description for each.

ATM Command

Syntax

ATM
ATM/CONFIG
ATM/SHOW
ATM/STATS
ATM/TEST

Menu

```
/ > atm

                    == ATM MENU ==
 [CONFIG]         [SHOW]              [STATS]
 [TEST]

/ATM >
```

Description

ATM commands are listed in the **AT-8202 ATM Uplink User's Guide**. Download the document in PDF format from Allied Telesyn's website at **www.alliedtelesyn.com/manuals.htm**.

BOOT Command

Syntax

BOOT
BOOT/IP
BOOT/SHOW
BOOT/UPDATE/<subcommand>

Menu

```
/ >boot

          == BOOT MENU ==

 [IP]       SHOW        [UPDATE]
```

Description

The **BOOT** command displays and defines boot sector information. Table 5-2 describes the parameters.

Table 5-2 BOOT Command Parameters

Subcommands		Alias	Description
IP	**CONFIG**	**ipcfg**	Configure IP, gateway, etc. for system boot.
	EEPROM	**ipprom**	Configure EEPROM IP
SHOW		**vboot**	Show boot post-test results.
UPDATE	**ALL**	**updcfg**	Update all configuration from RAM to flash.
	ATM	**udatm**	Update ATM configuration to flash.
	SYSTEM	**updsys**	Update system or VLAN configuration to flash

BOOT/IP/CONFIG Example

To assign a new IP address:

1. Enter the following command:

   BOOT/IP/CONFIG

2. Enter the information after each prompt, or press [Enter] to keep the default.

   The following screen is an example of the prompts:

```
/BOOT >ip/config
Local IP configuration:
   IP address (137.168.24.190) :149.35.101.31
   Local host name () :
   Default gateway (0.0.0.0) :
   Net mask (255.255.255.0) :
OK to write config to flash (y/n) ?
/BOOT/IP >
```

BOOT/UPDATE/SYSTEM Example

To update the system and VLAN configuration to flash:

Enter the following command:

BOOT/UPDATE/SYSTEM

The following display appears:

```
/BOOT/UPDATE >system
Updating system/VLAN configuration....
/BOOT/UPDATE >
```

CONSOLE Command

Syntax

CONSOLE/LOCK
CONSOLE/SHOW

Menu

```
/ >console

 == CONSOLE MENU ==
LOCK       SHOW
```

Description

The **CONSOLE** command displays, restricts, or configures the console parameters. Table 5-3 describes the parameters in that display.

Table 5-3 CONSOLE Command Parameters

Subcommand	Alias	Description
LOCK 1	**lcn 1**	Locks the console from remote sessions. This command can be entered from the local console only, and is not available via remote access.
LOCK 0	**lcn 0**	Unlocks a console to enable remote sessions. This command can be entered from the local console only, and is not available via remote access.
SHOW	**vcon**	Shows console parameters.

CONSOLE/LOCK Example

To disallow remote access to the console:

Use the **CONSOLE/LOCK** command:

```
/CONSOLE >lock 1
Console Locked
/CONSOLE
```

To unlock the console:

Use the **CONSOLE/LOCK 0** command:

```
/CONSOLE >lock 0
Console Unlocked
```

CONSOLE/SHOW Example

To display the console parameters:

Use the **CONSOLE/SHOW** command.
A similar display appears:

```
/CONSOLE >show
Speed     = 9600
Stopbit   = 1
Databits  = 8
Parity    = no
No. of lines per page = 25
/CONSOLE >
```

ELOG Command

Syntax

ELOG
ELOG/CLEAR
ELOG/CURRENT
ELOG/DETAIL
ELOG/RANGE
ELOG/SEVERITY
ELOG/SHORT
ELOG/SHOW
ELOG/AUTOREBOOT

Menu

```
/elog

            == ELOG MENU ==

CLEAR       CURRENT         DETAIL
RANGE       SEVERITY        SHORT
SHOW        AUTOREBOOT
```

Description

The **ELOG** command allows you to display or clear the error log. Table 5-4 describes the parameters in that display.

Table 5-4 ELOG Command Parameters

Subcommand	Alias	Description
CLEAR	**clrelog**	Clear the error log.
CURRENT	**current**	Display the current ten (default) errors.
DETAIL	**detail**	Display the detailed error log.
RANGE	**range**	Display the errors within the error code range.
SEVERITY	**range**	Display the errors of a specific severity.
SHORT	**srtelog**	Display the essential information from the error log.
SHOW	**velog**	Display total log message number and size.
AUTOREBOOT	**elogboot**	Enable or disable automatic reboot during fatal errors.

ELOG/CLEAR Example

To clear the error log:

Use the **ELOG/CLEAR** command.
A similar display appears:

```
ELOG/clear
System trace log is reset to record 0
/ELOG >
```

ELOG/CURRENT Example

To show the error log's current ten default errors:

Use the **ELOG/CURRENT** command.
A similar display appears:

```
/ELOG >current
(4/21/97 14:8:22) Code:    3 Level: 0 - Warning : Not tested
(4/21/97 14:8:22) Code:    3 Level: 0 - Warning : Not tested
(4/21/97 14:8:22) Code:    3 Level: 0 - Warning : Not tested
(4/21/97 14:8:22) Code:    3 Level: 0 - Warning : Not tested
(4/21/97 14:8:22) Code:    3 Level: 0 - Warning : Not tested
(4/21/97 14:8:22) Code:    3 Level: 0 - Warning : Not tested
(4/21/97 14:8:22) Code:    3 Level: 0 - Warning : Not tested
(4/21/97 14:8:22) Code:    3 Level: 0 - Warning : Not tested
(4/21/97 14:8:22) Code:    3 Level: 0 - Warning : Not tested
(4/21/97 14:8:32) Code: 1702 Level: 2 - GSR Error = 0x0xff000000
/ELOG >
```

Note

The error log is for Allied Telesyn's Technical Support use.

ELOG/SHOW Example

To display the number and size of the error log:

Use the **ELOG/SHOW** command.

A similar display appears:

```
/ELOG >show
Event log is enabled
Log size per message=100
Current message index=16
Total number of messages since reboot=16
/ELOG >
```

In the above display, the following default settings are shown:

- Event log is enabled
- Log size per message=100

ETHERNET Command

Syntax

ETHERNET
ETHERNET/CONFIG/<subcommand>
ETHERNET/SHOW/<subcommand>

Menu

```
/ethernet

  == ETHERNET MENU ==

[SHOW]     [CONFIG]
```

Description

The **ETHERNET** command allows you to configure and display Ethernet port information, and allows you to configure port mirroring. Table 5-5 describes the parameters in that display.

Table 5-5 ETHERNET Command Parameters

Subcommand		Alias	Description
SHOW	**PORT**	**vep**	Show Ethernet interface unit (EIU) port configuration.
	STAT	**ves**	Show EIU statistics configuration.
	COUNT	**est**	Show EIU statistics and counters.
	MACADDRCOUNT	**srccnt**	Show total number of MAC addresses in the source table.
CONFIG	**CLEAR**	**epclr**	Clear Ethernet statistics counters for a specific port.
	PORT	**epcfg**	Configure Ethernet port parameters.
	RXMIRROR	**rsm**	Set the receive (RX) mirror port.
	SETSNOOP	**snp**	Set the snoop port.
	SNOOPMIRROR	**snpm**	Show snoop and mirror ports.
	STAT PORT	**estcfg**	Display the Ethernet statistics configuration menu.
	TXMIRROR	**txm**	Set the transmit (TX) mirror port.
	FLUSH		Display the flush menu.
	FLUSH PORTFLU	**pf**	Flush all Ethernet entries per port

Table 5-5 ETHERNET Command Parameters (Continued)

Subcommand		Alias	Description
CONFIG (continued)	**FLUSH ALLPORT**	**allpf**	Flush all Ethernet port entries
	FLUSH UPLINKF	**uplinkf**	Flush all uplink entries

ETHERNET/CONFIG/PORT Example

To enable autonegotiation for Ethernet TX ports 1,2, and 3:

Note

100Base-FX fiber ports are fixed at 100 Mbps and full duplex and cannot be configured.

1. Use the **ETHERNET/CONFIG/PORT** command.
2. Enter the desired information at the prompts, which are shown in the display below.

   If a port is set to other than the default, pressing the Enter key resets it back to the default setting. It does not retain the previously configured port setting.

   Once you have responded to each of the prompts, the settings are displayed, and you are prompted to save your responses or to quit.

Autonegotiation prompt

```
/ETHERNET/CONFIG> port
Ethernet Port Configuration
(Press <Return> to take default value, Q to Quit)

Enter port(s) number to configure (1...16) (<port#-port#>):1 2 3
Autonegotiation enable? (y/n) (default=y): Y
Transmission enable? (y/n) (default=y):Y
Receiving enable? (y/n) (default=y): Y

Port(s) number to configure: 1 2 3
Autonegotiation enable? (y/n) (default=y): Y
Transmission enable? (y/n) (default=y): Y
Receiving enable? (y/n) (default=y): Y
Enter (S=save, Q=quit): S
```

ETHERNET/CONFIG/RXMIRROR Example

To set the receive mirror port for port mirroring:

Enter the following command:

ETHERNET/CONFIG> **rxmirror**

Refer to **Using Ethernet Port Mirroring** in Chapter 4 for more information.

ETHERNET/CONFIG/SETSNOOP Example

To set the snoop (monitoring) port for port mirroring:

Enter the following command:

ETHERNET/CONFIG> **setsnoop**

Refer to **Using Ethernet Port Mirroring** in Chapter 4 for more detailed information.

ETHERNET/CONFIG/STAT Example

To configure Ethernet statistics parameters:

1. Enter **ETHERNET/CONFIG/STAT/PORT** to enable statistics.

```
/ETHERNET/CONFIG/STAT/PORT
              Ethernet Port Statistics Configuration (Press <Return> to take
default value,
Q to Quit)
    Enter port(s) number to configure (1..16)(<port#>,<port#-port#>): 1-8
    Enable port statistics? (y/n) (default=n): y
    Port(s) to configure: 1-8
    Collect poll statistics:Enabled

Enter (S=save, Q-quit): S
..... Updating system/VLAN configuration .....
```

2. Use the **ETHERNET/SHOW/STAT** command to verify that statistics is turned on, that is, port(s) are shown as `Enabled`.

ETHERNET/CONFIG/FLUSH Example

To clear dynamically learned MAC addresses from the bridge table:

1. Enter **ETHERNET/CONFIG/FLUSH** to display the following menu:

```
/ETHERNET/CONFIG/FLUSH
=== FLUSH (ETHERNET CONFIG) MENU ==
PORTFLUSH      ALLPORTFLUSH      UPLINKFLUSH
```

2. Enter one of the following commands:

   PORTFLUSH <port #> to clear the bridge table of dynamically learned MAC addresses on a designated port

   ALLPORTFLUSH to clear the bridge table of dynamically learned MAC addresses on all ports

   UPLINKFLUSH to clear the bridge table of dynamically learned MAC addresses on an uplink port only

To view the table, use the **VBRIDGE/SHOW/FWT** command (page 5-50).

Note

The **FLUSH** command does not work on static addresses. Static addresses are manually entered and must therefore be manually deleted. See also **Configuring a Virtual Bridge** in Chapter 3, beginning on page 3-11, for the procedure to add static addresses to the table using the **VBRIDGE/CONFIG/FILTER/ADD** command.

ETHERNET/SHOW/PORT Example

To display information about the Ethernet interface port configuration:

Use the **ETHERNET/SHOW/PORT** command.

A similar display appears:

```
/ETHERNET/SHOW> port

Physical Port#      Autoneg      Speed      Duplex
================    =========    =======    =======
1                   off          100MBPS    HALF
2                   on           100MBPS    HALF
3                   off          100MBPS    HALF
4                   off          100MBPS    HALF
5                   on           100MBPS    HALF
```

ETHERNET/SHOW/COUNT Example

To display Ethernet statistics:

Use the **ETHERNET/SHOW/COUNT** command.

A similar display appears:

```
/ETHERNET/SHOW/COUNT 1
PORT#1 RX/TX Statistics
************************************************
TX bytes: 103488
TX frames:
UniCast: 0  MultiCast: 1617  BroadCast: 0
TX errors:
Fcs: 0  txUndrErrs: 0
ExcessColl: 0  OneColl: 0  multiColl: 0
RX bytes: 0
RX frames:
UniCast: 0  MultiCast: 0  BroadCast: 0
rx64: 0  rx65to127: 0  rx128to255: 0
rx256to511: 0  rx512to1023: 0  rx1024to1518: 0
RX errors:
Fcs: 0  AlignOrErr: 0  rxGoodOverSz: 0
rxErrOverSz: 0  rxGoodUndSz: 0  rxErrUndSz: 0
discBuffFull: 0  discMemFull: 0
```

Table 5-6 describes the parameters shown in the **ETHERNET/SHOW/COUNT** display.

Table 5-6 ETHERNET/SHOW/COUNT Parameters

Parameter		Description
TX bytes		The number of transmitted bytes since the last time Ethernet statistics were enabled or cleared
Tx frames	**UniCast**	The number of unicast frames transmitted from one network device to another single network device
	MultiCast	The number of multicast frames transmitted from one network device to multiple network devices
	BroadCast	The number of broadcast frames transmitted to all network devices
TX errors	**Fcs**	The number of frames that were discarded on the transmit side because of FCS (Frame Check Sequence) error
	txUndrErrs	The number of frames that were discarded on the transmit side because of underrun
	ExcessColl	The number of frames that were dropped because of excessive collisions
	OneColl	The number of frames that were transmitted after exactly one collision
	multiColl	The number of frames that were transmitted after more than one collision
Rx bytes		The number of received bytes since the last time Ethernet statistics were enabled or cleared
RX frames	**UniCast**	The number of received unicast frames
	MultiCast	The number of received multicast frames
	BroadCast	The number of received broadcast frames
	rx64	The number of frames (including frames with errors) that were 64 bytes in length
	rx65to127	The number of frames (including frames with errors) that were between 65 and 127 bytes long
	rx128to255	The number of frames (including frames with errors) that were between 127 and 255 bytes long
	rx256to511	The number of frames (including frames with errors) that were between 256 and 511 bytes long
	rx512to1023	The number of frames (including frames with errors) that were between 512 and 1023 bytes long
	rx1024to1518	The number of frames (including frames with errors) that were between 1024 and 1518 bytes long

Table 5-6 ETHERNET/SHOW/COUNT Parameters (Continued)

Parameter		Description
RX errors	**Fcs**	The number of well aligned frames that were received with FCS error
	AlignOrErr	The number of frames received with alignment or FCS errors
	rxGoodOverSz	The number of good oversized frames received
	rxErrOverSz	The number of oversized frames with errors (FCS, alignment)
	rxGoodUndSz	The Number of good undersized frames received
	rxErrUndSz	The number of undersized frames received with errors (FCS, alignment)
discBuffFull		The number of good frames that were discarded because the Rx buffer was full
discMemFull		The number of good frames discarded because memory was full

ETHERNET/SHOW/STAT Example

To show the ports' statistics gathering status:

Use the **ETHERNET/SHOW/STAT** command to display a list of ports. The list may be similar to the following display:

```
/ETHERNET/SHOW> stat
       Statistics polling:Disabled
       Polling interval:5 secs

 Port        Statistics
 =====       ===========
 1           Disabled
 2           Disabled
 3           Disabled
 4           Disabled
 5           Disabled
 6           Disabled
 7           Disabled
 8           Disabled
```

ETHERNET/SHOW/MACADDRCOUNT

To display the total number of MAC addresses in the source address table:

Use the command **ETHERNET/SHOW/MACADDRCOUNT** (alias **srccnt**) to display a similar screen:

```
/ETHERNET/SHOW/MACADDRCOUNT

MAC address Count in Source Table=22
```

The source address table can store up to 8,192 MAC addresses.

ETHERNET/CONFIG/CLEAR Example

To clear Ethernet statistics for a port:

Use the **ETHERNET/CONFIG/CLEAR <port #>** command to reset a port's statistics counters to 0.

You can clear statistics from only one port at a time.

Note

If the port's statistics is enabled, statistics gathering resumes and the counters may begin to increment at the next polling interval.

EXIT Command

Syntax

EXIT

Menu

```
/exit
```

Description

The **EXIT** command quits the command line interface (CLI) session.

FILE Command

Syntax

FILE/COPY
FILE/DELETE
FILE/LIST
FILE/RENAME
FILE/RMCFG
FILE/RZ
FILE/SZ
FILE/TYPE

Menu

```
/file

== FILE MENU ==
COPY          DELETE          LIST
RENAME        RMCFG           RZ
SZ            TYPE
```

Description

The **FILE** command allows you to configure and display system file information. Table 5-7 describes the parameters in that display.

Table 5-7 FILE Command Parameters

Subcommand	Alias	Description
COPY	**cp**	Copy from file to file.
DELETE	**rm**	Delete a file.
LIST	**ls**	List system files.
RENAME	**mv**	Rename a file.
RMCFG	**rmall**	Remove all configuration files from flash.
RZ	**load**	Download a file using ZMODEM.
SZ		Upload a file using ZMODEM.
TYPE	**cat**	Type a file to the console.

FILE/COPY Example

To copy from one file to another:

Use the **FILE/COPY** command.

For example, to copy a file named `system.cfg` to the file named `sys2.cfg`, enter the following command:

```
FILE/COPY system.cfg sys2.cfg
```

FILE/LIST Example

To list the system files:

Enter the **FILE/LIST** command.

A similar display appears:

```
/FILE>list

 size          date            time          name
 --------      ------          ------        --------
   1053238     JUL-14-1916     09:18:12      FIRMWARE
       181     JUL-14-1916     09:18:12      AGENT.CNF
     39420     JUL-14-1916     09:18:12      SYSTEM.CFG
      2137     JUL-14-1916     09:18:12      ERRLOG.CFG
     13869     JUL-14-1916     09:18:12      ATM.CFG
```

INET Command

Syntax

INET/CONFIG/<subcommand>
INET/PING
INET/RLOGIN
INET/SHOW/<subcommand>
INET/STATS/<subcommand>

Menu

```
/inet

== INET MENU ==
[CONFIG]     PING          RLOGIN
[SHOW]       [STATS]
```

Description

The **INET** command allows you to display and configure IP parameters for the switch.

Table 5-8 describes the parameters in the display.

Table 5-8 INET Command Parameters

Subcommand			Alias	Description
CONFIG	**ROUTE**		**cir**	Menu to configure a static route.
		ADD	**cira**	Add a static route.
		DEFAULT	**ciradr**	Set the default route.
		DELETE	**cird**	Delete a static route.
		RMDEFAULT	**cirdr**	Remove the default route.
	IPR			Configure IP routing mode.
PING			**ping**	Ping another machine via IP address.
RLOGIN			**rlogin**	Log in to a remote machine.
SHOW	**ARP**		**varp**	Show ARP table entries.
	ROUTE		**vir**	Show routing information.
	STATIC		**vis**	Show static routes.
	ICONNECT		**vcon**	Show TCP/UDP connection table.
	RTCACHE		**virc**	Show route cache.

Table 5-8 INET Command Parameters (Continued)

Subcommand		Alias	Description
STATS	**FORWARD**	**fwdst**	Show IP forwarding rate.
	ICMP	**icmpst**	Show statistics and errors for ICMP.
	IP	**ipst**	Show statistics and errors for IP.
	SNMP	**snmpst**	Show statistics and errors for SNMP.
	TCP	**tcpst**	Show statistics and errors for TCP.
	UDP	**udpst**	Show statistics and errors for UDP.

INET/ PING Example

To "ping" an IP address:

Use the **ping <IP address>** command. For example, to **ping** the IP address, 149.35.101.255, six times, enter:

```
/INET >ping 149.35.101.255 6
```

A similar display appears:

```
PING 149.35.101.255: 56 data bytes
64 bytes from 149.35.101.31: icmp_seq=0. time=0. ms
64 bytes from 149.35.101.31: icmp_seq=1. time=0. ms
64 bytes from 149.35.101.31: icmp_seq=2. time=0. ms
64 bytes from 149.35.101.31: icmp_seq=3. time=0. ms
64 bytes from 149.35.101.31: icmp_seq=4. time=0. ms
64 bytes from 149.35.101.31: icmp_seq=5. time=0. ms
----149.35.101.255 PING Statistics----
6 packets transmitted, 6 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 0/0/0
/INET >
```

If the **ping** command is unsuccessful, a message similar to the following appears:

```
no answer from 149.35.101.255
```

INET/SHOW/ROUTE Example

To display routing information:

Use the **INET/SHOW/ROUTE** command.

A display similar to the following appears:

```
/INET/SHOW >route

 ROUTE NET TABLE:
 Address            Gateway           Metric      VLAN       Type
 ===============    ===============   ======      =====      ============
 137.168.24.0       137.168.24.190    1           1          VLAN INTERFACE
 ROUTE HOST TABLE:
 Address            Gateway           Metric      VLAN       Type
 ===============    ===============   ======      =====      ============
 127.0.0.1          127.0.0.1         1                      LOOPBACK
/INET/SHOW >
```

INET/STATS/TCP Example

To display TCP statistics information:

Use the **INET/STATS/TCP** command.

A similar display appears:

```
/INET/STATS >tcp
TCP statistics :
     In segments : 2288
     Out segments : 1243
     Retrans segments : 0
     In errors : 0
     Out errors : 5
     Attempt fails : 5
```

LOOKUP Command

Syntax

LOOKUP <COMMAND NAME>

Menu

```
/lookup

Command        Alias          Description
=========      =====          ===========

?                             Use this to display the current menu commands

ALIAS          (ALIAS )       Look up aliases that match a pattern

ALLCMD                        List all commands available in CLI

.

.

.
```

Description

The **LOOKUP** command displays a description and an alias, if applicable, for a specific command.

LOOKUP Example

To display a description and alias for a command:

Enter the following command (**tftp/upload/cfg** is used in this example):

lookup/tftp/upload/cfg

A similar display appears:

```
TFTP UPLOAD CFG(ULDCFG ) Upload config file
```

MODE Command

Syntax

MODE
MODE/CONFIG<subcommand>
MODE/SHOW

Menu

```
/ >mode

  == MODE MENU ==
[CONFIG]     SHOW
```

Description

The **MODE** command allows you to configure and display information about the command line interface (CLI). Table 5-9 describes the parameters in that display.

Table 5-9 MODE Command Parameters

Subcommand		Alias	Description
CONFIG	**BATCHIN**	**batchin**	Read the command sequence from a file and execute one by one.
	CLOSE	**close**	Close the command log, batch and output files.
	OUTPUT	**output**	Save the output to a file.
	SAVECMD	**savecmd**	Save the command sequence to a file.
SHOW		**vmode**	Show current CLI mode, as set by using the **MODE/CONFIG** command. The default setting displays the output to the console.

MODE/CONFIG/SAVECMD Example

To save the command sequence to a file (for example, named `test.bat`):

Enter the following command:

MODE/CONFIG /savecmd test.bat

Any commands entered from now until you enter the **MODE/CONFIG/CLOSE** command are saved in the `test.bat` file, and can later be executed by using the **MODE/CONFIG/BATCHIN** file.

MODE/SHOW Example

To display the current CLI mode:

Use the **MODE/SHOW** command.

A similar display appears:

```
/MODE >show
No commands is saved
Interactive mode CLI
Output is displayed to console
/MODE >
```

PORTSERV Command

Syntax

PORTSERV
PORTSERV/CONFIG/<subcommand>
PORTSERV/SHOW/<subcommand>

Menu

```
/ >portserv

  == PORTSERV MENU ==
 [CONFIG]     [SHOW]
/PORTSERV >
```

Description

The **PORTSERV** command applies to ATM functionality only. This command allows you to configure and display port service for a physical port. Table 5-10 describes the parameters in the display.

Table 5-10 PORTSERV Command Parameters

Subcommand		Alias	Description
CONFIG	**CREATE**	**cps**	Create a port service.
	MOVE	**mvps**	Move a port service from one VLAN to another.
	REMOVE	**rmps**	Remote a port service.
SHOW	**PHYPORT**	**vpp**	Show the physical port configuration.
	PORTSERV	**vps**	Show the port service configuration.

Refer to the **AT-8202 ATM Uplink User's Guide** for more on ATM-specific commands. The guide is available in PDF format from Allied Telesyn's website at **www.alliedtelesyn.com/manuals.htm**.

REBOOT Command

Syntax

REBOOT

Menu

```
/reboot

Boot POST in progress...

PROM version: 1.0.7

Sizing DRAM (value displayed is bank size or error code)...
DRAM now configured into a contiguous block:
        Address: ............. 0xa0000000 - 0xa07ffffc
Running DRAM test...
Initializing 4650 icache and dcache...
Initializing PIG chip...
Initializing PMIU chips...
        PMIU_0 revision: ..... 0x0000000f
        PMIU_1 revision: ..... 0x0000000f
        PMIU_2 revision: ..... 0x0000000f
        PMIU_3 revision: ..... 0x0000000f

Initializing PHY chips...

Initializing interrupt vectors in DRAM...
Running Extended DRAM test...

Boot POST complete, passing control to firmware...
```

Description

The **REBOOT** command resets the FORMULA 8200. Its alias is **reset**.

It initializes the hardware, loads the system software from the flash, and restores the switch to current configuration settings. Upon restart, the POST and other diagnostic information appear, followed by the login and password prompts.

SNMP Command

Syntax

SNMP/CONFIG
SNMP/SHOW/<subcommand>

Menu

```
/snmp

== SNMP MENU ==

CONFIG       [SHOW]
```

Description

The SNMP command allows you to configure and display information about SNMP parameters. Table 5-11 describes the parameters in the display.

Table 5-11 SNMP Command Parameters

Subcommand		Alias	Description
CONFIG		**snmpcfg**	Configures the SNMP agent parameters.
SHOW	**PARAM**	**vsnmpp**	Displays information about SNMP system description and location.
	READCOMM	**vread**	Displays the read community string.
	WRITECOMM	**vwrite**	Displays the write community string.

SNMP/CONFIG Example

To configure the SNMP agent parameters:

Use the **SNMP/CONFIG** command.

A similar display appears:

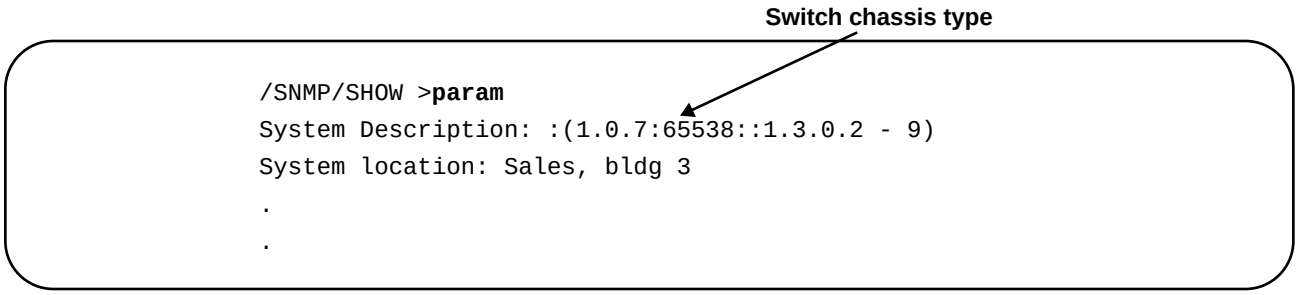
```
/SNMP >config
SNMP Agent configuration:
   System contact (): james
   System location (): Sales, bldg 3
   Read community string (public):
   Write community string (private):
   SNMP Trap Destination Table is empty.
     Enter A=add, C=change, D=delete, Q=quit: a
 IP Address: 123.251.789.111
 UDP Port Number (default 162): 56
 Community string:

                                SNMP Trap Destination Table
 Index        IP Address          UDP Port       Community
 -------      ------------        ----------     -----------
 1.           123.200.21.111      56             public
Enter A=add, C=change, D=delete, Q=quit:
/SNMP >
```

SHOW/PARAM Example

To display the SNMP agent parameters:

Use the **SNMP/SHOW/PARAM** command.

A similar display (partially shown) appears:



Switch chassis types are displayed in decimal value. To interpret these values, refer to Table 5-12.

Table 5-12 FORMULA 8200 Switch Chassis Types

Decimal Value	Description
65537	Eight TX ports
65538	Sixteen TX ports
65541	Eight TX ports + eight FX expansion ports
65542	Eight FX ports
65543	Sixteen FX ports

SYSTEM Command

Syntax

SYSTEM/CONFIG/<subcommand>
SYSTEM/SHOW

Menu

```
/ >system

 == SYSTEM MENU ==
 [CONFIG]     SHOW
```

Description

The **SYSTEM** command permits you to view and reconfigure system parameters, including the time, date, and administrator password. Table 5-13 describes the parameters in the display.

Table 5-13 SYSTEM Command Parameters

Subcommand		Alias	Description
CONFIG	**ADMINPW**	**admpw**	Change the administrator password.
	DATE	**date**	Change the date: mm dd yr.
	TIME	**time**	Change the time: hr mn sec (24-hour clock).
	UPTIME		Show the elapsed time since the last reboot.
SHOW		**vsys**	Show the general system configuration for hardware and software. (See **Displaying the System Configuration** in Chapter 4 for a sample screen display.)

SYSTEM/CONFIG/TIME Example

To change the time (for example, to 10:45 a.m.):

Use the following command:

/SYSTEM/CONFIG/time 10 45

Separate the hour, minutes, and seconds with spaces. Seconds are optional.

TFTP Command

Syntax

TFTP
TFTP/DOWNLOAD/<subcommand>
TFTP/SERVER
TFTP/UPLOAD/<subcommand>

Menu

```
/ >tftp

  == TFTP MENU ==
 [DOWNLOAD]    SERVER       [UPLOAD]
/TFTP >
```

Description

The **TFTP** command allows you to configure or display TFTP information. Table 5-14 describes the parameters in the display.

Table 5-14 TFTP Command Parameters

Subcommand		Alias	Description
DOWNLOAD	**CFG**	**dldcfg**	Download a configuration file.
	FIRMWARE	**dldfrm**	Download firmware.
SERVER		**tftpcfg**	Configure the TFTP server's IP address.
UPLOAD	**CFG**	**uldcfg**	Upload a configuration file.
	FIRMWARE	**uldfrm**	Upload firmware.

TFTP/SERVER Example

To change the TFTP server's IP address:

Use the **TFTP/SERVER** command.

A similar display appears:

```
/TFTP >server
IP address of the tftp server () : 150.15.10.10
Save TFTP configuration to flash? (y/n)
/TFTP >
```

TOP Command

Syntax

TOP

Menu

```
/top
                == MAIN MENU ==
 ?              ALIAS             ALLCMD
 [ATM]          [BOOT]            [CONSOLE]
 [ELOG]         [ETHERNET]        EXIT
 [FDDI]         [FILE]            [INET]
 LOOKUP         [MODE]            [PORTSERV]
 REBOOT         [SNMP]            [SYSTEM]
 [TFTP]         TOP               UP
 [VBRIDGE]      [VLAN]            [TRACE]
/ >
```

Description

The **TOP** command permits you to move from anywhere in the CLI command structure to the main menu.

UP Command

Syntax

UP

Menu

```
/up
```

Description

The **UP** command permits you to move up one level in the CLI command structure.

VBRIDGE Command

Syntax

VBRIDGE
VBRIDGE/CONFIG <subcommand>
VBRIDGE/SHOW <subcommand>

Menu

```
/ >vbridge

  == VBRIDGE MENU ==
 [CONFIG]     [SHOW]
```

Description

The **VBRIDGE** command allows you to configure and display the virtual bridge parameters. Table 5-15 describes the parameters in the display.

Table 5-15 VBRIDGE Command Parameters

Subcommand			Alias	Description
CONFIG	**BRIDGE**		**cvb**	Configures a virtual bridge.
	THROTTLE		**ctb**	Control dlf throttle
	FILTER	**ADD**	**addfl**	Adds a static filter table entry.
		DELETE	**delfl**	Deletes a static filter table entry.
	PARAPORT		**vbpa**	Sets virtual bridge port parameters.
SHOW	**BRIDGE**		**vvb**	Shows a virtual bridge.
	FILTER	**ALL**	**fl**	Shows all entries in the static filter table.
	FWT		**vfwt**	Shows the virtual bridge forwarding table.
	PORT		**vvbp**	Shows the virtual bridge port parameters for a VLAN.

VBRIDGE/SHOW/PORT Example

To display the virtual port parameters of a VLAN for all linked ports:

Enter the following command:

/VBRIDGE/SHOW/PORT<VLAN #>

A similar display appears (VLAN 1 is used as an example):

```
/> VBRIDGE/SHOW/PORT 2

Port                              Path     Desig     Desig     Root     Root Bridge ID
Number     Pri    State           Cost     Cost      Port      Port     Desig Bridge ID
------     ---    --------        ----     -----     -----     -----    ----------------

5          128    FORWDING        10       0         128-5     None     8000-0060e80033e0
                                                                       8000-0060e80033e0

11         128    FORWDING        10       0         128-11    None     8000-0060e80033e0
                                                                       8000-0060e80033e0

 /VBRIDGE>
```

Table 5-16 defines the fields in the display.

Table 5-16 VBRIDGE/SHOW/PORT Command Parameters

Parameter	Description
Port Number	The port number belonging to the VLAN
Pri	Part of port ID which is used to determine which port gets blocked or forwarded Range: 0 to 255 Default setting: 128.
State	The current state of the port: disabled, listening, learning, forwarding, or blocking
Path Cost	The contribution of the path through this port, when the port is the root port, to the total cost of the path to the root for this bridge
Desig Cost	The cost of the path to the root offered by the designated port on the LAN to which this port is attached
Desig Port	The port identifier of the bridge port identified as the designated port for the LAN associated with the port
Root Port	The port identifier of the port that offers the lowest cost path to the root, i.e., that port for which the sum of the values of the designated cost and path cost parameters held for the port is the lowest
Root Bridge ID	The Bridge ID of the root.
Designated Bridge ID	The ID of the bridge believed to be the designated bridge for the LAN that is associated with this port.

VBRIDGE/CONFIG/BRIDGE Example

To configure a virtual bridge:

1. Use the **VBRIDGE/CONFIG/BRIDGE** command. For example, to modify VLAN 1, enter the following command:

   VBRIDGE/CONFIG/bridge 1

   The following display appears:

```
/VBRIDGE/CONFIG/BRIDGE 1

Spanning Tree Parameters Modification for VLAN 1:

   1) Spanning tree Status is ON for this VLAN, set to OFF? (y/n)
   2) New Priority (0..65535) (current value is 32768):
   3) New Bridge Hello Time (1..10 secs) (current value is 2):
   4) New Bridge Max Age (6..40 secs) (current value is 20):
   5) New Bridge Forward Delay (4..30 secs)(current value is 15):
   6) New Aging Time (10..1000000 secs) (current value is 300):

   Enter selection (modification or 0 to commit, c to cancel) >
```

2. Respond to the prompt by entering the item number with an equal sign (=) and the value.

   For example, to change the aging time to 310:

```
Enter selection (modification or 0 to commit, c to cancel) > 6=310
```

To turn Spanning Tree off:

Respond to the prompt by entering the item number with an equal sign (=) and the value, as follows:

```
Enter selection (modification or 0 to commit, c to cancel) > 1=y
```

To save changes and exit the menu:

Enter **0** at the prompt, as follows:

```
Enter selection (modification or 0 to commit, c to cancel) > 0
```

Table 5-17 describes the Spanning Tree Parameters.

Table 5-17 Spanning Tree Parameters

Parameter	Description
Spanning Tree Status	Indicates whether Spanning Tree is enabled for this VLAN
New Priority	Bridge priority is used by the Bridge ID to determine which bridge will be the root bridge. Bridge ID consists of this bridge priority concatenated with a 6-byte MAC address. You can set the bridge priority by entering a decimal number from 0 to 65,535. Zero is the highest priority.
New Bridge Hello Time	The time interval between the transmission of Configuration BPDUs by a bridge that is attempting to become the root or is the root.
New Bridge Max Age	The maximum age (in seconds) of Spanning Tree Protocol information learned from the network on any port before it is discarded.
New Bridge Forward Delay	This time value (in seconds) controls how fast a port changes its spanning state when moving towards the Forwarding state. The value determines how long the port stays in each of the Listening and Learning states, which precede the Forwarding state. This value is also used, when a topology change has been detected and is underway, to age out all dynamic entries in the Forwarding Database.
New Aging Time	The timeout period in seconds for aging out dynamically learned forwarding information.

VBRIDGE/CONFIG/PARAPORT Example

To disable Spanning Tree for a port (for example, VLAN 1, port 10):

1. Use the **VBRIDGE/CONFIG/PARAPORT 1** command.

   A similar display appears:

```
/VBRIDGE/CONFIG >paraport 1

Spanning Tree Port Parameters Modification for VLAN 1:

Port      Port            Path       Enable          Manual
Number    Priority(a)     Cost(b)    Spanning        Mode(d)
------    -----------     -------    Tree(c)         -------
                                     -----------
  1       128             10         y               s
  2       128             10         y               s
  3       128             10         y               s
  .
  .
  .
  16      128             10         y               s
--------------------------------------------------------------------------------
Modification instruction :
              usage: <port number><option> = <new value>

                  where option=a(priority), =b(cost),
                        =c(enable spanning tree), =d(manual mode)
              command example:10b= 5 to set the cost for port 10 to 5
--------------------------------------------------------------------------------
Enter selection (modification or 0 to commit, c to cancel ) >
```

2. Enter the following at the prompt:

   10c = n

   Table 5-18 describes the parameters used in the display.

Table 5-18 `VBRIDGE/CONFIG/BRIDGE/PARAPORT` Parameters

Parameter	Description
Port Priority	Part of port ID which is used to determine which port gets blocked or forwarded Range: 0 to 25 Default setting: 128
Path Cost	The contribution of the path through this port, when the port is the root port, to the total cost of the path to the root for this bridge. The smaller the number, the smaller the cost. The Spanning Tree Protocol allocates a cost of 100 to 10 Mbps ports and 10 to 100 Mbps ports, and ensures that an active topology generates the minimal path costs (IEEE 802.1D).
Manual Mode	The hardware status for the port: (f) hardware forwarding state, Spanning Tree off (b) hardware blocking state, Spanning Tree off (s) Spanning Tree is enabled. However, if Spanning Tree is disabled for the VLAN, this mode defaults to forwarding state. If Spanning Tree is enabled for the VLAN, this setting defaults to (s). This setting also interacts with the **`Spanning Tree Enabled`** setting in this menu in the following ways: Sp Tree Enabled / Manual Mode / Port State y / s / Spanning Tree state n / s / HW blocking y / f / HW forwarding n / f / HW forwarding y / b / HW blocking n / b / HW blocking
Spanning Tree Enabled	Enables or disables Spanning Tree. (See **`Manual Mode`** above.)

VBRIDGE/SHOW/BRIDGE Example

To display Spanning Tree bridge parameters:

Use the **VBRIDGE/SHOW/BRIDGE <VLAN#>** command. For example, to display parameters for VLAN 1, enter the following command:

VBRIDGE/SHOW > **bridge 1**

The following display appears:

```
/VBRIDGE/SHOW/BRIDGE 1
Spanning Tree Parameters for VLAN 1

Spanning Tree Status  : ON
Priority              : 32768 (0x8000)
Bridge ID             : 8000-0060e8ffff00
Designated Root       : 8000-0060e8ffff00
Cost to Root Bridge   : 0
Root Port             : None
Hold Time             : 1
Topology Changes      : 0
Last Topology Change  : No Topology Change So Far
Bridge Aging Timer    : 300

                                  Parameters System Uses When
Current Parameters                Attempting to Become Root:
Max Age         20 secs   System Max Age        20 secs
Forward Delay   15 secs   System Forward Delay  15 secs
 ------------------------------------------------------------
 Hello Time     2 secs      System Hello Time    2 secs
```

Global parameters

Local parameters

Table 5-19 defines the fields in the display.

Table 5-19 Spanning Tree Parameters by the **VBRIDGE/SHOW/BRIDGE** Command

Parameter	Description
Spanning Tree Status	Indicates whether Spanning Tree is enabled for this VLAN
Priority	Bridge priority is used by the Bridge ID to determine which bridge will be the root bridge. The Bridge ID consists of this bridge priority concatenated with a 6-byte MAC address. You can set the bridge priority by entering a decimal number from 0 to 65,535. Zero is the highest priority.
Bridge ID	The bridge identification number
Designated Root	The root bridge as determined by the Spanning Tree Protocol
Cost to Root Bridge	The path cost to the root bridge from this bridge
Root Port	The port ID of the port that offers the lowest cost path to the root
Hold Time	The interval length (in seconds) during which no more than two configuration BPDUs shall be transmitted
Topology Changes	The total number of topology changes detected by this bridge since the counter was last reset or initialized
Last Topology Change	The amount of time since the last topology change was detected
Bridge Aging Timer	The timeout period in seconds for aging out dynamically learned forwarding information
Local and Global Parameters	
Max Age	The maximum age (in seconds) of information learned on any port before being discarded
Forward Delay	This time value (in seconds) controls how fast a port changes when moving towards the Forwarding state. The value determines how long the port stays in each of the Listening and Learning states, which precede the Forwarding state. This value is also used, when a topology change has been detected and is underway, to age out all dynamic entries in the Forwarding Database.
Hello Time	The time interval between the transmission of Configuration BPDUs by a bridge that is attempting to become the root or is the root

VBRIDGE/SHOW/FWT Example

To display the bridge forwarding table:

Use the **VBRIDGE/SHOW/FWT** command.

A similar table appears:

```
/VBRIDGE/SHOW/FWT

┌─────────────────────────────────────────────────────┐
│        VLAN          │                ARL                │
└─────────────────────────────────────────────────────┘
│ vlan │ port │ dom │ mac_address    │ flags │ age  │
├─────────────────────────────────────────────────────┤
│ 1      7       0     00:a0:d2:c1:55:01   –       5    │
│ 1      33      0     00:60:e8:ff:ff:50   –       0    │
└─────────────────────────────────────────────────────┘
```

Table 5-20 describes the fields that appear in the display:

Table 5-20 **VBRIDGE/SHOW/FWT** Fields

Parameter	Description
vlan	VLAN number
port	Port number
dom	Domain. This is an internal system value, equivalent to the VLAN number -1.
mac_address	MAC address
flags	This is a non-configurable internal system value.
age	The number of seconds that this entry has existed. The entry ages out at the threshold set by “New Aging Time” when you create a bridge. See **Configuring a Virtual Bridge** in Chapter 3.

VLAN Command

Syntax

VLAN
VLAN/CONFIG <subcommand>
VLAN/SHOW <subcommand>

Menu

```
/ >vlan

== VLAN MENU ==

[CONFIG]     [SHOW]
```

Description

The **VLAN** command permits you to create or display VLANs. Table 5-21 describes the parameters in the display.

Table 5-21 VLAN Command Parameters

Subcommand		Alias	Description
CONFIG	**ADDPORT**	**addvp**	Adds ports to a VLAN
	CREATE	**cvl**	Creates a VLAN
	DELPORT	**delvp**	Deletes ports from a VLAN
	DISABLE	**vldisb**	Disables the entire VLAN
	ENABLE	**vlenb**	Enables the entire VLAN
	MODIFY	**mdvl**	Modifies a VLAN
	MOVPORT	**mvvp**	Moves ports from one VLAN to another
	REMOVE	**rmvl**	Removes a VLAN
SHOW	**VLAN**	**vvl**	Displays current VLAN configuration
	VPORT	**vvp**	Displays current virtual port configuration
	VROUTER	**vvr**	Displays current virtual router configuration
	VSTATS	**vpst**	Displays current virtual port statistics

VLAN/CONFIG/DELETE Example

To delete ports from a VLAN:

Use the **delport** command to delete ports 5 and 7 from VLAN 6:

/VLAN/CONFIG >**delport 5,7 6**

A similar display appears:

```
Port(s) 5,7 are successfully deleted from VLAN 6
Updating system/VLAN configuration....
/VLAN/CONFIG >
```

VLAN/SHOW/VLAN Example

To display VLAN information:

Use the **VLAN/SHOW/VLAN** command.

A similar display appears:

```
/VLAN/SHOW >vlan
Virtual LAN Information :

 VLAN    VLAN                IP Network       Admin     Operation    Port
 ID      Description         Address          Status    Status       Membership
 ====    ===============     ==============   ======    =========    ===========

 1       Default VLAN (#1)   137.168.24.190   ENABLE    ACTIVE       1-16


/VLAN/SHOW >
```

VLAN/CONFIG/REMOVE Example

To remove a VLAN:

Enter the **REMOVE <VLAN#>** command to remove VLAN 6:

/VLAN/CONFIG >**remove 6**

A similar display appears:

```
Removing VLAN 6 ? (yes) :y
VLAN 6 is successfully removed
Updating system/VLAN configuration....
/VLAN/CONFIG >
```

Appendix A
Command Summary

Use This Command or Path	Or Use This Alias	To
?		Display the current menu commands
ALIAS	**alias**	Look up aliases that match a pattern
ALLCMD		List all commands available in CLI
ATM		Display the menu to configure ATM parameters or show its statistics
ATM CONFIG		Configure ATM parameters
ATM CONFIG CREATE		Create an ATM specific service
ATM CONFIG CREATE CIP	**ccip**	Create a CIP logical subnet
ATM CONFIG CREATE LEC	**clec**	Create an ELAN
ATM CONFIG CREATE PTOP	**cptop**	Create a point-to-point instance
ATM CONFIG CREATE TRUNK	**ctrunk**	Create a trunk instance
ATM CONFIG DELETE		Delete an ATM-specific service
ATM CONFIG DELETE CIP	**dcip**	Delete a CIP logical subnet
ATM CONFIG DELETE LEC	**dlec**	Delete an ELAN
ATM CONFIG DELETE PTOP	**dptop**	Delete a point-to-point instance
ATM CONFIG DELETE TRUNK	**dtrunk**	Delete a trunk instance
ATM CONFIG DISABLE		Disable an ATM-specific service
ATM CONFIG DISABLE CIP	**cipdis**	Disable a CIP logical subnet

Use This Command or Path	Or Use This Alias	To
ATM CONFIG DISABLE PTOP	**ptopdis**	Disable a PTOP instance
ATM CONFIG DISABLE TRUNK	**trunkdis**	Disable a trunk instance
ATM CONFIG ENABLE		Enable an ATM-specific service
ATM CONFIG ENABLE CIP	**cipen**	Enable a CIP logical subnet
ATM CONFIG ENABLE PTOP	**ptopen**	Enable a PTOP instance
ATM CONFIG ENABLE TRUNK	**trunken**	Enable a trunk instance
ATM CONFIG MODIFY		Modify an ATM-specific parameter
ATM CONFIG MODIFY CIP	**mcip**	Modify a CIP parameter
ATM CONFIG MODIFY LEC	**mlec**	Modify a LEC parameter
ATM CONFIG MODIFY PORT	**map**	Modify an ATM port
ATM CONFIG MODIFY PTOP	**mptop**	Modify a point-to-point parameter
ATM CONFIG MODIFY TRUNK	**mtrunk**	Modify a trunk parameter
ATM SHOW		Show ATM-specific information
ATM SHOW ARP		Show ARP information
ATM SHOW ARP CIP	**vciparp**	Show CIP ARP information
ATM SHOW ARP LEC	**vlecarp**	Show LEC ARP Information
ATM SHOW CIP	**vcip**	Show CIP information
ATM SHOW CONNECTION	**vac**	Show ATM connection information
ATM SHOW LEC	**vlec**	Show LEC Information
ATM SHOW PORT	**vap**	Show ATM Port Information
ATM SHOW PTOP	**vptop**	Show point-to-point information
ATM SHOW TRUNK	**vtrunk**	Show trunk information
ATM STATS		Display a menu to show ATM statistics information
ATM STATS AAL5	**aal5st**	Show AAL5 statistics
ATM STATS ATM	**atmst**	Show ATM layer statistics
ATM STATS CIP	**cipst**	Show CIP statistics
ATM STATS CONNECTION	**connst**	Show connection statistics

Use This Command or Path	Or Use This Alias	To
ATM STATS LEC	**lecst**	Show LEC statistics
ATM STATS PTOP	**ptopst**	Show point-to-point statistics
ATM STATS SIG	**sigst**	Show SSCOP statistics
ATM STATS TRUNK	**trunkst**	Show trunk statistics
ATM STATS UME	**umest**	Show UME statistics
ATM TEST		Run a loop test
ATM TEST LOOP		Enter parameters for an ATM loop test
BOOT		Show and define boot sector information
BOOT IP		Display a menu to configure IP
BOOT IP CONFIG	**ipcfg**	Configure IP, gateway, etc. for system boot
BOOT IP EEPROM	**ipprom**	Configure EEPROM IP
BOOT SHOW	**vboot**	Show boot sector/system configuration info
BOOT UPDATE		Display a menu to update configuration and system image
BOOT UPDATE ALL	**updcfg**	Update all configurations from RAM to flash
BOOT UPDATE ATM	**updatm**	Update ATM configurations to flash
BOOT UPDATE SYSTEM	**updsys**	Update system/VLAN configurations to flash
CONSOLE		Display the menu to configure serial port and console parameters
CONSOLE LOCK	**lcn**	Lock console from remote sessions
CONSOLE SHOW	**vcon**	Show console parameters
ELOG		Display a menu to view the error log
ELOG CLEAR	**clrelog**	Clear all event log messages
ELOG CURRENT	**current**	Dump the current 10 (default) errors
ELOG DETAIL	**detail**	Dump the detailed error log
ELOG RANGE	**range**	Dump the errors within the error code range

Use This Command or Path	Or Use This Alias	To
ELOG SEVERITY	**severe**	Dump the errors with a certain severity
ELOG SHORT	**srtelog**	Dump the essentials of error log
ELOG SHOW	**velog**	Show total log message number and size
ELOG AUTOREBOOT	**elogboot**	Enable/Disable auto-reboot on fatal errors
ETHERNET		Display the Ethernet configuration menu
ETHERNET SHOW		Show Ethernet port configurations and statistics
ETHERNET SHOW PORT	**vep**	Show EIU port configuration
ETHERNET SHOW STAT	**ves**	Show EIU statistics configuration
ETHERNET SHOW COUNT	**est**	Show EIU statistics/counters
ETHERNET SHOW MACADDRCOUNT	**srccnt**	Show the total number of MAC addresses in the source table
ETHERNET CONFIG		Configure EIU ports and statistical output
ETHERNET CONFIG CLEAR	**epclr**	Clear EIU statistics counters for a port
ETHERNET CONFIG PORT	**epcfg**	Configure EIU port parameters
ETHERNET CONFIG RXMIRROR	**rxm**	Set receive mirror RT information
ETHERNET CONFIG SETSNOOP	**snp**	Set snoop port
ETHERNET CONFIG SNOOPMIRROR	**snpm**	Show snoop and mirror ports
ETHERNET CONFIG STAT		Ethernet Statistics Configuration Menu
ETHERNET CONFIG STAT PORT	**estcfg**	Enable/Disable port statistics
ETHERNET CONFIG TXMIRROR	**txm**	Set transmit mirror port
EXIT		Exit the CLI
FDDI		Show and configure FDDI parameters and statistics
FDDI CONFIG		Display a menu to configure FDDI parameters

Use This Command or Path	Or Use This Alias	To
FDDI CONFIG BRIDGE		Display a menu to configure the FDDI bridge mode, add and delete forwarding and filtering entries
FDDI CONFIG BRIDGE ADD	**fbradd**	Add an FDDI forwarding or filtering entry
FDDI CONFIG BRIDGE AGE	**fage**	Configure an FDDI filter table aging timer
FDDI CONFIG BRIDGE DELETE	**fbrdel**	Delete an FDDI forwarding and filtering entry
FDDI CONFIG BRIDGE MODE	**fbrcfg**	Configure an FDDI bridge mode
FDDI SHOW		Display a menu to show FDDI parameters and statistics
FDDI SHOW BRIDGE		Display a menu to show FDDI bridge forwarding/filtering table
FDDI SHOW BRIDGE TABLE	**fbr**	Show the FDDI bridge forwarding/ filtering table
FDDI SHOW MAC		Display a menu to show FDDI MAC-specific parameters
FDDI SHOW MAC COUNTER	**fmacc**	Display FDDI MAC counters
FDDI SHOW MAC NBRADDR	**fmacnbr**	Display FDDI neighbor MAC addresses
FDDI SHOW MAC STATS	**fmacst**	Display FDDI MAC statistics
FDDI SHOW MAC STATUS	**fmacs**	Display FDDI MAC status
FDDI SHOW PORT		Display a menu to show FDDI port-specific parameters
FDDI SHOW PORT COUNTER	**fportc**	Display FDDI port counters
FDDI SHOW PORT STATUS	**fports**	Display FDDI port status
FDDI SHOW PORT SUMMARY	**fport**	Display FDDI port configuration
FDDI SHOW SMT		Display a menu to show FDDI SMT-specific parameters
FDDI SHOW SMT ID	**fsmtid**	Display SMT station ID group data
FDDI SHOW SMT STATUS	**fsmts**	Display SMT status
FDDI SHOW SMT SUMMARY	**fsmt**	Display SMT station configuration group data
FILE		Display the FILE menu

Use This Command or Path	Or Use This Alias	To
FILE COPY	**cp**	Copy from file to file
FILE DELETE	**rm**	Delete a file
FILE LIST	**ls**	List system files
FILE RENAME	**mv**	Rename a file
FILE RMCFG	**rmall**	Remove all configuration files from flash
FILE RZ	**load**	Download a file using ZMODEM
FILE SZ		Upload a file using ZMODEM
FILE TYPE	**cat**	Type a file to console
INET		Display the Internet statistics menu
INET CONFIG		Menu to configure IP parameters
INET CONFIG ROUTE	**cir**	Configure static routes
INET CONFIG ROUTE ADD	**cira**	Add a static route
INET CONFIG ROUTE DEFAULT	**cirsdr**	Set the default route
INET CONFIG ROUTE DELETE	**cird**	Delete a static route
INET CONFIG ROUTE RMDEFAU	**cirdr**	Remove the default route
INET CONFIG IPR	**cipr**	Configure IP routing mode
INET PING	**ping**	Ping another machine with IP address
INET RLOGIN	**rlogin**	Remote log in to another machine
INET SHOW		Display a menu to show Internet configuration
INET SHOW ROUTE	**vir**	Show routing information
INET SHOW STATIC	**vis**	Show static routes in flash
INET SHOW ICONNECT	**vcon**	Show TCP/UDP connection table
INET SHOW RTCACHE	**virc**	Show route cache
INET STATS		Display a menu to show Internet statistics for TCP, UDP, IP, and so on
INET STATS FORWARD	**fwdst**	Show IP forwarding rate
INET STATS ICMP	**icmpst**	Show statistics and errors for ICMP

Use This Command or Path	Or Use This Alias	To
INET STATS IP	**ipst**	Show statistics and errors for IP
INET STATS RIP	**ripst**	Show statistics and errors for RIP
INET STATS SNMP	**snmpst**	Show statistics and errors for SNMP
INET STATS TCP	**tcpst**	Show statistics and errors for TCP
INET STATS UDP	**udpst**	Show statistics & errors for UDP
LOOKUP		Search for commands that match a pattern
MODE		Display a menu to save commands, define batch mode and output log, and so on
MODE CONFIG		Display a menu to define CLI mode - interactive, batch, save commands, and so on
MODE CONFIG BATCHIN	**batchin**	Read the command sequence from a file and execute one by one
MODE CONFIG CLOSE	**close**	Close command log, batch and output files
MODE CONFIG OUTPUT	**output**	Save the output to a file
MODE CONFIG SAVECMD	**savecmd**	Save the command sequence to a file
MODE SHOW	**vmode**	Show current CLI mode - interactive, batch, save commands, and so on
PORTSERV		Display a menu to configure/display ATM-specific port service for a physical port
PORTSERV CONFIG		Display a menu to configure ATM-specific port service
PORTSERV CONFIG CREATE	**cps**	Create a port service
PORTSERV CONFIG MOVE	**mvps**	Move a port service from one VLAN to another
PORTSERV CONFIG REMOVE	**rmps**	Remove a port service
PORTSERV SHOW		Display a menu to show current port service specific information
PORTSERV SHOW PHYPORT	**vpp**	Show physical port configuration

Use This Command or Path	Or Use This Alias	To
PORTSERV SHOW PORTSERV	**vps**	Show port service configuration
REBOOT	**reset**	Restart the switch and the CLI
SNMP		Display a menu to show uplink and configure SNMP read/write community string
SNMP CONFIG	**snmpcfg**	Configure all parameters for SNMP agent
SNMP SHOW		Display a menu to show SNMP chassis, uplink, memory, read/write community string
SNMP SHOW PARAM	**vsnmpp**	Show SNMP configuration for system description, location
SNMP SHOW READCOMM	**vread**	Show read community string
SNMP SHOW WRITECOMM	**vwrite**	Show write community string
SYSTEM		Display a menu to show system parameters and configure time, date, and so on
SYSTEM CONFIG		Display a menu to set time, date, system name, location, contact
SYSTEM CONFIG DATE	**date**	Show or define date
SYSTEM CONFIG TIME	**time**	Show or define time
SYSTEM CONFIG ADMINPW	**admpw**	Change password for admin
SYSTEM SHOW	**vsys**	Show general system configuration for the hardware and software
TFTP		Display a menu to configuration/ download firmware or configuration files from TFTP server
TFTP DOWNLOAD		Display a menu to download the firmware/configuration files through TFTP server
TFTP DOWNLOAD FIRMWARE	**dldfrm**	Download firmware from the TFTP server
TFTP DOWNLOAD CFG	**dldcfg**	Download configuration file
TFTP SERVER	**tftpcfg**	Define TFTP server

Use This Command or Path	Or Use This Alias	To
TFTP UPLOAD		Display a menu to upload the firmware or configuration g files from local to TFTP server
TFTP UPLOAD FIRMWARE	**uldfrm**	Upload firmware
TFTP UPLOAD CFG	**uldcfg**	Upload configuration file
TOP		Go to the main menu
UP		Go up one level
VBRIDGE		Display the virtual bridge configuration menu
VBRIDGE CONFIG		Display the menu to configure the virtual bridge or port state
VBRIDGE CONFIG BRIDGE	**cvb**	Set a virtual bridge
VBRIDGE CONFIG THROTTLE	**ctb**	Control dlf throttle
VBRIDGE CONFIG FILTER		Display the menu to configure static filter table
VBRIDGE CONFIG FILTER ADD	**addfl**	Add a static filter table entry
VBRIDGE CONFIG FILTER DELETE	**delfl**	Delete a static entry
VBRIDGE CONFIG PARAPORT	**vbpa**	Set virtual bridge port parameters
VBRIDGE SHOW		Display the menu to show virtual bridge information
VBRIDGE SHOW BRIDGE	**vvb**	Show a virtual bridge
VBRIDGE SHOW FILTER		Display the menu to show static filter table
VBRIDGE SHOW FILTER ALL	**fl**	Show all entries in static filter table
VBRIDGE SHOW FWT	**vfwt**	Show virtual bridge forwarding table
VBRIDGE SHOW PORT	**vvbp**	Show a virtual bridge port parameters
VLAN		Display the menu to configure/display VLAN information
VLAN CONFIG		Display the menu to configure VLANs
VLAN CONFIG ADDPORT	**addvp**	Add port(s) to a VLAN

Use This Command or Path	Or Use This Alias	To
VLAN CONFIG CREATE	**cvl**	Create a VLAN
VLAN CONFIG DELPORT	**delvp**	Delete port(s) from a VLAN
VLAN CONFIG DISABLE	**vldisb**	Disable the entire VLAN
VLAN CONFIG ENABLE	**vlenb**	Enable the entire VLAN
VLAN CONFIG MODIFY	**mdvl**	Modify a VLAN
VLAN CONFIG MOVPORT	**mvvp**	Move port(s) from one VLAN to another
VLAN CONFIG REMOVE	**rmvl**	Remove a VLAN
VLAN SHOW		Display the menu to show current VLAN/ VROUTER/VPORT information
VLAN SHOW VLAN	**vvl**	Show VLAN configuration
VLAN SHOW VPORT	**vvp**	Show virtual port configuration
VLAN SHOW VROUTER	**vvr**	Show virtual router configuration
VLAN SHOW VSTATS	**vps**	Show current port statistics

Appendix B
RMON Configuration

This appendix provides the following information:

- A list of supported standard and proprietary MIBs
- The sequence followed by Castle Rock's SNMPc® when compiling MIBs
- Sample procedures for enabling and disabling RMON objects

This appendix does not provide all the details on SNMP and assumes you are experienced in using SNMP commands to manage your network.

The FORMULA 8200 has an SNMP agent software that can provide information on the following RMON groups (RFC 1271):

- Statistics
- History
- Alarms
- Events

MIB Support

MIBs are classified in two categories:

- **Standard**: These MIBs are developed by a working group of the IETF. The prefix for the OBJECT IDENTIFIER assignments for these MIBs is under management subtree.
- **Enterprise-specific**: Individual products have features not covered by the standard MIBs. Vendors are developing their-own product-specific MIBs under the enterprise subtree.

The FORMULA 8200 is a multiport Ethernet switch/bridge that implements all the MIBs relevant to this category of products:

Standard MIBs:

- RFC 1155 - Structure identification of management information
- RFC-1213 - MIB II; the general Internet-standard MIB
- RFC-1512 - FDDI
- RFC 1573B.MIB - Evolution of Interfaces Group (sub-part B) - MIB II
- RFC-1650 - Definition of managed objects - SNMPv2
- RFC1902 SNMPv2-SMI
- RFC1903 SNMPv2-TC
- RFC1907 SNMPv2-MIB
- RFC-1271 - RMON MIB; Media specific MIB defining the Remote Monitoring Management Information Base
- MIBs under the filename ILMI4.MIB:
  - — ATM-FORUM-MIB
  - — ATM-FORUM-ADDR-REG
  - — ATM-FORUM-SRVC-REG
- ATM-FORUM-TC-MIB

Enterprise (proprietary) MIBs:

Filename	Description
ATITC.MIB	ati-tc-mib
SWVLAN.MIB	switch-vlan-mib
SWITCH.MIB	switch-mib
SWVENDOR.MIB	switch-info-mib
SWCHASIS.MIB	switch-chassis-mib
SWBRIDGE.MIB	switch-bridge-mib
SWATM.MIB	switch-atm-mib

SNMP Management Using Castle Rock's SNMPc®

The FORMULA 8200 can be managed by any SNMP manager that supports the Standard and Proprietary MIBs from the Supported MIB list. As for example, you can use Castle Rock's SNMPc Network Management product, which supports many vendor's products and most managed products from Allied Telesyn.

The following is the FORMULA 8200's compile list and the compilation order for the SNMPc product:

standard.mib

SNMPv2_2.mib (includes RFCs 1902,1903, and 1907)

RFC 1512

RFC 1650

RFC 1573b

ati-tc-mib

switch-vlan-mib

switch-mib

switch-info-mib

switch-chassis-mib

switch-bridge-mib

ILMI4.MIB:

— atm-forum-mib

— atm-forum-addr-reg

— atm-forum-srvc-reg

— atm-forum-tc-mib

switch-atm-mib (included in ILMI4.MIB)

RFC 1271

The compile results in three warnings. These warnings will not affect the management of the FORMULA 8200.

The Product MIB files can be obtained from Allied Telesyn's FTP server:

Address: **ftp.alliedtelesyn.com** [lowercase letters]
Login: **anonymous** [lowercase letters]
Password: **your e-mail address** [requested by the server at login]

To obtain Standard based RFC MIB files not available in your SNMP manager, contact the manufacturer of your SNMP manager for support. You can also find the standard RFCs on the WWW.INTERNIC.NET web site.

Go to the URL:

http://ds.internic.net/rfc/rfc<# of RFC>.txt

Substitute the number of the needed RFC for <# of RFC>

The ATM MIBs can be obtained from ATM Forum web site.

http://www.atmforum.com/atmforum/

The SNMPc compiler requires that the text content of the RFC be stripped before the RFC can be compiled by SNMPc. For future information on the SNMPc, see the *SNMPc Network Management Reference Guide*. Each SNMP compiler has it own requirements, so contact the manufacturer of you SNMP manager for support on that compiler's requirements.

You can enable the RMON groups History, Alarm, and Event in SNMPc by using the RMON probe or using the **Edit MIB var (F7)** command. See the *FORMULA 8200 User's Guide* on how to set up the SNMP parameters. See the *SNMPc Network Management Reference Guide* for information on managing RMON probes and MIB objects.

RMON Support

Note

Enable RMON only on ports you want to monitor in this instance. Once you are done monitoring, turn off or disable RMON activities to maintain peak switch performance.

Enabling RMON Objects

The following is an example of enabling the RMON groups Statistics, History, Alarm and Event groups. This example show the setting of a `Rising Alarm` of `Absolute Value` that gets logged to the Event Group. The alarm Variable is the object `icmpInMsgs.0`, with a threshold of 600 messages. Port 5 of the FORMULA 8200 is used in this example (`ifIndex.5`). Use your SNMP management station to set the objects.

```
set <IP Address of AT-8200 Switch> etherStatsStatus.5 "createRequest"
set <IP Address of AT-8200 Switch> etherStatsDataSource.5 "ifIndex.5"
set <IP Address of AT-8200 Switch> etherStatsOwner.5 "Owner"
set <IP Address of AT-8200 Switch> etherStatsStatus.5 "valid"

set <IP Address of AT-8200 Switch> historyControlStatus.5 "createRequest"
set <IP Address of AT-8200 Switch> historyControlDataSource.5 "ifIndex.5"
set <IP Address of AT-8200 Switch> historyControlOwner.5 "Owner"
set <IP Address of AT-8200 Switch> historyControlStatus.5 "valid"

set <IP Address of AT-8200 Switch> eventStatus.5 "createRequest"
set <IP Address of AT-8200 Switch> eventDescription.5 "icmpInMsg.0 = 600"
set <IP Address of AT-8200 Switch> eventType.5 "log"
set <IP Address of AT-8200 Switch> eventOwner.5 "Owner"
set <IP Address of AT-8200 Switch> eventStatus.5 "valid"

set <IP Address of AT-8200 Switch> alarmStatus.5 "createRequest"
set <IP Address of AT-8200 Switch> alarmInterval.5 "1"
set <IP Address of AT-8200 Switch> alarmVariable.5 "icmpInMsgs.0"
set <IP Address of AT-8200 Switch> alarmSampleType.5 "absoluteValue"
set <IP Address of AT-8200 Switch> alarmStartupAlarm.5 "risingAlarm"
set <IP Address of AT-8200 Switch> alarmRisingThreshold.5 "600"
set <IP Address of AT-8200 Switch> alarmFallingThreshold.5 "0"
set <IP Address of AT-8200 Switch> alarmRisingEventIndex.5 "5"
set <IP Address of AT-8200 Switch> alarmFallingEventIndex.5 "5"
set <IP Address of AT-8200 Switch> alarmOwner.5 "Owner"
set <IP Address of AT-8200 Switch> alarmStatus.5 "valid"
```

Disabling RMON Objects

The Statistics, History, Alarm, and Event groups are not disabled by powering down or resetting the switch. Nor are they disabled by the activation of an alarm or event. To disable an active RMON index, use your SNMP management station to set the Status object for each RMON index to `invalid`. The following examples shows how to disable the active RMON groups activated in the previous example:

```
set <IP Address of AT-8200 Switch> etherStatsStatus.5 "invalid"
set <IP Address of AT-8200 Switch> historyControlStatus.5 "invalid"
set <IP Address of AT-8200 Switch> alarmStatus.5 "invalid"
set <IP Address of AT-8200 Switch> eventStatus.5 "invalid"
```

Appendix C
Downloading Software at the [VxWorks] Prompt

This appendix describes the procedures to download software to your switch from the [VxWorks] prompt. To use these procedures, you must be logged in to another host on the network, for example, an SNMP management station.

Caution

The recommended procedure to upgrade software is via the FORMULA 8200's command, **TFTP**. Follow the procedures in this appendix **only if** the switch's command line interface (CLI) is not accessible for some reason, and if you are very familiar with VxWorks commands.

This appendix discusses the following topics:

- What you need prior to downloading the software
- Backing up your configurations
- Using FTP/TFTP or ZMODEM at the [VxWorks] prompt to upgrade software
- What to do in case of problems during the download

Caution

There is only enough space on the switch to store one version of software. Do not attempt to download multiple versions on the switch.

Firmware Upgrade Using FTP/TFTP

This section describes the procedures to use FTP/TFTP at the `[VxWorks]` prompt. If you can, use Port 1 for this procedure; however, you may use any port.

This procedure requires a workstation with both FTP and TFTP server capabilities.

Prior to the TFTP download process:

1. Your TFTP server must be running the TFTP daemon (UNIX) or a TFTP process (DOS/Windows). Without the daemon or the process, your download from your server will fail.
2. If you have Solaris®, refer to Appendix B for the procedures to configure a TFTP server on that platform.
3. If you have DOS or Windows, you have several options:
   - ❑ Castle Rock's SNMPc® includes a TFTP server. Refer to the documentation for server setup.
   - ❑ Shareware TFTP servers are available for Windows®95 or WindowsNT®.
   - ❑ For other TCP/IP stacks, check your software applications for details.
4. The IP address of the switch and the TFTP server must be on the same subnet.
5. You need the latest FORMULA 8200's system software file from Allied Telesyn. The software is available from the World Wide Web or from Allied Telesyn's anonymous FTP server. For questions, please phone the Allied Telesyn's Technical Support. For information on how to contact the nearest Allied Telesyn location, refer to Appendix A.
6. Note the name of the FORMULA 8200 system software file that resides on your TFTP server. This is the software file you will download.
7. Make sure the software file on your server has read and write access. In UNIX, enter

   chmod 777 <filename>

   to give read and write access to the files. Then copy the software file to the appropriate directory on your TFTP server.
8. Verify the physical connection from your TFTP server to the FORMULA 8200.

Backing Up Your Current Configurations

The upgrade may change some settings to new defaults, and this may or may not cause a problem.

To ensure your ability to restore your current switch configurations after the software upgrade, you need to back up the following configuration files to your TFTP server:

- SYSTEM.CUR contains the majority of the configuration files
- AGENT.CNF contains location, contact, and SNMP management information (backup optional)

1. Log in to the switch and **PING** the TFTP server to verify communications:

```
/>ping 192.48.127.124
192.48.127.124 is alive
```

2. Assign an IP address to the TFTP server:

```
/TFTP/SERVER
IP address of the tftp server () : 192.48.127.124
Save TFTP configuration to flash? (y/n) Y
Writing new TFTP configuration to flash ...
Updating system/VLAN configuration....
```

3. If you are using a UNIX TFTP server, the file must exist (for example, system.001) in the directory path indicated in the /etc/inetd.conf file. It must also have read, write, and execute permissions for everyone:

```
cd /tftpboot
touch system.001
chmod 777 system.001.
```

4. In your switch, backup the configuration files by using the **TFTP/UPLOAD/CFG** command. In this command, you need to specify the name of the file(s) you want to backup:

```
/>tftp/upload/cfg
   Name of file on switch () : system.cur
   Name of file on tftp server ()   : system.001
   File "/flash/system.cur" on switch to be copied to server "192.48.127.124" as
"system.001"
   Are they correct? (y/n) y
   Save TFTP configuration to flash? (y/n) n
   LF = /flash/system.cur, RF = system.001, SRV = 192.48.127.124, op = put
/TFTP/UPLOAD>
```

5. Repeat the procedure to upload AGENT.CNF to a corresponding pre-existing file (for example, agent.001) in the server.

You are done backing up your files. You may proceed with the software upgrade.

Configuring for the TFTP Download Process

The following steps provide the FORMULA 8200 with the IP address of your TFTP server:

1. Log in to the switch and enter:

   /TFTP/SERVER

2. Enter the IP address of your TFTP server.

   Enter **Y** in the Save the configuration to flash? (y/n) prompt to save the TFTP server configuration for later use.

```
/TFTP/SERVER

IP address of the tftp server () : 192.5.5.18
Save the configuration to flash? (y/n) Y
Writing new configuration to flash ...
Updating system/VLAN configuration....
```

3. Verify that you can **PING** the TFTP server from the FORMULA 8200.

   You are now ready to download software to your FORMULA 8200 switch.

Caution

There is only enough space on the switch to store one version of software. Do not attempt to download multiple versions on the switch.

Downloading the Firmware Using FTP/TFTP

This procedure requires a station with both FTP and TFTP server capabilities.

1. Reset the FORMULA 8200.

   When the system starts, the following message appears:

```
Press any key to stop auto-boot...
```

2. **Quickly** press any key.

   The VxWorks operating system prompt appears:

```
[VxWorks Boot]:
```

   The flash needs to be formatted to accommodate the new version of the image software.

3. Enter **F** at the prompt to format the flash and confirm.

```
[VxWorks Boot]: F

WARNING: you are about to reformat the flash file system The system cannot boot
after this. Are you sure (y/n):y

Formatting the flash ...done
```

   The system restarts and the following message appears:

```
Press any key to stop auto-boot...
```

4. **Quickly** press any key.

   This returns you to the VxWorks operating system prompt:

```
[VxWorks Boot]:
```

5. Enter **c** to change the parameters for downloading the image software:

```
[VxWorks Boot]: c
'.'=clear field; '-'=go to previous field; ^D=quit
boot device:
```

6. Respond to each prompt, beginning with the boot device. Base your entries on Table C-1.

Table C-1 Parameters for Downloading the Image Software to Flash

If You See This Prompt	You Must Enter
boot device:	hs
processor number:	0
host name:	Your TFTP server's host name
file name:	The image filename or complete path
inet on Ethernet (e) :	The FORMULA 8200's IP address
host inet (h) :	Your TFTP server's IP address
gateway inet (g) :	Leave blank . Note that you are performing the download within this local subnet; therefore, you must not enter a gateway address here.
user (u) :	User login for the TFTP server
ftp password (pw) (blank = use rsh):	Password for the TFTP user
flags (f) :	0x80
target name (tn) :	Press [Return]
startup script (s) :	Press [Return]
other (o) :	Press [Return]

This returns you to the `[VxWorks Boot]:` prompt. You are now ready to download the new software to flash.

7. Enter **z** at the prompt and confirm, as in the following sample screen:

```
[VxWorks Boot]: Z
WARNING: you are about to zap a new firmware image into flash
Enter `y' to continue: y

boot device         :hs
processor number    :0
host name           :server1
file name           :v1225.Z
inet on ethernet (e):192.34.140.20
host inet (h)       :192.34.140.30
user (u)            :root
ftp password (pw)   :password
flags (f)           :

Attaching network interface hs0... done.
Subnet Mask: 0xffffff00
Attaching network interface lo0... done.
Zapping image to flash...
Copyright 1984-1994  Wind River Systems, Inc.
```

This process replaces the previous firmware image file. The image file update can take up to five minutes.

Note

If the image file did not load successfully, reset the switch and repeat the procedure from the beginning.

8. Press the reset button located on the front panel to reset the switch.

   The following message appears:

```
Press any key to stop auto-boot...
```

9. **Quickly** press any key.

   This returns you to the VxWorks operating system prompt:

   ```
   [VxWorks Boot]:
   ```

10. Enter **c** to set the boot parameters for loading the new image file from flash:

```
[VxWorks Boot]: c
'.'=clear field; '-'=go to previous field; ^D=quit
boot device:
```

11. Respond to each prompt, beginning with the boot device. Base your entries on Table C-2.

Table C-2 Parameters for Loading the New Image Software From Flash

System Prompt	User Entry
boot device:	flash
processor number:	0
host name:	Press [Return]
file name:	/flash/firmware
inet on Ethernet (e) :	Press [Return]
host inet (h) :	Press [Return]
gateway inet (g) :	Press [Return]
user (u) :	Press [Return]
ftp password (pw) (blank = use rsh):	Press [Return]
flags (f) :	0x8
target name (tn) :	Press [Return]
startup script (s) :	Press [Return]
other (o) :	Press [Return]

This takes you back to the `[VxWorks Boot]:` prompt.

12. Enter **@** to boot the new firmware.

```
[VxWorks Boot]:@
```

The image software begins loading from flash. The switch prompts you for system information. These items are optional; you can change them later.

13. Log in to the switch and use the **/BOOT/IP** command to configure all IP information.

You are done. You may now restore your backed up configurations.

Restoring Your Configurations

To restore your configurations:

1. Log in to the switch and **PING** the TFTP server to verify communications:

```
/>ping 192.48.127.124
192.48.127.124 is alive
```

2. Assign an IP address to the TFTP server:

```
/TFTP/SERVER
IP address of the tftp server () : 192.48.127.124
Save TFTP configuration to flash? (y/n) Y
Writing new TFTP configuration to flash ...
Updating system/VLAN configuration....
```

3. Restore the configuration files by using the **TFTP/DOWNLOAD/CFG** command. In this command, you need to specify the name of the file(s) you want to restore:

```
/>TFTP/DOWNLOAD/CFG

Name of file on switch (system.cur) :
Name of file on tftp server (system.001) :
File "system.001" on server (192.48.12.124) is to be copied to switch as "/flash/
system.cur"
Are they correct? (y/n) y
Save TFTP configuration to flash? (y/n) y
Writing new TFTP configuration to flash ...Updating system/VLAN configuration....
LF = /flash/system.cur, RF = system.001, SRV = 192.48.127.124, op = get


/TFTP/DOWNLOAD>
```

4. Reboot the switch using the **REBOOT** command on the console prompt:

```
/TFTP/DOWNLOAD>TOP
/ >REBOOT
Are you sure, you want to reboot ? [y/n]: y
```

You are done.

Firmware Upgrade Using Zmodem

Note

Before proceeding, make sure you back up your configurations.

This procedure requires the following:

- A null modem cable
- The compressed firmware file renamed `firmware`
- A PC that supports a Zmodem transfer

These procedures are written for Windows® 95 HyperTerminal .

To download system software using Zmodem:

1. Start the HyperTerminal application.
2. Reset the FORMULA 8200.

   When the system starts, the following message appears:

```
Press any key to stop auto-boot...
```

3. **Quickly** press any key.

   The VxWorks operating system prompt appears:

   `[VxWorks Boot]:`

   The flash needs to be formatted to accommodate the new version of the image software.
4. Enter **F** at the prompt to format the flash and confirm.

```
[VxWorks Boot]: F

WARNING: you are about to reformat the flash file system The system cannot boot
after this. Are you sure (y/n):y

Formatting the flash ...done
```

   The system automatically reboots.
5. **Quickly** press any key to stop auto-boot.

   This returns you to the VxWorks operating system prompt:

   `[VxWorks Boot]:`

6. Enter **c** to change the parameters for downloading the image software:

```
[VxWorks Boot]: c
'.'=clear field; '-'=go to previous field; ^D=quit
boot device:
```

7. Respond to each prompt, beginning with boot device, basing your entries on Table C-3.

Table C-3 Parameters for Downloading the Image Software

System Prompt	User Entry
boot device:	flash
processor number:	0
host name:	Press [Return]
file name:	/flash/firmware
inet on Ethernet (e) :	Press [Return]
host inet (h) :	Press [Return]
gateway inet (g) :	Press [Return]
user (u) :	Press [Return]
ftp password (pw) (blank = use rsh):	Press [Return]
flags (f) :	0x4
target name (tn) :	Press [Return]
startup script (s) :	Press [Return]
other (o) :	Press [Return]

8. Select **Transfer**, then **Send File**.
9. When prompted, browse for the firmware and select communications protocol Zmodem. Make sure the firmware file is named `firmware`.
10. Press the **SEND** button.

    The process takes about 25 minutes.
11. Reset the FORMULA 8200.

    When the system starts, the following message appears:

```
Press any key to stop auto-boot...
```

12. **Quickly** press any key to return to the `[VxWorks Boot]` prompt.
13. Enter **c** to set the boot parameters for loading the new image file.

```
[VxWorks Boot]: c
'.'=clear field; '-'=go to previous field; ^D=quit
boot device:
```

14. Respond to each prompt, basing your entries on Table C-4.

Table C-4 Parameters for Loading the New Image File From Flash

System Prompt	User Entry
boot device:	flash
processor number:	0
host name:	Press [Return]
file name:	/flash/firmware
inet on Ethernet (e) :	Press [Return]
host inet (h) :	Press [Return]
gateway inet (g) :	Press [Return]
user (u) :	Press [Return]
ftp password (pw) (blank = use rsh):	Press [Return]
flags (f) :	0x8
target name (tn) :	Press [Return]
startup script (s) :	Press [Return]
other (o) :	Press [Return]

15. At the `[VxWorks Boot]:` prompt, enter @ to boot the new firmware from the switch:

```
[VxWorks Boot]: @
```

You are done. You may now restore your backed up configurations.

In Case of Problems With the Software Upgrade

Interrupting a software download (for example, rebooting the switch or disconnecting the power cord) creates files of 0 bytes. Attempts to download again will not succeed because the download process cannot write over these files.

If you encounter these problems:

1. Log in to the switch.
2. Manually delete the firmware file by entering:

   /FILE/DELETE firmware

3. Download the firmware again.

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