CHAPTER 2

Understanding the User Interfaces for the LightStream 1010 ATM Switch

The LightStream 1010 ATM switch user interface provides access to several different command modes. Each command mode provides a group of related commands. Users familiar with the Cisco Internetwork Operating System (Cisco IOS) user interface will find the interfaces very similar. This chapter describes how to access and list the commands available in each command mode, and explains the primary uses for each command mode.

For security purposes, the user interface provides two levels of access to commands: *user* and *privileged*. The unprivileged user mode is called user EXEC mode. The privileged mode is called privileged EXEC mode, and requires a password. The commands available in user EXEC mode are a subset of the commands available in privileged EXEC mode.

From the privileged level, you can access global configuration mode and three specific configuration modes: terminal, memory, and network configuration. In addition, if your switch does not find a valid system image, or if its configuration file is corrupted at startup, the system might enter read-only memory (ROM) monitor mode. Entering a question mark (**?**) at the system prompt allows you to obtain a list of commands available for each command mode.

Almost every switch configuration command also has a **no** form. In general, use the **no** form to disable a feature or function. Use the command without the keyword **no** to reenable a disabled feature or to enable a feature that is disabled by default. For example, terminal history is enabled by default. Specify the command **no history** to disable terminal history and specify **terminal history** to reenable it. The *LightStream 1010 ATM Switch Command Reference* publication provides the complete syntax for every switch configuration command and describes what the **no** form of a command does.

The user interface also provides context-sensitive help on command syntax. This chapter describes how to use the help system. It also describes the command editing and command history features that enable you to recall previous command entries and easily edit command entries.

For a complete description of the commands mentioned in this chapter, refer to the *LightStream 1010 ATM Switch Command Reference* publication.

User Interface Task List

You can perform the tasks in the following sections to become familiar with the LightStream 1010 ATM switch user interface:

- Access Each Command Mode
- Get Context-Sensitive Help
- Check Command Syntax
- Use the Command History Features

- Use the Editing Features
- End a Session

Access Each Command Mode

This section describes how to access each of the LightStream 1010 ATM switch command modes:

- User EXEC Mode
- Privileged EXEC Mode
- Get Context-Sensitive Help
- Global Configuration Mode
- Interface Configuration Mode
- Subinterface Configuration Mode
- Line Configuration Mode
- Map-List Configuration Mode
- Map-Class Configuration Mode
- ATM Router Configuration Mode
- ATM Router Node Configuration Mode

Table 2-1 lists the command modes, how to access each mode, the prompt you will see while you are in that mode, the main uses for each configuration mode, and the method to exit that mode. The prompts listed assume the default switch name "Switch." Table 2-1 might not include all of the possible ways to access or exit each command mode.

Table 2-1 Summary of Command Modes

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Log in to the switch.	`Switch>`	Use the **logout** command.
Privileged EXEC	From user EXEC mode, use the **enable** EXEC command.	`Switch#`	To exit back to user EXEC mode, use the **disable** command. To enter global configuration mode, use the **configure** privileged EXEC command.
ROM monitor	From privileged EXEC mode, use the **reload** EXEC command. Press Break during the first 60 seconds while the system is booting.	`>`	To exit to user EXEC mode, type **continue**.
Global configuration	From privileged EXEC mode, use the **configure** privileged EXEC command.	`Switch(config)#`	To exit to privileged EXEC mode, use the **exit** or **end** command or press **Ctrl-Z**. To enter interface configuration mode, enter an **interface** configuration command.

Command Mode	Access Method	Prompt	Exit Method
Interface configuration	From global configuration mode, enter by specifying an interface with an **interface** command.	`Switch(config-if)#`	To exit to global configuration mode, use the **exit** command. To exit to privileged EXEC mode, use the exit command or press **Ctrl-Z**. To enter subinterface configuration mode, specify a subinterface with the **interface** command.
Subinterface configuration	From interface configuration mode, specify a subinterface with an **interface** command.	`Switch(config-subif)#`	To exit to global configuration mode, use the **exit** command. To enter privileged EXEC mode, use the **end** command or press **Ctrl-Z**.
Line configuration	From global configuration mode, enter by specifying a line with a **line** command.	`Switch(config-line)#`	To exit to global configuration mode, use the **exit** command. To enter privileged EXEC mode use the **end** command or press **Ctrl-Z**.
Map-list configuration	From global configuration mode, define a map list with the **map-list** command.	`Switch(config-map-list)#`	To exit to map-class configuration mode, use the **map-class** command. To enter privileged EXEC mode, use the **end** command or press **Ctrl-Z**.
Map-class configuration	From global configuration mode, configure a map class with the **map-class** command.	`Switch(config-map-class)#`	To exit to global configuration mode, use the **exit** command. To enter privileged EXEC mode, press **Ctrl-Z**.
ATM router configuration	From global configuration mode, configure the PNNI routing protocol with the **atm router pnni** command.	`Switch(config-atm-router)#`	To exit to global configuration mode, use the **exit** command. To enter privileged EXEC mode use the **end** command or press **Ctrl-Z**.
ATM router node configuration	From ATM router configuration mode, configure the PNNI routing node with the **node** command.	`Switch(config-pnni-node)#`	To exit to global configuration mode, use the **exit** command. To enter privileged EXEC mode use the **end** command or press **Ctrl-Z**.

User EXEC Mode

After you log in to the switch, you are automatically in user EXEC command mode. The EXEC commands available at the user level are a subset of those available at the privileged level. In general, the user EXEC commands allow you to connect to remote switches, change terminal settings on a temporary basis, perform basic tests, and list system information.

The user-level prompt consists of the switch's host name followed by the angle bracket (>):

```
Switch>
```

The default host name is `Switch` unless it has been changed during initial configuration using the **hostname** global configuration command described in the section "Configure the System Information."

To list the commands available in user EXEC mode, enter a question mark (**?**) as shown in the following example:

```
Switch> ?
Exec commands:
  atmsig           Execute Atm Signalling Commands
  cd               change current device
  connect          Open a terminal connection
  dir              List files on given device
  disable          Turn off privileged commands
  disconnect       Disconnect an existing network connection
  enable           Turn on privileged commands
  exit             Exit from the EXEC
  help             Description of the interactive help system
  lock             Lock the terminal
  login            Log in as a particular user
  logout           Exit from the EXEC
  name-connection  Name an existing network connection
  ping             Send echo messages
  ppp              Start IETF Point-to-Point Protocol (PPP)
  pwd              Display current device
  resume           Resume an active network connection
  show             Show running system information
  slip             Start Serial-line IP (SLIP)
  systat           Display information about terminal lines
  telnet           Open a telnet connection
  terminal         Set terminal line parameters
  traceroute       Trace route to destination
    where            List active connections
Switch>
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

Privileged EXEC Mode

Because many of the privileged commands set operating parameters, privileged access should be password-protected to prevent unauthorized use. The privileged command set includes those commands contained in user EXEC mode, as well as the **configure** command through which you can access the remaining command modes. Privileged EXEC mode also includes high-level testing commands, such as **debug**. For details on the **debug** commands, see the *LightStream 1010 ATM Switch Command Reference* publication.

To access and list the privileged EXEC commands, complete the following tasks:

Task		Command
Step 1	Enter the privileged EXEC mode.	**enable** [*password*]
Step 2	List privileged EXEC commands.	**?**

If the system administrator has set a password, you are prompted to enter it before being allowed access to privileged EXEC mode. The password is not displayed on the screen and is case sensitive. If an enable password has not been set, enabled mode can only be accessed from the console. The system administrator uses the **enable password global configuration** command to set the password that restricts access to privileged mode. This command is described in the *Lightstream 1010 ATM Switch Command Reference* publication.

The privileged EXEC mode prompt consists of the switch's host name followed by the pound sign (#). (If the switch was named with the **hostname** command, that name would appear as the prompt instead of "Switch.")

```
Switch#
```

The following example shows how to access privileged EXEC mode and list privileged EXEC commands:

```
Switch> enable
Password:
Switch
Exec commands:
  atmsig           Execute Atm Signalling Commands
  calendar         Manage the hardware calendar
  cd               change current device
  clear            Reset functions
  clock            Manage the system clock
  configure        Enter configuration mode
  connect          Open a terminal connection
  copy             Copy configuration or image data
  debug            Debugging functions (see also 'undebug')
  delete           Delete a file
  dir              List files on given device
  disable          Turn off privileged commands
  disconnect       Disconnect an existing network connection
  enable           Turn on privileged commands
  erase            Erase flash or configuration memory
  exit             Exit from the EXEC
  format           format a device
  help             Description of the interactive help system
  lock             Lock the terminal
  login            Log in as a particular user
  logout           Exit from the EXEC
  name-connection  Name an existing network connection
  no               Disable debugging functions
  ping             Send echo messages
  ppp              Start IETF Point-to-Point Protocol (PPP)
```

```
pwd             Display current device
reload          Halt and perform a cold restart
resume          Resume an active network connection
rsh             Execute a remote command
send            Send a message to other tty lines
setup           Run the SETUP command facility
show            Show running system information
slip            Start Serial-line IP (SLIP)
squeeze         Squeeze a device
start-chat      Start a chat-script on a line
systat          Display information about terminal lines
telnet          Open a telnet connection
terminal        Set terminal line parameters
test            Test subsystems, memory, and interfaces
traceroute      Trace route to destination
undebug         Disable debugging functions (see also 'debug')
undelete        Undelete a file
verify          Verify checksum of a Flash file
where           List active connections
write           Write running configuration to memory, network, or terminal
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

From the privileged level, you can access global configuration mode. For instructions, see the "Global Configuration Mode" section, which follows this section.

To return from privileged EXEC mode to user EXEC mode, perform the following task:

Task	Command
Move from privileged EXEC mode to user EXEC mode.	**disable**

ROM Monitor Mode

If your switch does not find a valid system image, or if you interrupt the boot sequence, the system might enter read-only memory (ROM) monitor mode. From ROM monitor mode, you can boot the switch or perform diagnostic tests.

You can also enter ROM monitor mode by entering the **reload** EXEC command and then pressing the Break key during the first 60 seconds of startup. To save changes to the configuration file, use the **copy running-config startup-config** command before issuing the **reload** command.

To access and list the ROM monitor configuration commands, complete the following tasks:

Task	Command
Enter ROM monitor mode from privileged EXEC mode.	**reload**[1] Press Break during the first 60 seconds while the system is booting.
List the ROM monitor commands.	**?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

The ROM monitor prompt is the angle bracket (>):

```
rommon 1> help
alias               set and display aliases command
boot                boot up an external process
break               set/show/clear the breakpoint
confreg             configuration register utility
cont                continue executing a downloaded image
context             display the context of a loaded image
dev                 list the device table
dir                 list files in file system
dis                 disassemble instruction stream
dnld                serial download a program module
frame               print out a selected stack frame
help                monitor builtin command help
history             monitor command history
meminfo             main memory information
repeat              repeat a monitor command
reset               system reset
set                 display the monitor variables
stack               produce a stack trace
sync                write monitor environment to NVRAM
sysret              print out info from last system return
unalias             unset an alias
unset               unset a monitor variable
rommon 3 >
```

To initialize the switch, enter the **b** command. To boot the system image file, use the **b** command as described in the chapter "Loading System Images, Software Images, and Configuration Files."

Global Configuration Mode

Global configuration commands apply to features that affect the system as a whole. Use the **configure** privileged EXEC command to enter global configuration mode. When you enter this command, the EXEC prompts you for the source of the configuration commands:

```
Configuring from terminal, memory, or network [terminal]?
```

You can then specify either the terminal, nonvolatile memory (NVRAM), or a file stored on a network server as the source of configuration commands. For more information see the chapter "Loading System Images, Software Images, and Configuration Files." The default is to enter commands from the terminal console. Pressing the **Return** key begins this configuration method.

To access and list the global configuration commands, complete the following tasks:

Task		Command
Step 1	At the terminal, from the privileged EXEC mode, enter global configuration mode.	**configure**[1] <**CR**>
Step 2	List the global configuration commands.	**?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

The following example shows how to access global configuration mode and list global configuration commands:

```
Switch# configure
Configuring from terminal, memory, or network [terminal]? <CR>
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# ?
Configure commands:
  aaa                         Authentication, Authorization and Accounting.
  access-list                 Add an access list entry
  alias                       Create command alias
  arp                         Set a static ARP entry
  async-bootp                 Modify system bootp parameters
  atm                         ATM Global Cofiguration Commands
  banner                      Define a login banner
  boot                        Modify system boot parameters
  buffers                     Adjust system buffer pool parameters
  cdp                         Global CDP configuration subcommands
  chat-script                 Define a modem chat script
  clock                       Configure time-of-day clock
  config-register             Define the configuration register
  default-value               Default character-bits values
  dialer-list                 Create a dialer list entry
  dnsix-dmdp                  Provide DMDP service for DNSIX
  dnsix-nat                   Provide DNSIX service for audit trails
  downward-compatible-config  Generate a configuration compatible with older
                              software
  enable                      Modify enable password parameters
  end                         Exit from configure mode
  exit                        Exit from configure mode
  help                        Description of the interactive help system
  hostname                    Set system's network name
  interface                   Select an interface to configure
  ip                          Global IP configuration subcommands
  line                        Configure a terminal line
  logging                     Modify message logging facilities
  map-class                   Configure static map class
  map-list                    Configure static map list
  network-clock-select        Network clock select
  no                          Negate a command or set its defaults
  ntp                         Configure NTP
  privilege                   Command privilege parameter
  route-map                       Create route-map or enter route-map command mode
  router                      Enable a routing process
  scheduler                   Scheduler parameters
  service                     Modify use of network based services
  snmp-server                 Modify SNMP parameters
  tacacs-server               Modify TACACS query parameters
  tftp-server                 Provide TFTP service for netload requests
  username                    Establish User Name Authentication
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

To exit global configuration command mode and return to privileged EXEC mode, use one of the following commands:

Task	Command
Exit global configuration mode.	**exit** **end** **Ctrl-Z**

From global configuration mode, you can access the following configuration modes:

- Interface Configuration Mode
- Subinterface Configuration Mode
- Line Configuration Mode
- Map-List Configuration Mode
- Map-Class Configuration Mode
- ATM Router Configuration Mode
- ATM Router Node Configuration Mode

These command modes are described in the following sections.

Interface Configuration Mode

Many features are enabled on a per-interface basis. Interface configuration commands modify the operation of an interface such as an ATM, Ethernet, or asynchronous port. Interface configuration commands always follow an **interface** global configuration command, which defines the interface type.

To access and list the interface configuration commands, complete the following task:

Task		Command
Step 1	From global configuration mode, enter interface configuration mode.	**interface atm** *card/sub_card/port*[1]
Step 2	List the interface configuration commands.	**?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

In the following example, ATM interface 3/0/0 is about to be configured. The new prompt `Switch(config-if)#` indicates interface configuration mode. In this example, the user asks for help by requesting a list of commands.

```
Switch#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface atm 3/0/0
Switch(config)#?
  ATM          ATM interface
  Async        Async interface
  Ethernet     IEEE 802.3
  Group-Async  Async Group interface
  Lex          Lex interface
  Loopback     Loopback interface
  Null         Null interface

Switch(config)#interface
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

To exit interface configuration mode and return to global configuration mode, enter the **exit** command. To exit configuration mode and return to privileged EXEC mode, use the **end** command or press **Ctrl-Z**.

Subinterface Configuration Mode

You can configure multiple logical interfaces (called subinterfaces) for VP tunneling on a single ATM interface. And you can configure multiple subinterfaces on a single ASP interface.

To access and list the subinterface configuration commands, complete the following task:

Task		Command
Step 1	From interface configuration mode, configure a logical interface.	**interface atm** *card/sub_card/port* [*.sub-inter #*][1] **interface ethernet 2/0/0** [*.sub-inter #*]
Step 2	List the subinterface configuration commands.	**?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

In the following example, an interface is configured for ATM 0/0/0. The subinterface is number 99 to indicate that it is subinterface 99 of port 0 on the port adapter module (PAM) 0 in carrier module (CAM in slot 0). The new prompt `Switch(config-subif)#` indicates subinterface configuration mode. The subinterface can be configured to support one or more ATM PVCs. To list the commands available in subinterface configuration mode, enter a question mark (**?**).

```
Switch(config)#interface atm 0/0/0.99
Switch(config-subif)#?
Interface configuration commands:
  atm          ATM Interface ILMI Config Commands
  bandwidth    Set bandwidth informational parameter
  cdp          CDP interface subcommands
  delay        Specify interface throughput delay
  description  Interface specific description
  exit         Exit from interface configuration mode
  map-group    Configure static map group
  no           Negate a command or set its defaults
  ntp          Configure NTP
  shutdown     Shutdown the selected interface

Switch(config-subif)#
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

To exit subinterface configuration mode and return to global configuration mode, enter the **exit** command. To exit configuration mode and return to privileged EXEC mode, press **Ctrl-Z**.

Line Configuration Mode

Line configuration commands modify the operation of a terminal line. Line configuration commands always follow a **line** command, which defines a line number. These commands are generally used to connect to remote switches, change terminal parameter settings either on a line-by-line basis or for a range of lines, and set up the auxiliary port modem configuration. For detailed line configuration instructions, see the chapter "Configuring Terminal Lines and Modem Support."

To access and list the auxiliary port, console port, and virtual terminal line configuration commands, complete the following task:

Task		Command
Step 1	From global configuration mode, configure an auxiliary, console, or virtual terminal line.	**line** {**aux** | **con** | **vty**} *line-number* [*ending-line-number*][1]
Step 2	List the line configuration commands.	**?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

The following example shows how to enter line configuration mode for the console line and list the line configuration commands. The new prompt `Switch(config-line)#` indicates line configuration mode.

```
Switch(config)#line console 0
Switch(config-line)#?
Line configuration commands:
  access-class            Filter connections based on an IP access list
  autocommand             Automatically execute an EXEC command
  data-character-bits     Size of characters being handled
  databits                Set number of data bits per character
  editing                 Enable command line editing
  escape-character        Change the current line's escape character
  exec                    Start an EXEC process
  exec-banner             Enable the display of the EXEC banner
  exec-character-bits     Size of characters to the command exec
  exec-timeout            Set the EXEC timeout
  exit                    Exit from line configuration mode
  flowcontrol             Set the flow control
  full-help               Provide help to unprivileged user
  help                    Description of the interactive help system
  history                 Enable and control the command history function
  ip                      IP options
  length                  Set number of lines on a screen
  location                Enter terminal location description
  logging                 Modify message logging facilities
  login                   Enable password checking
  modem                   Configure the Modem Control Lines
  monitor                 Copy debug output to the current terminal line
  no                      Negate a command or set its defaults
  notify                  Inform users of output from concurrent sessions
  padding                 Set padding for a specified output character
  parity                  Set terminal parity
  password                Set a password
  privilege               Change privilege level for line
  refuse-message          Define a refuse banner
  rotary                  Add line to a rotary group
  rxspeed                 Set the receive speed
  script                  specify event related chat scripts to run on the line
  session-timeout         Set interval for closing connection when there is no
                          input traffic
  special-character-bits  Size of the escape (and other special) characters
  speed                   Set the transmit and receive speeds
  start-character         Define the start character
```

```
  stop-character          Define the stop character
  stopbits                Set async line stop bits
  terminal-type           Set the terminal type
  transport               Define transport protocols for line
  txspeed                 Set the transmit speeds
  vacant-message          Define a vacant banner
  width                   Set width of the display terminal

Switch(config-line)#
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

To exit line configuration mode and return to global configuration mode, use the **exit** command. To exit configuration mode and return to privileged EXEC mode, use the **end** command or press **Ctrl-Z**.

Map-List Configuration Mode

The LightStream 1010 ATM switch supports a static mapping scheme that identifies the ATM address of remote hosts or switches.

Map-list configuration commands configure a map list. They always follow a **map-list** global configuration command. To access and list the map list configuration commands, complete the following task:

Task		Command
Step 1	From global configuration mode, use the **map-list** command.	**map-list** *name* [1]
Step 2	List the map-list configuration commands.	**?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

The following example shows how to enter map-list configuration mode and list the map list configuration commands. In this example, the static map-list configuration commands are listed. The new prompt `Switch(config-map-list)#` indicates map-list configuration mode.

```
Switch(config)#map-list 1
Switch(config-map-list)#?
Static maps list configuration commands:
  A.B.C.D        Protocol specific address
  arp            IP ARP
  cdp            Cisco Discovery Protocol
  compressedtcp  Compressed TCP
  exit-class     Exit from static map class configuration mode
  help           Description of the interactive help system
  ip             IP
  no             Negate or set default values of a command

Switch(config-map-list)#
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

To exit map-list configuration mode and return to global configuration mode, enter the **exit** command. To exit configuration mode and return to privileged EXEC mode, use the **end** command or press **Ctrl-Z**.

Map-Class Configuration Mode

The ATM interface allows you to specify Quality of Service (QOS) parameters that control how much traffic the source switch will be sending over a switched virtual circuit (SVC).

To define QOS parameters that are associated with a static map for an SVC, use the following **map-class** global configuration command:

Task		Command
Step 1	From global configuration mode, configure an ATM map class.	**map-class atm** *class-name*[1]
Step 2	List the map-class configuration commands.	**?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

In the following example, the static map-class configuration commands are listed. The prompt `Switch(config-map-class)#` indicates map-class configuration mode.

```
Switch(config)#map-class atm example
Switch(config-map-class)#?
Static maps class configuration commands:
  atm         Configure atm static map class
  dialer      Configure dialer static map class
  exit-class  Exit from static map class configuration mode
  help        Description of the interactive help system
  no          Negate or set default values of a command

Switch(config-map-class)#
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

To exit map-class configuration mode and return to global configuration mode, enter the **exit** command. To exit configuration mode and return to privileged EXEC mode, use the **end** command or press **Ctrl-Z**.

ATM Router Configuration Mode

The LightStream 1010 ATM switch supports the Private Network-to-Network Interface (PNNI) routing protocol. The **atm router pnni** command entered from privileged EXEC command mode allows you to change to PNNI router configuration mode.

To access and list the **atm router pnni** configuration commands, complete the following tasks:

Task		Command
Step 1	From global configuration mode, use the **atm router pnni** command.	**atm router pnni** [1]
Step 2	List the ATM router PNNI configuration commands.	**?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

The following example shows how to enter ATM router PNNI configuration mode and list the ATM router PNNI configuration commands. The new prompt `Switch(config-atm-router)#` indicates ATM router PNNI configuration mode.

```
Switch(config)#atm router pnni
Switch(config-atm-router)#?
ATM router configuration commands:
  administrative-weight        Select mode of administrative weight assignment
  background-routes            Enable or Disable Background Routes
  bg                           Background SPF Related Parameters
  exit                         Exit from ATM routing protocol configuration
                               mode
  max-admin-weight-percentage  Maximum Administrative Weight Percentage
  no                           Negate or set default values of a command
  node                         Configure PNNI node
  precedence                   Define Prefix Priorities For Routing
  rm-poll-interval             How Often To Poll Resource Manager
  statistics                   Turn on PNNI statistics

Switch(config-atm-router)#
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

To exit ATM router configuration mode and return to global configuration mode, enter the **exit** command. To exit configuration mode and return to privileged EXEC mode, use the **end** command or press **Ctrl-Z**.

ATM Router Node Configuration Mode

The LightStream 1010 ATM switch supports the PNNI routing protocol. The ATM router PNNI **node** command entered from ATM router PNNI command mode, allows you to change to node configuration mode.

To access and list the ATM router PNNI **node** configuration commands, complete the following task:

Task		Command
Step 1	From ATM router PNNI configuration mode, use the **node** command.	**node** *index_number*[1]
Step 2	List the ATM router PNNI node configuration commands.	**?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

The following example shows how to enter ATM router PNNI node configuration mode for PNNI node index number one and list the ATM router PNNI **node** configuration commands. The new prompt `Switch(config-pnni-node)#` indicates ATM router PNNI node configuration mode.

```
Switch(config-atm-router)#node 1
Switch(config-pnni-node)#?
PNNI router node configuration commands:
  auto-summary        Automatically summarize switch address prefix
  exit                Exit from PNNI router node configuration mode
  name                Configure Node's Name
  no                  Negate or set default values of a command
  ptse                PTSE generation parameters
  redistribute        Route redistribution from another routing protocol
  summary-address     Summarize reachable addresses into PNNI
  timer               PNNI timer variables
  transit-restricted  Transit calls are not allowed

Switch(config-pnni-node)#
```

Note The list of commands might vary slightly from this example, depending on the software feature set and configuration of your switch.

To exit ATM router node configuration mode and return to global configuration mode, enter the **exit** command. To exit configuration mode and return to privileged EXEC mode, use the **end** command or press **Ctrl-Z**.

Get Context-Sensitive Help

The previous sections described the first level of help available with the user interface. Entering a question mark (**?**) at the system prompt displays a list of commands available for each command mode. You can also get a list of any command's keywords and arguments with the context-sensitive help feature.

To get help specific to a command mode, a command, a keyword, or arguments, perform one of the following tasks:

Task	Command
Obtain a brief description of the help system in any command mode.	**help**
Configure a line or lines to receive help for the full set of user-level commands when a user presses **?**.	**full-help**
Configure a line to receive help for the full set of user-level commands for this exec session.	**terminal full-help**[1]
Obtain a list of commands that begins with a particular character string.	*abbreviated-command-entry***?**
Complete a partial command name.	*abbreviated-command-entry*<**Tab**>
List all commands available for a particular command mode.	**?**
List a command's associated keywords.	*command* **?**
List a keyword's associated arguments.	*command keyword* **?**

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference.*

When using context-sensitive help, the space (or lack of a space) before the question mark (**?**) is significant. To obtain a list of commands that begin with a particular character sequence, type in those characters followed immediately by the question mark (**?**). Do not include a space. This form of help is called *word help*, because it completes a word for you.

To list keywords or arguments, enter a question mark **(?**) in place of a keyword or argument. Include a space before the **?**. This form of help is called *command syntax help*, because it reminds you which keywords or arguments are applicable based on the command, keywords, and arguments you already have entered.

You can abbreviate commands and keywords to the number of characters that allow a unique abbreviation. For example, you can abbreviate the **show** command to **sh**.

Enter the **help** command (which is available in any command mode) for a brief description of the help system:

```
Switch# help
Help may be requested at any point in a command by entering
a question mark '?'. If nothing matches, the help list will
be empty and you must back up until entering a '?' shows the
available options.
Two styles of help are provided:
1. Full help is available when you are ready to enter a
   command argument (e.g. 'show ?') and describes each possible
   argument.
2. Partial help is provided when an abbreviated argument is entered
   and you want to know what arguments match the input
   (e.g. 'show pr?'.)
```

As described in the **help** command output, you can enter a partial command name and a question mark (**?**) to obtain a list of commands beginning with a particular character set. See "Complete a Partial Command Name" later in this chapter for more detail.

The following example illustrates how the context-sensitive help feature enables you to create an access list from configuration mode. First enter the letters **co** at the system prompt followed by a question mark (?). Do not leave a space between the last letter and the question mark (?). The system provides the commands that begin with **co**.

```
Switch# co?
configure  connect  copy
```

Enter the **configure** command followed by a space and a question mark **(?**) to list the command's keywords and a brief explanation:

```
Switch# configure ?
  memory             Configure from NV memory
  network            Configure from a TFTP network host
  overwrite-network  Overwrite NV memory from TFTP network host
  terminal           Configure from the terminal
  <cr>

Switch(boot)#configure
```

Enter the **terminal** keyword to enter configuration mode from the terminal:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(boot)(config)#
```

Enter the **access-list** command followed by a space and a question mark (**?**) to list the command's keywords:

```
Switch(config)# access-list ?
  <1-99>     IP standard access list
  <100-199>  IP extended access list
```

Enter the access list number **99** and then enter another question mark (**?**) to see the arguments that apply to the keyword and brief explanations:

```
Switch(config)# access-list 99 ?
  deny    Specify packets to reject
  permit  Specify packets to forward
```

Enter the **deny** argument followed by a question mark (?) to list additional options:

```
Switch(config)# access-list 99 deny ?
  A.B.C.D  Address to match
```

Enter the IP address followed by a question mark (?) to list additional options:

```
Switch(config)# access-list 99 deny 131.108.134.0 ?
  A.B.C.D  Mask of bits to ignore
  <cr>
```

The <cr> symbol appears in the list, indicating that one of your options is to press **Return** to execute the command. The other option is to add a wildcard mask. Enter the wildcard mask followed by a question mark (?) to list further options.

```
Switch(config)# access-list 99 deny 131.108.134.0 0.0.0.255 ?
<cr>

Switch(config)# access-list 99 deny 131.108.134.0 0.0.0.255
```

The <cr> symbol by itself indicates there are no more keywords or arguments. Press **Return** to execute the command. The system adds an entry to access list 99 that denies access to all hosts on subnet 131.108.134.0.

Check Command Syntax

The user interface provides error isolation in the form of an error indicator (^). The ^ symbol appears at the point in the command string where you have entered an incorrect command, keyword, or argument. The error location indicator and interactive help system allow you to easily find and correct syntax errors.

In the following example, suppose you want to set the switch clock. First, use context-sensitive help to check the syntax for setting the clock.

```
Switch# clock ?
  read-calendar    Read the hardware calendar into the clock
  set              Set the time and date
  update-calendar  Update the hardware calendar from the clock
Switch# clock
```

The help output shows that the **set** keyword is required. Next, check the syntax for entering the time:

```
Switch# clock set ?
hh:mm:ss   Current time
Switch# clock set
```

Enter the current time:

```
Switch# clock set 13:32:00
% Incomplete command.
```

The system indicates that you need to provide additional arguments to complete the command. Press **Ctrl-P** (see the next section, "Use the Command History Features") to automatically repeat the previous command entry. Then add a space and question mark (**?**) to reveal the additional arguments:

```
Switch# clock set 13:32:00 ?
  <1-31>     Day of the month
  January    Month of the year
  February
  March
  April
  May
  June
  July
  August
  September
  October
  November
  December
```

Now you can complete the command entry:

```
Switch# clock set 13:32:00 23 February 93
                                       ^
% Invalid input detected at '^' marker.
```

The caret symbol (^) and help response indicate an error at 93. To list the correct syntax, enter the command up to the point where the error occurred and then enter a question mark (**?**):

```
Switch# clock set 13:32:00 23 February ?
  <1993-2035> Year
Switch# clock set 13:32:00 23 February
```

Enter the year using the correct syntax and press **Return** to execute the command.

```
Switch# clock set 13:32:00 23 February 1993
```

Use the Command History Features

With the current software release, the user interface provides a history or record of commands you have entered. This feature is particularly useful for recalling long or complex commands or entries, including access lists. With the command history feature, you can complete the tasks in the following sections:

- Set the Command History Buffer Size
- Recall Commands
- Disable the Command History Feature

Set the Command History Buffer Size

By default, the system records ten command lines in its history buffer. To set the number of command lines the system will record during the current terminal session, complete the following task in EXEC mode:

Task	Command
Enable the command history feature for the current terminal session.	**terminal history** [**size** *number-of-lines*][1]

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference*.

The **terminal no history size** command resets the number of lines saved by history to the default of ten lines.

To configure the number of command lines the system will record, complete the following task in line configuration mode:

Task	Command
Enable the command history feature.	**history** [**size** *number-of-lines*][1]

1. The **no history** command turns off command history for the line.

Recall Commands

To recall commands from the history buffer, perform one of the following tasks:

Task	Key Sequence/Command
Recall commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.	Press **Ctrl-P** or the up arrow key.[1]
Return to more recent commands in the history buffer after recalling commands with Ctrl-P or the up arrow key. Repeat the key sequence to recall successively more recent commands.	Press **Ctrl-N** or the down arrow key.[1]
While in EXEC mode, list the last several commands you have just entered.	**show history**

1. The arrow keys function only on ANSI-compatible terminals such as VT100s.

Disable the Command History Feature

The command history feature is automatically enabled. To disable it during the current terminal session, complete the following task in EXEC mode:

Task	Command
Disable the command history feature for the current session.	**terminal no history**[1]

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference*.

To configure a specific line so that the command history feature is disabled, complete the following task in line configuration mode:

Task	Command
Configure the line so that the command history feature is disabled.	**no history**

Use the Editing Features

The current software release includes an enhanced editing mode that provides a set of editing key functions similar to those of the Emacs editor.

You can enter commands in uppercase, lowercase, or a mix of both. Only passwords are case sensitive. You can abbreviate commands and keywords to the number of characters that allow a unique abbreviation. For example, you can abbreviate the **show** command to **sh**. After entering the command line at the system prompt, press the **Return** key to execute the command.

With the editing features you can complete the tasks in the following sections:

- Enable Enhanced Editing Mode
- Move Around on the Command Line
- Complete a Partial Command Name
- Paste in Buffer Entries
- Editing Command Lines that Wrap
- Delete Entries
- Scroll Down a Line or a Screen
- Redisplay the Current Command Line
- Transpose Mistyped Characters
- Control Capitalization
- Designate a Keystroke as a Command Entry
- Disable Enhanced Editing Mode

Enable Enhanced Editing Mode

Although enhanced editing mode is automatically enabled with the current software release, you can disable it and revert to the editing mode of previous software releases. See the section “Disable Enhanced Editing Mode” later in this chapter.

To reenable the enhanced editing mode for the current terminal session, complete the following task in EXEC mode:

Task	Command
Enable the enhanced editing features for the current terminal session.	**terminal editing**[1]

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference*.

To reconfigure a specific line to have enhanced editing mode, complete the following task in line configuration mode:

Task	Command
Enable the enhanced editing features.	**editing**

Move Around on the Command Line

Perform the following tasks to move the cursor around on the command line for corrections or changes:

Task	Keystrokes
Move the cursor back one character.	Press **Ctrl-B** or press the left arrow key.[1]
Move the cursor forward one character.	Press **Ctrl-F** or press the right arrow key.[1]
Move the cursor to the beginning of the command line.	Press **Ctrl-A**.
Move the cursor to the end of the command line.	Press **Ctrl-E**.
Move the cursor back one word.	Press **Esc B**.
Move the cursor forward one word.	Press **Esc F**.

1. The arrow keys function only on ANSI-compatible terminals such as VT100s.

Complete a Partial Command Name

If you cannot remember a complete command name, you can use the Tab key to allow the system to complete a partial entry. To do so, perform the following task:

Task	Keystrokes
Complete a command name.	Enter the first few letters and press the Tab key.

If your keyboard does not have a Tab key, press **Ctrl-I** instead.

In the following example, when you enter the letters **conf** and press the Tab key, the system provides the complete command:

```
Switch# conf<Tab>
Switch# configure
```

If you enter a set of characters that could indicate more than one command, the system beeps to indicate an error. Enter a question mark (**?**) to obtain a list of commands that begin with that set of characters. Do not leave a space between the last letter and the question mark (**?**).

For example, there are three commands in privileged mode that start with co. To see what they are, type **co?** at the privileged EXEC prompt:

```
Switch# co?
configure  connect  copy
Switch# co
```

Paste in Buffer Entries

The system provides a buffer that contains the last ten items you deleted. You can recall these items and paste them in the command line by performing the following task:

Task		Keystrokes
Step 1	Recall the most recent entry in the buffer.	Press **Ctrl-Y**.
Step 2	Recall the next buffer entry.	Press **Esc Y**.

The buffer contains only the last ten items you have deleted or cut. If you press **Esc Y** more than ten times, you will cycle back to the first buffer entry.

Editing Command Lines that Wrap

The new editing command set provides a wraparound feature for commands that extend beyond a single line on the screen. When the cursor reaches the right margin, the command line shifts ten spaces to the left. You cannot see the first ten characters of the line, but you can scroll back and check the syntax at the beginning of the command. To scroll back, perform the following task:

Task	Keystrokes
Return to the beginning of a command line to verify that you have entered a lengthy command correctly.	Press **Ctrl-B** or the left arrow key repeatedly until you scroll back to the beginning of the command entry, or press **Ctrl-A** to return directly to the beginning of the line.[1]

1. The arrow keys function only on ANSI-compatible terminals such as VT100s.

In the following example, the **access-list** command entry extends beyond one line. When the cursor first reaches the end of the line, the line is shifted ten spaces to the left and redisplayed. The dollar sign ($) indicates that the line has been scrolled to the left. Each time the cursor reaches the end of the line, the line is again shifted ten spaces to the left.

```
Switch(config)# access-list 101 permit tcp 131.108.2.5 255.255.255.0 131.108.1
Switch(config)# $ 101 permit tcp 131.108.2.5 255.255.255.0 131.108.1.20 255.25
Switch(config)# $t tcp 131.108.2.5 255.255.255.0 131.108.1.20 255.255.255.0 eq
Switch(config)# $108.2.5 255.255.255.0 131.108.1.20 255.255.255.0 eq 45
```

When you have completed the entry, press Ctrl-A to check the complete syntax before pressing the **Return** key to execute the command. The dollar sign ($) appears at the end of the line to indicate that the line has been scrolled to the right:

```
Switch(config)# access-list 101 permit tcp 131.108.2.5 255.255.255.0 131.108.1$
```

The switch assumes you have a terminal screen that is 80 columns wide. If you have a width other than that, use the **terminal width** command to tell the switch the correct width of your terminal.

Use line wrapping in conjunction with the command history feature to recall and modify previous complex command entries. See the section “Recall Commands” earlier in this chapter for information about recalling previous command entries.

Delete Entries

Perform any of the following tasks to delete command entries if you make a mistake or change your mind:

Task	Keystrokes
Erase the character to the left of the cursor.	Press the Delete or Backspace key.
Delete the character at the cursor.	Press **Ctrl-D**.
Delete all characters from the cursor to the end of the command line.	Press **Ctrl-K**.
Delete all characters from the cursor to the beginning of the command line.	Press **Ctrl-U** or **Ctrl-X**.
Delete the word to the left of the cursor.	Press **Ctrl-W**.
Delete from the cursor to the end of the word.	Press **Esc D**.

Scroll Down a Line or a Screen

When you use the help facility to list the commands available in a particular mode, the list is often longer than the terminal screen can display. In such cases, a `---More---` prompt is displayed at the bottom of the screen. To view the next line or screen, complete the following tasks:

Task	Keystrokes
Scroll down one line.	Press the **Return** key.
Scroll down one screen.	Press the Space bar.

Note The `---More---` prompt is used for any output that has more lines than can be displayed on the terminal screen, including **show** command output. You can use the keystrokes listed above whenever you see the `---More---` prompt.

Redisplay the Current Command Line

If you are entering a command and the system suddenly sends a message to your screen, you can easily recall your current command line entry. To do so, perform the following task:

Task	Keystrokes
Redisplay the current command line.	Press **Ctrl-L** or **Ctrl-R**.

Transpose Mistyped Characters

If you have mistyped a command entry, you can transpose the mistyped characters by performing the following task:

Task	Keystrokes
Transpose the character to the left of the cursor with the character located at the cursor.	Press **Ctrl-T**.

Control Capitalization

You can capitalize or lowercase words or capitalize a set of letters with simple keystroke sequences. To do so, perform the following task:

Task	Keystrokes
Capitalize at the cursor.	Press **Esc C**.
Change the word at the cursor to lowercase.	Press **Esc L**.
Capitalize letters from the cursor to the end of the word.	Press **Esc U**.

Designate a Keystroke as a Command Entry

Sometimes you might want to use a particular keystroke as an executable command, perhaps as a shortcut. Complete the following task to insert a system code for this purpose:

Task	Keystrokes
Insert a code to indicate to the system that the keystroke immediately following should be treated as a command entry, *not* an editing key.	Press **Ctrl-V** or **Esc Q**.

Disable Enhanced Editing Mode

To disable enhanced editing mode and revert to the editing mode perform the following task in EXEC mode:

Task	Command
Disable the enhanced editing features for the local line.	**terminal no editing**[1]

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference*.

You might want to disable enhanced editing if you have prebuilt scripts; for example, scripts that do not interact well when enhanced editing is enabled. You can reenable enhanced editing mode with the **terminal editing** command.

End a Session

After using the **setup** command or other configuration commands, exit the switch and quit the session.

To end a session, perform the following task:

Task	Command
Enter the quit EXEC command.	**quit**