Understanding the User Interface

The communication server user interface provides several different command modes. Each command mode provides a group of related commands. This chapter describes how to access and list the commands available in each command mode. It also tells you how to get help, use syntax checking, and how to use the command history and editing features.

Entering a question mark (?) at the system prompt allows you to obtain a list of commands available for each command mode.

The command interpreter is called the EXEC. The EXEC interprets the commands you type and carries out the corresponding operations. You must log into the communication server before you can enter an EXEC command. For security purposes, the EXEC has two levels of access to commands: *user* and *privileged*. The EXEC commands available at the user level are a subset of the EXEC commands available at the privileged level. From the privileged level, you can also access global configuration mode and six specific configuration modes: interface, subinterface, line, router, ipx router, and route map configuration.

If your communication server 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. This command mode is also called bootstrap mode. A brief description of the ROM monitor mode is included in this chapter.

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 *Communication Server Command Reference* publication.

User Interface Task List

Complete the following tasks to become familiar with the communication server user interface:

- Access Command Modes and List Supported Commands
- Get Context-Sensitive Help
- Use Syntax Checking
- Use the Command History Features
- Use the Editing Features

Access Command Modes and List Supported Commands

This section describes how to access and list the commands available in each command mode.

For security purposes, the communication server system has two levels of access to commands: *user* and *privileged*. The commands available at the user level are EXEC commands. These are a subset of the EXEC commands available at the privileged level. From the privileged level, you can access global configuration mode and five specific configuration modes: interface, line, router, novell router, and route map configuration.

If, when you are booting your communication server, it 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.

You can access the following command modes:

- User EXEC mode

- Privileged EXEC mode

- Global configuration mode

- Interface configuration mode

- Subinterface configuration mode

- Line configuration mode

- Router configuration mode

- IPX-router configuration mode

- Route-map configuration mode

- ROM monitor mode

Table 1-1 lists the command modes, how to access each mode, the prompt you will see while you are in that mode, and the method to exit that mode. The prompts listed assume the default communication server name, cs.

Table 1-1   Summary of Command Modes

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Log into communication server.	`cs>`	Log out of communication server.
Privileged EXEC	From user EXEC mode, use the **enable** EXEC command.	`cs#`	To exit back to user EXEC mode, use the **disable** command.
			To exit into global configuration mode, use the **configure** privileged EXEC command.
Global configuration	From privileged EXEC mode, use the **configure** privileged EXEC command.	`cs(config)#`	To exit to privileged EXEC mode, use the **exit** or **end** command, or press Ctrl-Z.
			To exit to interface configuration mode, enter an **interface** configuration command.
Interface configuration	From global configuration mode, enter by specifying an interface with an **interface** command.	`cs(config-if)#`	To exit to global configuration mode, use the **exit** command.
			To exit to privileged EXEC mode, press Ctrl-Z.
			To exit to subinterface configuration mode, specify a subinterface with the **interface** command.

Command Mode	Access Method	Prompt	Exit Method
Subinterface configuration	From global configuration mode, specify a subinterface with an **interface** command.	cs(config-subif)#	To exit to global configuration mode, use the **exit** command. To exit to privileged EXEC mode, press Ctrl-Z.
Line configuration	From global configuration mode, enter by specifying a line with a **line** command.	cs(config-line)#	To exit to global configuration mode, use the **exit** command. To exit to privileged EXEC mode, press Ctrl-Z.
Router configuration	From global configuration mode, enter by specifying a routing protocol with a **router** command.	cs(config-router)#	To exit to global configuration mode, use **exit** command. To exit to privileged EXEC mode, press Ctrl-Z.
IPX router configuration	From global configuration mode, enter by specifying the **ipx router** command.	cs(config-ipx-router)#	To exit to global configuration mode, use the **exit** command.
Route map configuration	From global configuration mode, enter by specifying the **route-map** command.	cs(config-route-map)#	To exit to global configuration mode, use the **exit** command. To exit to privileged EXEC mode, press Ctrl-Z.
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, use **c** to continue.

The preceding table does not include all of the possible ways to access or exit each command mode.

User EXEC Mode

The commands available in user EXEC mode are a subset of those available in privileged mode. In general, these commands are used to establish connections, change terminal settings on a temporary basis, perform basic tests, and list system information. You are in user EXEC mode when you log into a communication server.

To list the user EXEC commands, complete the following task:

Task	Command
List the user EXEC commands.	**?**

The system prompt indicates the communication server's host name. The angle bracket (>) symbol indicates that you are in user EXEC mode:

    cs>

The default host name is "cs" unless it has been changed during initial configuration. (Refer to the *Communication Server Getting Started Guide* for information on the **setup** facility). You can also change the communication server name in global configuration mode as described in the chapter "Managing the System."

The following is an example of how to list user EXEC commands:

```
cs> ?
Exec commands:
  <1-99>            Session number to resume
  connect           Open a terminal connection
  disconnect        Disconnect an existing telnet session
  enable            Turn on privileged commands
  exit              Exit from the EXEC
  help              Description of the interactive help system
  lat               Open a lat connection
  lock              Lock the terminal
  login             Log in as a particular user
  logout            Exit from the EXEC
  name-connection   Name an existing telnet connection
  pad               Open a X.29 PAD connection
  ping              Send echo messages
  resume            Resume an active telnet connection
  show              Show running system information
  systat            Display information about terminal lines
  telnet            Open a telnet connection
  terminal          Set terminal line parameters
  tn3270            Open a tn3270 connection
  trace             Trace route to destination
  where             List active connections
  x3                Set X.3 parameters on PAD
  xremote           Enter XRemote mode
communication server>
```

The list of commands might vary slightly from this example, depending upon how your communication server has been configured.

Privileged EXEC Mode

Because many of the privileged EXEC commands set operating parameters, privileged access should be password-protected to prevent unauthorized use. The command set includes those commands contained in user EXEC mode, as well as the global configuration command mode through which you can access the remaining command modes. Privileged EXEC mode also includes high-level testing commands. For details on setting up the system, see the *Communication Server Getting Started Guide.*

To access privileged EXEC mode, complete the following tasks:

Task	Command
Enter the privileged EXEC mode.	**enable**
List privileged EXEC commands.	**?**
Return to user EXEC mode.	**disable**

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.

The system prompt indicates the communication server's host name. The pound sign (#) indicates that you are at the privileged level:

```
communication server#
```

The default host name is "communication server" unless it has been changed during initial configuration. (Refer to the *Communication Server Getting Started Guide* for information on the **setup** facility.) You can also change the communication server name in global configuration command mode as described in the chapter "Managing the System."

The following is an example of how to access and list privileged EXEC commands:

```
cs> enable
Password:
communication server# ?
Exec commands:
  <1-99>          Session number to resume
  bfe             For manual emergency modes setting
  clear           Reset functions
  clock           Manage the system clock
  configure       Enter configuration mode
  connect         Open a terminal connection
  copy            Copy a config file to or from a tftp server
  debug           Debugging functions (see also 'undebug')
  disable         Turn off privileged commands
  disconnect      Disconnect an existing telnet session
  enable          Turn on privileged commands
  exit            Exit from the EXEC
  help            Description of the interactive help system
  lat             Open a lat connection
  llc2            Execute llc2 tests
  lock            Lock the terminal
  login           Log in as a particular user
  logout          Exit from the EXEC
  name-connection Name an existing telnet connection
  pad             Open a X.29 PAD connection
  ping            Send echo messages
  reload          Halt and perform a cold restart
  resume          Resume an active telnet connection
  send            Send a message to other tty lines
  setup           Run the SETUP command facility
  show            Show running system information
  systat          Display information about terminal lines
  telnet          Open a telnet connection
  terminal        Set terminal line parameters
  test            Test subsystems, memory, and interfaces
  tn3270          Open a tn3270 connection
  trace           Trace route to destination
  undebug         Disable debugging functions (see also 'debug')
  where           List active connections
  which-route     Do route table lookup and display results
  write           Write running configuration to memory, network, or terminal
  x3              Set X.3 parameters on PAD
  xremote         Enter XRemote mode
cs#
```

The list of commands might vary slightly from this example, depending upon how your communication server has been configured.

From the privileged level, you can access global configuration mode.

Global Configuration Mode

Commands supported in global configuration mode apply to features that affect the system as a whole. You can specify the terminal, nonvolatile memory (NVRAM), or a file stored on a network server as the source of configuration commands (see the system configuration and management chapter of this manual). For information on protocol-specific global configuration commands, see the appropriate chapter in this manual.

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

Task	Command
From the privileged EXEC mode, enter configuration mode.	**configure**
List the global configuration commands.	**?**
Exit global configuration mode.	**exit** or **end** or **Ctrl-Z**

The following is an example of how to access and list global configuration commands:

```
cs# configure
Configuring from terminal, memory, or network [terminal]? <CR>
Enter configuration commands, one per line. End with CNTL/Z.
communication server(config)# ?
Configure commands:
  access-list         Add an access list entry
  arp                 Set a static ARP entry
  async-bootp         Modify system bootp parameters
  autonomous-system   Specify local AS number to which we belong
  banner              Define a login banner
  boot                Modify system boot parameters
  buffers             Adjust system buffer pool parameters
  busy-message        Display message when connection to host fails
  chat-script         Define a modem chat script
  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
  enable              Modify enable password parameters
  end                 Exit from configure mode
  exit                Exit from configure mode
  frame-relay         global frame relay configuration commands
  help                Description of the interactive help system
  hostname            Set system's network name
  interface           Select an interface to configure
  ip                  Global IP configuration subcommands
  ipx                 Novell/IPX global configuration commands
  keymap              Define a new keymap
  lat                 DEC Local Area Transport (LAT) transmission protocol
  line                Configure a terminal line
  logging             Modify message logging facilities
  login-string        Define a host-specific login string
  mop                 Configure the DEC MOP server
  no                  Negate a command or set its defaults
  ntp                 Configure NTP
  priority-list       Build a priority list
```

```
    queue-list        Build a custom queue list
    route-map         Create route-map or enter route-map command mode
    router            Enable a routing process
    scheduler-interval Maximum interval before running lowest priority process
    service           Modify use of network based services
    snmp-server       Modify SNMP parameters
    state-machine     Define a TCP dispatch state machine
    tacacs-server     Modify TACACS query parameters
    tftp-server       Provide TFTP service for netload requests
    timezone          Configure time zone
    tn3270            tn3270 configuration command
    translate         Translate global configuration commands
    ttycap            Define a new termcap
    username          Establish User Name Authentication
    x25               X.25 Level 3
    x29               X29 commands
    xns               XNS global configuration commands
    xremote           Configure XRemotec
  cs(config)#
```

The list of commands might vary slightly from this example, depending upon how your
communication server has been configured.

From global configuration mode, you can access five configuration sublevels: interface,
subinterface, line, router, novell-router, and route-map configuration mode. These configuration
modes are described in the following sections.

Interface Configuration Mode

Many features are enabled on a per-interface basis. For details on interface configuration commands
that affect general interface parameters, such as bandwidth, clock rate, and so on, see the chapter
"Configuring Interfaces." For protocol-specific commands, see the appropriate chapter in this
manual.

To access interface configuration mode and list the supported commands, complete the following
tasks:

Task	Command
From global configuration mode, enter interface configuration mode.	**interface** *type unit*
List the interface configuration commands.	**?**
Exit interface configuration mode.	**exit** or **Ctrl-Z**

In the following example, serial interface 0 is configured. The new prompt, (config-if)#, indicates
interface configuration mode.

```
  cs(config)# interface serial 0 <CR>
  cs(config-if)# ?
  Interface configuration commands:
    arp               Set arp type (arpa, probe, snap) or timeout
    async             Async interface parameters
    backup            Modify dial-backup parameters
```

```
bandwidth          Set bandwidth informational parameter
clockrate          Configure serial interface clock speed
custom-queue-list  Assign a custom queue list to an interface
delay              Specify interface throughput delay
description        Interface specific description
dialer             Dial-on-demand routing (DDR) commands
dialer-group       Assign interface to dialer-list
down-when-looped   Force looped serial interface down
encapsulation      Set encapsulation type for an interface
exit               Exit from interface configuration mode
frame-relay        Set frame relay parameters
hdh                Set HDH mode
help               Description of the interactive help system
hold-queue         Set hold queue depth
ip                 Interface Internet Protocol config commands
ipx                Novell interface subcommands
keepalive          Enable keepalive
lapb               X.25 Level 2 parameters (Link Access Procedure, Balanced)
lat                LAT commands
llc2               LLC2 Interface Subcommands
loopback           Configure internal loopback on an interface
mac-address        Manually set interface MAC address
mop                DEC MOP server commands
mtu                Set the interface Maximum Transmission Unit (MTU)
no                 Negate a command or set its defaults
ntp                Configure NTP
ppp                Point-to-point protocol
priority-group     Assign a priority group to an interface
pulse-time         Enables pulsing of DTR during resets
sdlc               SDLC commands
sdllc              Configure SDLC to LLC2 translation
shutdown           Shutdown the selected interface
smds               Modify SMDS parameters
transmit-interface Assign a transmit interface to a receive-only interface
transmitter-delay  Set dead-time after transmitting a datagram
tunnel             protocol-over-protocol tunneling
tx-queue-limit     Configure card level transmit queue limit
xns                XNS interface subcommands
```

The list of commands might vary slightly from this example, depending upon how your communication server has been configured.

Subinterface Configuration Mode

You can configure multiple virtual interfaces (called subinterfaces) on a single physical interface. This feature is called virtual port routing and is supported on serial, Frame Relay, and Ethernet interfaces.

Subinterfaces appear as distinct physical interfaces to the various protocols. For example, Frame Relay networks provide multiple point-to-point links called permanent virtual circuits (PVCs). PVCs can be grouped under separate subinterfaces which in turn are configured on a single physical interface. From a bridging spanning tree viewpoint, each PVC is a separate bridge port, and a frame arriving on one PVC might be sent out on a separate PVC.

Subinterfaces also allow multiple encapsulations for a protocol on a single interface. For example, a communication server can receive an ARPA-framed IPX packet and forward the packet back out the same interface as a SNAP-framed IPX packet.

For detailed information on how to enable the virtual port routing feature, see Chpater 6, "Configuring Interfaces." For information on how Frame Relay, IPX, and IP use subinterfaces, see the appropriate chapter in this guide.

To access subinterface configuration mode and list the supported commands, complete the following tasks:

Task	Command
From interface configuration mode, configure a virtual interface.	See the example that follows. For a list of all interface commands that allow subinterface implementation, seethe chapter "Configuring Interfaces."
List the subinterface configuration commands.	**?**
Exit subinterface configuration mode.	**exit** or **Ctrl-Z**

In the following example, a subinterface is configured for serial interface 1. Subinterface number 1.1 is configured for Frame Relay encapsulation. The new prompt, (config-subif)#, indicates subinterface configuration mode. To list the commands available in subinterface configuration mode, enter a question mark (?).

```
cs(config-if)# encapsulation frame-relay
cs(config-if)# int s1.1
cs(config-subif)# ?
Interface configuration commands:
 appletalk     Appletalk interface subcommands
 bandwidth     Set bandwidth informational parameter
 bridge-group  Transparent bridging interface parameters
 clns          CLNS interface subcommands
 decnet        Interface DECnet config commands
 delay         Specify interface throughput delay
 description   Interface specific description
 exit          Exit from interface configuration mode
 frame-relay   Set frame relay parameters
 ip            Interface Internet Protocol config commands
 ipx           Novell interface subcommands
 isis          IS-IS commands
 iso-igrp      ISO-IGRP interface subcommands
 no            Negate a command or set its defaults
 ntp           Configure NTP
 shutdown      Shutdown the selected interface
```

The list of commands might vary slightly from this example, depending upon how your communication server has been configured.

Line Configuration Mode

Line configuration mode is generally used to establish connections and change terminal parameter settings on a line by line basis. To access and list the line configuration commands, complete the following tasks:

Task	Command
From global configuration mode, configure an auxiliary, console, or virtual terminal line.	**line**
List the line configuration commands.	**?**
Exit line configuration mode.	**exit** or **Ctrl-Z**

In the following example, virtual terminal line 03 is configured. Enter a question mark (?) at the new prompt, (config-line#), to list the line configuration commands:

```
cs(config)# line vty 03 <CR>
cs(config-line)# ?
Line configuration commands:
  access-class          Filter connections based on an IP access list
  activation-character  Define the activation character
  autobaud              Set line to autobaud
  autocommand           Automatically execute an EXEC command
  autohangup            Automatically hangup when last connection closes
  autohost              Automatically connect to a host
  data-character-bits   Size of characters being handled
  databits              Set number of data bits per character
  disconnect-character  Define the disconnect character
  dispatch-character    Define the dispatch character
  dispatch-machine      Reference a TCP dispatch state machine
  dispatch-timeout      Set the dispatch timer
  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
  help                  Description of the interactive help system
  history               Set the size of the command history buffer
  hold-character        Define the hold character
  insecure              Mark line as 'insecure' for LAT
  keymap-type           Specify a keymap entry to use
  lat                   DEC Local Area Transport (LAT) transmission protocol
  length                Set number of lines on a screen
  location              Enter terminal location description
  lockable              Allow users to lock a line
  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
  private               Configuration options that user can set will remain
                        in effect between terminal sessions
  refuse-message        Define a refuse banner
  rotary                Add line to a rotary group
  rxspeed               Set the receive speed
  session-limit         Set maximum number of sessions
  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
  telnet                Telnet protocol-specific configuration
  telnet-transparent    Send a CR as a CR followed by a NULL instead of a CR
                        followed by a LF
  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
```

The list of commands might vary slightly from this example, depending upon how your communication server has been configured.

Router Configuration Mode

The router configuration mode is used to configure routing protocols. To access router configuration mode and list supported commands, complete the following tasks:

Task	Command
From global configuration mode, enter router configuration mode.	**router** [*keyword*]
List the router configuration commands.	**?**
Exit router configuration mode.	**exit** or **Ctrl-Z**

To list the available router configuration keywords, enter the **router** command and a question mark (?) at the global configuration prompt:

```
cs(config)# router ?
  bgp       Border Gateway Protocol (BGP)
  chaos     Chaos
  egp       Exterior Gateway Protocol (EGP)
  hello     HELLO
  igrp      Interior Gateway Routing Protocol (IGRP)
  isis      ISO IS-IS
  iso-igrp  IGRP for OSI networks
  ospf      Open Shortest Path First (OSPF)
  rip       Routing Information Protocol (RIP)
  static    Static CLNS Routing
```

In the following example, the communication server is configured to support the Routing Information Protocol (RIP). The new prompt is (config-router)#.

```
cs(config)# router rip
cs(config-router)# ?
Router configuration commands:
  default-information  Control distribution of default information
  default-metric       Set metric of redistributed routes
  distance             Define an administrative distance
  distribute-list      Filter networks in routing updates
  exit                 Exit from routing protocol configuration mode
  help                 Description of the interactive help system
  neighbor             Specify a neighbor router
  network              Enable routing on an IP network
  no                   Negate or set default values of a command
  offset-list          Add or subtract offset from IGRP, RIP, or HELLO metrics
  passive-interface    Suppress routing updates on an interface
  redistribute         Redistribute information from another routing protocol
  timers               Adjust routing timers
```

The list of commands might vary slightly from this example, depending upon how your communication server has been configured.

IPX-Router Configuration Mode

To access ipx-router configuration mode and list the supported commands, complete the following tasks:

Task	Command
From global configuration mode, enter the ipx-router configuration mode.	**ipx-router** [*keyword*]
List the ipx-router configuration commands.	**?**
Exit ipx-router configuration mode.	**exit**

You can access configuration commands specific to the Novell protocol by entering the IPX router command and a keyword at the global configuration prompt. In the following example, IPX RIP routing is configured. The new prompt is config-novell-router:

```
cs(config)# ipx routing
cs(config)# ipx router rip
cs(config-ipx-router)# ?
Novell router configuration commands:
  exit      Exit from IPX routing protocol configuration mode
  network   Enable routing on an IPX network
  no        Negate or set default values of a command
cs(config-ipx-router)# network ?
  <0-FFFFFFFF>  IPX Network number
```

Note   The **novell** and **ipx** commands and keywords are interchangeable.

Route-Map Configuration Mode

The route-map configuration mode is used to configure routing table and source and destination information. To access router-map configuration mode and list supported commands, complete the following tasks:

Task	Command
From global configuration mode, enter route-map configuration mode.	**route-map** [*route-map-tag*]
List the route-map configuration commands.	**?**
Exit route-map configuration mode.	**exit** or **Ctrl-Z**

In the following example, a route map named arizona1 is configured at the global configuration prompt. The new prompt is (config-route-map)#. Enter a question mark (?) to list route-map configuration commands.

```
cs(config-ipx-router)# exit
cs(config)# route-map ?
  WORD  Route map tag
cs(config)# route-map arizona1
cs(config-route-map)# ?
Route Map configuration commands:
  exit   Exit from route-map configuration mode
  help   Description of the interactive help system
  match  Match values from routing table
  no     Negate or set default values of a command
  set    Set values in destination routing protocol
```

ROM Monitor Mode

If your communication server 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. This command mode is also called bootstrap mode.

You can also enter the **reload** EXEC command to enter ROM monitor mode.

Note   To save changes to the configuration file, use the **write memory** 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**
List the ROM monitor commands.	**?**
Return to EXEC mode.	**c**
Or, boot the configuration file (see the chapter "Managing the System."	**b**

The ROM monitor prompt is indicated with the > symbol:

```
> ?
$ state     Toggle cache state (? for help)
B [filename] [TFTP Server IP address | TFTP Server Name]
             Load and execute system image from ROM or from TFTP server
C [address] Continue execution [optional address]
D /S M L V  Deposit value V of size S into location L with modifier M
E /S M L    Examine location L with size S with modifier M
G [address] Begin execution
H           Help for commands
I           Initialize
K           Stack trace
L [filename] [TFTP Server IP address | TFTP Server Name]
             Load system image from ROM or from TFTP server, but do not
             begin execution
O           Show configuration register option settings
P           Set the break point
S           Single step next instruction
T function  Test device (? for help)

Deposit and Examine sizes may be B (byte), L (long) or S (short).
Modifiers may be R (register) or S (byte swap).
Register names are: D0-D7, A0-A6, SS, US, SR, and PC
```

Get Context-Sensitive Help

The previous section described the first level of help. Entering a question mark (?) at the system prompt allows you to obtain a list of commands available for each command mode. You can also get a list of any command's associated keywords and arguments with the context-sensitive help feature.

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

Task	Command
Obtain a brief description of the help system in any command mode.	**help**
Obtain a list of commands that begin with a particular character set.	[*abbreviated command entry*]**?**
List all commands available for a particular command mode.	**?**
List a command's associated keywords.	*command* **?**
List a keyword's associated arguments.	*command keyword* **?**

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

```
cs# 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 backup 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 also "Use the Tab Key to Complete a Command Name" later in this chapter for more detail.

The following example illustrates how the context-sensitive help feature enables a user to create an access list from configuration mode. First the user enters the letters "co" at the system prompt proceeded by a question mark (?) to verify the syntax of the configuration command. Do not leave a space between the last letter and the question mark (?). The system provides the commands that begin with those letters.

```
cs# co?
configure  connect  copy
```

Finding the **configure** command, the user enters the command followed by a question mark (?) to lists the command's keywords. Leave a space between the command or keyword and the question mark (?).

```
cs# configure ?
  memory    Configure from NV memory
  network   Configure from a TFTP network host
  terminal  Configure from the terminal
  <cr>
```

The user enters configuration mode from the terminal:

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

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

```
cs(config)# access-list ?
  <1-99>      IP standard access list
  <100-199>   IP extended access list
  <1000-1099> IPX SAP access list
  <1100-1199> Extended 48-bit MAC address access list
  <200-299>   Protocol type-code access list
  <300-399>   DECnet access list
  <400-499>   XNS standard access list
  <500-599>   XNS extended access list
  <600-699>   Appletalk access list
  <700-799>   48-bit MAC address access list
  <800-899>   IPX standard access list
  <900-999>   IPX extended access list
```

The user selects the access list number 99 and enters another question mark (?) to see the arguments that apply to the keyword:

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

The user selects the deny argument and enters a question mark (?) to list further options:

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

The user enters the IP address and a question mark (?) to list further options:

```
cs(config)# access-list 99 deny 131.108.134.234 ?
  A.B.C.D  Mask of bits to ignore
  <cr>
```

The <cr> symbol in the above example indicates that the mask argument is the final remaining option in the command syntax. The user enters the mask and presses the Return key to successfully execute the command.

```
cs(config)# access-list 99 deny 131.108.134.234 255.255.255.255
```

Use Syntax Checking

The user interface provides syntax checking in the form of an error-location indicator.
The caret (^) character 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 any syntax errors.

In the following example, the user tries to set the communication server clock. First, the user checks the syntax for setting the clock and discovers the **set** keyword is required:

```
cs# clock ?
  set  Set the time and date
```

The user checks the syntax for entering the time:

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

The user decides to enter the current time:

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

The system indicates that the user needs to provide additional arguments to complete the command. The user presses Ctrl-P (see the section "Use the Command History Features" later in this chapter) to automatically repeat the previous command entry. Then the user adds a space and question mark (?) to reveal the additional arguments:

```
cs# 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
```

The user completes the command entry:

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

The ^ symbol and help response indicate an incorrect entry was at the entry 93. The user enters the command up to the point where the error occurred and enters a question mark (?) to list the correct syntax:

```
cs# clock set 13:32:00 23 February ?
  <1993-2032>  Year
```

The user enters the correct syntax and presses the Return key to execute a successful command:

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

Use the Command History Features

The user interface provides a history, or record, of commands you have entered. This feature is particularly useful to recall long or complex commands or entries, including access lists. You can complete the following tasks:

- Configure the command history buffer size.

- Recall commands.

- Disable the command history feature.

Establish the Command History Buffer Size

To establish the number of commands the system will record, complete either of the following tasks:

Task	Command
Enable the command history feature in EXEC mode for the current terminal session.	**terminal history size** *number-of-command-lines*
Enable the command history feature in line configuration mode.	**history size** *number-of-command-lines*

Recall Commands

To recall commands from the history buffer, complete the following steps:

Task	Command
Recall the most recent command in the history buffer.	Press Ctrl-P or the Up Arrow.
Recall remaining commands in the history buffer in a backward sequence.	Press Ctrl-N or the Down Arrow.
While in EXEC mode, list the commands you have just entered.	**show history**

Note   Ctrl indicates the Control key. It must be pressed simultaneously with its associated letter key. Keys are indicated in capitals, but are not case sensitive.

This feature is particularly useful when you are entering long, complex commands, such as access lists. If you are creating several access lists with minor variations, use the command history recall feature to copy a previous access list. Then use the line wrapping feature to modify the entry. See the section "Edit Command Lines That Wrap" later in this chapter.

Disable the Command History Feature

The command history feature is automatically enabled. To disable the command history feature, complete either of the following tasks:

Task	Command
Disable the command history feature in EXEC mode for the current session.	**no terminal history**
Disable the command history feature in line configuration mode.	**no history**

Use the Editing Features

The enhanced command editing mode provides a rich set of features. The editing key functions are similar to 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.

The following tasks are described in this section:

- Enable enhanced editing mode

- Move around on the command line

- Use the Tab key to complete a command name

- Paste in buffer entries

- Edit 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

Note   Ctrl indicates the Control key. It must be pressed simultaneously with its associated letter key. Esc indicates the Escape key. It must be pressed first, followed by its associated letter key. Keys are indicated in capitals, but are not case sensitive.

Enable Enhanced Editing Mode

Although enhanced editing mode is automatically enabled, you can disable the new editing command mode and revert to the previous editing mode. See "Disable the Enhanced Editing Mode."

To re-enable the enhanced editing mode, complete either of the following tasks:

Task	Command
Enable the enhanced editing features in EXEC mode for the current terminal session.	**terminal editing**
Enable the enhanced editing features in line configuration mode.	**editing**

Move Around on the Command Line

Complete the following tasks to move the cursor around on the command line:

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

Use the Tab Key to Complete a Command Name

If you cannot recall a complete command name, you can use the Tab key to allow the system to complete a partial entry. Perform the following task:

Task	Keystrokes
Recall a complete command name.	Enter first few letters and press the Tab key or Ctrl-I.

In the following example, when the letters conf are entered and the Tab key is pressed, the system provides the complete command:

```
dunes# conf<Tab>
dunes# 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":

```
communication server# co?
configure  connect  copy
```

Paste in Buffer Entries

The system provides a buffer containing the last ten items you have deleted. You can recall these items and paste them in the command line.

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

The buffer contains 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.

Edit Command Lines That Wrap

The new editing command set provides a wraparound capability 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.

Task	Keystrokes
Verify that you have entered a lengthy command correctly.	Press the left arrow key repeatedly until you scroll back to the beginning of the command entry. Or, press Ctrl-A.

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.

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

When you have completed the entry, you can check the complete syntax before pressing the Return key to execute the command. In the following example, the user presses Ctrl-a to return to the beginning of the command line:

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

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.

Delete Entries

Complete any of the following tasks to delete command entries:

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 back 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. A "---more---" prompt will display at the bottom of the screen.

Task	Keystrokes
Scroll down one line to display the next command.	Press the Return key.
Scroll down one screen to display the remaining commands.	Press the Space bar.

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.

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 characters with a simple keystroke sequence.

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.

Task	Keystrokes
Capitalize the word 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 want to use a particular keystroke as an executable command. 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, and *not* as an editing key.	Press Ctrl-V or Esc-Q.

Disable the Enhanced Editing Mode

To disable the enhanced command editing mode and revert to the editing mode from previous software releases, complete either of the following tasks:

Task	Command
Disable the enhanced editing features in EXEC mode for the current terminal session.	**no terminal editing**
Disable the enhanced editing features in line configuration mode.	**no editing**