CHAPTER 2

# User Interface Commands

This chapter describes the commands used to access user and privileged EXEC command modes. It provides a description of the **help** command and features, lists the command editing keys and functions, and details the command history feature.

This chapter also includes the EXEC commands that can be used to set various terminal parameters on a temporary basis (for the duration of a session). It includes the Telnet commands you can use to make a connection from a terminal to a remote router in order to configure the router. The commands to actually configure these parameters on a more permanent basis are provided in the "Terminal Line and Modem Support Commands" chapter in the *Router Products Command Reference* publication.

You need enter only enough characters of a command to uniquely identify the command, thereby abbreviating the command syntax you type.

For user interface task information and examples, refer to the "Understanding the User Interface" chapter of the *Router Products Configuration Guide*.

# clear line

Use the **clear line** EXEC command to return a terminal line to idle state.

**clear line** *line-number*

## Syntax Description

*line-number* Absolute line number

## Default

None

## Command Mode

EXEC

## Usage Guidelines

Use this command to log out of a specific session running on another line. If the line uses a modem, the modem will be disconnected.

## Example

In the following example, line 3 is reset:

```
clear line 3
```

# connect

To make a Telnet connection, enter the **connect** EXEC command at the system prompt.

**connect** *host* [*port*] [*keyword*]

## Syntax Description

*host* Host name or an Internet address.

*port* (Optional) Decimal TCP port number; the default is the Telnet server port (decimal 23) on the host.

*keyword* (Optional) Keyword that can be set with the connection; see Table 2-1 for a list of keywords.

**Table 2-1 Telnet Connection Keywords**

| Keyword | Description |
|---|---|
| /**route**: *path* | Specifies loose source routing. The argument *path* is a list of host names or Internet addresses that specifies network nodes, ending with the final destination. |
| /**line** | Enables Telnet line mode. In this mode, the router does not send any data to the host until you press Return. You can edit the line using the standard router command editing characters (Backspace, Delete, Ctrl-U, Ctrl-W). The /**line** keyword is a local option; the remote server is not notified of the mode change. |
| /**debug** | Enables Telnet debugging mode. |
| /**stream** | Turns on stream processing, which enables a raw TCP stream with no Telnet control sequences. A stream connection does not process Telnet options and may be appropriate for connections to ports running UUCP and other non-Telnet protocols. |

## Command Mode

EXEC

## Usage Guidelines

You are not required to enter the command **connect** to establish a Telnet connection. If you prefer, you can just enter the host name. Omit the command word **connect** if the host name you want to use is not the same as a router command word. See the **transport preferred** command to disable this capability.

The router assigns a logical name to each connection; several commands use these names to identify connections. The logical name is the same as the host name, unless that name is already in use or you change the connection name with the EXEC command **name-connection**. If the name is already in use, the router assigns a null name to the connection.

## Examples

The following example routes packets from the source system to kl.sri.com, then to 10.1.0.11, and finally to *mathom*:

```
connect mathom /route:kl.sri.com 10.1.0.11 mathom
```

The following example connects to a host with logical name *mathom*:
connect mathom

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**name-connection**
**resume**
**telnet**
**transport preferred none** †

# disable

To exit privileged EXEC mode and return to user EXEC mode, enter the **disable** EXEC command.

**disable**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Example

In the following example, entering the **disable** command causes the system to exit privileged EXEC mode and return to user EXEC mode as indicated by the angle bracket (>):

```
Router# disable
Router>
```

## Related Command

**enable**

# disconnect

To close a Telnet connection, enter the **disconnect** EXEC command at the system prompt.

**disconnect** [*connection*]

## Syntax Description

*connection* (Optional) Connection name or number; the default is the current connection.

## Command Mode

EXEC

## Usage Guidelines

Do not use the **disconnect** command to end a terminal session. Instead, log off the host, which allows the host to initiate the disconnect, then use **exit** to close the session. If you cannot log off the host using **exit**, use the **disconnect** command.

## Example

The following example illustrates how to disconnect a specific session. First use the **where** command to list the current sessions:

```
Router> where

Conn Host     Address         Byte  Idle  Conn Name
*  1 Eng1     192.31.6.22        0     0  my host
   2 Term2    192.33.6.21        0     0  Term2

Router> disconnect my host

Closing connection to Eng1 [confirm]
```

## Related Commands

**exit**
**logout**

# enable

To enter privileged EXEC mode, use the **enable** EXEC command.

**enable**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Usage Guidelines

Because many of the privileged commands set operating parameters, privileged access should be password-protected to prevent unauthorized use. If the system administrator has set a password with the **enable password** global configuration command, you are prompted to enter it before being allowed access to privileged EXEC mode. The password is case sensitive.

## Example

In the following example, the user enters the **enable** command and is prompted to enter a password. The password is not displayed on the screen. After entering the password, the system enters privileged command mode as indicated by the # symbol.

```
Router> enable
Password:
Router#
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**disable**
**enable password** †

# end

To exit configuration mode, use the **end** global configuration command.

**end**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

Global configuration

## Usage Guidelines

You can also press Ctrl-Z to exit configuration mode.

## Example

In the following example, the router name is changed to *alibaba* using the **hostname** global configuration command. Entering the **end** command causes the system to exit configuration mode and return to EXEC mode.

```
Router(config)# hostname alibaba
alibaba(config)# end
alibaba#
```

# exit

To exit any command mode or close an active terminal session and terminate the EXEC, use the **exit** command at the system prompt.

**exit**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

Available in all command modes

## Usage Guidelines

When you enter the **exit** command at the EXEC levels, the EXEC mode is ended. Use the **exit** command at the configuration level to return to privileged EXEC mode. Use the **exit** command in interface, line, router, ipx-router, and route-map command modes to return to global configuration mode. Use the **exit** command in subinterface configuration mode to return to interface configuration mode. You can also press Ctrl-Z from any configuration mode to return to privileged EXEC mode.

## Examples

In the following example, the user exits subinterface configuration mode to return to interface configuration mode:

```
Router(config-subif)# exit
Router(config-if)#
```

The following example shows how to exit an active session.

```
Router> exit
```

## Related Commands

**disconnect**
**logout**

# full-help

To get help for the full set of user-level commands, use the **full-help** command.

**full-help**

## Syntax Description

This command has no arguments or keywords.

## Default

Disabled

## Command Mode

Available in all command modes.

## Usage Guidelines

The **full-help** command enables (or disables) an unprivileged user to see all of the help messages available. It is used with the **show ?** command.

## Example

The following example is output for **show ?** with **full-help** disabled:

```
Router> show ?
clock      Display the system clock
history    Display the session command history
hosts      IP domain-name, lookup style, nameservers, and host table
sessions   Information about Telnet connections
terminal   Display terminal configuration parameters
users      Display information about terminal lines
version    System hardware and software status
```

## Related Commands

**help**
**terminal full-help** (EXEC)

# help

To display a brief description of the help system, enter the **help** command.

**help**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

Available in all command modes

## Usage Guidelines

The **help** command provides a brief description of the context-sensitive help system.

- To list all commands available for a particular command mode, enter a question mark (**?**) at the system prompt.
- To obtain a list of commands that begin with a particular character string, enter the abbreviated command entry immediately followed by a question mark (**?**). This form of help is called word help, because it lists only the keywords or arguments that begin with the abbreviation you entered.
- To list a command's associated keywords or arguments, enter a question mark (**?**) in place of a keyword or argument on the command line. This form of help is called command syntax help, because it lists the keywords or arguments that apply based on the command, keywords, and arguments you have already entered.

## Examples

Enter the **help** command for a brief description of the help system:

```
Router# 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?'.)
```

The following example shows how to use word help to display all the privileged EXEC commands that begin with the letters "co":

```
Router# co?
configure  connect  copy
```

The following example shows how to use command syntax help to display the next argument of a partially complete **access-list** command. One option is to add a wild-card mask. The <cr> symbol indicates that the other option is to press Return to execute the command.

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

## Related Commands

**full-help**
**terminal full-help**

# history size

To change the command history buffer size for a particular line, use the **history size** line configuration command. To disable the command history feature, use the **no** form of this command. (**history** enables history, **no history** disables history, and **no history size** resets to default.)

**history size** *number-of-lines*
**no history size**

## Syntax Description

| | |
|---|---|
| *number-of-lines* | Number of command lines that the system will record in its history buffer. The range is 0 to 256. |

## Default

10 lines

## Command Mode

Line configuration

## Usage Guidelines

The command history feature provides a record of EXEC commands you have entered. This feature is particularly useful for recalling long or complex commands or entries, including access lists.

Table 2-2 lists the keys and functions you can use to recall commands from the command history buffer.

**Table 2-2 History Keys**

| Key | Function |
|---|---|
| Ctrl-P or Up Arrow[1] | Recalls commands in the history buffer in a backward sequence, beginning with the most recent command. Repeat the key sequence to recall successively older commands. |
| Ctrl-N or Down Arrow[1] | Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up Arrow. Repeat the key sequence to recall successively more recent commands. |

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

## Example

In the following example, virtual terminal line 4 is configured with a history buffer size of 35 lines:

```
line vty 4
history size 35
```

## Related Commands

**show history**
**terminal history size**

# lock

To prevent access to your session while keeping your connection open, enter the **lock** EXEC command at the system prompt.

**lock**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Usage Guidelines

This command locks the keyboard. The global configuration command **lockable** must be included in the system configuration file for this command to work. The **lock** EXEC command remains in effect until the **clear line** privileged EXEC command is executed.

When this command is entered, the system prompts for a password, which can be any arbitrary string. The screen clears and displays the message "Locked." To regain access to the session, reenter the password.

## Example

The following example shows how to lock a session. The system prompts for a password, then verifies it. Once the "Locked" message displays, it will not be possible to use the terminal until the correct password is entered.

```
Router# lock

Password:
Again:

                Locked
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**clear line** †
**lockable** †

# login (EXEC)

To log in to a server, enter the **login** EXEC command at the system prompt.

**login**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Usage Guidelines

When you enter this command, the server prompts for a username and password. If you enter both correctly, the session becomes associated with the specified username. If there is no match, the connection reverts to the username with which the **login** command attempt was made, if applicable. If no login name and password were originally required, the connection reverts to a session that is not associated with any name.

When using the **login** command to access a system with TACACS security, you can type your name or specify a TACACS server *user@hostname*, *user@IP address*. The server must be one defined in a configuration with the **tacacs-server host** command.

If you do not specify a host, the router will try each of the TACACS servers in the list until it receives a response.

If you specify a host and that host does not respond, the router does not query another TACACS server. The router either denies access or behaves according to the action specified by the **tacacs-server last-resort** command if there is one configured.

If you specify a TACACS server host with *user@hostname*, the TACACS server specified will be used for all subsequent authentication or notification queries, with the possible exception of SLIP address queries.

## Examples

In the following example, a user wants to change the login name to *led*. The user enters the **login** command, the new name, and an incorrect password. The system rejects the attempt to change the username. Then the user attempts to change the login name to *zep*. The user enters the correct password and is allowed access to the EXEC at the user-level under the username of *zep*.

```
Router> login
Username: led
Password:
% Access denied
Still logged in as "usera"

Router> login
Username: zep
Password:
Router>
```

In the following example, user robert specifies TACACS host1 to authenticate his password:

```
Router> login
Username: robert@host1
Translating “HOST1”...domain server (131.108.1.111) [OK]
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**logout**
**tacacs-server host** †
**tacacs-server last-resort** †
**username** †

# logout

To close an active terminal session and terminate the EXEC, enter the **logout** EXEC command at the system prompt.

**logout**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Usage Guidelines

This command has the same function as the **exit** EXEC command.

## Example

The following example shows how to exit an active session:

```
logout
```

## Related Commands

**disconnect**
**exit**
**login** (EXEC)

# name-connection

To assign a logical name to a connection, enter the **name-connection** EXEC command at the system prompt.

**name-connection**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Usage Guidelines

Use this command to assign a logical name to a physical connection. The EXEC prompts for the connection number and name to assign when you enter this command. The **where** command displays a list of the assigned logical connection names.

## Example

The following example checks the connection number for the host Eng1, assigns the logical name “my host” to it, and then confirms the assignment:

```
Router> where

Conn Host     Address         Byte  Idle  Conn  Name
*  1 Eng1     192.31.6.22        0     0  Eng1
   2 Term2    192.33.6.21        0     0  Term2

Router> name-connection

Connection number: 1
Enter logical name: my host
Connection 1 to Eng1 will be named ”my host” [confirm]

Router> where

Conn Host     Address         Byte  Idle  Conn  Name
*  1 Eng1     192.31.6.22        0     0  my host
   2 Term2    192.33.6.21        0     0  Term2
```

## Related Commands

**connect**
**telnet**
**where**

# resume

To return to a previous Telnet connection, enter the **resume** EXEC command at the system prompt.

**resume** [*connection*] [*keyword*]

## Syntax Description

*connection* (Optional) Connection name or number; the default is the most recent connection.

*keyword* (Optional) Keyword that can be set; see Table 2-3 for a list of keywords.

**Table 2-3 Resume Keywords**

| Keyword | Description |
|---|---|
| **/line** | Enables Telnet line mode. In this mode, the router does not send any data to the host until the user presses Return. The user can edit the line using the standard router command editing characters (Backspace, Delete, Ctrl-U, Ctrl-W). The **/line** keyword is a local switch; the remote server is not notified of the mode change. |
| **/noline** | Disables Telnet line mode and enables character-at-a-time mode (default). |
| **/debug** | Enables Telnet debugging mode. |
| **/nodebug** | Disables Telnet debugging mode (default). |
| **/stream** | Turns on stream processing, which enables a raw TCP stream with no Telnet control sequences. A stream connection does no processing of Telnet options and may be appropriate for connections to ports running UUCP and other non-Telnet protocols. |
| **/nostream** | Turns off stream processing, which enables the Telnet protocol (default). |
| **/echo** | Enables local echoing of characters (default). The **/echo** keyword is a local switch; the remote server is not notified of the state change. |
| **/noecho** | Disables local echoing of characters. |
| **/set** | Sets X3 connection options. |

## Command Mode

EXEC

## Usage Guidelines

Use this command after you have escaped out of a session to move to another open connection. You can omit the command word **resume** and simply type the connection number to resume a connection. You can also return to the most recent session by simply pressing the Return key.

**Note** The router supports Telnet line mode, also called local editing; you can request line mode with the **connect** command. If a remote host responds with "WONT SUPPRESS-GA," the router assumes the host wants line-at-a-time input along with line mode. You can also put a Telnet session into line mode by using the **/line** keyword with the **resume** command.

## Examples

The following example resumes connection 2 in Telnet line mode:

```
Router> resume 2 /line
```

The following example resumes Telnet connection 3:

```
Router> 3
```

## Related Commands

**connect**
**telnet**

# service finger

To allow Finger protocol requests (defined in RFC 742) to be made of the network server, use the **service finger** global configuration command. This service is equivalent to issuing a remote **show users** command. The **no service finger** command removes this service.

**service finger**
**no service finger**

### Syntax Description

This command has no arguments or keywords.

### Default

Enabled

### Command Mode

Global configuration

### Example

The following is an example of how to disable the Finger protocol:

```
no service finger
```

# show history

To list the commands you have entered in the current EXEC session, use the **show history** EXEC command.

**show history**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Usage Guidelines

The command history feature provides a record of EXEC commands you have entered. The number of commands the history buffer will record is determined by the **history size** line configuration command or the **terminal history size** EXEC command.

Table 2-4 lists the keys and functions you can use to recall commands from the command history buffer.

**Table 2-4 History Keys**

| Key | Function |
|---|---|
| Ctrl-P or Up Arrow | Recalls commands in the history buffer in a backward sequence, beginning with the most recent command. Repeat the key sequence to recall successively older commands. |
| Ctrl-N or Down Arrow | Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up Arrow. Repeat the key sequence to recall successively more recent commands. |

## Sample Display

The following is sample output from the **show history** command, which lists the commands the user has entered in EXEC mode for this session:

```
Router# show history
help
  where
  show hosts
  show history
Router#
```

## Related Commands

**history size**
**terminal history size**

# show line

To display a terminal line's parameters, use the **show line** EXEC command.

**show line** [*line-number*]

## Syntax Description

*line-number* (Optional) Absolute line number of the line for which you want to list parameters.

## Command Mode

EXEC

## Sample Display

The following sample output from the **show line** command shows that line 2 is a virtual terminal with a transmit and receive rate of 9600 bps. Also shown is the modem state, terminal screen width and length, and so on.

```
Router# show line 2

 Tty Typ     Tx/Rx    A Modem  Roty AccO AccI  Uses    Noise   Overruns
   2 VTY  9600/9600  -    -      -    -    -     0        0        0/0

Line 2, Location: "", Type: ""
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 9600/9600
Status: No Exit Banner
Capabilities: none
Modem state: Idle
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
                ^^x    none   -     -       none
Timeouts:      Idle EXEC    Idle Session   Modem Answer  Session   Dispatch
               0:10:00        never         0:00:15      not imp   not set
Session limit is not set.
Editing is enabled.
History is enabled, history size is 10.
Allowed transports are telnet mop.  Preferred is telnet.
No output characters are padded
Characters causing immediate data dispatching:
   Char    ASCII
```

# show sessions

Use the **show sessions** EXEC command to show the active Telnet sessions.

**show sessions**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Sample Display

The following is sample output from the **show sessions** command:

```
Router# show sessions

Conn Host               Address             Byte  Idle Conn Name
   1 MATHOM             192.31.7.21            0     0 MATHOM
*  2 CHAFF              131.108.12.19          0     0 CHAFF
```

In the display, an asterisk (*) indicates your current terminal session.

Table 2-5 describes the fields shown in the display.

**Table 2-5 Show Sessions Field Descriptions**

| Field | Description |
|---|---|
| Conn | Name or address of the remote host to which the connection is made. |
| Host | Remote host to which the router is connected through a Telnet session. |
| Address | IP address of the remote host. |
| Byte | Number of unread bytes that are waiting for the user to see on the connection. |
| Idle | Interval (in minutes) since data was last sent on the line. |
| Conn Name | Assigned name of the connection. |

# show tcp

Use the **show tcp** EXEC command to display the status of TCP connections.

**show tcp** [*line-number*]

## Syntax Description

| | |
|---|---|
| *line-number* | (Optional) Absolute line number of the line for which you want to display Telnet connection status. |

## Command Mode

EXEC

## Sample Display

The following is sample output from the **show tcp** command:

```
Router# show tcp

con0 (console terminal), connection 1 to host MATHOM
Connection state is ESTAB, I/O status: 1, unread input bytes: 1
Local host: 192.31.7.18, 33537  Foreign host: 192.31.7.17, 23
Enqueued packets for retransmit: 0, input: 0, saved: 0
Event Timers (current time is 2043535532):
Timer:       Retrans   TimeWait    AckHold    SendWnd   KeepAlive
Starts:           69          0         69          0           0
Wakeups:           5          0          1          0           0
Next:     2043536089          0          0          0           0
iss: 2043207208 snduna: 2043211083  sndnxt: 2043211483    sndwnd: 1344
irs: 3447586816 rcvnxt: 3447586900  rcvwnd:       2144 delrcvwnd:   83
RTTO: 565 ms, RTV: 233 ms, KRTT: 0 ms, minRTT: 68 ms, maxRTT: 1900 ms
ACK hold: 282 ms
Datagrams (max data segment is 536 bytes):
Rcvd: 106 (out of order: 0), with data: 71, total data bytes: 83
Sent: 96 (retransmit: 5), with data: 92, total data bytes: 4678
```

Table 2-6 describes the following lines of output shown in the display:

```
con0 (console terminal), connection 1 to host MATHOM
Connection state is ESTAB, I/O status: 1, unread input bytes: 1
Local host: 192.31.7.18, 33537  Foreign host: 192.31.7.17, 23
Enqueued packets for retransmit: 0, input: 0, saved: 0
```

**Table 2-6 Show TCP Field Descriptions—First Section of Output**

| Field | Description |
|---|---|
| con0 | Identifying number of the line. |
| (console terminal) | Location string. |
| connection 1 | Number identifying the TCP connection. |
| to host MATHOM | Name of the remote host to which the connection has been made. |
| Connection state is ESTAB | A connection progresses through a series of states during its lifetime. These states follow in the order in which a connection progresses through them.<br>• LISTEN—Waiting for a connection request from any remote TCP and port.<br>• SYNSENT—Waiting for a matching connection request after having sent a connection request.<br>• SYNRCVD—Waiting for a confirming connection request acknowledgment after having both received and sent a connection request.<br>• ESTAB—Indicates an open connection; data received can be delivered to the user. This is the normal state for the data transfer phase of the connection.<br>• FINWAIT1—Waiting for a connection termination request from the remote TCP or an acknowledgment of the connection termination request previously sent.<br>• FINWAIT2—Waiting for a connection termination request from the remote TCP host.<br>• CLOSEWAIT—Waiting for a connection termination request from the local user.<br>• CLOSING—Waiting for a connection termination request acknowledgment from the remote TCP host.<br>• LASTACK—Waiting for an acknowledgment of the connection termination request previously sent to the remote TCP host.<br>• TIMEWAIT—Waiting for enough time to pass to be sure the remote TCP host has received the acknowledgment of its connection termination request.<br>• CLOSED—Indicates no connection state at all.<br>For more information, see RFC 793, *Transmission Control Protocol Functional Specification.* |
| I/O status: 1 | Number describing the current internal status of the connection. |
| unread input bytes: 1 | Number of bytes that the lower-level TCP processes have read, but the higher level TCP processes have not yet processed. |
| Local host: 192.31.7.18 | Internet address of the network server. |
| 33537 | Local port number, as derived from the following equation: *line-number* + (512 * *random-number*). (The line number uses the lower nine bits; the other bits are random.) |
| Foreign host: 192.31.7.17 | Internet address of the remote host to which the TCP connection has been made. |
| 23 | Destination port for the remote host. |

| Field | Description |
|---|---|
| Enqueued packets for retransmit: 0 | Number of packets waiting on the retransmit queue. These are packets on this TCP connection that have been sent but have not yet been acknowledged by the remote TCP host. |
| input: 0 | Number of packets that are waiting on the input queue to be read by the user. |
| saved: 0 | Number of received out-of-order packets that are waiting for all packets comprising the message to be received before they enter the input queue. For example, if packets 1, 2, 4, 5, and 6 have been received, packets 1 and 2 would enter the input queue, and packets 4, 5, and 6 would enter the saved queue. |

The following line of output shows the current time according to the system clock of the local host.

```
Event Timers (current time is 2043535532):
```

The time shown is the number of milliseconds since the system started.

The following lines of output display the number of times that various local TCP timeout values were reached during this connection. In this example, the router retransmitted 69 times because it received no response from the remote host, and it transmitted an ACK many more times because there was no data on which to piggyback.

```
Timer:       Retrans   TimeWait    AckHold    SendWnd   KeepAlive
Starts:           69          0         69          0           0
Wakeups:           5          0          1          0           0
Next:     2043536089          0          0          0           0
```

Table 2-7 describes the fields in the preceding lines of output.

**Table 2-7 Show TCP Field Descriptions—Second Section of Output**

| Field | Description |
|---|---|
| Timer: | This line of output indicates the names of the timers in the display. |
| Starts: | The number of times the timer has been started during this connection. |
| Wakeups: | The Wakeups row of the KeepAlives column shows how many keepalives have been transmitted without receiving any response. (This field is reset to zero when a response is received.) |
| Next: | The system clock setting that will trigger the next time this timer will go off. |
| Retrans | The Retransmission timer is used to time TCP packets that have not been acknowledged and are waiting for retransmission. |
| TimeWait | The TimeWait timer is used to ensure that the remote system receive a request to disconnect a session. |
| AckHold | The Acknowledgment timer is used to delay the sending of acknowledgments to the remote TCP in an attempt to reduce network use. |
| SendWnd | The Send Window is used to ensure that there is no closed window due to a lost TCP acknowledgment. |
| KeepAlive | The KeepAlive timer is used to control the transmission of test messages to the remote TCP to ensure that the link has not been broken without the local TCP's knowledge. |

The following lines of output display the sequence numbers that TCP uses to ensure sequenced, reliable transport of data. The router and remote host each use these sequence numbers for flow control and to acknowledge receipt of datagrams. Table 2-8 describes the specific fields in these lines of output:

```
iss: 2043207208 snduna: 2043211083  sndnxt: 2043211483    sndwnd: 1344
irs: 3447586816 rcvnxt: 3447586900  rcvwnd:       2144 delrcvwnd:   83
```

**Table 2-8 Show TCP Field Descriptions—Sequence Number**

| Field | Description |
|---|---|
| `iss: 2043207208` | Initial send sequence number. |
| `snduna: 2043211083` | Last send sequence number the router has sent but has not received an acknowledgment for. |
| `sndnxt: 2043211483` | Sequence number the router will send next. |
| `sndwnd: 1344` | TCP window size of the remote host. |
| `irs: 3447586816` | Initial receive sequence number. |
| `rcvnxt: 3447586900` | Last receive sequence number the router has acknowledged. |
| `rcvwnd: 2144` | Router's TCP window size. |
| `delrcvwnd: 83` | Delayed receive window—data the router has read from the connection, but has not yet subtracted from the receive window the router has advertised to the remote host. The value in this field gradually increases until it is larger than a full-sized packet, at which point it is applied to the rcvwnd field. |

The following lines of output display values that the router uses to keep track of transmission times so that TCP can adjust to the network it is using. Table 2-9 describes the fields in the following line of output:

```
RTTO: 565 ms, RTV: 233 ms, KRTT: 0 ms, minRTT: 68 ms, maxRTT: 1900 ms
ACK hold: 282 ms
```

**Table 2-9 Show TCP Field Descriptions—Line Beginning with RTTO**

| Field | Description |
|---|---|
| `RTTO: 565 ms` | Round trip timeout. |
| `RTV: 233 ms` | Variance of the round trip time. |
| `KRTT: 0 ms` | New round trip timeout (using the Karn algorithm). This field separately tracks the round trip time of packets that have been retransmitted. |
| `minRTT: 68 ms` | Smallest recorded round trip timeout (hard wire value used for calculation). |
| `maxRTT: 1900 ms` | Largest recorded round trip timeout. |
| `ACK hold: 282 ms` | Time the router will delay an acknowledgment in order to piggyback data on it. |

For more information on these fields, refer to "Round Trip Time Estimation," P. Karn & C. Partridge, ACM SIGCOMM-87, August 1987.

Table 2-10 describes the fields in the following lines of output:

```
Datagrams (max data segment is 536 bytes):
Rcvd: 106 (out of order: 0), with data: 71, total data bytes: 83
Sent: 96 (retransmit: 5), with data: 92, total data bytes: 4678
```

**Table 2-10 Show TCP Field Descriptions—Last Section of Output**

| Field | Description |
|---|---|
| Rcvd: 106 (out of order: 0) | Number of datagrams the local host has received during this connection (and the number of these datagrams that were out of order). |
| with data: 71 | Number of these datagrams that contained data. |
| total data bytes: 83 | Total number of bytes of data in these datagrams. |
| Sent: 96 (retransmit: 5) | Number of datagrams the local host sent during this connection (and the number of these datagrams that had to be retransmitted). |
| with data: 92 | Number of these datagrams that contained data. |
| total data bytes: 4678 | Total number of bytes of data in these datagrams. |

# show terminal

Use the **show terminal** EXEC command to obtain information about the terminal configuration parameter settings for the current terminal line.

**show terminal**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Sample Display

The following is sample output from the **show terminal** command:

```
Router# show terminal

Line 2, Location: “”, Type: ""
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 9600/9600
Status: Ready, Active, No Exit Banner
Capabilities: Enabled
Modem state: Ready
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
                ^^x    none   -     -       none
Timeouts:      Idle EXEC    Idle Session   Modem Answer  Session   Dispatch
                never         never         0:00:15      not imp   not set
Session limit is not set.
Allowed transports are telnet rlogin.  Preferred is telnet
No output characters are padded
```

Table 2-11 describes the fields in the first three lines of **show terminal** output.

**Table 2-11 Show Terminal Field Descriptions—First Three Lines of Output**

| Field | Description |
|---|---|
| Line 2 | Current terminal line. |
| Location: “” | Location of the current terminal line, as specified using the **location** line configuration command. |
| Type: “” | Type of the current terminal line, as specified using the **line** global configuration command. |
| Length: 24 lines | Length of the terminal display. |
| Width: 80 columns | Width of the terminal display, in character columns. |
| Baud rate (TX/RX) is 9600/ 9600 | Transmit rate/receive rate of the line. |

The following line of output indicates the status of the line:

```
Status: Ready, Active, No Exit Banner
```

Table 2-12 describes possible values for the Status field.

**Table 2-12 Show Terminal Field Description—Status Field**

| Field | Description |
|---|---|
| Active | A process is actively using the line. |
| Autobauding | The line is running the autobaud process. |
| Carrier Dropped | Some sense of "carrier" has been dropped, so the line process should be killed. |
| Connected | The line has at least one active connection. |
| Dialing Out | A DDR async interface is dialing a remote site on this line. |
| Echo Off | The line is not echoing what the user types in (because a password must be entered, for example). |
| Escape Started | The first character of the escape sequence has been typed. |
| Escape Typed | Both characters of the escape sequence have been typed. |
| Hanging Up | The line state is "hanging up." |
| Hardware XON/XOFF | The line uses a UART that supports XON/XOFF flow control in hardware. (This does not mean that the line is currently using software flow control.) |
| Hold Typed | The user typed the "hold character" (and the line is paused). |
| Idle | The line modem state is "idle" (see modem state diagrams). |
| Idle Timeout | An idle timeout has occurred. |
| Input Stopped | The input has been turned off due to hardware flow control or overflow. |
| No Exit Banner | The normal exit banner will not be displayed on this line. |
| PSI Enabled | The line is paying attention to typed escape characters. |
| Rcvd BREAK | A BREAK sequence has been received on the line. |
| Rcvd Command | The line has received a special command sequence (four example, ^^B for send break). |
| Rcvd CR | The last character received was a carriage return. |
| Ready | The line state is "ready." |
| Ring Transition | There has been a transition on the RING signal of the line. |
| Send Break Soon | You need to send a BREAK on the line soon. |
| Send XOFF Soon | Your buffers are full and you should send an XOFF soon. |
| Sending Break | You are in the process of sending a BREAK sequence on the line. |
| Sent XOFF | Your buffers were full, so we sent an XOFF. |
| SLIP Mode | The line is running SLIP or PPP. |

The following line of output indicates the status of the capabilities of the line; these capabilities correspond closely to configurable parameters that can be set using configuration commands.

```
Capabilities: Enabled
```

Table 2-13 describes possible values for the Capabilities field.

**Table 2-13 Show Terminal Field Descriptions—Capabilities Field**

| Field | Description |
|---|---|
| Autobaud Full Range | Corresponds to the **autobaud** command. |
| Character Padding | At least one **pad** *c x* configuration command has been used. |
| Enabled | The user has “enabled” successfully. |
| EXEC Suppressed | Corresponds to the **no exec** command. |
| Hangup on Last Close | Corresponds to the **autohangup** command. |
| Hardware Flowcontrol In | Corresponds to the **flowcontrol hardware in** command. |
| Hardware Flowcontrol Out | Corresponds to the **flowcontrol hardware out** command. |
| Insecure | Corresponds to the **insecure** command. |
| Lockable | Corresponds to the **lockable** command. |
| Modem Callin | Corresponds to the **modem callin** command. |
| Modem Callout | Corresponds to the **modem callout** command. |
| Modem CTS-Required | Corresponds to the **modem cts-required** command. |
| Modem DTR-Active | Corresponds to the **modem dtr-active** command. |
| Modem RI is CD | Corresponds to the **modem ri-is-cd** command. |
| No Login Banner | Corresponds to the **no exec-banner** command. |
| Notification Set | Corresponds to the **notify** command. |
| Output Non-Idle | Corresponds to the **session-timeout N output** command. |
| Permanent SLIP | Corresponds to the **slip-dedicated** command |
| Private Line | Corresponds to the **private** command. |
| Refuse Suppress-GA | Corresponds to the **telnet refuse** command. |
| Receives Logging Output | Corresponds to the **monitor** command. |
| Refuse Telnet Echo | Corresponds to the **telnet refuse** command. |
| Send BREAK on IP | Corresponds to the **telnet break-on-ip** command. |
| SLIP allowed | Corresponds to the **slip address xxxx** command. |
| Software Flowcontrol In | Corresponds to the **flowcontrol software in** command. |
| Software Flowcontrol Out | Corresponds to the **flowcontrol software out** command. |
| Telnet Transparent Mode | Corresponds to the **telnet transparent** command. |

The following line of output indicates the modem state. Possible values include Autobauding, Carrier Dropped, Hanging Up, Idle, and Ready.

```
Modem state: Ready
```

The following lines of output indicate the special characters that can be entered to activate various terminal operations. The none or hyphen (-) values imply that no special characters are set.

```
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
                ^^x    none   -     -       none
```

The following lines of output indicate the timeout values that have been configured for the line:

```
Timeouts:      Idle EXEC    Idle Session   Modem Answer  Session   Dispatch
                never          never         0:00:15      not imp   not set
```

Table 2-14 describes the fields in the preceding lines of output.

**Table 2-14 Show Terminal Field Descriptions—Timeouts Fields**

| Field | Description |
|---|---|
| Idle EXEC | Interval that the EXEC command interpreter waits for user input before resuming the current connection; or if no connections exist, returning the terminal to the idle state and disconnecting the incoming session. This interval is set using the **exec-timeout** command. |
| Idle Session | Interval that the router waits for traffic before closing the connection to a remote computer and returning the terminal to an idle state. This interval is set using the **session-timeout** command. |
| Modem Answer | Interval during which the router raises DTR in response to RING and the modem response to CTS. This interval is set using the **modem answer-timeout** command. |
| Session | Not implemented in this release. |
| Dispatch | Number of milliseconds the router waits after putting the first character into a packet buffer before sending the packet. This interval is set using the **dispatch-timeout** command. |

The following lines of output indicate how various options have been configured:

```
Session limit is not set.
Allowed transports are telnet rlogin. Preferred is telnet
No output characters are padded
```

# show users

Use the **show users** EXEC command to display information about the active ports of the router. The information displayed includes the line number, connection name, idle time, and terminal location.

**show users** [**all**]

## Syntax Description

**all** (Optional) Specifies that all lines, whether or not anyone is using them, be displayed.

## Command Mode

EXEC

## Sample Display

The following is sample output from the **show users** command:

```
Router# show users

     Line          User           Host(s)       Idle Location
     0 con 0                      idle
*    2 vty 0       rdoe           idle          0 ABC.CISCO.COM
```

Table 2-15 describes the fields shown in the display.

**Table 2-15 Show Users Field Descriptions**

| Field | Description |
|---|---|
| Line | Contains three subfields. The asterisk (*) identifies the line of the user entering the **show** command.<br>The first subfield (2, in this case) is the absolute line number.<br>The second subfield (vty, in this case) indicates the type of line. Possible values follow:<br>• con—Console<br>• aux—Auxiliary port<br>• vty—Virtual terminal<br>The third subfield (0, in this case) indicates the relative line number within type. |
| User | Name of user using the line. If this field is blank, no user is using the line. |
| Host(s) | Host to which the user is connected (outgoing connection). A value of idle indicates no outgoing connection to a host. |
| Idle | Interval (in minutes) since the user has typed something. |
| Location | Either the hardwired location for the line or, if there is an incoming connection, the host the incoming connection is from. |

The following is sample output from the **show users all** command:

```
Router> show users all
    Line     User      Host(s)              Idle Location
   0 con 0
   1 aux 0
*  2 vty 0             idle                    0 USER.COMPANY.COM
   3 vty 1
   4 vty 2
   5 vty 3
   6 vty 4
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**line** †
**location** †

# systat

To display information about the active ports of the router, use the **systat** EXEC command.

**systat** [**all**]

## Syntax Description

**all** (Optional) Displays information for both active and inactive ports.

## Command Mode

EXEC

## Usage Guidelines

This command is a synonym for the **show users** command.

## Example

The following example shows how to use the **systat** command:

```
Router> systat all

    Line     User      Host(s)              Idle Location
   0 con 0
   1 aux 0
*  2 vty 0    cma        idle                  0 USER-MAC.COMPANY.COM
   3 vty 1               idle                  0 NAME.COMPANY.COM
   4 vty 2
   5 vty 3
   6 vty 4
```

Table 2-16 describes the fields shown in the display.

**Table 2-16 Systat Field Descriptions**

| Field | Description |
|---|---|
| Line | Contains three subfields. The asterisk (*) identifies the line of the user entering the command.<br>The first subfield (2, in this case) is the absolute line number.<br>The second subfield (vty, in this case) indicates the type of line. Possible values follow:<br>• con—Console<br>• aux—Auxiliary port<br>• vty—Virtual terminal<br>The third subfield (0, in this case) indicates the relative line number within type. |
| User | Name of user using the line. If this field is blank, no user is using the line. |
| Host(s) | Host to which the user is connected (outgoing connection). A value of idle indicates no outgoing connection to a host. |
| Idle | Interval (in minutes) since the user has typed something. |
| Location | Either the hardwired location for the line or, if there is an incoming connection, the host the incoming connection is from. |

# telnet (EXEC)

To start a Telnet connection, enter the **telnet** EXEC command.

**telnet** *host* [*port*] [*keyword*]

## Syntax Description

*host* A host name or an Internet address.

*port* (Optional) Decimal TCP port number; the default is the Telnet server port (decimal 23) on the host.

*keyword* (Optional) Keyword that can be set with the connection; see Table 2-17 for a list of keywords.

**Table 2-17 Telnet (EXEC) Keywords**

| Keyword | Description |
|---|---|
| **/route:** *path* | Specifies loose source routing. The argument *path* is a list of host names or Internet addresses that specifies network nodes, ending with the final destination. |
| **/line** | Enables Telnet line mode. In this mode, the router does not send any data to the host until you press Return. You can edit the line using the standard router command editing characters (Backspace, Delete, Ctrl-U, Ctrl-W). The **/line** keyword is a local switch; the remote server is not notified of the mode change. |
| **/debug** | Enables Telnet debugging mode. |
| **/echo** | Enables local echoing of characters (default). The **/echo** keyword is a local switch; the remote server is not notified of the state change. |
| **/stream** | Turns on stream processing, which enables a raw TCP stream with no Telnet control sequences. A stream connection does not process Telnet options and may be appropriate for connections to ports running UUCP and other non-Telnet protocols. |

## Command Mode

EXEC

## Usage Guidelines

The router assigns a logical name to each connection; several commands use these names to identify connections. The logical name is the same as the host name, unless that name is already in use or you change the connection name with the EXEC command **name-connection**. If the name is already in use, the router assigns a null name to the connection.

To obtain an onscreen list of Telnet special sequence commands, enter the **Ctrl-^?** sequence at the EXEC prompt. The system administrator can change the escape character portion of this sequence; use the **show terminal** EXEC command to check the current setting for the escape character. To enter the escape sequence, press and hold the Ctrl, Shift, and 6 keys, then let go and press the X key.

## Examples

The following example routes packets from the source system to kl.sri.com, then to 10.1.0.11, and finally to mathom:

```
Router> connect mathom /route:kl.sri.com 10.1.0.11 mathom
```

The following example connects to a host with logical name mathom:

```
Router> mathom
```

The following example shows the on-line table displayed when the **Ctrl-^-?** sequence is entered. (Note that the sequence will not appear on your terminal.)

```
Router> <Ctrl-^ ?>

[Special telnet escape help]
^^B  sends telnet BREAK
^^C  sends telnet IP
^^H  sends telnet EC
^^O  sends telnet AO
^^T  sends telnet AYT
^^U  sends telnet EL
```

## Related Commands

**connect**
**name-connection**

# terminal data-character-bits

To set the number of data bits per character that are interpreted and generated by software for the current line, use the **terminal data-character-bits** EXEC command.

**terminal data-character-bits** {**7** | **8**}

## Syntax Description

| | |
|---|---|
| **7** | Seven data bits per character |
| **8** | Eight data bits per character |

## Default

8 data bits per character

## Command Mode

EXEC

## Usage Guidelines

The **terminal data-character-bits** command is used primarily to strip parity from X.25 connections on IGS or Cisco 3000 routers with the protocol translation software option. The **terminal data-character-bits** command does not work on hardwired lines.

## Example

The following example shows how to change the data bits per character to 7:

```
terminal data-character-bits 7
```

# terminal databits

To set the number of data bits per character that are interpreted and generated by hardware for the current terminal line, use the **terminal databits** EXEC command.

**terminal databits** {**5** | **6** | **7** | **8**}

## Syntax Description

**5** Five databits per character

**6** Six databits per character

**7** Seven databits per character

**8** Eight databits per character

## Default

8 data bits per character

## Command Mode

EXEC

## Usage Guidelines

The **terminal databits** command can be used to mask the high bit on input from devices that generate 7 data bits with parity. If parity is being generated, specify 7 data bits per character. If no parity generation is in effect, specify 8 data bits per character. The other keywords are supplied for compatibility with older devices and generally are not used.

## Example

The following example shows how to change the data bits per character to 7:

```
terminal databits 7
```

# terminal dispatch-character

To define a character that causes a packet to be sent for the current terminal line, use the **terminal dispatch-character** EXEC command. Use the **terminal no dispatch-character** command to remove the dispatch characters.

**terminal dispatch-character** *ascii-number1* [*ascii-number2 . . . ascii-number*]
**terminal no dispatch-character**

## Syntax Description

| | |
|---|---|
| *ascii-number* | ASCII decimal representation of the character, such as Return (ASCII character 13) for line-at-a-time transmissions. The command can take multiple arguments, so you can define any number of characters as the dispatch character. |

## Default

None

## Command Mode

EXEC

## Usage Guidelines

This command defines a dispatch character that causes packets to be sent even if the dispatch timer has not expired. It causes the router to attempt to buffer characters into larger-sized packets for transmission to the remote host. The router normally dispatches each character as it is typed. See the "ASCII Character Set" appendix for a list of ASCII characters.

## Example

The following example defines the characters Ctrl-D and Ctrl-Y as the dispatch characters:

```
terminal dispatch-character 4 25
```

## Related Command

**terminal dispatch-timeout**

# terminal dispatch-timeout

To set the character dispatch timer for the current terminal line, use the **terminal dispatch-timeout** EXEC command. The **terminal no dispatch-timeout** command removes the timeout definition.

**terminal dispatch-timeout** *milliseconds*
**terminal no dispatch-timeout**

## Syntax Description

| | |
|---|---|
| *milliseconds* | An integer that specifies the number of milliseconds the router waits after putting the first character into a packet buffer before sending the packet. During this interval, more characters may be added to the packet, thus increasing the processing efficiency of the remote host. |

## Default

None

## Command Mode

EXEC

## Usage Guidelines

The **terminal dispatch-timeout** command causes the router to buffer characters into packets for transmission to the remote host. The router sends a packet a specified amount of time after the first character is put in the buffer. The router normally dispatches each character as it is entered. You can use the **terminal dispatch-timeout** and **terminal dispatch-character** commands together. In this case, the router dispatches a packet each time the dispatch character is entered, or after the specified dispatch timeout interval, depending on which condition is met first.

---

**Note** The router's response may appear intermittent if the timeout interval is greater than 100 milliseconds and remote echoing is used.

---

## Example

The following example sets the dispatch timer to 80 milliseconds:

```
terminal dispatch-timeout 80
```

## Related Command

**terminal dispatch-character**

# terminal download

To temporarily set the ability of a line to act as a transparent pipe for file transfers, use the **terminal download** EXEC command. Use the **terminal no download** command to remove this ability.

**terminal download**
**terminal no download**

## Syntax Description

This command has no arguments or keywords.

## Default

Disabled

## Command Mode

EXEC

## Usage Guidelines

Use the **terminal download** command when running a program such as Kermit, Xmodem, or CrossTalk that downloads a file across a router line.

## Example

The following example shows how to set up the current line for a Kermit file transfer:

```
terminal download
```

# terminal editing

To enable the enhanced editing mode on the local line, use the **terminal editing** EXEC command. To disable the enhanced editing mode on the current line, use the **no** form of this command.

**terminal editing**
**terminal no editing**

## Syntax Description

This command has no arguments or keywords.

## Default

Enabled

## Command Mode

EXEC

## Usage Guidelines

Table 2-18 provides a description of the keys used to enter and edit commands. 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 *not* case sensitive.

**Table 2-18 Command Editing Keys and Functions**

| Keys | Function |
|---|---|
| Tab | Completes a partial command name entry. When you enter a unique set of characters and press the Tab key, the system completes the command name. 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 (?) immediately following the partial command (no space). The system provides a list of commands that begin with that string. |
| Delete or Backspace | Erases the character to the left of the cursor. |
| Return | At the command line, pressing the Return key performs the function of processing, or carrying out, a command. At the "---More---" prompt on a terminal screen, pressing the Return key scrolls down a line. |
| Space Bar | Scrolls down a page on the terminal screen. Press the space bar when you see the line "---More---" on the screen to display the next screen. |
| Left Arrow[1] | Moves the cursor one character to the left. When you enter a command that extends beyond a single line, you can continue to press the left arrow key at any time to scroll back toward the system prompt and verify the beginning of the command entry. |
| Right Arrow[1] | Moves the cursor one character to the right. |
| Up Arrow[1] or Ctrl-P | Recalls commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands. |
| Down Arrow[1] or Ctrl-N | Return to more recent commands in the history buffer after recalling commands with the Up Arrow or Ctrl-P. Repeat the key sequence to recall successively more recent commands. |
| Ctrl-A | Moves the cursor to the beginning of the line. |
| Ctrl-B | Moves the cursor back one character. |
| Ctrl-D | Deletes the character at the cursor. |

| Keys | Function |
|---|---|
| Ctrl-E | Moves the cursor to the end of the command line. |
| Ctrl-F | Moves the cursor forward one character. |
| Ctrl-K | Deletes all characters from the cursor to the end of the command line. |
| Ctrl-L and Ctrl-R | Redisplays the system prompt and command line. |
| Ctrl-T | Transposes the character to the left of the cursor with the character located at the cursor. |
| Ctrl-U and Ctrl-X | Deletes all characters from the cursor back to the beginning of the command line. |
| Ctrl-V and Esc Q | Inserts a code to indicate to the system that the key stroke immediately following should be treated as a command entry, *not* as an editing key. |
| Ctrl-W | Deletes the word to the left of the cursor. |
| Ctrl-Y | Recalls the most recent entry in the delete buffer. The delete buffer contains the last ten items you have deleted or cut. Ctrl-Y can be used in conjunction with Esc Y. |
| Ctrl-Z | Ends configuration mode and returns you to the EXEC prompt. |
| Esc B | Moves the cursor back one word. |
| Esc C | Capitalizes the word at the cursor. |
| Esc D | Deletes from the cursor to the end of the word. |
| Esc F | Moves the cursor forward one word. |
| Esc L | Changes the word at the cursor to lowercase. |
| Esc U | Capitalizes from the cursor to the end of the word. |
| Esc Y | Recalls the next buffer entry. The buffer contains the last ten items you have deleted. Press Ctrl-Y first to recall the most recent entry. Then press Esc Y up to nine times to recall the remaining entries in the buffer. If you bypass an entry, continue to press Esc Y to cycle back to it. |

1. The arrow keys function only with ANSI-compatible terminals.

The editing keys and functions of the earlier software release are listed in Table 2-19.

**Table 2-19 Editing Keys and Functions for Software Release 9.1 and Earlier**

| Key | Function |
|---|---|
| Delete or Backspace | Erases the character to the left of the cursor. |
| Ctrl-W | Erases a word. |
| Ctrl-U | Erases a line. |
| Ctrl-R | Redisplays a line. |
| Ctrl-Z | Ends configuration mode and returns to the EXEC prompt. |
| Return | Executes single-line commands. |

## Example

In the following example, enhanced mode editing is reenabled for the current terminal session:

```
terminal editing
```

### Related Command

A dagger (†) indicates that the command is documented in another chapter.

**editing** †

# terminal escape-character

To set the escape character for the current terminal line, use the **terminal escape-character** EXEC command. The **terminal no escape-character** command sets the escape character to Break.

**terminal escape-character** *ascii-number*
**terminal no escape-character**

## Syntax Description

| | |
|---|---|
| *ascii-number* | Either the ASCII decimal representation of the desired escape character or a control sequence (Ctrl-P, for example). |

## Default

Ctrl-^

## Command Mode

EXEC

## Usage Guidelines

Typing the escape character followed by the X key returns you to the EXEC when you are connected to another computer. See the "ASCII Character Set" appendix for a list of ASCII characters.

**Note** The Break key cannot be used as an escape character on the console terminal because the operating software interprets Break as an instruction to halt the system.

## Example

The following example sets the escape character to Ctrl-P (ASCII decimal 16).

```
terminal escape-character 16
```

# terminal exec-character-bits

To change the ASCII character widths for characters entered for the current terminal line, use the **terminal exec-character-bits** EXEC command.

**terminal exec-character-bits** {**7** | **8**}

## Syntax Description

| | |
|---|---|
| **7** | Selects the 7-bit ASCII character set. |
| **8** | Selects the full 8-bit character set. |

## Default

7-bit ASCII character set

## Command Mode

EXEC

## Usage Guidelines

This EXEC command overrides the **default-value exec-character-bits** global configuration command. Configuring the EXEC character width to 8 bits allows you to add special graphical and international characters in banners, prompts, and so forth.

When the user exits the system, the character width is reset to the default value established by the global configuration command. However, setting the EXEC character width to 8 bits can also cause failures. If a user on a terminal that is sending parity enters the command **help**, an "unrecognized command" message appears because the system is reading all 8 bits, although the eighth bit is not needed for the **help** command.

## Example

The following example temporarily configures a router to use a full 8-bit user interface for system banners and prompts. This allows the use of additional graphical and international characters.

```
terminal exec-character-bits 8
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**default-value exec-character-bits** †
**default-value special-character-bits** †
**exec-character-bits** †
**special-character-bits** †
**terminal special-character-bits**

# terminal flowcontrol

To set up the method of data flow control for the current terminal line, use the **terminal flowcontrol** EXEC command.

**terminal flowcontrol** {**none** | **software** [**in** | **out**] | **hardware**}

## Syntax Description

**none** Prevents flowcontrol.

**software** Sets software flow control. An optional keyword specifies the direction: **in** causes the router to listen to flow control from the attached device, and **out** causes the router to send flow control information to the attached device. If you do not specify a direction, both directions are assumed.

**hardware** Sets hardware flow control. For information about setting up the RS-232 line, see the hardware manual for your product.

## Default

By default, no flow control method is set. This default is returned with the **none** keyword. For software flow control, the default stop and start characters are Ctrl-S and Ctrl-Q (XOFF and XON). You can change them with the **terminal stop-character** and **terminal start-character** commands.

## Command Mode

EXEC

## Usage Guidelines

This command pertains to the auxiliary port only.

## Example

The following example sets incoming software flow control:

```
terminal flowcontrol software in
```

## Related Commands

**terminal start-character**
**terminal stop-character**

# terminal full-help (EXEC)

To get help for the full set of user-level commands, use the **terminal full-help** EXEC command.

**terminal full-help**

## Syntax Description

This command has no arguments or keywords.

## Default

Disabled

## Command Mode

EXEC

## Usage Guidelines

The **terminal full-help** command enables (or disables) a user to see all of the help messages available from the terminal. It is used with the **show** command.

## Example

The following example is output for **show?** with **terminal full-help** enabled.

```
router> terminal full-help
router> show?
access expression List access expression
access lists List access lists
apollo Apollo network information
appletalk AppleTalk information
arp ARP table
async Information on terminal lines used as router interfaces
...
```

## Related Commands

**full-help**
**help**

# terminal history size

To change the command history buffer size for the current terminal session, use the **terminal history size** EXEC command. To revert to the default value, use the **no** form of this command.

**terminal history size** *number-of-lines*
**terminal no history size**

## Syntax Description

| | |
|---|---|
| *number-of-lines* | Number of command lines that the system will record in its history buffer. The range is 0 to 256. |

## Default

10 lines

## Command Mode

EXEC

## Usage Guidelines

The command history feature provides a record of EXEC commands you have entered. This feature is particularly useful to recall long or complex commands or entries, including access lists.

Table 2-20 lists the keys and functions you can use to recall commands from the history buffer.

**Table 2-20 History Keys**

| Key | Function |
|---|---|
| Ctrl-P or Up Arrow[1] | Recalls commands in the history buffer in a backward sequence, beginning with the most recent command. Repeat the key sequence to recall successively older commands. |
| Ctrl-N or Down Arrow[1] | Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up Arrow. Repeat the key sequence to recall successively more recent commands. |

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

## Example

In the following example, the number of command lines recorded is set to 15 for the local line:

```
terminal history size 15
```

## Related Commands

**history size**
**show history**

# terminal hold-character

To set the hold character, use the **terminal hold-character** EXEC command. Use the **terminal no hold-character** command to restore the default.

**terminal hold-character** *ascii-number*
**terminal no hold-character**

## Syntax Description

| | |
|---|---|
| *ascii-number* | Either the ASCII decimal representation of the hold character or a control sequence (for example, Ctrl-P). |

## Default

None

## Command Mode

EXEC

## Usage Guidelines

Typing the hold character temporarily halts the output at the terminal. To continue the output, type any other character. To send the hold character to the host, precede it with the escape character.

The Break character is represented by zero; NULL cannot be represented.

See the "ASCII Character Set" appendix for a list of ASCII characters.

---

**Note** You cannot suspend output on the console terminal.

---

## Example

The following example removes the previously set hold character:

```
terminal no hold-character
```

## Related Command

A dagger (†) indicates that the command is documented in another chapter.

**hold-character** †

# terminal length

To set the number of lines on the current terminal screen, use the **terminal length** EXEC command. The **terminal no length** command is the same as entering a value of zero.

**terminal length** *screen-length*
**terminal no length**

## Syntax Description

| | |
|---|---|
| *screen-length* | The desired number of lines. The router uses this value to determine when to pause during multiple-screen output. The default length is 24 lines. A value of zero disables pausing between screens of output. |

## Default

24 lines

## Command Mode

EXEC

## Usage Guidelines

The screen length specified can be learned by remote hosts.

## Example

The following example disables pausing between screen output:

```
terminal length 0
```

# terminal monitor

To set the ability to display **debug** command output and system error messages to the current terminal, use the **terminal monitor** EXEC command. Use the **terminal no monitor** command to disable this ability.

**terminal monitor**
**terminal no monitor**

## Syntax Description

This command has no arguments or keywords.

## Default

Disabled

## Command Mode

EXEC

## Usage Guidelines

To use this command, you must first issue the **enable** command and enter the password to access the privileged EXEC command mode.

## Example

The following example illustrates how to enable the system debugging messages on the local terminal screen:

```
terminal monitor
```

# terminal notify

To enable terminal notification about pending output from other connections, use the **terminal notify** EXEC command. Use the **terminal no notify** command to end such notifications.

**terminal notify**
**terminal no notify**

## Syntax Description

This command has no arguments or keywords.

## Default

Disabled

## Command Mode

EXEC

## Usage Guidelines

This command sets a line to inform a user who has multiple, concurrent Telnet connections when output is pending on a connection other than the current one. When you have multiple concurrent connections, you might want to know when output is pending on a connection other than the current connection. For example, you might want to know when another connection receives mail or a message. The **terminal notify** command causes the router to notify you of pending output.

## Example

The following example sets up notification to the current line of e-mail messages on the other open connection:

```
terminal notify
```

# terminal padding

To set the padding on a specific output character for the current terminal line, use the **terminal padding** EXEC command. The **terminal no padding** command removes padding for the specified output character.

**terminal padding** *ascii-number count*
**terminal no padding** *ascii-number*

## Syntax Description

| | |
|---|---|
| *ascii-number* | ASCII decimal representation of the character. |
| *count* | Number of NULL bytes sent after the ASCII character, up to 255 padding characters in length. |

## Default

None

## Command Mode

EXEC

## Usage Guidelines

See the “ASCII Character Set” appendix for a list of ASCII characters.

## Example

The following example pads Ctrl-D (ASCII 4) with 164 NULL bytes:

```
terminal padding 4 164
```

# terminal parity

To define the generation of the parity bit for the current terminal line, use the **terminal parity** EXEC command.

**terminal parity** {**none** | **even** | **odd** | **space** | **mark**}

## Syntax Description

**none** No parity

**even** Even parity

**odd** Odd parity

**space** Space parity

**mark** Mark parity

## Default

No parity

## Command Mode

EXEC

## Example

The following example shows how to set the parity bit to odd:

```
terminal parity odd
```

# terminal rxspeed

To set the terminal baud rate receive (from terminal) speed for the current terminal line, use the **terminal rxspeed** EXEC command.

**terminal rxspeed** *bps*

## Syntax Description

| | |
|---|---|
| *bps* | Baud rate in bits per second (bps); see Table 2-21 for settings. |

## Default

9600 bps

## Command Mode

EXEC

## Usage Guidelines

Use Table 2-21 as a guide for setting the line speeds.

**Table 2-21 Router Line Speeds in Bits per Second**

| Router Model | Baud Rates |
|---|---|
| Cisco 7000 series, AGS, CGS, MGS | 50, 75, 110, 134, 150, 200, 300, 600, 1050, 1200, 2000, 2400, 4800, 9600, 19200, 38400 |
| Cisco 2000, Cisco 3000, Cisco 4000 | 75, 110, 134, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600, 19200, 38400 |

## Example

The following example sets the current auxiliary line receive speed to 2400 bps:

```
terminal rxspeed 2400
```

## Related Commands

**terminal speed**
**terminal txspeed**

# terminal special-character-bits

To change the ASCII character widths to accept special characters for the current terminal line, use the **terminal special-character-bits** EXEC command.

**terminal special-character-bits** {**7** | **8**}

## Syntax Description

| | |
|---|---|
| **7** | Selects the 7-bit ASCII character set. |
| **8** | Selects the full 8-bit character set. |

## Default

7-bit ASCII character set

## Command Mode

EXEC

## Usage Guidelines

The **terminal special-character-bits** command temporarily allows the server to support international character sets. It overrides the **default-value special-character-bits** global configuration command and is used to compare character sets typed by the user with the special character available during a data connection, which includes software flow control and escape characters. Configuring the width to 8 allows you to use twice as many special characters as with the 7-bit setting. When the user exits the system, the command is reset to the default value established by the global configuration command.

## Example

The following example temporarily configures full 8-bit comparisons of flow control and interrupt characters to allow more special characters to be accepted. When you exit the system, character width will be reset to the width established by the global configuration command.

```
terminal special-character-bits 8
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**default-value exec-character-bits** †
**default-value special-character-bits** †
**exec-character-bits** †
**special-character-bits** †
**terminal exec-character-bits**

# terminal speed

To set the terminal baud rate for the current terminal line, use the **terminal speed** EXEC command. The command sets both the transmit (to terminal) and receive (from terminal) speeds.

**terminal speed** *bps*

## Syntax Description

*bps* Baud rate in bits per second (bps), see Table 2-22 for settings.

## Default

9600 bps

## Command Mode

EXEC

## Usage Guidelines

Set the speed to match the baud rate of whatever device you have connected to the port. Some baud rates available on devices connected to the port might not be supported on the router. The router will indicate if the speed you select is not supported. Use Table 2-22 as a guide for setting the line speeds.

**Table 2-22 Router Line Speeds in Bits per Second**

| Router Model | Baud Rates |
|---|---|
| Cisco 7000 series, AGS, CGS, MGS | 50, 75, 110, 134, 150, 200, 300, 600, 1050, 1200, 2000, 2400, 4800, 9600, 19200, 38400 |
| Cisco 2000, Cisco 3000, Cisco 4000 | 75, 110, 134, 150, 300, 600, 1200, 2000, 2400, 4800, 1800, 9600, 19200, 38400 |

## Example

The following example sets the current auxiliary line receive and transmit speed to 2400 bps:

```
terminal speed 2400
```

## Related Commands

**terminal rxspeed**
**terminal txspeed**

# terminal start-character

To set the flow control stop character for the current terminal line, use the **terminal start-character** EXEC command. The command defines the character that signals the start of data transmission when software flow control is in effect. Use the **terminal no start-character** command to remove the start character.

**terminal start-character** *ascii-number*
**terminal no start-character**

## Syntax Description

*ascii-number* ASCII decimal representation of the start character.

## Default

Ctrl-Q (ASCII character 17)

## Command Mode

EXEC

## Usage Guidelines

See the "ASCII Character Set" appendix for a list of ASCII characters.

## Example

The following example changes the start character to Ctrl-O (ASCII decimal 15):

```
terminal start-character 15
```

## Related Command

A dagger (†) indicates that the command is documented in another chapter.

**start-character** †

# terminal stop-character

To set the flow control stop character for the current terminal line, use the **terminal stop-character** EXEC command. The command defines the character that signals the end of data transmission when software flow control is in effect. The **terminal no stop-character** command removes the character.

**terminal stop-character** *ascii-number*
**terminal no stop-character**

## Syntax Description

*ascii-number* ASCII decimal representation of the stop character.

## Default

Ctrl-S (ASCII character 19)

## Command Mode

EXEC

## Usage Guidelines

See the “ASCII Character Set” appendix for a list of ASCII characters.

## Example

The following example changes the stop character to Ctrl-E, which is ASCII decimal 5:

```
terminal stop-character 5
```

## Related Command

A dagger (†) indicates that the command is documented in another chapter.

**stop-character** †

# terminal stopbits

To set the number of stop bits transmitted per byte by the current terminal line, use the **terminal stopbits** EXEC command.

**terminal stopbits** {**1** | **1.5** | **2**}

## Syntax Description

| | |
|---|---|
| **1** | One stop bit |
| **1.5** | One and a half stop bits |
| **2** | Two stop bits |

## Default

2 stop bits

## Command Mode

EXEC

## Example

The following example illustrates how to change the stop bits to 1:

```
terminal stopbits 1
```

## Related Command

A dagger (†) indicates that the command is documented in another chapter.

**stopbits** †

# terminal telnet break-on-ip

To cause the system to generate a hardware Break signal on the RS-232 line that is associated with a reverse Telnet connection for the current line, use the **terminal telnet break-on-ip** EXEC command.

**terminal telnet break-on-ip**

## Syntax Description

This command has no arguments or keywords.

## Default

None

## Command Mode

EXEC

## Usage Guidelines

Occurs when a Telnet Interrupt-Process (IP) command is received on that connection. This command can be used to control the translation of Telnet IP commands into X.25 Break indications.

This command is also a useful workaround in the following situations:

- Several user Telnet programs send an IP command, but cannot send a Telnet break signal.
- Some Telnet programs implement a Break signal that sends an IP command.
- Some RS-232 hardware devices use a hardware Break signal for various purposes. A hardware Break signal is generated when a Telnet Break command is received.

## Example

The following example shows how to generate a Break signal on the RS-232 line:

```
line aux 0
terminal telnet break-on-ip
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**telnet** (EXEC) †
**telnet break-on-ip** †

# terminal telnet refuse-negotiations

To set the current line to refuse to negotiate full duplex, remote echo options on incoming connections, use the **terminal telnet refuse-negotiations** EXEC command.

**terminal telnet refuse-negotiations**

## Syntax Description

This command has no arguments or keywords.

## Default

None

## Command Mode

EXEC

## Usage Guidelines

This command is used on reverse Telnet connections to allow the router to refuse these requests from the other end. This command suppresses negotiation of the Telnet Remote Echo and Suppress Go Ahead options.

## Example

The following example shows how to set the auxiliary port to refuse full duplex, remote echo requests:

```
line aux 0
terminal telnet refuse-negotiations
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**telnet** (EXEC) †
**telnet refuse-negotiations** †

# terminal telnet speed

To allow the router to negotiate transmission speed for the current line, use the **terminal telnet speed** EXEC command.

**terminal telnet speed** *default-speed maximum-speed*

## Syntax Description

| | |
|---|---|
| *default-speed* | Line speed (in bps) that the router will use if the device on the other end of the connection has not specified a speed. |
| *maximum-speed* | Maximum speed (in bps) that the device on the port will use. |

## Default

None

## Command Mode

EXEC

## Usage Guidelines

You can match line speeds on remote systems in reverse Telnet, on host machines hooked up to a router to access the network, or on a group of console lines hooked up to the router, when disparate line speeds are in use at the local and remote ends of the connection. Line speed negotiation adheres to the Remote Flow Control option, defined in RFC 1080.

## Example

The following example allows the router to negotiate a bit rate on the line using the Telnet option. If no speed is negotiated, the line will run at 2400 bps. If the remote host requests a speed of greater than 9600 bps, then 9600 bps will be used.

```
line aux 0
terminal telnet speed 2400 9600
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**telnet** (EXEC) †
**telnet speed** †

# terminal telnet sync-on-break

To cause the router to send a Telnet Synchronize signal when it receives a Telnet Break signal on the current line, use the **terminal telnet sync-on-break** EXEC command.

**terminal telnet sync-on-break**

## Syntax Description

This command has no arguments or keywords.

## Default

None

## Command Mode

EXEC

## Example

The following example shows how to set the auxiliary port to cause the router to send a Telnet synchronize signal:

```
line aux 0
terminal telnet sync-on-break
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**telnet** (EXEC) †
**telnet sync-on-break** †

# terminal telnet transparent

To cause the router to send a Return (CR) as a CR followed by a NULL instead of a CR followed by a Line Feed (LF) on the current line, use the **terminal telnet transparent** EXEC command.

**terminal telnet transparent**

## Syntax Description

This command has no arguments or keywords.

## Default

None

## Command Mode

EXEC

## Usage Guidelines

This command is useful for coping with different interpretations of end-of-line handling in the Telnet protocol specification.

## Example

The following example sets the router, when sending a CR, to send a CR followed by a NULL character:

```
terminal telnet transparent
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**telnet** (EXEC) †
**telnet transparent** †

# terminal terminal-type

To specify the type of terminal connected to the current line, use the **terminal terminal-type** EXEC command. The command records the type of terminal connected to the line. The **terminal no terminal-type** command removes any information about the type of terminal and resets the line to the default terminal emulation.

**terminal terminal-type** *terminal-name*
**terminal no terminal-type**

## Syntax Description

| | |
|---|---|
| *terminal-name* | Terminal name and type. |

## Default

VT100

## Command Mode

EXEC

## Usage Guidelines

The argument *terminal-name* provides a record of the terminal type and allows terminal negotiation of display management by hosts that provide that type of service.

## Example

The following example defines the terminal as a type VT220 during the current session:

```
terminal terminal-type VT220
```

## Related Command

A dagger (†) indicates that the command is documented in another chapter.

**terminal-type** †

# terminal transport

To specify a default transport protocol for the router to use for the current session (if the user does not specify a protocol), use the **terminal transport** EXEC command. Also use to prevent any connection attempts.

**terminal transport** {**telnet** | **none**}

## Syntax Description

**telnet** Specifies all types of incoming TCP/IP connections.

**none** Prevents any protocol selection on the line. This makes the port unusable by incoming connections.

## Default

**telnet**

## Command Mode

EXEC

## Example

The following example illustrates how to configure the console to not try to connect when an unrecognized command is entered:

```
terminal transport none
```

## Related Command

A dagger (†) indicates that the command is documented in another chapter.

**transport preferred** †

# terminal txspeed

To set the terminal transmit baud rate (to terminal) on the current terminal line, use the **terminal txspeed** EXEC command.

**terminal txspeed** *bps*

## Syntax Description

*bps* Baud rate in bits per second (bps); see Table 2-23 for settings.

## Default

9600 bps

## Command Mode

EXEC

## Usage Guidelines

Set the speed to match the baud rate of whatever device you have connected to the port. Some baud rates available on devices connected to the port might not be supported on the router. The router will indicate if the speed you select is not supported. Use the following table as a guide for setting the line speeds.

**Table 2-23 Router Line Speeds in Bits per Second**

| Router Model | Baud Rates |
|---|---|
| Cisco 7000 series, AGS, CGS, MGS | 50, 75, 110, 134, 150, 200, 300, 600, 1050, 1200, 2000, 2400, 4800, 9600, 19200, 38400 |
| Cisco 2000, Cisco 3000, Cisco 4000 | 75, 110, 134, 150, 300, 600, 1200, 2000, 2400, 4800, 1800, 9600, 19200, 38400 |

## Example

The following example sets the current auxiliary line transmit speed to 2400 bps:

```
terminal txspeed 2400
```

## Related Commands

**terminal rxspeed**
**terminal speed**

# terminal width

To set the number of character columns on the terminal screen for the current line, use the **terminal width** EXEC command.

**terminal width** *characters*

### Syntax Description

| | |
|---|---|
| *characters* | Number of character columns displayed on the terminal. |

### Default

80 character columns

### Command Mode

EXEC

### Usage Guidelines

The width specified can be learned by remote hosts.

### Example

The following example sets the terminal character columns to 132:

```
terminal width 132
```

### Related Command

A dagger (†) indicates that the command is documented in another chapter.

**width** †

# where

To display information about all open Telnet connections associated with the current terminal line, enter the **where** EXEC command at the system prompt.

**where**

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Example

The following example shows output from the **where** command:

```
Router> where

Conn Host                Address             Byte  Idle Conn Name
   1 MIS1              131.108.19.50          0     0   MIS1
*  2 OTTER             192.31.7.24            0     0   OTTER
```

The information displayed includes the host name, address, number of characters waiting to be sent to the terminal, idle time, and connection name. An asterisk (*) indicates the current connection.

## Related Commands

**connect**
**name-connection**
**telnet** (EXEC)