



# Configuring Operating Characteristics for Terminals

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Configuring the operating characteristics for terminals enables you to customize the settings for displays, formatting, and usability of the terminals on your network.

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

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## Prerequisites for Configuring Operating Characteristics for Terminals

- You should have at least a basic familiarity with the Cisco IOS environment and the command-line interface.



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- You should have at least a minimal configuration running on your system. You can create a basic configuration file using the **setup** command (see [Using Setup Mode to Configure a Cisco Networking Device](#) for details).

## Restrictions for Configuring Operating Characteristics for Terminals

- Many of the Cisco IOS commands described in this document are available and function only in certain configuration modes on the router.
- Some of the Cisco IOS configuration commands are only available on certain router platforms, and the command syntax may vary on different platforms.

## Information About Configuring Operating Characteristics for Terminals

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## Definition of the Escape Character and Other Key Sequences

You can define or modify the default keys used to execute functions for system escape, terminal activation, disconnect, and terminal pause. Generally, the keys used are actually combinations of keys, such as pressing the Control (Ctrl) key and another key (or keys) at the same time (such as Ctrl-^). Sequences of keys, such as pressing the Control key and another key, then pressing yet another key, are also sometimes used (for example Ctrl-^, x). However, in each case these keys are referred to as characters, because each key or combination of keys is represented by a single ASCII character. For a complete list of available ASCII characters and their decimal and keyboard equivalents, see the “ASCII Character Set” appendix of the *Cisco IOS Configuration Fundamentals Command Reference*.

## Specification of an International Character Display

The classic U.S. ASCII character set is limited to 7 bits (128 characters), which adequately represents most displays in the U.S. Most defaults on the modem router work best on a 7-bit path. However, international character sets and special symbol display can require an 8-bit wide path and other handling.

You can use a 7-bit character set (such as ASCII), or you can enable a full 8-bit international character set (such as ISO 8859). This allows special graphical and international characters for use in banners and prompts, and adds special characters such as software flow control. Character settings can be configured globally, per line, or locally at the user level. Use the following criteria for determining which configuration mode to use when you set this international character display:

- If a large number of connected terminals support nondefault ASCII bit settings, use the global configuration commands.
- If only a few of the connected terminals support nondefault ASCII bit settings, use line configuration commands or the EXEC local terminal setting commands.

**Note**

Setting the EXEC character width to an 8-bit character set can cause failures. If a user on a terminal that is sending parity enters the **help** command, an “unrecognized command” message appears because the system is reading all eight bits, although the eighth bit is not needed for **help**.

If you are using the **autoselect** function, the activation character should be set to the default Return, and the EXEC character bit should be set to 7. If you change these defaults, the application does not recognize the activation request.

## Data Transparency for File Transfers

Data transparency enables the Cisco IOS software to pass data on a terminal connection without the data being interpreted as a control character.

During terminal operations, some characters are reserved for special functions. For example, the key combination Ctrl-Shift-6, X (^X) suspends a session. When transferring files over a terminal connection (using the Xmodem or Kermit protocols, for example), you must suspend the recognition of these special characters to allow a file transfer. This process is called *data transparency*.

You can set a line to act as a transparent pipe so that programs such as Kermit, Xmodem, and CrossTalk can download a file across a terminal line. To temporarily configure a line to act as a transparent pipe for file transfers, use the **terminal download** command in EXEC mode. The **terminal download** command is equivalent to using all the following commands:

- **terminal telnet transparent**
- **terminal no escape-character**
- **terminal no hold-character**
- **terminal no padding 0**
- **terminal no padding 128**
- **terminal parity none**
- **terminal databits**

## Terminal Screen Length and Width

By default, the Cisco IOS software provides a screen display of 24 lines by 80 characters. You can change these values if they do not meet the requirements of your terminal. The screen values you set are passed during rsh and rlogin sessions.

The screen values set can be learned by some host systems that use this type of information in terminal negotiation. To disable pausing between screens of output, set the screen length to 0.

The screen length specified can be learned by remote hosts. For example, the rlogin protocol uses the screen length to set terminal parameters on a remote UNIX host. The width specified also can be learned by remote hosts.

## Creation of Character and Packet Dispatch Sequences

The Cisco IOS software supports dispatch sequences and TCP state machines that send data packets only when they receive a defined character or sequence of characters. You can configure dispatch characters that allow packets to be buffered, then sent upon receipt of a character. You can configure a state machine that allows packets to be buffered, then sent upon receipt of a sequence of characters. This feature enables packet transmission when the user presses a function key, which is typically defined as a sequence of characters, such as Esc I C.

TCP state machines can control TCP processes with a set of predefined character sequences. The current state of the device determines what happens next, given an expected character sequence. The state-machine commands configure the server to search for and recognize a particular sequence of characters, then cycle through a set of states. The user defines these states—up to eight states can be defined. (Think of each state as a task that the server performs based on the assigned configuration commands and the type of character sequences received.)

The Cisco IOS software supports user-specified state machines for determining whether data from an asynchronous port should be sent to the network. This functionality extends the concept of the dispatch character and allows the equivalent of multicharacter dispatch strings.

Up to eight states can be configured for the state machine. Data packets are buffered until the appropriate character or sequence triggers the transmission. Delay and timer metrics allow for more efficient use of system resources. Characters defined in the TCP state machine take precedence over those defined for a dispatch character.

## LPD Protocol Support on a Printer

The Cisco IOS software supports a subset of the Berkeley UNIX Line Printer Daemon (LPD) protocol used to send print jobs between UNIX systems. This subset of the LPD protocol permits the following:

- Improved status information
- Cancellation of print jobs
- Confirmation of printing and automatic retry for common print failures
- Use of standard UNIX software

The Cisco implementation of LPD permits you to configure a printer to allow several types of data to be sent as print jobs (for example, PostScript or raw text).

## How to Configure Terminal Operating Characteristics

To configure operating characteristics for terminals, perform any of the tasks described in the following sections. All tasks in this chapter are optional.

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- [Setting Local Terminal Parameters, page 6](#)
- [Saving Local Settings Between Sessions, page 7](#)
- [Ending a Session, page 8](#)
- [Globally Defining Escape Character and Other Key Sequences, page 8](#)
- [Defining Escape and Pause Characters for the Current Session, page 10](#)
- [Generating a Hardware Break Signal for a Reverse Telnet Connection, page 10](#)
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## Displaying Information About the Current Terminal Session

To display terminal line information, complete the tasks in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>show whoami</b> [ <i>text</i> ]  <b>Example:</b> Router> show whoami	Displays information about the terminal line being used for the current session, including host name, line number, line speed, and location. If <i>text</i> is included as an argument in the command, that <i>text</i> is displayed as part of the additional data about the line.
Step 2	<b>where</b>  <b>Example:</b> Router> where	Lists all open sessions associated with the current terminal line. An asterisk (*) in the output indicates the current terminal session.

## Examples

The following example shows sample output of the **show whoami** command:

```
Router> show whoami

Comm Server "Router", Line 0 at 0bps. Location "Second floor, West"

--More--
Router>
```

To prevent the information from disappearing from the screen, the **show whoami** command always displays a --More-- prompt before returning to the CLI prompt. Press the Spacebar to return to the prompt.

## Setting Local Terminal Parameters

The **terminal EXEC** mode commands enable or disable features for the current session only. You can use these commands to temporarily change terminal line settings without changing the stored configuration file. To display a list of the commands for setting terminal parameters for the current session, complete the tasks in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>terminal ?</b>  <b>Example:</b> Router# terminal ?	Lists the commands for setting terminal parameters.

## Examples

The following example shows sample output for the **terminal ?** command. Commands available on your routing device will vary depending on the software image and hardware you are using.

```
Router> terminal ?
  autohangup           Automatically hangup when last connection closes
  data-character-bits  Size of characters being handled
  databits            Set number of data bits per character
  dispatch-character   Define the dispatch character
  dispatch-timeout    Set the dispatch timer
  download            Put line into 'download' mode
  editing             Enable command line editing
  escape-character    Change the current line's escape character
  exec-character-bits Size of characters to the command exec
  flowcontrol        Set the flow control
  full-help          Provide help to unprivileged user
  help              Description of the interactive help system
  history           Enable and control the command history function
  hold-character    Define the hold character
  ip               IP options
  keymap-type      Specify a keymap entry to use
  lat             DEC Local Area Transport (LAT) protocol-specific
                 configuration
  length          Set number of lines on a screen
  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
  rxspeed       Set the receive speed
  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
  width        Set width of the display terminal
```

## Troubleshooting Tips

Many terminal settings can be configured for all terminal sessions or for just the current terminal session. Settings for all terminal sessions are configured in line configuration mode and can be saved. Settings for the current session are specified using EXEC mode commands that generally begin with the word **terminal**.

## Saving Local Settings Between Sessions

To save local settings between sessions, complete the tasks in this section:

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure line</b>  <b>Example:</b> Router# configure line	Enters line configuration mode.
<b>Step 3</b>	<b>private</b>  <b>Example:</b> Router(config-line)# private	Saves local settings between sessions. You can configure the Cisco IOS software to save local parameters (set with <b>terminal</b> EXEC mode commands) between sessions. Saving these local settings ensures that the parameters remain in effect between terminal sessions (useful for servers in private offices).

**Troubleshooting Tips**

If the **private** line configuration command is not used, user-set terminal parameters are cleared when the session ends with either the **exit** EXEC mode command or when the interval set with the **exec-timeout** line configuration command has passed.

**Ending a Session**

To end a session, complete the task in this section:

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>quit</b>  <b>Example:</b> Router> quit	Ends the current session.

**What to Do Next**

Refer to the [“Managing Connections, Menus, and System Banners”](#) chapter for more information on ending sessions and closing connections.

**Globally Defining Escape Character and Other Key Sequences**

To define or change the default key sequences involved with terminal session activation, disconnection, escape, or pausing, use the following commands in line configuration mode, as needed:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>configure line</b>  <b>Example:</b> Router# configure line	Enters line configuration mode.
Step 3	<b>escape-character</b> { <i>ascii-number</i>   <i>ascii-character</i>   <b>break</b>   <b>default</b>   <b>none</b> }  <b>Example:</b> Router(config-line)# escape-character 16	Changes the system escape character. We recommend the use of the ASCII characters represented by the decimal numbers 1 through 30. The escape character can be a single character (such as ^), a key combination (such as Ctrl-X), or a sequence of keys (such as Ctrl-^, X). The default escape character (key combination) is Ctrl-Shift-6 (Ctrl-^), or Ctrl-Shift-6, X (Ctrl-^, X).
Step 4	<b>activation-character</b> <i>ascii-number</i>  <b>Example:</b> Router(config-line)# activation-character 127	Defines a session activation character. Entering this character at a vacant terminal begins a terminal session. The default activation character is the Return key.
Step 5	<b>disconnect-character</b> <i>ascii-number</i>  <b>Example:</b> Router(config-line)# disconnect-character 27	Defines the session disconnect character. Entering this character at a terminal ends the session with the router. There is no default disconnect character.
Step 6	<b>hold-character</b> <i>ascii-number</i>  <b>Example:</b> Router(config-line)# hold-character 16	Defines the hold character that causes output to the screen to pause. After this character has been set, a user can enter the character at any time to pause output to the terminal screen. To resume output, the user can press any key. To use the hold character in normal communications, precede it with the escape character. There is no default hold character.

## Troubleshooting Tips

For most of the commands described, you can reinstate the default value by using the **no** form. However, to return the escape character to its default, you should use the **escape-character default** line-configuration command.

**Note**

If you are using the autoselect function (enabled using the **autoselect** line configuration command), the activation character should not be changed from the default value of Return. If you change this default, the autoselect feature may not function.

## Defining Escape and Pause Characters for the Current Session

For the current terminal session, you can modify key sequences to execute functions for system escape and terminal pause. To modify these sequences, complete the tasks in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>terminal escape-character</b> <i>ascii-number</i>  <b>Example:</b> Router> terminal escape-character 127	Changes the system escape sequence for the current session. The escape sequence indicates that the codes that follow have special meaning. The default key combination is Ctrl-Shift-6 (Ctrl-^).  The <b>terminal escape-character EXEC</b> command is useful, for example, if you have the default escape character defined for a different purpose in your keyboard file. Entering the escape character followed by the X key returns the router to EXEC mode when the router is connected to another device.
Step 2	<b>terminal hold-character</b> <i>ascii-number</i>  <b>Example:</b> Router> terminal hold-character 16	Defines the hold sequence or character that causes output to the terminal screen to pause for this session. There is no default sequence. To continue the output, type any character after the hold character. To use the hold character in normal communications, precede it with the escape character. You cannot suspend output on the console terminal.

## Generating a Hardware Break Signal for a Reverse Telnet Connection

To cause the access server to generate a hardware Break signal on the EIA/TIA-232 line that is associated with a reverse Telnet connection for the current line and session, complete the task in this section.

### Restrictions

The command in this section applies only to access servers.

### DETAILED STEPS

	Command	Purpose
Step 1	<b>terminal telnet break-on-ip</b>  <b>Example:</b> Router> terminal telnet break-on-ip	Generates a hardware Break signal on the EIA/TIA-232 line that is associated with a reverse Telnet connection for the current line and session.

### Troubleshooting Tips

The hardware Break signal occurs when a Telnet Interrupt-Process 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 Interrupt-Process command, but cannot send a Telnet Break signal.
- Some Telnet programs implement a Break signal that sends an Interrupt-Process command.

Some EIA/TIA-232 hardware devices use a hardware Break signal for various purposes. A hardware Break signal is generated when a Telnet Break command is received.

## Setting the Line to Refuse Full-Duplex, Remote Echo Connections

To set the current line to refuse to negotiate full-duplex for the current session or remote echo options on incoming connections, complete the task in this section.

### Restrictions

The command in this section applies only to access servers.

#### DETAILED STEPS

	Command	Purpose
Step 1	<pre>terminal telnet refuse-negotiations</pre> <p><b>Example:</b> Router&gt; terminal telnet refuse-negotiations</p>	<p>Sets the current line to refuse to negotiate full-duplex for the current session.</p> <p>You can set the line to allow the Cisco IOS software to refuse full-duplex, remote echo connection requests from the other end. This refusal suppresses negotiation of the Telnet Remote Echo and Suppress Go Ahead options.</p>

## Allowing Transmission Speed Negotiation

To allow the Cisco IOS software to negotiate transmission speed for the current line and session, complete the task in this section.

### Restrictions

The command in this section applies only to access servers.

**DETAILED STEPS**

	<b>Command</b>	<b>Purpose</b>
<b>Step 1</b>	<pre>terminal telnet speed <i>default-speed</i> <i>maximum-speed</i></pre> <p><b>Example:</b> Router&gt; terminal telnet speed 2400 9600</p>	<p>Allows the Cisco IOS software to negotiate transmission speed for the current line and session.</p> <p>You can match line speeds on remote systems in reverse Telnet, on host machines that connect to the network through an access server, or on a group of console lines hooked up to an access server 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.</p>

## Synchronizing the Break Signal

To cause the Cisco IOS software to send a Telnet Synchronize signal when it receives a Telnet Break signal on the current line and session, complete the task in this section.

### Restrictions

The command in this section applies only to access servers.

**DETAILED STEPS**

	<b>Command</b>	<b>Purpose</b>
<b>Step 1</b>	<pre>terminal telnet sync-on-break</pre> <p><b>Example:</b> Router&gt; terminal telnet sync-on-break</p>	<p>Causes the Cisco IOS software to send a Telnet Synchronize signal when it receives a Telnet Break signal on the current line and session.</p> <p>You can set lines on the access server to cause a reverse Telnet line to send a Telnet Synchronize signal when it receives a Telnet Break signal. The TCP Synchronize signal clears the data path, but interprets incoming commands.</p>

## Changing the End-of-Line Character

To cause the current terminal line to send a CR signal as a CR followed by a NULL instead of a CR followed by a line feed (LF), complete the task in this section.

### Restrictions

The command in this section applies only to access servers.

## DETAILED STEPS

	Command	Purpose
Step 1	<pre>terminal telnet transparent</pre> <p><b>Example:</b> Router&gt; terminal telnet transparent</p>	<p>Causes the current terminal line to send a CR signal as a CR followed by a NULL instead of a CR followed by an LF. This command ensures interoperability with different interpretations of end-of-line handling in the Telnet protocol specification.</p> <p><b>Note</b> The end of each line typed at the terminal is ended with a CR+LF (Carriage Return plus Line Feed) signal. The CR+LF signal is sent when a user presses Enter or Return.</p>

## Configuring Data Transparency for File Transfers

To temporarily configure a line to act as a transparent pipe for file transfers, complete the task in this section:

## DETAILED STEPS

	Command	Purpose
Step 1	<pre>terminal download</pre> <p><b>Example:</b> Router&gt; terminal download</p>	<p>Configures the terminal line to act as a transparent pipe for file transfers. The <b>terminal download</b> command is equivalent to using all the following commands:</p> <ul style="list-style-type: none"> <li>• <b>terminal telnet transparent</b></li> <li>• <b>terminal no escape-character</b></li> <li>• <b>terminal no hold-character</b></li> <li>• <b>terminal no padding 0</b></li> <li>• <b>terminal no padding 128</b></li> <li>• <b>terminal parity none</b></li> <li>• <b>terminal databits 8</b></li> </ul>

## Specifying the Character Display for All Lines

To specify a character set for all lines (globally), complete steps 1, 2, and 3 or steps 1, 2, and 4 in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> <code>Router&gt; enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>configure terminal</code>  <b>Example:</b> <code>Router# configure terminal</code>	Enters global configuration mode.
Step 3	<code>default-value exec-character-bits {7   8}</code>  <b>Example:</b> <code>Router(config)# default-value exec-character-bits 8</code>	Specifies the character set used in command characters.
Step 4	<code>default-value special-character-bits {7   8}</code>  <b>Example:</b> <code>Router(config)# default-value special-character-bits 8</code>	Specifies the character set used in special characters such as software flow control, hold, escape, and disconnect characters.

## Specifying the Character Display for a Line

To specify a character set based on hardware, software, or on a per-line basis, complete any of the tasks in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> <code>Router&gt; enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>configure line</code>  <b>Example:</b> <code>Router# configure line</code>	Enters line configuration mode.
Step 3	<code>databits {5   6   7   8}</code>  <b>Example:</b> <code>Router(config-line)# databits 8</code>	Sets the number of data bits per character that are generated and interpreted by hardware.
Step 4	<code>data-character-bits {7   8}</code>  <b>Example:</b> <code>Router(config-line)# data-character-bits 8</code>	Sets the number of data bits per character that are generated and interpreted by software.

	Command or Action	Purpose
Step 5	<code>exec-character-bits {7   8}</code>  <b>Example:</b> Router(config-line)# <code>exec-character-bits 8</code>	Specifies the character set used in EXEC and configuration command characters on a per-line basis.
Step 6	<code>special-character-bits {7   8}</code>  <b>Example:</b> Router(config-line)# <code>special-character-bits 7</code>	Specifies the character set used in special characters (such as software flow control, hold, escape, and disconnect characters) on a per-line basis.

## Specifying the Character Display for the Current Session

To specify a character set based on hardware, software, or on a per-line basis for the current terminal session, use the following commands in EXEC mode:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>terminal databits {5   6   7   8}</code>  <b>Example:</b> Router> <code>terminal databits 8</code>	Sets the number of data bits per character that are generated and interpreted by hardware for the current session.
Step 2	<code>terminal data-character-bits {7   8}</code>  <b>Example:</b> Router> <code>terminal data-character-bits 8</code>	Sets the number of data bits per character that are generated and interpreted by software for the current session.
Step 3	<code>terminal exec-character-bits {7   8}</code>  <b>Example:</b> Router> <code>terminal exec-character-bits 8</code>	Specifies the character set used in EXEC and configuration command characters on a per-line basis for the current session.
Step 4	<code>terminal special-character-bits {7   8}</code>  <b>Example:</b> Router> <code>terminal special-character-bits 7</code>	Specifies the character set used in special characters (such as software flow control, hold, escape, and disconnect characters) on a per-line basis for the current session.

## Setting Character Padding

Character padding adds a number of null bytes to the end of a line and can be used to make that line an expected length for conformity. You can change the character padding on a specific output character.

### Setting Character Padding for a Line

To set character padding for a line, complete the tasks in this section:

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<code>enable</code>  <b>Example:</b> <code>Router&gt; enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<code>configure line</code>  <b>Example:</b> <code>Router# configure line</code>	Enters line configuration mode.
<b>Step 3</b>	<code>padding <i>ascii-number count</i></code>  <b>Example:</b> <code>Router(config-line)# padding 13 25</code>	Sets padding on a specific output character for the specified line.

**Changing Character Padding for the Current Session**

To change character padding on a specific output character for the current session, complete the task in this section:

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<code>terminal padding <i>ascii-number count</i></code>  <b>Example:</b> <code>Router&gt; terminal padding 4 164</code>	Sets padding on a specific output character for the specified line for the current session.

**Specifying the Terminal Type for a Line**

To specify the terminal type for a line, complete the tasks in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>Enter your password if prompted.</li></ul>
Step 2	<code>configure line</code>  <b>Example:</b> Router# configure line	Enters line configuration mode.
Step 3	<code>terminal-type terminal-type</code>  <b>Example:</b> Router(config-line)# terminal-type vt220	Specifies the terminal type. Any string is accepted for the <i>terminal-type</i> argument.  You can specify the type of terminal connected to a line to provide a record of the type of terminal attached to a line (in Telnet terminal negotiations) to inform the remote host of the terminal type for display management.

## Troubleshooting Tips

This feature is used by TN3270 terminals to identify the keymap and ttycap passed by the Telnet protocol to the end host.

## Specifying the Terminal and Keyboard Type for the Current Session

To specify the type of terminal connected to the current line and keyboard type for the current session, complete the tasks in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>terminal terminal-type terminal-type</code>  <b>Example:</b> Router> terminal terminal-type vt220	Specifies the terminal type for the current session.  Indicate the terminal type if it is different from the default of VT100. This default is used by TN3270 terminals for display management and by Telnet and rlogin to inform the remote host of the terminal type.
Step 2	<code>terminal keymap-type keymap-name</code>  <b>Example:</b> Router> terminal keymap-type vt220	Specifies the keyboard type for the current session.  You must specify the keyboard type when you use a keyboard other than the default of VT100. The system administrator can define other keyboard types (using the <b>terminal-type</b> line configuration command) and provide these names to terminal users.

## Setting the Terminal Screen Length and Width for a Line

To set the terminal screen length and width for all sessions on a line, use either of the following commands in line configuration mode:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>configure line</b>  <b>Example:</b> Router# configure line	Enters line configuration mode.
Step 3	<b>length</b> <i>screen-length</i>  <b>Example:</b> Router(config-line)# length 0	Sets the screen length.
Step 4	<b>width</b> <i>characters</i>  <b>Example:</b> Router(config-line)# width 132	Sets the screen width.

## Setting the Terminal Screen Length and Width for the Current Session

To set the number of lines or character columns on the current terminal screen for the current session, complete the tasks in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>configure line</b>  <b>Example:</b> Router# configure line	Enters line configuration mode.

	Command or Action	Purpose
Step 3	<code>terminal length screen-length</code>  <b>Example:</b> Router(config-line)# terminal length 0	Sets the screen length for the current session.
Step 4	<code>terminal width characters</code>  <b>Example:</b> Router(config-line)# terminal width 132	Sets the screen width for the current session.

## Enabling Pending Output Notifications

To enable pending output notifications for a line, complete the tasks in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>configure line</code>  <b>Example:</b> Router# configure line	Enters line configuration mode.
Step 3	<code>notify</code>  <b>Example:</b> Router(config-line)# notify	Enables the system to inform users when output is pending on a connection other than the active connection for situations in which users are likely to have multiple, concurrent telnet connections through the system (for example, the user might want to know when another connection receives mail or a message).

## Setting Pending Output Notification for the Current Session

To set pending output notification for the current session, complete the task in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>terminal notify</code>  <b>Example:</b> Router> terminal notify	Sets up a line to notify a user of pending output for the current session.

## Setting Character and Packet Dispatch Sequences for a Line

To configure your system, complete the tasks in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>state-machine</b> <i>name state firstchar lastchar</i> [ <i>nextstate</i>   <b>transmit</b> ]  <b>Example:</b> Router(config)# state-machine function 0 0 255 6 transmit	Specifies the transition criteria for the states in a TCP state machine.
Step 3	<b>configure line</b>  <b>Example:</b> Router# configure line	Enters line configuration mode.
Step 4	<b>dispatch-machine</b> <i>name</i>  <b>Example:</b> Router(config-line)# dispatch-machine linefeed	Specifies the state machine for TCP packet dispatch.
Step 5	<b>dispatch-character</b> <i>ascii-number</i> [ <i>ascii-number2</i> . . . <i>ascii-number</i> ]  <b>Example:</b> Router(config-line)# dispatch-character 13	Defines a character that triggers packet transmission.
Step 6	<b>dispatch-timeout</b> <i>milliseconds</i>  <b>Example:</b> Router(config-line)# dispatch-timeout 80	Sets the dispatch timer.
Step 7	<b>buffer-length</b> <i>length</i>  <b>Example:</b> Router(config-line)# buffer-length 132	Specifies the maximum length of the data stream to be forwarded.

## Changing the Packet Dispatch Character for the Current Session

To change the packet dispatch character for the current session, complete the tasks in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>configure terminal</code>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<code>terminal dispatch-character ascii-number1</code> [ <i>ascii-number2 . . . ascii-number</i> ]  <b>Example:</b> Router# terminal dispatch-character 4 25	Defines a character that triggers packet transmission for the current session.

## Changing Flow Control for the Current Session

To change flow control between the router and attached device for the current session, complete the tasks in this section, as needed:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>terminal flowcontrol {none   software [in   out]   hardware}</code>  <b>Example:</b> Router# terminal flowcontrol software in	Sets the terminal flow control for this session.
Step 3	<code>terminal start-character ascii-number</code>  <b>Example:</b> Router# terminal start-character 15	Sets the flow control start character in the current session. <b>Note</b> This command is seldom used. Typically, you only need to use the <b>terminal flowcontrol</b> command.
Step 4	<code>terminal stop-character ascii-number</code>  <b>Example:</b> Router# terminal stop-character 5	Sets the flow control stop character in the current session. <b>Note</b> This command is seldom used. Typically, you only need to use the <b>terminal flowcontrol</b> command.

## Troubleshooting Tips

Software flowcontrol is enabled by default for EE switch console.

## Enabling Session Locking

To allow session locking by users on a specific line or group of lines, complete the tasks in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>configure line</code>  <b>Example:</b> Router# configure line	Enters line configuration mode.
Step 3	<code>lockable</code>  <b>Example:</b> Router(config-line)# lockable	Enables a temporary terminal-locking mechanism. The <b>lock</b> command temporarily locks access to a session, denying access to other users. Session locking must be enabled on the line for the <b>lock</b> command to work.

## Configuring Automatic Baud Rate Detection

You can configure a line to automatically detect the baud rate being used. To set up automatic baud rate detection, complete the tasks in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>configure line</code>  <b>Example:</b> Router# configure line	Enters line configuration mode.
Step 3	<code>autobaud</code>  <b>Example:</b> Router(config-line)# autobaud	Configures a line to automatically detect the baud rate.  <b>Note</b> Donot use the <b>autobaud</b> command with the <b>autoselect</b> command.

## Troubleshooting Tips

To start communications using automatic baud detection, use multiple Returns at the terminal. A 600-, 1800-, or 19200-baud line requires three Returns to detect the baud rate. A line at any other baud rate requires only two Returns. If you use extra Returns after the baud rate is detected, the EXEC facility simply displays another system prompt.

## Setting a Line as Insecure

You can set up a terminal line to appear as an insecure dialup line. The information is used by the local-area transport (LAT) software, which reports such dialup connections to remote systems.

To set a line as insecure, complete the tasks in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>configure line</b>  <b>Example:</b> Router# configure line	Enters line configuration mode.
Step 3	<b>insecure</b>  <b>Example:</b> Router(config-line)# insecure	Sets the line as a dialup line.  <b>Note</b> In early releases of Cisco IOS software, any line that used modem control was reported as dialup connection through the LAT protocol; this command allows more direct control of your line.

## Configuring Communication Parameters for Terminal Ports

To change the following parameters as necessary to meet the requirements of the terminal or host to which you are attached, complete the tasks in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>terminal {speed   txspeed   rxspeed} bps</b>  <b>Example:</b> Router> terminal rxspeed 115200	Sets the line speed for the current session. Choose from line speed, transmit speed, or receive speed.
Step 2	<b>terminal databits {5   6   7   8}</b>  <b>Example:</b> Router> terminal databits 7	Sets the data bits for the current session.

	Command or Action	Purpose
Step 3	<code>terminal stopbits {1   1.5   2}</code>  <b>Example:</b> Router> terminal stopbits 2	Sets the stop bits for the current session.
Step 4	<code>terminal parity {none   even   odd   space   mark}</code>  <b>Example:</b> Router> terminal parity odd	Sets the parity bit for the current session.

## Displaying Debug Messages on the Console and Terminals

To display **debug** command output and system error messages in EXEC mode on the current terminal, complete the tasks in this section:

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>terminal monitor</code>  <b>Example:</b> Router# terminal monitor	Displays <b>debug</b> command output and system error messages in EXEC mode on the current terminal.

### Troubleshooting Tips

Remember that all terminal parameter-setting commands are set locally and do not remain in effect after a session is ended. You must use this command at the privileged-level EXEC prompt at each session to display the debugging messages.

## Recording the Serial Device Location

To record the location of a serial device so the text provided for the location appears in the output of the EXEC monitoring commands, complete the tasks in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>configure line</code>  <b>Example:</b> Router# configure line	Enters line configuration mode.
Step 3	<code>location text</code>  <b>Example:</b> Router(config-line)# location Building 3, First Floor	Records the location of a serial device.

## Changing the Retry Interval for a Terminal Port Queue

If you attempt to connect to a remote device such as a printer that is busy, the connection attempt is placed in a terminal port queue. If the retry interval is set too high, and several routers or other devices are connected to the remote device, your connection attempt can have long delays. To change the retry interval for a terminal port queue, complete the tasks in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<code>configure terminal</code>  <b>Example:</b> Router# configure terminal	Enters terminal configuration mode.
Step 3	<code>terminal-queue entry-retry-interval interval</code>  <b>Example:</b> Router(config)# terminal-queue entry-retry-interval 10	Changes the retry interval for a terminal port queue: <ul style="list-style-type: none"> <li><i>interval</i>—Number of seconds between terminal port retries. The default is 60 seconds.</li> </ul>

## Configuring LPD Protocol Support on a Printer

To configure a printer for the LPD protocol, complete the tasks in this section:

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters terminal configuration mode.
Step 3	<b>printer</b> <i>printername</i> { <i>line number</i>   <b>rotary</b> <i>number</i> } [ <b>newline-convert</b> ]  <b>Example:</b> Router(config)# printer printer1 line 4	Configures a printer and specifies a tty line (or lines) for the device.

## Examples

The following example includes the configuration of the printer named saturn on the host memphis:

```
comm1pt|Printer on cisco AccessServer:\
:rm=memphis:rp=saturn:\
:sd+/usr/spool/lpd/comm1pt:\
:lf=?var/log/lpd/comm1pt:
```

The content of the actual file may differ, depending on the configuration of your UNIX system.

To print, users use the standard UNIX lpr command.

## Troubleshooting Tips

If you use the **printer** command, you also must modify the `/etc/printcap` file on the UNIX system to include the definition of the remote printer on the router. Use the optional **newline-convert** keyword on UNIX systems that do not handle single character line terminators to convert a new line to a character Return, line-feed sequence.

## Displaying a List of Currently Defined Printers

To display a list of currently defined printers and current usage statistics for each printer, complete the task in this section:

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<p><code>show printer</code></p> <p><b>Example:</b>                      Router&gt; <code>show printer</code></p>	<p>Lists currently defined printers and their current usage statistics.</p>

**Troubleshooting Tips**

To provide access to LPD features, your system administrator must configure a printer and assign a TTY line (or lines) to the printer. The administrator must also modify the `/etc/printcap` file on your UNIX system to include the definition of the remote printer in the Cisco IOS software.

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