Chapter 21

Terminal Server

Introduction

This chapter describes the terminal server facilities provided by the router, how to configure virtual terminals, define services and create host nickname tables.

See Chapter 7, Interfaces for details of how to configure and manage the asynchronous ports on the router. See Chapter 22, Printer Server for details of how to create permanent assignments using the asynchronous terminal ports and how to configure asynchronous ports as printer ports.

Asynchronous ports may also be used as network interfaces using SLIP (Serial Line Internet Protocol) and asynchronous PPP (Point-to-Point Protocol). See Chapter 28, Asynchronous Call Control for more detailed information.

Some of the commands described in this chapter are available as both Manager (or Security Officer) privilege level and User privilege level commands. Normally, commands that require only User privilege have a restricted syntax. For example, if the **set asyn** command is issued from a port with User privileges, it can only alter characteristics of the port from which the command was entered. Displays produced by some commands are different for different privilege levels. Differences are described in the individual command descriptions.

TTY Devices

A *TTY device* is a *s*oftware device that forms a link between a terminal device (a terminal connected to an asynchronous port or a Telnet connection), and the router's command processor or the interactive and Telnet services provided by the router. TTY devices support Telnet connections to the router and multiple terminal sessions from a single asynchronous port or Telnet connection. The term TTY is derived from the UNIX operating system where TTY is an abbreviation for TeleTYpe, the terminal I/O handling software layer in UNIX. TTY devices are also called *virtual terminals*.

Each asynchronous port has associated with it a dedicated TTY device that provides access to the router's command prompt, and interactive and Telnet services (Figure 21-1 on page 21-4). When a terminal session is initiated from the port to an interactive service (using the **connect** command on page 21-15), a dynamic connection is established between the dedicated TTY for the port and the dedicated TTY for one of the asynchronous ports assigned to the service. When a terminal session is initiated to a Telnet service (using the **connect** command on page 21-15 or the **telnet** command on page 21-31), a dynamic TTY device is created for the Telnet service and linked to the dedicated TTY device.

Some configuration parameters of a terminal connection to an asynchronous port such as the baud rate apply only to the physical port; whereas other parameters such as the prompt apply to the dedicated TTY device. Parameters in the **set asyn** command on page 7-37 of Chapter 7, Interfaces can be used to set the configuration of both the physical port and the dedicated TTY device (Table 21-1 on page 21-3).

Table 21-1: Configuration parameters for TTY devices

| Parameter	Meaning
history	Sets the number of commands saved for command line recall.
page	Sets the number of lines of output displayed on the terminal before the router pauses and waits for the user to press a key to continue.
prompt	Sets the router prompt to a string, the default prompt, or disables the prompt.
type	Sets the type of the terminal to VT100 or DUMB. Dumb terminals are used for printing or for terminals that do not support VT100 escape sequences.

The physical characteristics of the asynchronous port affect the operation of the port as a network interface, as well as a terminal port. However, characteristics of the dedicated TTY device affect only terminal connections and have no affect when the port is used as a network interface.

When the **set asyn** command on page 7-37 of Chapter 7, Interfaces is executed from a terminal attached to an asynchronous port, it displays the configuration of the asynchronous port, followed by the configuration of the dedicated TTY device. To view the configuration of a dedicated TTY device, use the command:

```
show tty
```

A Telnet connection (created when a user Telnets to the router) also has an associated dedicated TTY device (Figure 21-1 on page 21-4). The TTY device is temporary, however, and exists while the Telnet connection is active. When a terminal session is initiated from the Telnet session to an interactive service (using the **connect** command on page 21-15), a dynamic connection is established between the dedicated TTY device for the Telnet connection and the dedicated TTY for one of the asynchronous ports assigned to the service.

Figure 21-1: TTY devices provide an interface between terminals and Telnet connections, the router's command processor, and interactive and Telnet services provided by the router
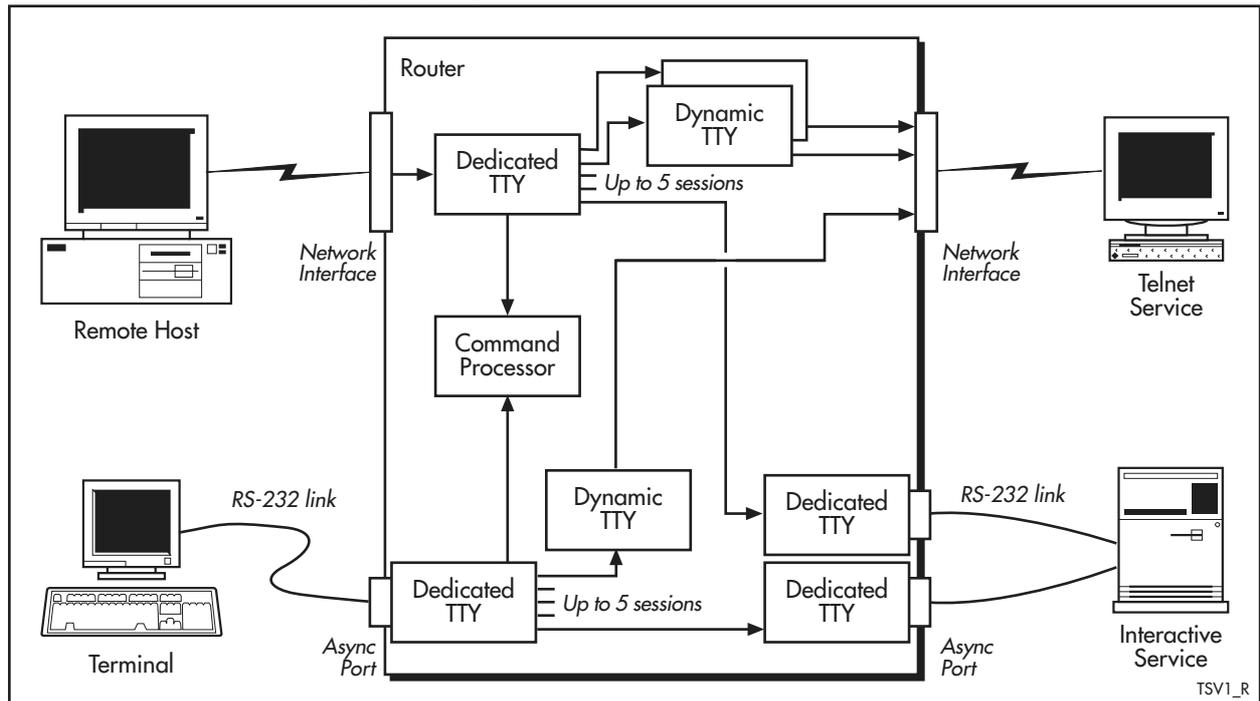
The **set asyn** command on page 7-37 of Chapter 7, Interfaces can be used to set the configuration of a dedicated TTY device (Table 21-1 on page 21-3). Physical port characteristics cannot be set since by nature, a Telnet connection is not associated with an asynchronous port. When the **set asyn** command is executed from a Telnet connection, it displays the configuration of the dedicated TTY device, and is equivalent to the **show tty** command on page 21-27.

From either a terminal attached to an asynchronous port or a Telnet connection, use the following command to display the configuration of any TTY device, including both dedicated and dynamically created TTY devices.

```
show tty[=tty-number]
```

To display a one-line summary for a specific TTY device, use the command:

```
show tty[=tty-number] summary
```

If ALL is specified as the TTY device, a list of all existing dedicated and dynamic TTY devices is displayed.

To set the default configuration for dynamically created TTY devices dedicated to Telnet connections, use the command:

```
set tty [history=0..99] [page=4..99] [prompt={prompt|default|
    off}] [type={dumb|vt100}]
```

The default configuration for TTY devices dedicated to the asynchronous ports is set with the **set asyn** command on page 7-37 of Chapter 7, Interfaces. All defaults are retained through router reboots.

Command Line Editing and Recall

The router supports command line editing and recall. The functions available are shown in Table 21-2.

Table 21-2: Command line editing functions and keystrokes

Function	VT100 Terminal	Dumb terminal
Moves cursor backwards and forwards within the command line by using the cursor keys	←, □→	*Not available*
Moves the cursor to the beginning of the command line	[Ctrl/A]	*Not available*
Moves the cursor to the end of the command line	[Ctrl/E]	*Not available*
Deletes character to left of cursor	[Delete] or [Backspace]	[Delete] or [Backspace]
Toggles between insert/overstrike	[Ctrl/O]	*Not available*
Clears command line	[Ctrl/U]	[Ctrl/U]
Moves backwards through a history of previous commands	↑ or [Ctrl/B]	[Ctrl/B]
Moves forwards through a history of previous commands	↓ or [Ctrl/F]	[Ctrl/F]
Displays command history and select a command from the list	[Ctrl/C] or **show asyn history**	[Ctrl/C] or **show asyn history**
Clears command history	**reset asyn history**	**reset asyn history**
Recalls the most recent command matching a partially entered command	[Tab] or [Ctrl/I]	[Tab] or [Ctrl/I]
Terminates Telnet session before login complete	[Ctrl/D]	[Ctrl/D]
Interrupts (or "breaks") text paging or continuously streaming text, for example, when results from **show** commands are displayed. Buffered text is deleted.	Ctrl-Q	Ctrl-Q

The router assumes that the width of the terminal screen is 80 characters, and performs command line wrapping at the 80th column regardless of the setting of the terminal. The cursor does not need to be at the end of the line for the command to be executed. The default editing mode is insert mode. Characters are inserted at the cursor position and any characters to the right of the cursor are pushed to the right to make room. In overstrike mode, characters are inserted at the cursor position and replace any existing characters.

For VT100-compatible terminals, recalled commands are all displayed on the same line, but for dumb terminals recalled commands are displayed on succeeding lines. To configure the maximum number of commands stored in the command history, use the commands:

```
set asyn history
set tty history
```

Multiple Sessions

Once a terminal or Telnet connection has been made to the router, it is possible to Telnet to another host or to connect to a service defined on the router. The connection between the TTY device for the terminal port or Telnet connection and the TTY device for the service is called a session. It is possible to have up to five sessions open at one time, but only one session may be active at any one time. Input from the terminal or Telnet connection is sent to the active session and output from the active session is sent to the terminal or Telnet connection. Inactive sessions do not receive any input. Output from a inactive session is buffered until the session becomes the active session. To create a session. use the command:

```
connect service

telnet hostaddr
```

where *service* may be an interactive service on this router or a Telnet service, and *hostaddr* may be a host name defined in host address table, the IP address of a host in dotted decimal notation or a domain name to be resolved by a *Domain Name Server* (DNS).

Once the session is created, input from the terminal is sent to the host or service and output from the host or service is sent to the terminal. To return to the router prompt a special character must be typed; this character is known as the *attention character*. For an asynchronous port, this character is a [Break] by default, but may be changed to [Ctrl/P] by using the following command if the method of connection from the terminal to the port prevents the transmission of a [Break].

```
set asyn attention=^P
```

See the **set asyn** command on page 7-37 of Chapter 7, Interfaces for more information. For a Telnet connection the attention character is always [Ctrl/P]. The attention character for a Telnet session cannot be a [Break] because it is not possible to transmit such a character over the network, since [Break] is a line state rather than a true character.

When a session is active, pressing the attention character suspends the session and returns the user to the router prompt. Another session can be created by entering another **connect** or **telnet** command. Up to five concurrent sessions may be established. While a session is suspended it remains connected until it is terminated by the user or the remote host (in the case of a Telnet session).

A number of router commands are provided to manage sessions. To display the currently established sessions, use the command:

```
show session
```

To reconnect to a session, use the command:

```
reconnect session-number
```

To terminate a session, use the command:

```
disconnect session-number
```

An alternative method of reconnecting to a session is to press [Ctrl/X] to display the name of the first available session and a reconnect command for the session next to the prompt. To reconnect to this session press [Enter] or [Return]. Pressing [Ctrl/X] repeatedly displays each available session in turn. Press [Enter] or [Return] when the desired session is displayed.

Accessing Telnet Hosts and Other Services

Asynchronous ports on the router are often used to access Telnet hosts or interactive services available on the network by using the **telnet** command on page 21-31 and the **connect** command on page 21-15.

Telnet

To access a Telnet host, use the command:

```
telnet ipadd
```

where *ipadd* is an IPv4 address in dotted decimal form, a valid IPv6 address, or a full domain name. For example, a host with the domain name zaphod.beeblebrox.com and IP address 172.16.1.5 can be accessed with either of the commands:

```
telnet zaphod.beeblebrox.com
telnet 172.16.1.5
```

If a domain name is specified, the router sends a request to a name server to translate the domain name to an IP address. If the translation is successful, the router attempts to make a connection to the host specified by the IP address.

A name server must be defined with the **set ip nameserver** command on page 14-151 of Chapter 14, Internet Protocol (IP). The domain name lookup may take several seconds, during which time the normal router prompt reappears. When the lookup is complete, a message is displayed indicating whether the lookup was successful.

To assign a short nickname to popular Telnet hosts, use the command:

```
set ip host=nickname ipaddress=ipadd
```

To see the current list of nicknames, use the command:

```
show ip host
```

The Telnet host can now be accessed with the command:

```
telnet nickname
```

For example, if the Telnet host zaphod.beeblebrox.com is assigned the nickname zaphod, then it can be accessed with the command:

```
telnet zaphod
```

Using nicknames solves two problems: it reduces the time delay associated with domain name lookups, and it saves users having to remember IP addresses or long domain names.

See the **set ip host** command on page 14-144 of Chapter 14, Internet Protocol (IP) and the **show ip host** command on page 14-189 of Chapter 14, Internet Protocol (IP) for more information about configuring host names.

Services

An *interactive service* is a connection to another port on the router. For instance, a service could be used to attach a dialup modem to a remote or local port, or to allow host port connections to hosts that do not support TCP/IP directly. In this case, the host asynchronous ports are directly attached (using a crossed cable normally) to the asynchronous ports on the router.

A *Telnet service* is a service that is not associated with a particular port on the router. It is provided so that users can access both local and remote hosts by using the **connect** command on page 21-15.

To create and delete services, use the commands:

```
create service=service-name description="description"
    type={interactive|telbin|telnet} [ipaddress=ipadd]
    [visible={on|off}]

destroy service=service-name
```

To modify an existing service, use the command:

```
set service=service-name [description="description"}
    [ipaddress=ipadd] [visible={on|off}]
```

To assign asynchronous ports to the service, use the command:

```
set asyn=asyn-number service=service-name
```

See the **set asyn** command on page 7-37 of Chapter 7, Interfaces for more information.

To connect to a service, use the command:

```
connect service-name
```

To display a list of the currently available services, use the command:

```
show service[=service-name] [type={telnet|interactive|
    telbin}]
```

On a port with User privileges, the display lists the service names, descriptions and whether the service is a Telnet service or an interactive service. On a port with Manager privileges, the display includes additional information such as the type of service (e.g. Telnet), the IP address of the service (for Telnet services) and whether the service is visible to users.

Reverse Telnet

This implementation of reverse Telnet is in accordance with RFC 2217 "Telnet Com Port Control Option".

What does reverse Telnet do?

Reverse Telnet allows traffic to flow in both directions between the Telnet client and server during a session. In the normal mode of Telnet, a client initiates a session to a port on an access server, and once the session is established, messages are passed only from the server to the client. But with reverse Telnet, once the session is established and the client authenticated, the client can send commands (typically from a PC) to the server. The client can configure the target com port and receive data over that port. Client commands are detailed in RFC 2217.

Reverse Telnet TCP ports

When reverse Telnet is enabled, the device will initialise Telnet listen sessions for TCP ports. There is a TCP port, starting with 2001, for each asyn port on the device except asyn0. (Asyn0 is for management only and can not be used for reverse Telnet.) For example, a device with the four asyn ports asyn1 to asyn4 may have four reverse Telnet listen sessions on TCP ports 2001, 2002, 2003, and 2004. If an asyn port supports the following baud rates, they can be used for this implementation of reverse Telnet: 1200, 2400, 4800, 9600, 28800, 38400, 57600, 152000, and 512000.

Client command limitations

A client connected to an Allied Telesyn router with reverse Telnet can send it commands. These commands are executed from the client machine (typically a PC), and are **not** executed at the CLI of the Allied Telesyn device. The following client commands deviate from RFC 2217, *Special Com Port Control Commands*. See the RFC for details about client commands.

The only supported options for the *set control* client command are:

- request flow control
- set flow control
- set break
- set DTR state
- set RTS state
- request inbound flow control

The *set linestate mask* and *set modemstate mask* client commands are accepted and processed, but notifications of com port and modem line change are not implemented.

The *purge data* client command is accepted but not actioned.

Configuration Examples

The following examples illustrate how to configure a range of asynchronous services on the router.

Telnet Service

In order to set up a Telnet service, the router must be running TCP/IP. It is not necessary for the router to be acting as a router; it could be configured as a server. For this reason, there is no assumption about a remote router. This example uses "A Basic TCP/IP Setup" on page 14-53 of Chapter 14, Internet Protocol (IP) as a basis.
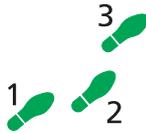
To configure a Telnet service

1. **Configure the IP routing module.**

    To configure the IP routing module from scratch, first purge the module to remove any old configuration information. Enable the IP routing module and configure the default interface for IP:

    ```
    purge ip
    enable ip
    add ip interface=eth0 ip=172.16.8.33 mask=255.255.255.0
    ```

2. **Define the Telnet service.**

    Define an asynchronous service called "test" of type *telnet* and specify the IP address of the service (the host to which Telnet sessions should connect):

    ```
    create service=test type=telnet ipaddress=172.16.8.2
        description="Telnet test"
    ```

    A user connected to the router with either a terminal or using reverse Telnet could access the host with IP address 172.16.8.2 by simply typing:

    ```
    C TEST
    ```

    The **connect** command on page 21-15 has been abbreviated to 'c'. This command, like all others, is not case sensitive. Neither is the service name 'test'. Manager level access is required to define the service but not to use it.

Locally Defined Service

A locally defined service could be used to gain access to devices like dialup modems or hosts that have only asynchronous ports. In either case, the process consists of connecting a port on the router to the device in question and then gaining a connection to that port based on a text string entered at the terminal. The process is made more powerful by the fact that a bank of ports can be accessed with a single name. As users connect to these ports, the next free port is selected.

As with the previous example of a Telnet service, locally defined services do not need to have any router modules defined. This example uses ports 2, 3 and 4 to access a host called NCR2, and port 5 to access a modem called *modem*.
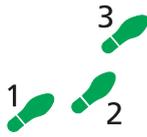
3 **To configure a local service**

1. Define the services.

Create two services, one to access the NCR2 host and one to access the dialup modem:

```
create service=ncr2 type=inter desc="ncr mainframe host"
create service=modem type=inter desc="Dial out modem"
```

2. Configure the asynchronous port.

Configure the asynchronous ports that is connected to the host and modem. For the ports connecting to the host, set up the port characteristics to match the host. Assume that the modem is configured for 2400 bps, 7 data bits and no parity.

```
set asyn=1 speed=2400 data=7
```

3. Assign the ports to each service.

Two ports are connected to the host service, so that up to two users can access the host via the service at any one time. Only one port is connected to the modem.

```
set asyn=2 service=ncr2
set asyn=3 service=ncr2
set asyn=1 service=modem
```

The services can be tested by attempting to connect to each service:

```
connect ncr2
connect modem
```

Permanent Assignment

A permanent assignment is a logical connection between two asynchronous ports. These ports are normally on different routers. The permanent assignment is commonly used to support remote printers when LPD is unsuitable.

Permanent assignments are established and maintained using TCP/IP. Therefore the routers at each end of the assignment must be running TCP/IP, either as a server or as a gateway. In addition, because a proprietary method sets up the link, a permanent assignment cannot be established to a router from another vendor.

This example sets up an assignment between two routers. The permanent assignment is called "Tester". The local router has an IP address of 172.16.8.33 and the permanent assignment uses port 6, set to 9600, 8 data bits, no parity. The remote router has an IP address of 172.16.24.6 and the permanent assignment uses port 2, set to 9600, 8 data bits, even parity.

The assignment is referred to by name in all other related commands. The name is a text string of up to 15 characters. It is case sensitive.
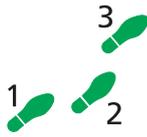
To configure a permanent assignment

1. **Configure the asynchronous ports.**

    Configure the asynchronous ports on each router to suit the speed and data framing requirements at each end of the link. It is not necessary that they both be the same. For example, to set the local port use:

    ```
    set asyn=6 speed=9600 data=8 parity=none
    ```

    To set the remote port use:

    ```
    set asyn=2 speed=9600 data=8 parity=even
    ```

2. **Create the permanent assignment.**

    Set up the permanent assignment on the local router using:

    ```
    add perm=tester lport=6 rport=2 ipaddress=172.16.24.6
    ```

    Set up the permanent assignment on the remote router using:

    ```
    add perm=tester lport=2 rport=6 ipaddress=172.16.8.33
    ```

Remote Use of Asynchronous Services

The router's asynchronous ports may be accessed remotely by modem for a variety of purposes. See Chapter 7, Interfaces for a detailed description of the configuration of the asynchronous ports. Where asynchronous ports are accessible by modem, security is paramount. See "User Authentication Facility" on page 1-15 of Chapter 1, Operation for a description of the security features available on the router to support remote access via the asynchronous ports.

This example describes how to connect a modem to an asynchronous port and configure the router for dial-in access to asynchronous services. It is assumed that the IP module has been set up correctly as this is required when Telnet services or TACACS authentication are to be used. See "A Basic TCP/IP Setup" on page 14-53 of Chapter 14, Internet Protocol (IP) for information on configuring IP. It is also assumed that, when necessary, interactive and/or Telnet services have been set up on the router. See the previous examples for details.
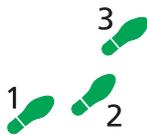
To configure a remote dial-up service

1. **Attach a modem to an asynchronous port.**

    Port 1 is to be used for dial-up access. Connect the modem to port 1 on the router. See the Hardware Reference for a description of the cables and connectors required to connect a modem to an asynchronous port.

    Refer to the documentation for the modem and configure the modem for the correct baud rate. Configure the port to have the desired baud rate for the modem, connect the modem to the port and then connect to the port using the **connect** command on page 21-15. You can then issue commands to the modem via this connection. The modem should also be configured to automatically answer calls and to disconnect a call when the Data Terminal Ready (DTR) modem control signal is negated.

2. **Configure the asynchronous port.**

Reset the port to its factory default settings:

```
purge asyn=1
```

Configure the port for dial-in access, setting hardware flow control, baud rate and the CDCONTROL option:

```
set asyn=1 flow=hardware speed=speed cdcontrol=connect
```

3. **Configure user authentication.**

Router users may be authenticated by reference to the router's User Authentication Database or to an independent TACACS authentication server.

To configure the User Authentication Database, add the login names for the users to the User Authentication Database. For example:

```
add user=bill password=initial description="Bill's Modem"
```

This command defines a login name of "bill" with an initial password of "initial". Once this login name has been defined the user (Bill) should log in and change the password to something that only the user knows. The login name may be a maximum of 64 characters long, may contain letters and numbers, and is not case sensitive. The password may be a maximum of 32 characters, may contain any printing character, and is case sensitive. The description may be up to 23 characters long and must be in quotes if it contains embedded spaces. By default, passwords must be at least 6 characters long but this limit may be altered. Enter the command:

```
show user configuration
```

to see the parameters that may be changed and their current settings.

Alternatively, users may be authenticated by sending the login name and password to a TACACS server. The server returns a response indicating whether to accept or reject the login. A TACACS server is defined using the command:

```
add tacacs server=202.34.35.24
```

specifying the IP address of the TACACS server. If a login name entered by a user is not found in the User Authentication Database a query is automatically sent to the TACACS server (if one is defined). Multiple TACACS servers may be defined to provide backup if one server is not operational.

4. **Configure a default service.**

The DEFAULTSERVICE parameter configures a port to automatically connect to a service when a call is received.

Define Telnet or interactive service as required. If the desired service is an interactive service then the service must be assigned to one or more router ports with the command:

```
set asyn=2 service=ncr2
```

See *Locally Defined Service* above for more information on defining services. Do not specify the DEFAULTSERVICE with this command.

Specify the default service for the dial-in port(s) with the command:

```
set asyn=1 service=ncr2 defaultservice=yes
```

The DEFAULTSERVICE parameter changes the effect of assigning a service to a port. If the DEFAULTSERVICE parameter is omitted or set to "NO" then the port is assigned to the service for use in connections *from* the router. The service must be an interactive service. If the DEFAULTSERVICE parameter is set to "YES" then an automatic connection is made to that service when a call comes into the router. For a port that is directly connected to a terminal or PC, rather than to a modem, the automatic connection is made as soon as any character is typed at the port.

Troubleshooting

No response after connection to service

1. Check that the service port is correctly cabled. See the Hardware Reference.

2. Check that the service port is correctly configured. Type

    ```
    show asyn=5
    ```

    to check the setting on the MODEM service port.

3. Contact your authorised distributor or reseller for assistance.

Connection attempt fails

If the connection attempt fails with the message:

```
No free host ports
```

1. Check that ports have been assigned to the service.

2. Check that all assigned ports are already in use.

3. Contact your authorised distributor or reseller for assistance.

Permanent assignment fails

1. The network between the two routers could be faulty. Test this as outlined in "A Basic TCP/IP Setup" on page 14-53 of Chapter 14, Internet Protocol (IP), or use the **ping** command on page 14-129 of Chapter 14, Internet Protocol (IP) from a local TCP/IP host to check that both routers respond.

2. Check the cabling for each port is correctly installed and that the ports are correctly configured for the application.

3. Try resetting the permanent assignment by using:

    ```
    reset perm="name"
    ```

4. Contact your authorised distributor or reseller for assistance.

Command Reference

This section describes the commands available on the router to configure and use the terminal server functions on the router.

When a user executes the **connect** command on page 21-15 or the **telnet** command on page 21-31 to access a service on the network, the port where the user's terminal is connected is said to be *assigned*. Most of the commands for configuring an asynchronous terminal port described in this section do not work when the port is assigned. An error message to that affect is displayed if an attempt is made to change the characteristics of a port that is currently assigned.

The shortest valid command is denoted by capital letters in the Syntax section. See "Conventions" on page xcv of Preface in the front of this manual for details of the conventions used to describe command syntax. See Appendix A, Messages for a complete list of messages and their meanings.

connect

Syntax   Connect *service-name*

Connect ASYn=*port-number*

where:

■   *service-name* is the name of a service 1 to 15 characters long, with no embedded spaces. The first character must be alphabetic (A–Z). The name is not case sensitive.

■   *port-number* is the number of an asynchronous port.

Description   This command connects the terminal to a named Telnet or interactive host service, or to an asynchronous port on the router.

A user who has logged in to a port is permitted to connect to a Telnet service. If the user has not logged in (i.e. the port is not in SECURE mode) then the user is not permitted to connect to a Telnet service. If the user has connected to the router using Telnet and has logged in, then the user can connect to a Telnet service if the TELNET attribute is set to YES in the user's entry in the User Authentication Database. See "User Authentication Facility" on page 1-15 of Chapter 1, Operation for more information on these security features.

If the command is successful, then a different sequence of messages is displayed depending on whether the service is a Telnet service (Figure 21-2 on page 21-16) or a host port (Figure 21-3 on page 21-16). The messages is followed by the host login prompt. When the user logs off from the host session, the assignment automatically breaks and the router prompt reappears.

Figure 21-2: Example output from the **connect** command for a successful connection to a Telnet service

```
CMD> c sun

Info (105320): Attempting Telnet connection to SUN, Please wait ...
```

Figure 21-3: Example output from the **connect** command for a successful connection to a host port service

```
CMD> c tst
Info (136266): Local port ( Telnet 1 ) assigned to service ( tst ).
```

Example   To connect to the service ACCOUNTS on the local router, use the command:

```
c accounts
```

To connect to the router's asynchronous port 0, use the command:

```
c asy=0
```

Related Commands   create service
disconnect
reconnect
show service
show sessions
telnet

create service

Syntax   CREate SERvice=*service-name* DESCription="*description*"
TYpe={Interactive|TELBin|Telnet} [IPaddress=*ipadd*]
[VISible={ON|OFF}]

where:

■   *service-name* is the name of a service 1 to 15 characters long, with no embedded spaces. The first character must be alphabetic (A–Z). The string is not case sensitive.

■   *description* is a short description of the service from 1 to 39 characters long and in double quotes. It may include embedded spaces.

■   *ipadd* is an IPv4 address in dotted decimal notation, or a valid IPv6 address.

Description   This command creates a new service. The SERVICE parameter specifies the name of the service. This name specifies the service in the **connect** command on page 21-15.

The DESCRIPTION parameter specifies a user-defined description for the service.

The TYPE parameter specifies the type of service. If TYPE is set to INTERACTIVE the service is available to users for logging on to a host computer that does not support TCP/IP, or other devices with asynchronous ports such as dialup modems and data loggers. If TYPE is set to TELBIN the service is to be available to users for logging on to 8-bit binary Telnet services such as UUCP. If TYPE is set to TELNET the service is to be available to users for logging on to a Telnet host.

The IPADDRESS parameter specifies the IP address, in dotted decimal notation, of the Telnet host for a TELNET service.

The VISIBLE parameter specifies whether the service is visible to users. If VISIBLE is on, the service appears in the service list displayed when the **show service** command on page 21-24 is issued at a port with User privileges, and users can connect to the service from a port with User privileges. If VISIBLE is off, the service is not listed in the service list displayed when the **show service** command is issued at a port with User privileges, and users cannot connect to the service from a port with User privileges. The default is on.

Examples   To create a service for users to access a host computer, use the command:

```
cre ser=admin desc="Accounts and purchasing" ty=i vis=on
```

Related Commands   **destroy service**
set service
show service

destroy service

Syntax   DESTroy SERvice=*service-name*

where *service-name* is the name of a service 1 to 15 characters long with no embedded spaces. The first character must be alphabetic (A–Z). The string is not case sensitive.

Description   This command deletes a service. The SERVICE parameter specifies the name of the service. The service must already exist.

Examples   To destroy the service named, use the command:

```
dest ser=admin
```

Related Commands   **create service**
set service
show service

disable rtelnet

Syntax   `DISable RTELnet`

Description   This command disables the reverse Telnet capability on the device. You can only execute this command if reverse Telnet has previously been enabled with the **enable rtelnet** command.

Example   To disable reverse Telnet, use the command:

```
dis rtel
```

Related Commands   disable telnet server

disable rtelnet debug

Syntax   `DISable RTELnet DEBug={ALL|CONFig|ERRORcode|OPTions|TRACE}`

Description   This command disables debug mode for the reverse Telnet capability on the device. You can only execute this command if debug has previously been enabled with the **enable rtelnet debug** command.

The **all** parameter disables debug output for all types of debug.

The **config** parameter disables debugging for the setup phase of the reverse Telnet session.

The **errorcode** parameter disables the translation of error codes returned by reverse Telnet into words.

The **options** parameter disables debug output on the negotiation of Telnet options between the device and the client.

The **trace** parameter disables debug output of function names as they are called during code execution.

Example   To disable config debug, use the command:

```
dis rtel deb=conf
```

Related Commands   enable rtelnet debug

disable telnet server

Syntax   `DISABLE TELnet SErver`

Description   This command blocks telnet access to the router. Telnet access is enabled by default. For security reasons, it may be desirable to disable telnet access to the router.

Example   To disable telnet access to the router, use the command:

```
dis tel se
```

Related Commands   enable telnet server
set telnet
show telnet
telnet

disconnect

Syntax   `Disconnect session-number`

where *session-number* is the number from 1 to 5 for a currently established terminal session

Description   This command terminates the specified terminal session. If the session is a connection to a host port then the assignment is broken. If the session is a Telnet connection the connection is broken. The session number must be the number of a currently available terminal session.

This command should not normally be required. Users should execute the standard logoff procedure for the host service. Logging off from the host disconnects the session and returns the user to the router prompt. The **disconnect** command should be used if logging off from the host fails to disconnect the session.

Examples   To terminate session 2, use the command:

```
d 2
```

Related Commands   connect
reconnect
show service
show sessions
telnet

enable rtelnet

Syntax   `ENAble RTELnet`

Description   This command enables the reverse Telnet capability on the device. When this command is executed, the device initialises a Telnet listen session on available TCP ports from and including port 2001.

You must enable Telnet with the **enable telnet server** command before you can enable reverse Telnet.

Example   To enable reverse Telnet, use the command

    ena rtel

Related Commands   disable rtelnet

enable rtelnet debug

Syntax   `ENAble RTELnet DEBug={ALL|CONFig|ERRORcode|OPTions|TRACE}`

Description   This command enables debug mode for the reverse Telnet capability on the device. You can only execute this command if reverse Telnet has previously been enabled.

The **all** parameter enables debug output for all types of debug.

The **config** parameter enables debugging for the setup phase of the reverse Telnet session. The debug output shows a sequence of messages showing the connection being established between the TTYs of the Telnet session and the asyn port.

The **errorcode** parameter enables the translation of error codes returned by reverse Telnet into words. For example, "Listen session open failed".

The **options** parameter enables debug output on the negotiation of Telnet options between the device and the client. Unknown options are shown with their option code.

The **trace** parameter enables debug output of function names as they are called during code execution. Trace debug output may be long.

Example   To enable errorcode debug, use the command:

    ena rtel deb=error

Related Commands   disable telnet server

enable telnet server

Syntax   `ENAble TELnet SErver`

Description This command enables the Telnet server to be accessed remotely. The Telnet server is enabled by default.

Related Commands   disable telnet server
set telnet
show telnet
telnet

reconnect

Syntax   `Reconnect session-number`

where *session-number* is the number from1 to 5 for a currently established terminal session

Description This command reconnects the user's terminal to the specified terminal session. All subsequent output from the terminal is sent to the specified session and all output from the session is sent to the terminal. The session number must be the number of a currently established terminal session.

Examples   To reconnect to session 2, use the command:

`r 2`

Related Commands   connect
disconnect
show sessions
telnet

set service

Syntax   `SET SERvice=service-name [DESCription="description"]`
`[IPaddress=ipadd] [VISible={ON|OFF}]`

where:

- *service-name* is the name of a service 1 to 15 characters long with no embedded spaces. The first character must be alphabetic (A–Z). The string is not case sensitive.

- *description* is a short description of the service from 1 to 39 characters long and in double quotes. It may include embedded spaces.

- *ipadd* is an IPv4 address in dotted decimal form, or a valid IPv6 address.

Description   This command modifies the characteristics of an existing service. The SERVICE parameter specifies the name of the service. The service must already exist.

The DESCRIPTION parameter specifies a user-defined description for the service.

The IPADDRESS parameter specifies the IP address, in dotted decimal notation, of the Telnet host for a TELNET service.

The VISIBLE parameter specifies whether the service is visible to users. If VISIBLE is set to ON, the service appears in the service list displayed when the **show service** command on page 21-24 is issued at a port with User privileges, and users can connect to the service from a port with User privileges. If VISIBLE is set to OFF, the service is not listed in the service list displayed when the SHOW SERVICE command is issued at a port with User privileges, and users cannot connect to the service from a port with User privileges. The default is ON.

Examples   To make the service named "DataLogger" invisible to users without Manager privileges, use the command:

```
set ser=DataLogger vis=off
```

Related Commands   create service
destroy service
show service

set telnet

Syntax   SET TELnet [TErmtype=*termstring*] [INsertnull={ON|OFf}]
     [LISTenport=*port*] [IDLEtimeout=0..4294967295]
     [MAXSessions=0..30]

where:

■ *termstring* is a character string 1 to 31 characters long. If the string contains spaces, it must be in double quotes.

■ *port* is a number from 1 to 65535.

Description   This command sets the terminal type string used, and the null insertion behaviour for all outgoing Telnet sessions.

The TERMTYPE parameter specifies a terminal identification string that is passed to a remote Telnet server upon connection. The default option is the string "UNKNOWN". The terminal identification is usually used by the remote system to set the terminal attributes for the Telnet session.

The INSERTNULL parameter, when set to ON, specifies that a NULL character should be inserted after each CR sent to the remote host. The default is OFF.

The LISTENPORT parameter sets the TCP port over which the Telnet server listens for connections. If this parameter is not used, the default port number is 23.

The IDLETIMEOUT parameter specifies a period of time, in seconds, for the Telnet server's idle timer. If the specified time period lapses since the last time a Telnet session received data from the remote client, the session is terminated; this applies from the moment that the Telnet session becomes established, regardless of whether the user has logged in or not. If zero is specified, the idle timer remains off, and the session must be explicitly terminated. The default is zero.

If the Telnet server idle timeout period is modified while there are established Telnet sessions, the idle timers for those sessions are reset so that they use the new timeout value. Any idle time accumulated by those sessions prior to the issuing of the set command is lost.

The MAXSESSIONS parameter specifies the number of concurrent Telnet sessions that are supported by the local switch. Once this limit is reached, any subsequent session requests are rejected. The session limit cannot be set below the number of currently established Telnet sessions. The default, is 30.

> If the TCP listen port is changed from the default of 23, care must be taken to ensure that firewall or IP filtering configurations are matched accordingly.

Examples   To set the terminal identification string to vt100, use the command:

```
set tel te=vt100
```

Related Commands   disable telnet server
enable telnet server
set telnet
telnet

set tty

Syntax   SET TTy [History=0..99] [PAGe=4..99] [PRompt={*string-15*|
DEFault|OFf}] [TYpe={Dumb|Vt100}]

where *string-15* is a string 1 to 15 characters long. If the string contains spaces, it must be in double quotes. The string is not case sensitive.

Description   This command sets the default values for TTY devices created for Telnet connections. Multiple options may be specified in the same command.

To change the settings for a Telnet connection immediately, use the **set asyn** command on page 7-37 of Chapter 7, Interfaces.

The HISTORY parameter sets the number of commands saved in the command history for future recall. The minimum number is 0 and the maximum is 99. Setting the history length to zero for a port does not clear all the commands from the history. The command history is cleared with the **reset asyn history** command on page 7-34 of Chapter 7, Interfaces. The default history length for asynchronous ports and Telnet connections is 30.

The PAGE parameter sets the number of lines of command output displayed on the terminal screen before the router pauses and waits for the user to press a

key to continue. This number may range from 4 to 99. The default is 22 for both asynchronous ports and Telnet connections. If PAGE is set to OFF, paging is disabled.

The PROMPT parameter sets the prompt for the port to either the default string, such as:

```
CMD>
```

or a user-specified string, or disables the prompt. It is often convenient to disable the prompt if the port is being used as a manager port or for debugging network problems, as it reduces the clutter on the terminal screen. This option has effect when the port is not assigned. When the port is assigned, the host controls prompting.

The TYPE parameter specifies the type of terminal attached to the port. If TYPE is set to VT100, the router expects the terminal to support standard VT100 escape sequences and uses them. If TYPE is set to DUMB, the router does not use VT100 escape sequences. The DUMB option is required for Telnet clients that do not support VT100 escape sequences. The default is VT100 for both asynchronous ports and Telnet connections.

Examples   To set PAGE mode off for all subsequent Telnet connections, use the command:

```
set tt pag=of
```

Related Commands   **set asyn** in Chapter 7, Interfaces
show tty

show service

Syntax   SHow SERvice[=*service-name*] [TYpe={Telnet|Interactive|
    TELBin}]

where *service-name* is the name of a service 1 to 15 characters long with no embedded spaces. The first character must be alphabetic (A–Z). The string is not case sensitive.

Description   This command displays a list of services defined on the router (Figure 21-4 on page 21-25, Figure 21-5 on page 21-25, Table 21-3 on page 21-25). If a service type is not specified all services are displayed. If a service name is specified, the specified service is displayed. If a service type (TELNET, INTERACTIVE or TELBIN) is specified, services for the specified type are displayed.

The display varies depending on whether the command is entered from a port with User or Manager privileges. Summary information is displayed on a port with User privileges.

Figure 21-4: Example output from the **show service** command for a port with Manager privileges

```
    Service name      Type            Visible   IP address
    -------------------------------------------------------
    SUN               Telnet          ON        192.168.35.17
        Engineering
    ADMIN             Interactive     ON        -
        Administration and Support Services
    -------------------------------------------------------
```

Figure 21-5: Example output from the **show service** command for a port with User privileges

```
    Service name    Type          Description
    -------------------------------------------------------------
    SUN             Telnet        Engineering
    ADMIN           Interactive   Administration and Support Services
    -------------------------------------------------------------
```

Table 21-3: Parameters in the output of the **show service** command

Parameter	Meaning
Service name	Name of the service.
Type	Whether the service is Interactive, Telnet, or Telbin.
Visible	Whether the service is visible and available to a user with User privileges.
IP address	IP address for a Telnet service.
Description	Description of the service. For a Manager port, the description is on the line following the name of the service.

Examples   To display all services, use the command:

    sh ser

Related Commands   **connect**
create service
destroy service
disconnect
set asyn
set service

show sessions

Syntax   SHow SESsions

Description   This command displays the status of the five sessions available for a port or Telnet login (Figure 21-6 on page 21-26). The status will be one of the following:

■   The name of an interactive service.

■   The name of a Telnet service

■   The IP address for Telnet connection

■   The host name for Telnet connection

■   The nickname for Telnet connection

■   "not connected" if the session is not in use.

Figure 21-6: Example output from the **show sessions** command

```
Session information for Telnet 1

session 1 connected to tst
session 2 connected to SUN
session 3 connected to 192.168.35.17
session 4 connected to host.company.com
session 5 not connected
```

Examples   To display the status of the current terminal sessions, use the command:

```
sh ses
```

Related Commands   connect
disconnect
reconnect

show telnet

Syntax   SHow TELnet

Description   This command displays information about the current Telnet settings.

Figure 21-7: Example output from the **show tty** command

```
TELNET Module Configuration
------------------------------------------------------------
  Telnet Server .................. Enabled
  Telnet Server Listen Port ...... 23
  Telnet Terminal Type ........... UNKNOWN
  Telnet Insert Nulls ............ Off
  Telnet Com Port Control ........ Enabled
  Telnet Current Sessions ........ 1
  Telnet Session Limit ........... 12
  Telnet Idle Timeout ............ 180
------------------------------------------------------------
```

Table 21-4: Parameters in the output of the **show telnet** command

Parameter	Meaning
Telnet Server	Whether the Telnet server is enabled.
Telnet Server Listen Port	TCP port number that the Telnet server is listening on. Can be any number from 1 to 65535 that is not already in use.
Telnet Terminal Type	Terminal type identification string that is passed to a remote Telnet server upon connection. The default is UNKNOWN.
Telnet Insert Nulls	Whether a NULL character is inserted after each CR that is sent.
Telnet Com Port Control	Whether or not reverse Telnet is enabled; one of "Enabled" or "Disabled".
Telnet Current Sessions	Number of currently established Telnet sessions.
Telnet Session Limit	Maximum number of concurrent Telnet sessions allowed.
Telnet Idle Timeout	Maximum period of time in seconds without data being received from a given remote Telnet client before the corresponding session is terminated.

Related Commands   disable telnet server
enable telnet server
set telnet
telnet

show tty

Syntax   SHow TTy[=*tty-number*|All] [{Summary|Default}]

where *tty-number* is the number of a TTY device

Description   This command displays information about one or all of the TTY devices defined on the router at the time the command is issued. There is a TTY device dedicated to each port and it is always present. Other TTY devices are created and destroyed as they are required for Telnet logins and multiple sessions.

If a TTY number is specified, then information for this TTY is displayed. If a TTY number is not specified, then information for the TTY where the command is issued is displayed. If ALL is specified, then information for all the TTYs on the router is displayed.

If no other parameters are specified then full configuration information for the specified TTY is displayed (Figure 21-8 on page 21-28, Table 21-5 on page 21-28). The SUMMARY parameter generates an abbreviated one-line display for each TTY specified (Figure 21-9 on page 21-29, Table 21-6 on page 21-29). The DEFAULT parameter displays the default values assigned to TTY devices created for Telnet connections (Figure 21-10 on page 21-30, Table 21-7 on page 21-30). A TTY number may not be specified with the DEFAULT parameter.

If the command is issued from a connection with User privileges, the TTY number cannot be specified and the information displayed is for the TTY from which the command was issued.

Figure 21-8: Example output from the **show tty** command

```
TTY information
Instance .................. 30
Login name ............... manager
Description .............. Telnet 1
Secure ................... yes
Connections to ........... 21
Current connection ....... 0
In flow state ............ on
Out flow state ........... on
Attached module .......... Telnet
Attached module instance .. 1
Type ..................... VT100
Service .................. none
Prompt ................... default
Echo ..................... yes
Attention ................ char
Manager .................. yes
Edit mode ................ insert
History length ........... 30
Page mode/length ......... 22
```

Table 21-5: Parameters in the output of the **show tty** command

Parameter	Meaning
Instance	Instance number for the TTY device.
Login name	Login name of the user logged in to this port, if any.
Description	Name assigned to the port.
Secure	Whether the port is secure.
Connections to	A list of TTY devices (if any) to which this port TTY is linked for the purpose of providing multiple sessions.
Current connection	Instance number of the TTY that this port TTY is currently connected to, or "none" if there is no active connection.
In flow state	Whether the input flow control for the TTY device is on.
Out flow state	Whether the output flow control for the TTY device is on.
Attached module	The name of the module that owns the TTY. The default is TSER (terminal server).
Attached module instance	The instance of the module that owns the TTY.
Type	Whether the terminal type for the TTY is dumb or VT100.
Service	Name of the service to which this TTY belongs, if any.

Table 21-5: Parameters in the output of the **show tty** command (continued)

Parameter	Meaning
Prompt	Prompt for this TTY: default off login password confirm encapsulation user-defined string
Echo	Whether the TTY echoes characters are received.
Attention	Attention character for this TTY: none break char
Manager	Whether the TTY has Manager privileges.
Edit mode	Edit mode for the TTY question mark (?) insert overstrike
History length	Maximum number of commands that is held in the command history for this TTY.
Page mode/length	Number of lines of command output the router displays before pausing and waiting for the user to press a key, or "off" if page mode is disabled for this TTY.

Figure 21-9: Example output from the **show tty=all summary** command

```
 TTY Description    User name    Module Inst Mgr Connections
 ----------------------------------------------------------
 016 Port 0         support      TSER   000  yes
 017 tst            test         TSER   001  no  018
 018 Telnet 1       manager      TELN   001  yes 017,019
 019 SUN            admin        TELN   002  no  018
 ----------------------------------------------------------
```

Table 21-6: Parameters in the output of the **show tty=all summary** command

Parameter	Meaning
TTY	Instance number of the TTY
Description	Name of the port, or service associated with that port, for a TTY dedicated to a port. For a Telnet login TTY the description is "Telnet" followed by the Telnet instance number. For a multiple session connection to a service it is the name of the service. For a multiple session Telnet it is the IP number or name of the host.
User name	Login name of the user logged in to the TTY, if any.
Module	Name of the module that is connected to the TTY.
Inst	Instance number of the module that is connected to the TTY.

Table 21-6: Parameters in the output of the **show tty=all summary** command (continued)

Parameter	Meaning
Mgr	Whether the TTY has manager privileges.
Connections	List of the other TTY instance numbers with which this TTY has connections to support multiple sessions.

Figure 21-10: Example output from the **show tty default** command

```
TTY Default Settings
--------------------
History length......20
Page length.........22
Prompt..............default
Type................VT100
```

Table 21-7: Parameters in the output of the **show tty default** command

Parameter	Meaning
History length	Default maximum number of commands that is held in the command history for a TTY.
Page mode/length	Default number of lines of command output the router displays before pausing and waiting for the user to press a key, or "off" if page mode is disabled for a TTY.
Prompt	Default prompt for a TTY: default off login password confirm encapsulation user-defined string
Type	Whether the default terminal type for a TTY is dumb or VT100.

Examples   To display the TTY configuration for a Telnet connection, use the command:

```
sh tt
```

To display a summary of all the TTY information for a router, use the command:

```
sh tt=a s
```

Related Commands   **set asyn** in Chapter 7, Interfaces
set tty

telnet

Syntax   TELnet {*ipadd*|*ipv6add*[%*interface*]|*host*}

where:

■   *ipadd* is an IP address in dotted decimal notation.

■   *ipv6add* is a valid IPv6 address.

■   *interface* is the interface the Telnet request is sent out, for a request to Telnet to an IPv6 link-local address, e.g. eth0.

■   *host* is a full domain name of a host, a host nickname created with the **add ip host** command on page 14-76 of Chapter 14, Internet Protocol (IP), or a host name in the same domain.

Description   This command attempts to open a Telnet connection to a Telnet host at the specified IP address or with the specified name. If the command is successful, the message in Figure 21-11 on page 21-31 is followed by the host prompt. When the user logs off from the host, the connection terminates and the router prompt reappears. The Telnet session can also be terminated by pressing [Ctrl/ D].

Telneting to an IPv6 link-local address requires interface information as well as the address because a single link-local address can belong to several interfaces. To Telnet to a link-local address, specify the interface out which the Telnet request is sent, as well as the address. This interface is the interface on the router from which the Telnet request originates and is connected to the required destination interface (Figure 15-2 on page 15-19 in Chapter 15, Internet Protocol Version 6 (IPv6)). For example:

```
TELNET fe80::7c27%eth0
```

If the *sysName* MIB object is set to the router's fully qualified domain name (e.g. router.company.com) by using the **set system name** command on page 1-124 of Chapter 1, Operation, and a name server has been defined by using the **set ip nameserver** command on page 14-151 of Chapter 14, Internet Protocol (IP), then the command:

```
tel mainhost
```

attempts a Telnet connection to the host "mainhost.company.com", provided "mainhost" is not an IP nickname (IP nicknames take precedence).

Figure 21-11: Example output from the **telnet** command

```
TELNET. Attempting to connect to 192.168.35.17, please wait...
```

If a domain name is specified, the router sends a request to a name server to translate the domain name into an IP address. This may take several seconds during which time the normal router prompt reappears. When the name server responds (or fails to respond), a message is displayed indicating that the lookup was unsuccessful, or that it was successful and an attempt is being made to connect to a host at the specified IP address.

A user is permitted to issue the **telnet** command only if the user has the TELNET attribute set to YES in the user database. See Chapter 1, Operation for further information on these security features.

If a user telnets to the router but does not login within one minute, the router automatically times out the session and terminates the Telnet connection.

Examples   To connect to Telnet host zaphod.beeblebrox.com use the command:

        tel zaphod.beeblebrox.com

Related Commands   add ip host
connect
delete ip host
disable telnet server
disconnect
enable telnet server
reconnect
set ip host
set ip nameserver
set system name
set telnet
show ip host
show telnety