



Configuring the PA-T3

To continue your PA-T3 port adapter installation, you must configure the serial interfaces. The instructions that follow apply to all supported platforms. Minor differences between the platforms—with Cisco IOS software commands—are noted.

This chapter contains the following sections:

- [Using the EXEC Command Interpreter, page 4-1](#)
- [Configuring the Interfaces, page 4-2](#)

Using the EXEC Command Interpreter

You modify the configuration of your router through the software command interpreter called the *EXEC* (also called enable mode). You must enter the privileged level of the EXEC command interpreter with the **enable** command before you can use the **configure** command to configure a new interface or change the existing configuration of an interface. The system prompts you for a password if one has been set.

The system prompt for the privileged level ends with a pound sign (#) instead of an angle bracket (>). At the console terminal, use the following procedure to enter the privileged level:

-
- Step 1** At the user-level EXEC prompt, enter the **enable** command. The EXEC prompts you for a privileged-level password as follows:

```
Router> enable
```

```
Password:
```

- Step 2** Enter the password (the password is case sensitive). For security purposes, the password is not displayed. When you enter the correct password, the system displays the privileged-level system prompt (#):

```
Router#
```

To configure the new interfaces, proceed to the [“Configuring the Interfaces” section on page 4-2](#).

Configuring the Interfaces

After you verify that the new PA-T3 is installed correctly (the enabled LED goes on), use the privileged-level **configure** command to configure the new interfaces. Have the following information available:

- Protocols you plan to route on each new interface
- IP addresses, if you plan to configure the interfaces for IP routing
- Bridging protocols you plan to use
- Clock timing source you plan to use for each new interface and clock speeds for external timing

If you installed a new PA-T3 or if you want to change the configuration of an existing interface, you must enter configuration mode to configure the new interfaces. If you replaced a PA-T3 that was previously configured, the system recognizes the new interfaces and brings each of them up in their existing configuration.

For a summary of the configuration options available and instructions for configuring interfaces on a PA-T3, refer to the appropriate configuration publications listed in the “[Related Documentation](#)” section on page viii.

You execute configuration commands from the privileged level of the EXEC command interpreter, which usually requires password access. Contact your system administrator, if necessary, to obtain password access. (See the “[Using the EXEC Command Interpreter](#)” section on page 4-1 for an explanation of the privileged level of the EXEC.)

This section contains the following subsections:

- [Shutting Down an Interface](#), page 4-2
- [Performing a Basic Configuration](#), page 4-8
- [Configuring Timing \(Clock\) Signals](#), page 4-10
- [Configuring Cyclic Redundancy Checks](#), page 4-10

Shutting Down an Interface

Before you remove an interface that you will not replace, **replace a compact serial cable**, or replace port adapters, use the **shutdown** command to shut down (disable) the interfaces to prevent anomalies when you reinstall the new or reconfigured interface processor. When you shut down an interface, it is designated *administratively down* in the **show** command displays.

Follow these steps to shut down an interface:

-
- Step 1** Enter the privileged level of the EXEC command interpreter (also called enable mode). (See the “[Using the EXEC Command Interpreter](#)” section on page 4-1 for instructions.)
- Step 2** At the privileged-level prompt, enter configuration mode and specify that the console terminal is the source of the configuration subcommands, as follows:
- ```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
```
- Step 3** Shut down interfaces by entering the **interface serial** subcommand (followed by the interface address of the interface), and then enter the **shutdown** command. [Table 4-1](#) shows the command syntax.

When you have finished, press **Ctrl-Z**—hold down the **Control** key while you press **Z**—or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter.

**Table 4-1** Syntax of the shutdown Command

| Platform                                                             | Command                                                                                                                                         | Example                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalyst RSM/VIP2 in Catalyst 5000 family switches                   | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                   | The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.<br><br><pre>Router(config-if)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>                                            |
| Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches | <b>interface</b> , followed by the <i>type (serial)</i> and <i>mod_num/bay/port</i> (module-slot-number/port-adapter-bay-number/interface-port) | The example is for interface 0 and interface 1 on a port adapter in port adapter bay 0 of a FlexWAN module installed in slot 3.<br><br><pre>Router(config-if)# <b>interface serial 3/0/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 3/0/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre> |
| Cisco 7120 series routers                                            | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                   | The example is for interface 0 and interface 1 on a port adapter in port adapter slot 3.<br><br><pre>Router(config-if)# <b>interface serial 3/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 3/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>                                            |
| Cisco 7140 series routers                                            | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                   | The example is for interface 0 and interface 1 on a port adapter in port adapter slot 4.<br><br><pre>Router(config-if)# <b>interface serial 4/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 4/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>                                            |
| Cisco 7200 series routers                                            | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                   | The example is for interface 0 and interface 1 on a port adapter in port adapter slot 6.<br><br><pre>Router(config-if)# <b>interface serial 6/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 6/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>                                            |

Table 4-1 Syntax of the shutdown Command (continued)

| Platform                                                        | Command                                                                                                                                                                    | Example                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco uBR7223 router                                            | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                                              | The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.<br><pre>Router(config-if)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>                                                                |
| Cisco uBR7246 router                                            | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                                              | The example is for interface 0 and interface 1 on a port adapter in port adapter slot 2.<br><pre>Router(config-if)# <b>interface serial 2/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 2/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>                                                                |
| Cisco 7301 routers                                              | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                                              | The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.<br><pre>Router(config-if)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>                                                                |
| Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (module-slot-number/interface-port-number)                                                    | The example is for interface 0 and interface 1 on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router.<br><pre>Router(config-if)# <b>interface serial 3/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 3/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre> |
| Cisco 7401ASR routers                                           | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                                              | The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.<br><pre>Router(config-if)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>                                                                |
| VIP in Cisco 7000 series or Cisco 7500 series routers           | <b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port adapter/port</i> (interface-processor-slot-number/port-adapter-slot-number/interface-port-number) | The example is for interface 1 and interface 0 on a port adapter in port adapter slot 1 of a VIP2 installed in interface processor slot 1.<br><pre>Router(config-if)# <b>interface serial 1/1/1</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1/0</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>          |



**Note** If you need to shut down additional interfaces, enter the **interface serial** command (followed by the interface address of the interface) for each of the interfaces on your port adapter. Use the **no shutdown** command to enable the interface.

**Step 4** Write the new configuration to NVRAM as follows:

```
Router# copy running-config startup-config
[OK]
Router#
```

The system displays an OK message when the configuration has been stored in NVRAM.

**Step 5** Verify that new interfaces are now in the correct state (shut down) using the **show interfaces** command (followed by the interface type and interface address of the interface) to display the specific interface. [Table 4-2](#) provides examples.

**Table 4-2** Examples of the *show interfaces* Command

| Platform                                                             | Command                                                                                                                         | Example                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalyst RSM/VIP2 in Catalyst 5000 family switches                   | <b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                   | The example is for interface 0 on a port adapter in port adapter slot 1.<br><br>Router# <b>show interfaces serial 1/0</b><br><br>Serial 1/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from this example]                                            |
| Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches | <b>show interfaces serial</b> , followed by <i>mod_num/bay/port</i> (module-slot-number/port-adapter-bay-number/interface-port) | The example is for interface 0 on a port adapter in port adapter bay 0 of a FlexWAN module installed in slot 3.<br><br>Router# <b>show interfaces serial 3/0/0</b><br><br>Serial 3/0/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from this example] |
| Cisco 7120 series routers                                            | <b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                   | The example is for interface 0 on a port adapter in port adapter slot 3.<br><br>Router# <b>show interfaces serial 3/0</b><br><br>Serial 3/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from this example]                                            |

Table 4-2 Examples of the show interfaces Command (continued)

| Platform                  | Command                                                                                                               | Example                                                                                                                                                                                                                                                      |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco 7140 series routers | <b>show interfaces serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)  | The example is for interface 0 on a port adapter in port adapter slot 4.<br><br>Router# <b>show interfaces serial 4/0</b><br><br>Serial 4/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from<br>this example] |
| Cisco 7200 series routers | <b>show interfaces serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)  | The example is for interface 0 on a port adapter in port adapter slot 6.<br><br>Router# <b>show interfaces serial 6/0</b><br><br>Serial 6/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from<br>this example] |
| Cisco uBR7223 router      | <b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-<br>number/<br>interface-port-number) | The example is for interface 0 on a port adapter in port adapter slot 1.<br><br>Router# <b>show interfaces serial 1/0</b><br><br>Serial 1/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from<br>this example] |
| Cisco uBR7246 router      | <b>show interfaces serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)  | The example is for interface 0 on a port adapter in port adapter slot 2.<br><br>Router# <b>show interfaces serial 2/0</b><br><br>Serial 2/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from<br>this example] |
| Cisco 7301 routers        | <b>show interfaces serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)  | The example is for interface 0 on a port adapter in port adapter slot 1.<br><br>Router# <b>show interfaces serial 1/0</b><br><br>Serial 1/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from<br>this example] |

Table 4-2 Examples of the show interfaces Command (continued)

| Platform                                                        | Command                                                                                                                                                    | Example                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router | <b>show interfaces serial</b> , followed by <i>slot/port</i> (module-slot-number/interface-port-number)                                                    | The example is for interface 0 on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router.<br><br>Router# <b>show interfaces serial 3/0</b><br><br>Serial 3/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from this example] |
| Cisco 7401ASR routers                                           | <b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/interface-port-number)                                              | The example is for interface 0 on a port adapter in port adapter slot 1.<br><br>Router# <b>show interfaces serial 1/0</b><br><br>Serial 1/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from this example]                                                                |
| VIP in Cisco 7000 series or Cisco 7500 series routers           | <b>show interfaces serial</b> , followed by <i>slot/port adapter/port</i> (interface-processor-slot-number/port-adapter-slot-number/interface-port-number) | The example is for interface 0 on a port adapter in port adapter slot 1 of a VIP2 in interface processor slot 1.<br><br>Router# <b>show interfaces serial 1/1/0</b><br><br>Serial 1/1/0 is administratively down,<br>line protocol is down<br><br>[Additional display text omitted from this example]                    |

- Step 6** Reenable interfaces by doing the following:
- a. Repeat Step 3 to reenable an interface. Substitute the **no shutdown** command for the **shutdown** command.
  - b. Repeat Step 4 to write the new configuration to memory. Use the **copy running-config startup-config** command.
  - c. Repeat Step 5 to verify that the interfaces are in the correct state. Use the **show interfaces** command followed by the interface type and interface address of the interface.

For complete descriptions of software configuration commands, refer to the publications listed in the “[Obtaining Documentation](#)” section on page x.

## Performing a Basic Configuration

Following are instructions for a basic configuration: enabling an interface and specifying IP routing. You might also need to enter other configuration subcommands, depending on the requirements for your system configuration and the protocols you plan to route on the interface. For complete descriptions of configuration subcommands and the configuration options available for serial interfaces, refer to the appropriate software documentation.

In the following procedure, press the **Return** key after each step unless otherwise noted. At any time you can exit the privileged level and return to the user level by entering **disable** at the prompt as follows:

```
Router# disable
```

```
Router>
```

- Step 1** Enter configuration mode and specify that the console terminal is the source of the configuration subcommands, as follows:

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

- Step 2** Specify the first interface to configure by entering the **interface serial** subcommand, followed by the interface address of the interface you plan to configure. (The command for your port adapter may be different, for example, **interface atm**.) [Table 4-3](#) provides examples.

**Table 4-3** Examples of the interface serial Subcommand

| Platform                                                             | Command                                                                                                                              | Example                                                                                                                                                                                            |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalyst RSM/VIP2 in Catalyst 5000 family switches                   | <b>interface serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)                       | The example is for the first interface of a port adapter in port adapter slot 0.<br><br>Router(config)# <b>interface serial 0/0</b><br>Router(config-if)#                                          |
| Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches | <b>interface serial</b> , followed by <i>mod_num/bay/port</i><br>(module-slot-number/port-<br>adapter-bay-number/interface-<br>port) | The example is for the first interface of a port adapter in port adapter bay 0 of a FlexWAN module installed in slot 3.<br><br>Router(config)# <b>interface serial 3/0/0</b><br>Router(config-if)# |
| Cisco 7120 series routers                                            | <b>interface serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)                       | The example is for the first interface of a port adapter in port adapter slot 3.<br><br>Router(config)# <b>interface serial 3/0</b><br>Router(config-if)#                                          |
| Cisco 7140 series routers                                            | <b>interface serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)                       | The example is for the first interface of a port adapter in port adapter slot 4.<br><br>Router(config)# <b>interface serial 4/0</b><br>Router(config-if)#                                          |
| Cisco 7200 series routers                                            | <b>interface serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)                       | The example is for the first interface of a port adapter in port adapter slot 6.<br><br>Router(config)# <b>interface serial 6/0</b><br>Router(config-if)#                                          |

Table 4-3 Examples of the interface serial Subcommand (continued)

| Platform                                                        | Command                                                                                                                                                         | Example                                                                                                                                                                                                          |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco uBR7223 router                                            | <b>interface serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)                                                  | The example is for the first interface of a port adapter in port adapter slot 1.<br><br>Router(config)# <b>interface serial 1/0</b><br>Router(config-if)#                                                        |
| Cisco uBR7246 router                                            | <b>interface serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)                                                  | The example is for the first interface of a port adapter in port adapter slot 2.<br><br>Router(config)# <b>interface serial 2/0</b><br>Router(config-if)#                                                        |
| Cisco 7301 routers                                              | <b>interface serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)                                                  | The example is for the first interface of a port adapter in port adapter slot 1.<br><br>Router(config)# <b>interface serial 1/0</b><br>Router(config-if)#                                                        |
| Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router | <b>interface serial</b> , followed by <i>slot/port</i> (module-slot-number/<br>interface-port-number)                                                           | The example is for interface 0 on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router.<br><br>Router(config)# <b>interface serial 3/0</b><br>Router(config-if)# |
| Cisco 7401ASR routers                                           | <b>interface serial</b> , followed by <i>slot/port</i><br>(port-adapter-slot-number/<br>interface-port-number)                                                  | The example is for the first interface of a port adapter in port adapter slot 1.<br><br>Router(config)# <b>interface serial 1/0</b><br>Router(config-if)#                                                        |
| VIP in Cisco 7000 series or Cisco 7500 series routers           | <b>interface serial</b> , followed by <i>slot/port adapter/port</i><br>(interface-processor-slot-number/<br>port-adapter-slot-number/<br>interface-port-number) | The example is for the first interface of a port adapter in port adapter slot 1 of a VIP2 in interface processor slot 1.<br><br>Router(config)# <b>interface serial 1/1/0</b><br>Router(config-if)#              |

- Step 3** Assign an IP address and subnet mask to the interface (if IP routing is enabled on the system) by using the **ip address** subcommand, as in the following example:
- ```
Router(config-if)# ip address 10.0.0.0 10.255.255.255
```
- Step 4** Add any additional configuration subcommands required to enable routing protocols and set the interface characteristics.
- Step 5** Reenable the interfaces using the **no shutdown** command. (See the “[Shutting Down an Interface](#)” section on page 4-2.)
- Step 6** Configure all additional port adapter interfaces as required.
- Step 7** After including all of the configuration subcommands to complete your configuration, press **Ctrl-Z**—hold down the **Control** key while you press **Z**—or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter prompt.

Step 8 Write the new configuration to NVRAM as follows:

```
Router# copy running-config startup-config
[OK]
Router#
```

This completes the procedure for creating a basic configuration.

Configuring Timing (Clock) Signals

All EIA/TIA-232 interfaces support DTE mode. To use a port as a DTE interface, you need only connect a DTE compact serial cable to the port. When the system detects the DTE mode cable, it automatically uses the external timing signal. This section describes how to invert the clock to correct a phase shift between the data and clock signals. [Table 4-4](#) summarizes the **invert data** command. See the specific section that follows for further details.

Table 4-4 Clock Rate Configuration Commands

Purpose	Command	Example	Additional Information
Invert the data signal.	invert data	The example inverts the data stream for both transmit and receive for a serial interface: Router(config)# interface serial 3/0 Router(config-if)# invert-txc	“Inverting the Data Signal”

Inverting the Data Signal

If you use an EIA/TIA-232 interface on the PA-T3 port adapter to drive a dedicated T1 line that does not have B8ZS encoding—a method to avoid 15 zeros—you must invert the data stream (both TXD and RXD) either in the connecting CSU/DSU or on the interface. To invert the data stream coming out of the PA-T3, use the **invert data** command. By inverting the HDLC data stream, the HDLC zero insertion algorithm becomes a ones insertion algorithm that satisfies the T1 requirements.



Note

Invert data *only* on the PA-T3 interface *or* on the CSU/DSU; inverting both cancels out both data inversions.

Configuring Cyclic Redundancy Checks

[Table 4-5](#) summarizes cyclic redundancy check (CRC) commands. For more information, see the remainder of this section.

Table 4-5 CRC Commands

Purpose	Command	Example	Further Information
Enable 32-bit CRC.	<code>crc size</code>	The example enables 32-bit CRD on a serial interface: Router(config)# interface serial 3/0 Router(config-if)# crc 32	“Configuring Cyclic Redundancy Checks”
Return to default 16-bit CRC.	<code>no crc size</code>	The example disables 32-bit CRD on a serial interface and returns to the default 16-bit CRC: Router(config)# interface serial 3/0 Router(config-if)# no crc 32	“Configuring Cyclic Redundancy Checks”

CRC is an error-checking technique that uses a calculated numeric value to detect errors in transmitted data. All interfaces use a 16-bit CRC (CRC-CITT) by default but also support a 32-bit CRC. The sender of a data frame calculates the frame check sequence (FCS). Before it sends a frame, the sender appends the FCS value to the message. The receiver recalculates the FCS and compares its calculation to the FCS from the sender. If there is a difference between the two calculations, the receiver assumes that a transmission error occurred and sends a request to the sender to resend the frame.

Enable 32-bit CRC using the `crc 32` command. Before you can enable 32-bit CRC, you must use the `interface serial` command (followed by the interface address of the interface) to select the interface on which you want to enable 32-bit CRC. This command functions in the same way on all supported platforms.

In the example that follows, 32-bit CRC is specified:

```
Router(config-if)# crc 32
```

The preceding command example applies to all systems in which the PA-T3 is supported. Use the `no crc 32` command to disable CRC-32 and return the interface to the default CRC-16 (CRC-CITT) setting.

When you have finished, press **Ctrl-Z**—hold down the **Control** key while you press **Z**—or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter prompt. Then write the new configuration to NVRAM using the `copy running-config startup-config` command.

**Note**

When enabling a 32-bit CRC on an interface, ensure that the remote device is also configured for a 32-bit CRC. Both the sender and the receiver must use the same CRC setting.

For command descriptions, refer to the *Configuration Fundamentals Configuration Guide* publication. For more information, see the [“Related Documentation”](#) section on page viii and the [“Obtaining Documentation”](#) section on page x.

**Note**

If you are configuring a PA-T3 in a Cisco 7200 router and you want to configure the interface for half-duplex or Bisync operation, proceed to the next section, [“Checking the Configuration”](#); otherwise, proceed to the [“Checking the Configuration”](#) section on page 4-12.

Checking the Configuration

After configuring the new interface, use the **show** commands to display the status of the new interface or all interfaces, and use the **ping** and **loopback** commands to check connectivity. This section includes the following subsections:

- [Using show Commands to Verify the New Interface Status, page 4-12](#)
- [Using the ping Command to Verify Network Connectivity, page 4-25](#)
- [Using loopback Commands, page 4-25](#)

Using show Commands to Verify the New Interface Status

Table 4-6 demonstrates how you can use the **show** commands to verify that new interfaces are configured and operating correctly and that the PA-T3 appears in them correctly. Sample displays of the output of selected **show** commands appear in the sections that follow. For complete command descriptions and examples, refer to the publications listed in the “[Related Documentation](#)” section on page viii.



Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Table 4-6 Using show Commands

Command	Function	Example
show version or show hardware	Displays system hardware configuration, the number of each interface type installed, Cisco IOS software version, names and sources of configuration files, and boot images	Router# show version
show controllers	Displays all the current interface processors and their interfaces	Router# show controllers
show diag slot Note The <i>slot</i> argument is not required with Catalyst 5000 family switches.	Displays types of port adapters installed in your system and information about a specific port adapter slot, interface processor slot, or chassis slot	Router# show diag 2
show interfaces type 0 or 1/ interface-port-number	Displays status information about a specific type of interface (for example, serial) on a Catalyst RSM/VIP2	Router# show interfaces serial 1/0
show interfaces type module-slot- number/port-adapter-bay-number/ interface-port-number	Displays status information about a specific type of interface (for example, serial) on a Catalyst 6000 family FlexWAN module	Router# show interfaces serial 3/0/0

Table 4-6 Using show Commands (continued)

Command	Function	Example
show interfaces <i>type 3/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) in a Cisco 7120 series router	Router# show interfaces serial 3/1
show interfaces <i>type 4/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) in a Cisco 7140 series router	Router# show interfaces serial 4/1
show interfaces <i>type port-adapter-slot-number/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) in a Cisco 7200 series router	Router# show interfaces serial 1/0
show interfaces <i>type 1/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) in a Cisco uBR7223 router	Router# show interfaces serial 1/1
show interfaces <i>type 1 or 2/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) in a Cisco uBR7246 router	Router# show interfaces serial 2/0
show interfaces <i>type 2 or 3 or 4 or 5/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) on a Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	Router# show interfaces serial 3/0
show interfaces <i>type interface-processor-slot-number/port-adapter-slot-number/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) on a VIP in a Cisco 7000 series or Cisco 7500 series router	Router# show interfaces serial 3/1/0
show protocols	Displays protocols configured for the entire system and for specific interfaces	Router# show protocols
show running-config	Displays the running configuration file	Router# show running-config
show startup-config	Displays the configuration stored in NVRAM	Router# show startup-config

If an interface is shut down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the interface is properly connected and terminated. If you still have problems bringing up the interface, contact a service representative for assistance. This section includes the following subsections and offers some platform-specific output examples:

- [Using the show version or show hardware Commands, page 4-14](#)
- [Using the show diag Command, page 4-18](#)

- [Using the show interfaces Command, page 4-21](#)

Choose the subsection appropriate for your system. Proceed to the [“Using the ping Command to Verify Network Connectivity” section on page 4-25](#) when you have finished using the **show** commands.

Using the show version or show hardware Commands

Display the configuration of the system hardware, the number of each interface type installed, the Cisco IOS software version, the names and sources of configuration files, and the boot images, using the **show version** (or **show hardware**) command. This section contains examples for some of the supported platforms.



Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Catalyst RSM/VIP2 in Catalyst 5000 Family Switches

Following is an example of the **show version** command from a Catalyst 5000 family switch with a PA-T3:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) C5RSM Software (C5RSM-JSV-M), Version 11.2(9)P
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Tue 24-Jun-97 17:09 by biff
Image text-base: 0x600108E0, data-base: 0x6095E000

ROM: System Bootstrap, Version 11.2(15707)
BOOTFLASH: C5RSM Software (C5RSM-JSV-M), Version 11.2

Router uptime is 17 hours, 17 minutes
System restarted by reload
System image file is "c5rsm-jsv-mz.7P", booted via tftp

cisco RSP2 (R4700) processor with 32768K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
G.703/E1 software, Version 1.0.
SuperLAT software copyright 1990 by Meridian Technology Corp).
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software.
1 C5IP controller (15 Vlan).
2 MIP controllers (4 E1).
1 VIP2 controller (2 E1) (4 Token Ring).
6 Channelized E1/PRI ports.
123K bytes of non-volatile configuration memory.

16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x100
```

Catalyst 6000 Family FlexWAN Module

Following is an example of the **show version** command from a Catalyst 6000 family switch with a PA-T3:

```

Router(config)# show version
Cisco Internetwork Operating System Software
IOS (tm) MSFC Software (C6MSFC-JSV-M), Experimental Version 12.1(20000209:134547)
[amcrae-cosmos_e_nightly 163]
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Wed 09-Feb-00 07:10 by
Image text-base: 0x60008900, data-base: 0x6140E000

ROM: System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE

const-uut uptime is 5 minutes
System returned to ROM by reload
System image file is "bootflash:c6msfc-jsv-mz.Feb9"

cisco Cat6k-MSFC (R5000) processor with 122880K/8192K bytes of memory.
Processor board ID SAD03457061
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
Last reset from power-on
Channelized E1, Version 1.0.
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
6 FlexWAN controllers (13 Serial)(8 E1)(8 T1)(2 HSSI)(2 ATM)(1 Channelized T3)(1
Channelized E3)(2 POS).
1 Virtual Ethernet/IEEE 802.3 interface(s)
17 Serial network interface(s)
2 HSSI network interface(s)
2 ATM network interface(s)
2 Packet over SONET network interface(s)
1 Channelized T3 port(s)
1 Channelized E3 port(s)
123K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.

16384K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x1

```

Cisco 7100 Series Routers

Following is an example of the **show version** command from a Cisco 7120 series router with a PA-T3:

```

Router# show version
Cisco Internetwork Operating System Software
IOS (tm) EGR Software (c7100-IS-M), Version 12.0(4)XE, EARLY DEPLOYMENT
RELEASE)
TAC:Home:SW:IOS:Specials for info
Copyright (c) 1986-1999 by cisco Systems, Inc.
Compiled Thu 10-Jun-99 15:32 by linda
Image text-base:0x60008900, data-base:0x60D8E000

ROM: System Bootstrap, Version 12.0(19990720:023243)
[gautham-conn_4xe-PRE_ALPHE
BOOTFLASH:EGR Software (c7100-IS-M), Version 12.0(4)XE, EARLY DEPLOYMENT
RELEA)

Router uptime is 24 minutes
System restarted by power-on
System image file is "disk0:c7100-is-mz.120-4.XE"

cisco 7120-bad (EGR) processor with 61440K/69632K bytes of memory.
R527x CPU at 225Mhz, Implementation 40, Rev 10.0, 2048KB L2 Cache

```

```

Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
2 FastEthernet/IEEE 802.3 interface(s)
125K bytes of non-volatile configuration memory.

40960K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2000

```

Cisco 7200 Series and Cisco uBR7200 Series Routers

Following is an example of the **show version** command from a Cisco 7200 series router with a PA-T3:

```

Router# show version

Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Version 11.1(7)CA [biff 105]
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Sun 04-Aug-96 06:00 by biff
Image text-base: 0x600088A0, data-base: 0x605A4000

ROM: System Bootstrap, Version 11.1(7)CA RELEASED SOFTWARE

Router uptime is 4 hours, 22 minutes
System restarted by reload
System image file is "c7200-j-mz", booted via slot0

cisco 7206 (NPE150) processor with 12288K/4096K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (Level 2 Cache)
Last reset from power-on
Bridging software.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV INC).
Chassis Interface.
4 Ethernet/IEEE 802.3 interfaces.
2 FastEthernet/IEEE 802.3 interfaces.
4 Token Ring /IEEE802.5 interfaces.
12 Serial network interfaces.
1 Compression port adapter.
125K bytes of non-volatile configuration memory.
1024K bytes of packet SRAM memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2

```

Cisco 7401ASR Routers

Following is an example of the **show version** command from a Cisco 7401ASR router with a PA-T3:

```

Router# show version

Cisco Internetwork Operating System Software
IOS (tm) 7401ASR Software (C7401ASR-J-M), Version 11.1(7)CA [biff 105]
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Sun 04-Aug-96 06:00 by biff
Image text-base: 0x600088A0, data-base: 0x605A4000

ROM: System Bootstrap, Version 11.1(7)CA RELEASED SOFTWARE

Router uptime is 4 hours, 22 minutes

```

```

System restarted by reload
System image file is "c7401ASR-j-mz", booted via slot0

cisco 7401ASR processor with 12288K/4096K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (Level 2 Cache)
Last reset from power-on
Bridging software.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV INC).
Chassis Interface.
4 Ethernet/IEEE 802.3 interfaces.
2 FastEthernet/IEEE 802.3 interfaces.
4 Token Ring /IEEE802.5 interfaces.
12 Serial network interfaces.
1 Compression port adapter.
125K bytes of non-volatile configuration memory.
1024K bytes of packet SRAM memory.
20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).Configuration register is 0x2

```

VIP in Cisco 7000 Series and Cisco 7500 Series Routers

Following is an example of the **show version** command from a Cisco 7500 series router with a PA-T3:

```
Router# show version
```

```

Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-A), Version 11.1(7)CA [biff 125]
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Sat 10-Aug-96 17:56 by biff
Image text-base: 0x600108A0, data-base: 0x60952000

ROM: System Bootstrap, Version 5.3(16645) [biff 571], RELEASE SOFTWARE
ROM: GS Software (RSP-BOOT-M), Version 11.1(7)CA, RELEASE SOFTWARE (fc1)

Router uptime is 5 days, 4 minutes
System restarted by reload
System image file is "rsp-jv-mz", booted via slot0

cisco RSP2 (R4600) processor with 16384K bytes of memory.
R4600 processor, Implementation 32, Revision 2.0
Last reset from power-on
G.703/E1 software, Version 1.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV Inc).
Chassis Interface.
1 EIP controller (6 Ethernet).
1 VIP2 controller (8 Ethernet)(1 HSSI).
14 Ethernet/IEEE 802.3 interfaces.
1 HSSI network interface.
125K bytes of non-volatile configuration memory.

8192K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0

```

Using the show diag Command

Display the types of port adapters installed in your system (and specific information about each) using the **show diag slot** command, where *slot* is the *port adapter slot* in a Cisco 7100 series, Cisco 7200 series, Cisco uBR7200 series routers, and Cisco 7401ASR routers, and the *interface processor slot* in a Cisco 7000 series or Cisco 7500 series router with a VIP. This section contains examples for some of the supported platforms.

**Note**

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

**Note**

The *slot* argument is not required for Catalyst 5000 family switches.

Catalyst RSM/VIP2 in Catalyst 5000 Family Switches

Following is an example of the **show diag** command that shows a PA-T3 on a Catalyst RSM/VIP2:

```
Router# show diag
Slot 0:
  Physical slot 0, ~physical slot 0xF, logical slot 0, CBus 1
  Microcode Status 0x4
  Master Enable, LED, WCS Loaded
  Board is analyzed
  Pending I/O Status: Console I/O, Debug I/O
  EEPROM format version 1
  C5IP controller, HW rev 1.0, board revision A0
  Serial number: 00000001 Part number: 00-0000-01
  Test history: 0x00 RMA number: 00-00-00
  Flags: cisco 7000 board; 7500 compatible
EEPROM contents (hex):
  0x20: 01 1C 01 00 00 00 00 01 00 00 00 01 00 00 00 00
  0x30: 50 00 00 00 00 00 00 00 00 00 00 78 00 00 00 00
[Additional display text omitted]
```

Catalyst 6000 Family FlexWAN Module

Following is an example of the **show diag** command that shows a PA-T3 on a Catalyst 6000 family FlexWAN module:

```
Router# show diag
Slot 3: Logical_index 18
  Board is analyzed ipc ready FlexWAN controller

  Slot database information:
  Flags: 0x2004Insertion time: unknown

  CWAN Controller Memory Size: Unknown

PA Bay 0 Information:
  T3 Serial PA, 1 ports
  EEPROM format version 0
  HW rev 0.00, Board revision UNKNOWN
  Serial number: 00000000 Part number: 00-0000-00
```

Cisco 7100 Series Routers

Following is an example of the **show diag slot** command that shows a Fast Ethernet port adapter in port adapter slot 3 of a Cisco 7120 series router:

```
Router# show diag 3
Slot 3:
  10/100 Fast-ethernet with RJ45 Integrated port adapter, 2 ports
  Integrated port adapter is analyzed
  EEPROM contents at hardware discovery:
  Hardware revision 255.255 Board revision UNKNOWN
  EEPROM format version 1
  EEPROM contents (hex):
  0x20:01 D3 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
  0x30:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```



Note

To use the **show diag** command with the Cisco 7140 series router, replace the slot argument **3** with **4**.

Cisco 7200 Series and Cisco uBR7200 Series Routers

Following is an example of the **show diag slot** command that shows a PA-T3 in port adapter slot 1 of a Cisco 7200 series router:

```
Router# show diag 1
Slot 1:
Mueslix serial (RS232) port adapter, 8 ports
Port adapter is analyzed
Port adapter insertion time 2d09h ago
Hardware revision 255.255          Board revision UNKNOWN
Serial number 4294967295          Part number 255-65535-255
Test history 0xFF                  RMA number 255-255-255
EEPROM format version 1
EEPROM contents (hex):
0x20: 01 0D FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

Cisco 7401ASR Routers

Following is an example of the **show diag slot** command that shows a PA-T3 in port adapter slot 1 of a Cisco 7401ASR router:

```
Router# show diag 1
Slot 1:
Mueslix serial (RS232) port adapter, 8 ports
Port adapter is analyzed
Port adapter insertion time 2d09h ago
Hardware revision 255.255          Board revision UNKNOWN
Serial number 4294967295          Part number 255-65535-255
Test history 0xFF                  RMA number 255-255-255
EEPROM format version 1
EEPROM contents (hex):
0x20: 01 0D FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

VIP in Cisco 7000 Series and Cisco 7500 Series Routers

Following is an example of the **show diag slot** command that shows a PA-T3 in port adapter slot 0 on a VIP2 in interface processor slot 1:

```
Router# show diag 1
Slot 1:
Mueslix serial (RS232) port adapter, 8 ports
Port adapter is analyzed
Port adapter insertion time 2d09h ago
Hardware revision 1.4              Board revision UNKNOWN
Serial number 4294967295          Part number 255-65535-255
Test history 0xFF                  RMA number 255-255-255
EEPROM format version 1
EEPROM contents (hex):
0x20:01 0F 01 04 FF FF FF FF FF FF FF FF FF FF FF FF FF
0x30:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
Slot database information:
Flags: 0x4          Insertion time: 0x12A0 (08:56:58 ago)

Controller Memory Size: 8 MBytes

PA Bay 0 Information:
Mueslix Serial PA, 8 ports
EEPROM format version 1
HW rev 1.0, Board revision A0
Serial number: 4294967295 Part number: 255-65535-255
```

```

PA Bay 1 Information:
  Fast-Serial PA, 4 ports
  EEPROM format version 1
  HW rev 1.0, Board revision A0
  Serial number: 02024473  Part number: 73-1389-05

```

Using the show interfaces Command

The **show interfaces** command displays status information (including the physical slot and interface address) for the interfaces you specify. This section contains examples for some of the supported platforms; the examples specify serial interfaces.

For complete descriptions of interface subcommands and the configuration options available for Catalyst RSM/VIP2, Cisco 7100 series, Cisco 7200, Cisco uBR7200 series, Cisco 7401ASR routers, and VIP interfaces, refer to the publications listed in the [“Related Documentation” section on page viii](#).



Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Catalyst RSM/VIP2 in Catalyst 5000 Family Switches

In these examples, the two serial interfaces (0 and 1) are on a port adapter in port adapter slot 1 of a Catalyst RSM/VIP2; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```

Router# show interfaces serial 1/0
Serial1/0 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.1
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text omitted from this example]

```

```

Router# show interfaces serial 1/1
Serial1/1 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.1
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text omitted from this example]

```

Catalyst 6000 Family FlexWAN Module

The following example shows how the **show interfaces** command displays status information for the serial interface you specify. In this example, a one-port PA-T3 serial port adapter on a Catalyst 6000 family FlexWAN module is in chassis slot 3, in port adapter slot 0.

```

Router# show interfaces serial 3/0/0
Serial3/0/0 is administratively down, line protocol is down
  Hardware is PODS3 Serial
  MTU 4470 bytes, BW 44210 Kbit, DLY 200 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 16, loopback not set
  Keepalive not set
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo

```

```

Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 parity
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  0 packets output, 0 bytes, 0 underruns
  0 output errors, 0 applique, 0 interface resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions
  LC=down CA=down TM=down LB=down TA=down LA=down
router#

```

Cisco 7100 Series Routers

Following is an example of the **show interfaces** command used with a Cisco 7120 series router and a Cisco 7140 series router.

In this example, the two serial interfaces (0 and 1) are on a port adapter in port adapter slot 3 of a Cisco 7120 series router; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```

Router# show interfaces serial 3/0
Serial3/0 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.0
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text omitted from this example]

```

```

Router# show interfaces serial 3/1
Serial3/1 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.1
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text omitted from this example]

```



Note

To use the **show interfaces serial** command with the Cisco 7140 series router, replace the interface address arguments **3/0** and **3/1** with **4/0** and **4/1**, respectively.

Following is an example of the **show interfaces serial** command, which shows all of the information specific to interface 0 on a PA-T3 installed in port adapter slot 3 of a Cisco 7120 series router:

```

Router# show interfaces serial 3/0
Serial3/0 is up, line protocol is up
  Hardware is M8T-RS232
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output 1d17h, output hang never
  Last clearing of "show interface" counters never
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    24 packets output, 5137 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions      DCD=down DSR=down DTR=down RTS=down CTS=down

```

**Note**

To use the **show interfaces serial** command with the Cisco 7140 series router, replace the interface address argument **3/0** with **4/0**.

Cisco 7200 Series and Cisco uBR7200 Series Routers

Following is an example of the **show interfaces** command for Cisco 7200 series and Cisco uBR7200 series routers. In this example, the two serial interfaces (0 and 1) are on a port adapter in port adapter slot 1; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```
Router# show interfaces serial 1/0
Serial1/0 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.0
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text omitted from this example]
```

```
Router# show interfaces serial 1/1
Serial1/1 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.1
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text omitted from this example]
```

Following is an example of the **show interfaces serial** command, which shows all of the information specific to interface port 0 on a PA-T3 installed in port adapter slot 1:

```
Router# show interfaces serial 1/0
Serial1/0 is up, line protocol is up
  Hardware is M8T-RS232
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output 1d17h, output hang never
  Last clearing of "show interface" counters never
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    24 packets output, 5137 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions      DCD=down DSR=down DTR=down RTS=down CTS=down
```

Cisco 7401ASR Routers

Following is an example of the **show interfaces serial** command, which shows all of the information specific to interface port 0 on a PA-T3 installed in port adapter slot 1:

```
Router# show interfaces serial 1/0
Serial1/0 is up, line protocol is up
  Hardware is M8T-RS232
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output 1d17h, output hang never
  Last clearing of "show interface" counters never
```

```

Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  24 packets output, 5137 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions      DCD=down  DSR=down  DTR=down  RTS=down  CTS=down

```

VIP in Cisco 7000 Series or Cisco 7500 Series Routers

Following is an example of the **show interfaces** command used with the VIP2. In this example, the two serial interfaces (0 and 1) are on a port adapter in port adapter slot 1 of a VIP2 in interface processor slot 3; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```

Router# show interfaces serial 3/1/0
Serial3/1/0 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.0
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text omitted from this example]

```

```

Router# show interfaces serial 3/1/1
Serial3/1/1 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.1
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text omitted from this example]

```

Following is an example of the **show interfaces serial** command, which shows all of the information specific to interface 0 on a port adapter in port adapter slot 1 of a VIP2 in interface processor slot 3:

```

Router# show interfaces serial 3/1/0
Serial3/1/0 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.0
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
  Last input 2d18h, output 00:00:54, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/64/0 (size/threshold/drops)
    Conversations 0/1 (active/max active)
    Reserved Conversations 0/0 (allocated/max allocated)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    16 packets input, 1620 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 1 ignored, 0 abort
    3995 packets output, 1147800 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
    1 carrier transitions
  RTS up, CTS up, DTR up, DCD up, DSR up

```

Proceed to the next section, “[Using the ping Command to Verify Network Connectivity](#),” to check network connectivity of the *PA-T3* and switch or router.

Using the ping Command to Verify Network Connectivity

Using the **ping** command, you can verify that an interface port is functioning properly. This section provides a brief description of this command. Refer to the publications listed in the “[Related Documentation](#)” section on page viii for detailed command descriptions and examples.

The **ping** command sends echo request packets out to a remote device at an IP address that you specify. After sending an echo request, the system waits a specified time for the remote device to reply. Each echo reply is displayed as an exclamation point (!) on the console terminal; each request that is not returned before the specified timeout is displayed as a period (.). A series of exclamation points (!!!!!) indicates a good connection; a series of periods (.....) or the messages [timed out] or [failed] indicate a bad connection.

Following is an example of a successful **ping** command to a remote server with the address 10.0.0.10:

```
Router# ping 10.0.0.10 <Return>
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 10.0.0.10, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/64 ms
Router#
```

If the connection fails, verify that you have the correct IP address for the destination and that the device is active (powered on), and repeat the **ping** command.

Proceed to the next section, “[Using loopback Commands](#),” to finish checking network connectivity.

Using loopback Commands

With the loopback test, you can detect and isolate equipment malfunctions by testing the connection between the PA-T3 interface and a remote device such as a modem or a CSU/DSU. The **loopback** command places an interface in loopback mode, which enables test packets that are generated from the **ping** command to loop through a remote device or compact serial cable. If the packets complete the loop, the connection is good. If not, you can isolate a fault to the remote device or compact serial cable in the path of the loopback test.



Note

If no cable is attached to the port, the port is administratively up, and the port is in loopback mode.

Issuing the **loopback** command tests the path between the network processing engine and the near (network processing engine) side of the DSU or modem to test the PA-T3 interface and compact serial cable.

