



# CHAPTER 4

## Configuring the PA-MC-T3

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To continue your PA-MC-T3 installation, you must configure the MC-T3 interface. 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](#)
- [Checking the Configuration, page 4-26](#)

## 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-MC-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

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

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

You execute configuration commands from the privileged-level access of the EXEC command interpreter. 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:

- [Configuring T1 Lines, page 4-2](#)
- [Shutting Down an Interface, page 4-10](#)
- [Performing a Basic Interface Configuration, page 4-15](#)
- [Configuring the T3 Controller, page 4-17](#)

## Configuring T1 Lines

This section provides information about configuring T1 lines on the T3 link of the PA-MC-T3 and includes the following subsections:

- [T1 Line Configuration Commands, page 4-3](#)
- [Configuring a BERT on a T1 Line, page 4-4](#)
- [Sending a BERT Pattern on a T1 Line, page 4-5](#)
- [Viewing the Results of a BERT, page 4-7](#)
- [Terminating a BERT, page 4-9](#)

**Note**

For consistency throughout the following configuration examples and whenever possible, the port addresses 1/0/0 and 1/0/0/1:1 are used.

The PA-MC-T3 port addressing might be different depending on the interface processor slot in which the VIP is installed and the VIP port adapter slot in which the PA-MC-T3 is installed.

## T1 Line Configuration Commands

You can create a logical channel group on a T1 line using the following controller commands as appropriate for your channelized configuration:

```
t1 t1-line-number channel-group channel-group-number timeslots list-of-timeslots
[speed {56 | 64}]
```

where:

- *t1-line-number* is 1 to 28 (all 28 T1 lines can have more than one logical channel group).
- **channel-group** *channel-group-number* defines a logical channel group with a range of 0 to 23 to be a channelized T1 line (T1 lines 1 to 28 can be channelized).
- **timeslots** *list-of-timeslots* can be 1 to 24 or a combination of subranges within 1 to 24 (each subrange is a list of time slots that makes up the T1 line).
- **speed**{56 | 64} is an optional argument that specifies the speed of a time slot to be either 56 kbps or 64 kbps.

Table 4-1 shows the configuration of logical channel group 20 on T1 line 1 assigning channelized time slots 1 to 5 and 20 to 23.

You can remove a logical channel group from a T1 line with the **no-t1** controller command.

```
no t1 t1-line-number channel-group channel-group-number
```

where:

- *t1-line-number* is 1 to 28.
- *channel-group-number* is 0 to 23.

Table 4-1 shows how to remove logical channel group 10 from channelized T1 line 1.

**Table 4-1** T1 Line Configuration Commands

Purpose	Command	Example	Additional Information
Create a logical channel group on a T1 line	<b>t1</b> <i>t1-line-number</i> <b>channel-group</b> <i>channel-group-number</i>	The example is for interface 0 in port adapter slot 1.  Router(config)# <b>controller</b> <b>t3 1/0</b> Router(config-controller)# <b>t1 1 channel-group 20</b> <b>timeslots 1-5, 20-23</b>	
Remove a channel group from a T1 line	<b>no t1</b> <i>t1-line-number</i> <b>channel-group</b> <i>channel-group-number</i>	The example is for interface 0 on a port adapter in port adapter slot 1.  Router(config)# <b>controller</b> <b>t3 1/0</b> Router(config-controller)# <b>no t1 1 channel-group 10</b>	
Set the framing format on a T1 line	<b>t1</b> <i>t1-line-number</i> <b>framing</b> <b>{esf   sf}</b>	The example sets Super Frame (SF) framing for T1 line 6.  Router(config)# <b>controller</b> <b>t3 1/0</b> Router(config-controller)# <b>t1 6 framing sf</b>	Standard framing (SF) Default framing format is Extended Superframe (ESF).

Table 4-1 T1 Line Configuration Commands (continued)

Purpose	Command	Example	Additional Information
Turn detection or generation of a yellow alarm on and off a T1 line	<code>[no] t1 t1-line-number yellow {detection   generation}</code>	The example turns the detection of a yellow alarm off on a T1 line 6.  Router (config-controller) # <b>no t1 6 yellow detection</b>	When you select SF framing, consider turning off yellow alarm detection; yellow alarm can be incorrectly detected with SF framing.
Set the ESF framing format on a T1 line	<code>t1 16 framing esf</code>	The example sets ESF framing for T1 line 16.  Router (config)# <b>controller t3 1/0</b> Router (config-controller)# <b>t1 6 framing esf</b>	Extended Superframe (ESF)
Set internal clock source on a T1 line	<code>t1 t1-line-number clock source {internal   line}</code>	The example configures T1 line 1 to use an internal clock source on a VIP in interface processor slot 1.  Router (config)# <b>controller t3 1/0/0</b> Router (config-controller)# <b>t1 1 clock source internal</b>	<i>t1-line-numbers</i> are 1 to 28. The default clock source is internal. You can set the clock source to use internal clocking for testing purposes. One end of a T1 circuit <i>must</i> provide the clock source.
Set line clock source on a T1 line	<code>t1 t1-line-number clock source {internal   line}</code>	The example configures T1 line 16 using a line clock source on a VIP in interface processor slot 1.  Router (config)# <b>controller t3 1/0/0</b> Router (config-controller)# <b>t1 6 clock source line</b>	

**Note**

After a T1 line is configured, it appears to the Cisco IOS software as a serial interface; therefore, all the configuration commands for a serial interface are available. However, not all commands apply to the T1 line. All the encapsulation formats, such as PPP, HDLC, SMDS, and Frame Relay are applicable to the configured T1 line. Encapsulation can be set using the serial interface configuration commands. All the switching types that are applicable to a serial interface, including optimum switching, are also applicable to the configured T1 line.

## Configuring a BERT on a T1 Line

Bit error rate test (BERT) circuitry is built into the PA-MC-T3. Using BERT you can test cables and signal problems in the field. You can configure individual T1 lines to run an independent BERT; each T1 line has its own BERT circuitry.

Two categories of test patterns can be generated by the onboard BERT circuitry: pseudorandom and repetitive. The former test patterns are exponential numbers and conform to the CCITT/ITU O.151 and O.153 specifications; the latter test patterns are zeros or ones, or alternating zeros and ones.

A description of each type of test pattern follows:

- Pseudorandom test patterns:
  - 2<sup>11</sup> (per CCITT/ITU O.151)
  - 2<sup>15</sup> (per CCITT/ITU O.151)
  - 2<sup>20-153</sup> (per CCITT/ITU O.153)
  - 2<sup>20-QRSS</sup> (per CCITT/ITU O.151)
  - 2<sup>23</sup> (per CCITT/ITU O.151)
- Repetitive test patterns:
  - All zeros (0s)
  - All ones (1s)
  - Alternating zeros (0s) and ones (1s)

Both the total number of error bits received and the total number of bits received are available for analysis. You can set the testing period from 1 minute to 14,440 minutes (240 hours), and you can also retrieve the error statistics anytime during the BERT.



**Note**

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BERT testing for the T3 link is not supported.

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When running a BERT, your system expects to receive the same pattern that it is transmitting. To help ensure this, you can use one of two common options:

- Use a loopback somewhere in the link or network.
- Configure remote testing equipment to transmit the same BERT pattern at the same time.

## Sending a BERT Pattern on a T1 Line

You can send a BERT pattern on a T1 line with the following command:

**t1** *t1-line-number* **bert** *pattern* *interval* *time* [**unframed**]

where:

- *t1-line-number* is 1 to 28.
- *time* is 1 to 14440 minutes.
- *pattern* is:
  - 0s, repetitive test pattern of all zeros (00000...).
  - 1s, repetitive test pattern of all ones (11111...).
  - 2<sup>11</sup>, pseudorandom test pattern (2,048 bits long).
  - 2<sup>15-0.151</sup> pseudorandom 0.151 test pattern (32,768 bits long).
  - 2<sup>20-0.153</sup>, pseudorandom 0.153 test pattern (1,048,575 bits long).
  - 2<sup>20-QRSS</sup>, pseudorandom QRSS 0.151 test pattern (1,048,575 bits long).
  - 2<sup>23</sup>, pseudorandom 0.151 test pattern (8,388,607 bits long).
  - alt-0-1, repetitive alternating test pattern of zeros (0s) and ones (1s) (01010101....).



**Note** Use unframed T1 to run BERTs. If you do not specify **unframed**, the port adapter uses the currently configured T1 framing option to run a BERT.

Examples follow:

- Send a BERT pseudorandom pattern of 2<sup>20</sup> through T1 line 10 for 5 minutes.

The example that follows is for a port adapter on a Catalyst RSM/VIP2 in slot 1:

```
Router(config)# controller t3 1/0
Router(config-controller)# t1 10 bert pattern 2^20 interval 5 unframed
```

The example that follows is for a port adapter on a Catalyst 6000 family FlexWAN module in interface processor slot 5:

```
Router(config)# controller t3 5/0/0
Router(config-controller)# t1 10 bert pattern 2^20 interval 5 unframed
```

The example that follows is for a port adapter in slot 1 of the Cisco 7200 series router, Cisco 7200 VXR router, Cisco uBR7200 series router, Cisco 7201 router, Cisco 7301 router, or a Cisco 7401ASR router:

```
Router(config)# controller t3 1/0
Router(config-controller)# t1 10 bert pattern 2^20 interval 5 unframed
```

The example that follows is for a port adapter in slot 3 of a Cisco 7304 PCI port carrier card of a Cisco 7304 router:

```
Router(config)# controller t3 3/0
Router(config-controller)# t1 10 bert pattern 2^20 interval 5 unframed
```

The example that follows is for a port adapter on a VIP in interface processor slot 1:

```
Router(config)# controller t3 1/0/0
Router(config-controller)# t1 10 bert pattern 2^20 interval 5 unframed
```

- Send a repetitive pattern of all ones through T1 line 10 for 14440 minutes (240 hours).

The example that follows is for a port adapter on a Catalyst RSM/VIP2 in slot 1:

```
Router(config)# controller t3 1/0
Router(config-controller)# t1 10 bert pattern 1s interval 14440 unframed
```

The example that follows is for a port adapter on a Catalyst 6000 family FlexWAN module in interface processor slot 5:

```
Router(config)# controller t3 5/0/0
Router(config-controller)# t1 10 bert pattern 1s interval 14440 unframed
```

The example that follows is for a port adapter in slot 1 of the Cisco 7200 series router, Cisco 7200 VXR router, Cisco uBR7200 series router, Cisco 7201 router, Cisco 7301 router, or a Cisco 7401ASR router:

```
Router(config)# controller t3 1/0
Router(config-controller)# t1 10 bert pattern 1s interval 14440 unframed
```

The example that follows is for a port adapter in slot 3 of a Cisco 7304 PCI port carrier card of a Cisco 7304 router:

```
Router(config)# controller t3 3/0
Router(config-controller)# t1 10 bert pattern 1s interval 14440 unframe
```

The example that follows is for a port adapter on a VIP in interface processor slot 1:

```
Router(config)# controller t3 1/0/0
Router(config-controller)# t1 10 bert pattern 1s interval 14440 unframed
```

**Note**

You can terminate a BERT during the specified test period with the **no t1 bert** command.

## Viewing the Results of a BERT

You can view the results of a BERT using the **show controller** command:

```
show controllers t3 slot/port-adapter/port/t1-line-number
```

where: *t1-line-number* is 1 to 28.

You can view the results of a BERT at the following times:

- After you terminate the test using the **no t1 bert** command
- After the test runs completely
- Anytime during the test (in real time)

Examples:

- The example that follows is for a port adapter on a Catalyst RSM/VIP2 in slot 1:

```
Router# show controllers t3 1/0/1
T3 1/0 is up.
CT3 H/W Version : 3, CT3 ROM Version : 0.79, CT3 F/W Version : 0.29.0
T3 1/0 T1 1
No alarms detected.
Clock Source is internal.
BERT test result (running)
  Test Pattern : 2^11, Status : Sync, Sync Detected : 1
  Interval : 5 minute(s), Time Remain : 5 minute(s)
  Bit Errors(Since BERT Started): 6 bits,
  Bits Received(Since BERT start): 8113 Kbits
  Bit Errors(Since last sync): 6 bits
  Bits Received(Since last sync): 8113 Kbits
```

- The example that follows is for a port adapter in slot 1 of the Cisco 7200 series router, Cisco 7200 VXR router, Cisco uBR7200 series router, Cisco 7201 router, Cisco 7301 router, or a Cisco 7401ASR router:

```
Router# show controllers t3 1/0/1
T3 1/0 is up.
CT3 H/W Version : 3, CT3 ROM Version : 0.79, CT3 F/W Version : 0.29.0
T3 1/0 T1 1
No alarms detected.
Clock Source is internal.
BERT test result (running)
  Test Pattern : 2^11, Status : Sync, Sync Detected : 1
  Interval : 5 minute(s), Time Remain : 5 minute(s)
  Bit Errors(Since BERT Started): 6 bits,
  Bits Received(Since BERT start): 8113 Kbits
  Bit Errors(Since last sync): 6 bits
```

```
Bits Received(Since last sync): 8113 Kbits
```

- The example that follows is for a port adapter in slot 3 of a Cisco 7304 PCI port carrier card of a Cisco 7304 router:

```
Router# show controllers t3 3/0/1
T3 3/0 is up.
CT3 H/W Version : 3, CT3 ROM Version : 0.79, CT3 F/W Version : 0.29.0
T3 3/0 T1 1
No alarms detected.
Clock Source is internal.
BERT test result (running)
  Test Pattern : 2^11, Status : Sync, Sync Detected : 1
  Interval : 5 minute(s), Time Remain : 5 minute(s)
  Bit Errors(Since BERT Started): 6 bits,
  Bits Received(Since BERT start): 8113 Kbits
  Bit Errors(Since last sync): 6 bits
  Bits Received(Since last sync): 8113 Kbits
```

- The example that follows is for a port adapter on a VIP in interface processor slot 1:

```
Router# show controllers t3 1/0/0/1
T3 1/0/0 is up.
CT3 H/W Version : 3, CT3 ROM Version : 0.79, CT3 F/W Version : 0.29.0
T3 1/0/0 T1 1
No alarms detected.
Clock Source is internal.
BERT test result (running)
  Test Pattern : 2^11, Status : Sync, Sync Detected : 1
  Interval : 5 minute(s), Time Remain : 5 minute(s)
  Bit Errors(Since BERT Started): 6 bits,
  Bits Received(Since BERT start): 8113 Kbits
  Bit Errors(Since last sync): 6 bits
  Bits Received(Since last sync): 8113 Kbits
```

- The example that follows is for a port adapter on a VIP4 in interface processor slot 1:

```
Router#show controllers
T3 8/0/0 is down. Hardware is CT3 single wide port adapter
CT3 H/W Version:1.0.1, CT3 ROM Version:1.1, CT3 F/W Version:2.3.0
FREEDM version:1, reset 0
Applique type is Channelized T3
Transmitter is sending remote alarm.
Receiver has loss of signal.
FEAC code received:No code is being received
Framing is M23, Line Code is B3ZS, Clock Source is Internal
Rx throttle total 0, equipment customer loopback
Data in current interval (96 seconds elapsed):
  0 Line Code Violations, 0 P-bit Coding Violation
  0 C-bit Coding Violation, 0 P-bit Err Secs
  0 P-bit Severely Err Secs, 0 Severely Err Framing Secs
  106 Unavailable Secs, 0 Line Errored Secs
  0 C-bit Errored Secs, 0 C-bit Severely Errored Secs

T1 1
  Not configured.
...
T1 28
  Not configured.
```

The following explains the output of the preceding command, line by line:

Output Display Line	Explanation
BERT test result (running)	This line indicates the current state of the test. In this case, “running” indicates that the BERT is still in process. After a test is completed, “done” is displayed.
Test Pattern : 2^11, Status : Sync, Sync Detected : 1	This line indicates the test pattern you selected for the test (2^11), the current synchronization state (sync), and the number of times synchronization has been detected during this test (1).
Interval : 5 minute(s), Time Remain : 5 minute(s)	This line indicates the time the test takes to run and the time remaining for the test to run.
Interval : 5 minute(s), Time Remain : 2 minute(s) (unable to complete)	For a BERT that you terminate, this line indicates the time the test would have taken to run and the time remaining for the test to run had you not terminated it; “unable to complete” signifies that you interrupted the test.
Bit Errors(Since BERT Started): 6 bits, Bits Received(Since BERT start): 8113 Kbits Bit Errors(Since last sync): 6 bits Bits Received(Since last sync): 8113 Kbits	These four lines show the bit errors that have been detected versus the total number of test bits that have been received since the test started and since the last synchronization was detected.



#### Note

The BERT runs over the currently configured framing option for the specified T1 line (ESF or SF). Before running a BERT, you should configure the framing option that is appropriate to your application. You can run the BERT unframed by specifying **unframed**.

## Terminating a BERT

You can terminate a BERT with the following command:

```
no t1 t1-line-number bert
```

where: *t1-line-number* is 1 to 28.

The following examples show how to terminate the BERT running on T1 line 10 in different platforms.

- The example that follows is for a port adapter on a Catalyst RSM/VIP2 in slot 1:

```
Router(config)# controller t3 1/0  
Router(config-controller)# no t1 10 bert
```

- The example that follows is for a port adapter on a Catalyst 6000 family FlexWAN module in interface processor slot 5:

```
Router(config)# controller t3 5/0/0  
Router(config-controller)# no t1 10 bert
```

- The example that follows is for a port adapter in slot 1 of the Cisco 7200 series router, Cisco 7200 VXR router, Cisco uBR7200 series router, Cisco 7201 router, Cisco 7301 router, or a Cisco 7401ASR router:

```
Router(config)# controller t3 1/0
Router(config-controller)# no t1 10 bert
```

- The example that follows is for a port adapter in slot 3 of of a Cisco 7304 PCI port carrier card of a Cisco 7304 router:

```
Router(config)# controller t3 3/0
Router(config-controller)# no t1 10 bert
```

- The example that follows is for a port adapter on a VIP in interface processor slot 1:

```
Router(config)# controller t3 1/0/0
Router(config-controller)# no t1 10 bert
```

This completes the procedures for configuring and testing T1 lines.

To check your configurations using **show** commands, proceed to the [“Checking the Configuration” section on page 4-26](#); otherwise, proceed to the following sections to perform a basic interface configuration and T3 controller configurations:

- [Shutting Down an Interface, page 4-10](#)
- [Performing a Basic Interface Configuration, page 4-15](#)
- [Configuring the T3 Controller, page 4-17](#)

## Shutting Down an Interface

Before you remove an interface that you will not replace 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 [“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 **interfaces serial** subcommand (followed by the interface address of the interface), and then enter the **shutdown** command.

This step assumes you have already configured the logical channel group. For channelized T1 lines, *channel-group-number* can be 0 to 23.

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.



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

Table 4-2 shows the **shutdown** command syntax for the supported platforms.

**Table 4-2 Syntax of the shutdown Command for the Supported Platforms**

Platform	Commands	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>interface</b> , followed by the <i>type (serial) slot/port (port-adapter-slot-number/interface-port-number)/ t1-line-number: channel-group-number</i>  <b>shutdown</b>	The example is for logical channel group 1 on T1 line 1 of the T3 link on a port adapter on interface 0 in port adapter slot 1.  Router(config)# <b>interface serial 1/0/1:1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>interface</b> , followed by the <i>type (serial) module/bay/port (module-slot-number/port-adapter-bay-number/interface-port-number)/t1-line-number: channel-group-number</i>  <b>shutdown</b>	The example is for logical channel group 1 on T1 line 1 of the T3 link on a port adapter on interface processor slot 5 in port adapter bay 0.  Router(config)# <b>interface serial 5/0/0/1:1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers	<b>interface</b> , followed by the <i>type (serial) slot/port (port-adapter-slot-number/interface-port-number)/ t1-line-number: channel-group-number</i>  <b>shutdown</b>	The example is for logical channel group 1 on T1 line 1 of the T3 link on a port adapter on interface 0 in port adapter slot 1.  Router(config)# <b>interface serial 1/0/1:1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>interface</b> , followed by the <i>type (serial) slot/port (port-adapter-slot-number/interface-port-number)/ t1-line-number: channel-group-number</i>  <b>shutdown</b>	The example is for logical channel group 1 on T1 line 1 of the T3 link on a port adapter on interface 0 in port adapter slot 1.  Router(config)# <b>interface serial 1/0/1:1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#

Table 4-2 Syntax of the shutdown Command for the Supported Platforms (continued)

Platform	Commands	Example
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	<b>interface</b> , followed by the <i>type (serial) slot/port (module-slot-number/interface-port-number)/ t1-line-number: channel-group-number</i>  <b>shutdown</b>	The example is for logical channel group 1 on T1 line 1 of the T3 link on a port adapter on interface 0 in a Cisco 7304 PCI port adapter carrier card in port adapter slot 1 of the Cisco 7304 router:  Router(config)# <b>interface serial 3/0/1:1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>interface</b> , followed by the <i>type (serial) and slot/port-adapter/port (interface-processor-slot-number/port-adapter-slot-number/interface-port-number)/ t1-line-number: channel-group-number</i>  <b>shutdown</b>	The example is for logical channel group 1 on T1 line 1 of the T3 link on interface 0 on a port adapter in port adapter slot 1 of a VIP installed in interface processor slot 1.  Router(config-if)# <b>interface serial 1/1/0/1:1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#

**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 4-3 shows the **show interfaces serial** command syntax for the various supported platforms.

**Table 4-3** Examples of the **show interfaces serial** Command for the Supported Platforms

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)/ <i>t1-line-number:channel-group-number</i>	The example is for T1 line 1, channel group number 0 and interface 0 on a port adapter in port adapter slot 1.  Router# <b>show interfaces serial 1/0/1:0</b>  Serial 1/0/1:0 is administratively down, line protocol is down  [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>module/bay/port</i> (module-slot-number/port-adapter-bay-number/interface-port-number)/ <i>t1-line-number:channel-group-number</i>	The example is for T1 line 1, channel group number 0 and interface 0 on a port adapter in port adapter slot 0 in module number 5.  Router# <b>show interfaces serial 5/0/0/1:0</b>  Serial 5/0/0/1:0 is down, line protocol is down  [Additional display text omitted from this example]
Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)/ <i>t1-line-number:channel-group-number</i>	The example is for T1 line 1, channel group number 0 and interface 0 on a port adapter in port adapter slot 1.  Router# <b>show interfaces serial 1/0/1:0</b>  Serial 1/0/1:0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)/ <i>t1-line-number:channel-group-number</i>	The example is for T1 line 1, channel group number 0 and interface 0 on a port adapter in port adapter slot 1.  Router# <b>show interfaces serial 1/0/1:0</b>  Serial 1/0/1:0 is administratively down, line protocol is down  [Additional display text omitted from this example]

Table 4-3 Examples of the `show interfaces serial` Command for the Supported Platforms (continued)

Platform	Command	Example
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	<code>show interfaces serial</code> , followed by <i>slot/port</i> (module-slot-number/interface-port-number)/ <i>t1-line-number</i> : <i>channel-group-number</i>	The example is for T1 line 1, channel group number 0, interface 0 on a port adapter in a Cisco 7304 PCI port adapter carrier card in port adapter slot 3 of the Cisco 7304 router  Router# <code>show interfaces serial 3/0/1:0</code>  Serial 3/0/1:0 is administratively down, line protocol is down  [Additional display text omitted from this example]
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<code>show interfaces serial</code> , followed by <i>slot/port adapter/port</i> (interface-processor-slot-number/port-adapter-slot-number/interface-port-number)/ <i>t1-line-number</i> : <i>channel-group-number</i>	The example is for T1 line 1, channel group number 0, interface 0 on a port adapter in port adapter slot 0 of a VIP in interface processor slot 1.  Router# <code>show interfaces serial 1/0/0/1:0</code>  Serial 1/0/0/1:0 is administratively down, line protocol is down  [Additional display text omitted from this example]

- Step 6** Re-enable the interfaces by doing the following:
- a. Repeat Step 3 to re-enable 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 [“Related Documentation”](#) section on page viii.

## Performing a Basic Interface Configuration

Following are instructions for a basic configuration, which include enabling an interface, specifying IP routing, and configuring the T3 controller. 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.

Table 4-4 shows the **interface serial** command syntax for the supported platforms:

**Table 4-4** Examples of the **interface serial** Subcommands for the Supported Platforms

Platform	Command	Example
Catalyst RSM VIP2 in Catalyst 5000 family switches	<b>interface</b> , followed by the <i>type (serial) slot/port (port-adapter-slot-number/interface-port-number)/t1-line-number:channel-group-number</i>	The example is for logical channel group 1 on T1 line 1 of the T3 link on a port adapter on interface 0 in port adapter slot 1.  Router(config)# <b>interface serial 1/0/1:1</b> Router(config-if)#
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>interface</b> , followed by the <i>type (serial) module/bay/port (module-slot-number/port-adapter-bay-number/interface-port-number)/t1-line-number:channel-group-number</i>	The example is for logical channel group 1 on T1 line 1 of the T3 link on interface 0 of a port adapter in port adapter slot 0 in module slot 5.  Router(config)# <b>interface serial 5/0/0/1:1</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers	<b>interface</b> , followed by the <i>type (serial) slot/port (port-adapter-slot-number/interface-port-number)/t1-line-number:channel-group-number</i>	The example is for logical channel group 1 on T1 line 1 of the T3 link on a port adapter on interface 0 in port adapter slot 1.  Router(config)# <b>interface serial 1/0/1:1</b> Router(config-if)#
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>interface</b> , followed by the <i>type (serial) slot/port (port-adapter-slot-number/interface-port-number)/t1-line-number:channel-group-number</i>	The example is for logical channel group 1 on T1 line 1 of the T3 link on a port adapter on interface 0 in port adapter slot 1.  Router(config)# <b>interface serial 1/0/1:1</b> Router(config-if)#

Table 4-4 Examples of the interface serial Subcommands (continued)for the Supported Platforms (continued)

Platform	Command	Example
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	<b>interface</b> , followed by the <i>type (serial) slot/port (module-slot-number/interface-port-number)/t1-line-number:channel-group-number</i>	The example is for logical channel group 1 on T1 line 1 of the T3 link on a port adapter on interface 0 in a Cisco 7304 PCI port adapter carrier card in port adapter slot 3 of the Cisco 7304 router.  Router (config)# <b>interface serial 3/0/1:1</b> Router (config-if)#
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>interface</b> , followed by the <i>type (serial) and slot/port adapter/port (interface-processor-slot-number/port-adapter-slot-number/interface-port-number)/t1-line-number:channel-group-number</i>	The example is for logical channel group 1 on T1 line 1 of the T3 link on interface 0 on a port adapter in port adapter slot 1 of a VIP installed in interface processor slot 1.  Router (config-if)# <b>interface serial 1/1/0/1:1</b> 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** Re-enable the interfaces using the **no shutdown** command. (See the [“Shutting Down an Interface” section on page 4-10.](#))

**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 interface 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 the T3 Controller

This section provides procedures and examples for configuring the T3 controller on the PA-MC-T3, and includes information on the following topics:

- [T3 Controller Configuration Commands, page 4-17](#)
- [Configuring MDL Messages, page 4-18](#)
- [Configuring Idle Patterns, page 4-19](#)
- [Configuring the Loopback Mode for the T3 Controller, page 4-22](#)
- [Configuring the T3 Controller To Enable Remote Loopback, page 4-24](#)
- [Shutting Down the T3 Controller, page 4-25](#)

### T3 Controller Configuration Commands

[Table 4-5](#) summarizes T3 controller configuration commands.

**Table 4-5** T3 Controller Configuration Commands

Purpose	Command	Example	Additional Information
Select a T3 controller	<b>controller t3</b> <i>slot/port-adapter/port</i>	The example shows a port adapter on a Cisco 7200 series router in port adapter slot 1.  Router# <b>controller t3 1/0</b>	You must enter this command before any other T3 configuration commands.
Set the framing type for a T3 controller	<b>framing [c-bit   m23   auto-detect]</b>	The example sets c-bit framing.  Router(config-controller)# <b>framing c-bit</b>  The example sets m23 framing.  Router(config-controller)# <b>framing m23</b>	You can request the PA-MC-T3 to detect the framing type it is to receive from the far end as follows:  router(config-controller)# <b>framing auto-detect</b>

Table 4-5 T3 Controller Configuration Commands (continued)

Purpose	Command	Example	Additional Information
Specify the cable length <sup>1</sup>	<b>cablelength</b> <i>feet</i>	The example sets cable length.  Router(config-controller)# <b>cablelength 40</b> <sup>2</sup>	<i>Feet is a number from 0 to 450.</i>  The default value is 49 feet.
Set the clock source for the T3 controller	<b>clock source</b> { <b>internal</b>   <b>line</b> }	The example instructs a PA-MC-T3 on a VIP in interface processor slot 1 to use a line clock source.  Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>clock source line</b>  The example instructs a PA-MC-T3 on a Cisco 7200 series router to use an internal clock source.  Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>clock source internal</b>	

1. User-specified T3 cable lengths are structured into ranges as follows: 0–49 and 50–450. If you enter a cable length value that falls into one of these ranges, the range within which that applies is used.
2. Since a cable length of 40 is specified, the 0–49 range is used. If you change the cable length to 45, the 0–49 range still applies. Further, if you specify a cable length of 100 and then change it to 200, the 50–450 range applies in each case; therefore, these changes have no effect. Only moving from one range (0–49) to the other range (50–450) has an effect. The actual cable-length number you enter is stored in the configuration file.

## Configuring MDL Messages

You can configure Maintenance Data Link (MDL) messages (which are defined in the ANSI T1.107a-1990 specification) on the PA-MC-T3.



### Note

MDL messages are only supported when the T3 framing is set for c-bit parity. (See Table 4-5 for T3 controller configuration commands.)

To configure MDL messages, use the commands:

```
mdl { transmit { path | idle-signal | test-signal } | string { eic | lic | fic | unit | pfi | port | generator } string }
```

```
no mdl { transmit { path | idle-signal | test-signal } | string { eic | lic | fic | unit | pfi | port | generator } string }
```

where:

- **eic** is the equipment identification code (up to 10 characters).
- **lic** is the location identification code (up to 11 characters).
- **fic** is the frame identification code (up to 10 characters).
- **unit** is the unit identification code (up to 6 characters).
- **pfi** is the facility identification code to send in the MDL path message (up to 38 characters).

- **port** is the equipment port, which initiates the idle signal, to send in the MDL idle signal message (up to 38 characters).
- **generator** is the generator number to send in the MDL test signal message (up to 38 characters).

Use the **no** form of the **mdl** command to remove MDL messages. The default is that no MDL message is configured.

Table 4-6 summarizes the MDL message configuration controller commands.

**Table 4-6 MDL Message Configuration Commands**

Purpose	Command	Example
Enable the MDL path message transmission	<b>mdl transmit path</b>	Router(config-controller)# <b>mdl transmit path</b>
Enable the MDL idle signal message transmission	<b>mdl transmit idle-signal</b>	Router(config-controller)# <b>mdl transmit idle-signal</b>
Enable the MDL test signal message transmission	<b>mdl transmit test-signal</b>	Router(config-controller)# <b>mdl transmit test-signal</b>
Enter the equipment identification code	<b>mdl string eic router A</b>	Router(config-controller)# <b>mdl string eic router A</b>
Enter the location identification code	<b>mdl string eic router A</b>	Router(config-controller)# <b>mdl string lic test network</b>
Enter the frame identification code	<b>mdl string fic building b</b>	Router(config-controller)# <b>mdl string fic building b</b>
Enter the unit identification code	<b>mdl string unit abc</b>	Router(config-controller)# <b>mdl string unit abc</b>
Enter the facility identification code to send in the MDL path message	<b>mdl string pfi string</b>	Router(config-controller)# <b>mdl string pfi string</b>
Enter the port number to send in the MDL idle signal message	<b>mdl string port string</b>	Router(config-controller)# <b>mdl string port string</b>
Enter the generator number to send in the MDL test signal message	<b>mdl string generator string</b>	Router(config-controller)# <b>mdl string generator string</b>

## Configuring Idle Patterns

You can set a specific pattern to be transmitted for unused time slots on all T1 lines. Unused time slots are time slots that have not been assigned to any logical channel group on channelized T1 lines. To set an idle pattern, use the controller command:

**idle pattern patterns**

where:

- *patterns* is a hexadecimal number in the range of 0x0 to 0xFF (hexadecimal) or 0 to 255 (decimal); you can enter this value in either hexadecimal or decimal.
- The default idle pattern is 0x7F (or 127).

Table 4-7 shows the hexadecimal **idle pattern** controller command syntax for the supported platforms.

**Table 4-7** Examples of Hexadecimal Idle Pattern Commands for the Supported Platforms

Platform	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	Set a hexadecimal idle pattern	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>idle pattern 0x10</b>
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	Set a hexadecimal idle pattern	FlexWAN module in interface processor slot 5: Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>idle pattern 0x10</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers	Set a hexadecimal idle pattern	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>idle pattern 0x10</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	Set a hexadecimal idle pattern	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>idle pattern 0x10</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	Set a hexadecimal idle pattern	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router: Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>idle pattern 0x10</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	Set a hexadecimal idle pattern	Port adapter on a VIP in interface processor slot 1: Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>idle pattern 0x10</b>

Table 4-8 shows the decimal **idle pattern** controller command syntax for the supported platforms.

**Table 4-8** Examples of Decimal Idle Pattern Commands for the Supported Platforms

Platform	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	Sets a decimal idle pattern	Port adapter in slot 1: Router (config)# <b>controller t3 1/0</b> Router (config-controller)# <b>idle pattern 23</b>
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	Sets a decimal idle pattern	FlexWAN module in interface processor slot 5: Router (config)# <b>controller t3 5/0/0</b> Router (config-controller)# <b>idle pattern 23</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers	Sets a decimal idle pattern	Port adapter in slot 1: Router (config)# <b>controller t3 1/0</b> Router (config-controller)# <b>idle pattern 23</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	Sets a decimal idle pattern	Port adapter in slot 1: Router (config)# <b>controller t3 1/0</b> Router (config-controller)# <b>idle pattern 23</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	Sets a decimal idle pattern	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router: Router (config)# <b>controller t3 3/0</b> Router (config-controller)# <b>idle pattern 23</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	Sets a decimal idle pattern	Port adapter on a VIP in interface processor slot 1: Router (config)# <b>controller t3 1/0/0</b> Router (config-controller)# <b>idle pattern 23</b>

## Configuring the Loopback Mode for the T3 Controller

You can configure the T3 controller for loopback modes using the controller command:

**loopback [local | network | remote]**

The default is no loopback.

To return the T3 controller to its default condition, use the **no** form of the command:

**no loopback**

Local loopback simultaneously loops all channels toward the router and loops the T3 link back toward the network. You can use local loopback to diagnose problems with cables between the T3 controller and the central switching office at the T3 link level.

Table 4-9 shows the **loopback local** command syntax for the supported platforms.

**Table 4-9** Examples of Local Loopback Mode Commands for the T3 Controller for the Supported Platforms

Platform	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	Configure the T3 controller for local loopback	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>loopback local</b>
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	Configure the T3 controller for local loopback	Port adapter in a FlexWAN module in interface processor slot 5: Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>loopback local</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers	Configure the T3 controller for local loopback	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>loopback local</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	Configure the T3 controller for local loopback	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>loopback local</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	Configure the T3 controller for local loopback	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router: Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>loopback local</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	Configure the T3 controller for local loopback	Port adapter on a VIP in interface processor slot 1: Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>loopback local</b>

Table 4-10 shows the **loopback network** command syntax for the supported platforms.

**Table 4-10** Examples of Network Loopback Mode Commands for the T3 Controller for the Supported Platforms

Platform	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	Configure the T3 controller for network loopback	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>loopback network</b>
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	Configure the T3 controller for network loopback	Port adapter in a FlexWAN module in interface processor slot 5: Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>loopback network</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers	Configure the T3 controller for network loopback	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>loopback network</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	Configure the T3 controller for network loopback	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>loopback network</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	Configure the T3 controller for network loopback	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router: Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>loopback network</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	Configure the T3 controller for network loopback	Port adapter on a VIP in interface processor slot 1: Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>loopback network</b>

Table 4-11 shows the **loopback remote** command syntax for the supported routers.

**Table 4-11 Examples of Remote Loopback Mode Commands for the T3 Controller for Supported Routers**

Platform	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	Configure the T3 controller for remote loopback <sup>1</sup>	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>loopback remote</b>
Catalyst 6000 family FlexWAN module and Catalyst 6000 family switches	Configure the T3 controller for remote loopback	Port adapter in a FlexWAN module in interface processor slot 5: Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>loopback remote</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers	Configure the T3 controller for remote loopback <sup>2</sup>	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>loopback remote</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	Configure the T3 controller for remote loopback <sup>3</sup>	Port adapter in slot 1: Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>loopback remote</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	Configure the T3 controller for remote loopback <sup>4</sup>	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router: Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>loopback remote</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	Configure the T3 controller for remote loopback	Port adapter on a VIP in interface processor slot 1: Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>loopback remote</b>

1. Remote loopbacks are only available when you use c-bit parity framing.
2. Remote loopbacks are only available when you use c-bit parity framing.
3. Remote loopbacks are only available when you use c-bit parity framing.
4. Remote loopbacks are only available when you use c-bit parity framing.

## Configuring the T3 Controller To Enable Remote Loopback

You can configure whether or not the port adapter responds to remote T3 loopback and T1 loopback requests it receives from the remote site using the controller command:

### **equipment [customer | network] loopback**

You can configure the port adapter to respond to remote T3 loopback and T1 loopback requests it receives from the remote site using the **equipment customer loopback** command; you can configure the port adapter to ignore remote T3 and T1 loopback commands using the **equipment network loopback** command.

## Shutting Down the T3 Controller

You can shut down the T3 controller on the PA-MC-T3 using the **shutdown** controller command.

This command sends a DS3 idle signal toward the network. You can bring the T3 controller back up with the **no shutdown** controller command.

Table 4-12 shows the T3 controller **shutdown** command syntax for the supported routers.

**Table 4-12** Examples of T3 Controller shutdown Commands for Supported Routers

Platform	Command	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>controller t3</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	Port adapter in slot 1:  Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>shutdown</b>
Catalyst 6000 family FlexWAN Module in Catalyst 6000 family switches	<b>controller t3</b> , followed by <i>module/bay/port</i> (module-slot-number/port- adapter-bay-number/interface- port-number)	Port adapter on a FlexWAN module in interface processor slot 5:  Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>shutdown</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers	<b>controller t3</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	Port adapter in slot 1:  Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>shutdown</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>controller t3</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	Port adapter in slot 1:  Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>shutdown</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	<b>controller t3</b> , followed by the <i>slot/port</i> (module-slot-number/ interface-port-number)	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router:  Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>shutdown</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>controller t3</b> , followed by the <i>slot/port adapter/port</i> (interface-processor-slot-number/ port-adapter-slot-number/ interface-port-number)	Port adapter on a VIP in interface processor slot 1:  Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>shutdown</b>

## Checking the Configuration

After configuring the T1 lines and T3 controller, use the **show** commands to display the status of the new T1 lines, the T3 controller, and the new interface or all interfaces, and use the **ping** and **loopback** commands to verify network connectivity. This section includes information on the following subsections:

- [Using show Commands to Display New Interface Status, page 4-26](#)
- [Enabling Performance Reports, page 4-41](#)
- [Displaying Remote Performance Reports, page 4-41](#)
- [Using the ping Command to Verify Network Connectivity, page 4-44](#)
- [Using loopback Commands \(t1\), page 4-44](#)

## Using show Commands to Display New Interface Status

[Table 4-13](#) demonstrates how you can use **show** commands to verify that the new interfaces are configured and operating correctly and that the PA-MC-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](#).

**Table 4-13** Using show Commands

Command	Function	Example
<b>show version</b> <b>show hardware</b>	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# <b>show version</b>
<b>show controllers</b>	Displays all the current interface processors and their interfaces	Router# <b>show controllers</b>
<b>show diag slot</b> <b>Note—The slot argument is not required with Catalyst 5000 family switches.</b>	Displays types of port adapters installed in your system and information about a specific port adapter slot, interface processor slot, or chassis slot	Router# <b>show diag 2</b>
<b>show interfaces type</b> <i>port-adapter-slot-number/interface-port-number/t1-line-number:</i> <i>channel-group-number</i>	Displays status information about a specific type of interface (for example, <b>serial</b> ) on a Catalyst RSM/VIP2	Router# <b>show interfaces serial 1/0/1:0</b>
<b>show interfaces type</b> <i>module-number/port-adapter-bay-number/</i> <i>interface-port-number/t1-line-number:</i> <i>channel-group-number</i>	Displays status information about a specific type of interface (for example, <b>serial</b> ) on a Catalyst 6000 family FlexWAN module	Router# <b>show interfaces serial 5/0/0/1:0</b>

Table 4-13 Using show Commands (continued)

Command	Function	Example
<b>show interfaces</b> <i>type port-adapter-slot-number//interface-port-number/t1-line-number: channel-group-number</i>	Displays status information about a specific type of interface (for example, <b>serial</b> ) in a Cisco 7200 series routers, Cisco 7200 VXR routers, Cisco uBR7200 series, Cisco 7201 router, Cisco 7301 router, or Cisco 7401ASR router	Router# <b>show interfaces serial 1/0/1:0</b>
<b>show interfaces</b> <i>type port-adapter-slot-number//interface-port-number/t1-line-number: channel-group-number</i>	Displays status information about a specific type of interface (for example, <b>serial</b> ) on a Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	Router# <b>show interfaces serial 3/0/1:0</b>
<b>show interfaces</b> <i>type interface-processor-slot-number/port-adapter-slot-number/ interface-port-number/t1-line-number: channel-group-number</i>	Displays status information about a specific type of interface (for example, <b>serial</b> ) on a VIP in a Cisco 7000 series router or Cisco 7500 series router	Router# <b>show interfaces serial 1/0/0/1:0</b>
<b>show controllers t3</b>	Displays information for all 28 T1 lines within each T3 port adapter in the router	Router# <b>show controllers t3</b>
<b>show controllers t3</b> <i>slot/port-adapter/port</i>	Displays all information for the specified T3 line.	Router# <b>show controllers t3</b>
<b>show controllers t3</b> <i>slot/port-adapter/port brief</i>	Displays a list of configurations for all T1 lines within a PA-MC-T3	The example is for a PA-MC-T3 in port adapter slot 0 on a VIP installed in interface processor slot 1:  Router# <b>show controllers t3 1/0/0 brief</b>
<b>show controllers t3</b> <i>slot/port-adapter/port tabular</i>	Displays a list of configurations and MID data in a tabular format for all T1 lines within a PA-MC-T3	The example is for a PA-MC-T3 in port adapter slot 0 on a VIP installed in interface processor slot 1:  Router# <b>show controllers t3 1/0/0 tabular</b>
<b>show controllers t3</b> <i>slot/port-adapter/port remote performance</i>	Displays a list of performance data from the remote end of a T1 connection	The example is for a PA-MC-T3 in port adapter slot 0 on a VIP installed in interface processor slot 1:  Router# <b>show controllers t3 1/0/0 remote performance</b>
<b>show controllers t3</b> <i>slot/port-adapter/port/t1-line-number brief</i>	Displays a list of configurations for a specific T1 line within a PA-MC-T3	The example is for T1 line 1 in port adapter slot 0 on a VIP installed in interface processor slot 1:  Router# <b>show controllers t3 1/0/0/1 brief</b>

Table 4-13 Using show Commands (continued)

Command	Function	Example
<b>show controllers t3</b> <i>slot/port-adapter/port/t1-line-number</i> <b>tabular</b>	Displays a list of configurations and MID data in a tabular format for all T1 lines within a PA-MC-T3	The example is for T1 line 1 in port adapter slot 0 on a VIP installed in interface processor slot 1:  Router# <b>show controllers t2 1/0/0/1 tabular</b>
<b>show controllers t3</b> <i>slot/port-adapter/port/t1-line-number</i> <b>remote performance</b>	Displays a list of performance data from the remote end of a T1 connection	The example is for T1 line 1 in port adapter slot 0 on a VIP installed in interface processor slot 1:  Router# <b>show controllers t2 1/0/0/1 remote performance</b>
<b>show protocols</b>	Displays protocols configured for the entire system and for specific interfaces	Router# <b>show protocols</b>
<b>show running-config</b>	Displays the running configuration file	Router# <b>show running-config</b>
<b>show startup-config</b>	Displays the configuration stored in NVRAM	Router# <b>show startup-config</b>

If an interface is down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the network 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 4-28](#)
- [Using the show diag Command, page 4-34](#)
- [Using the show interfaces Command, page 4-38](#)

## Using the show version or show hardware Commands

Display the configuration of 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.



### 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.

The following sections provide platform-specific output examples using the **show version** command:

- [Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show version Command, page 4-29](#)
- [Catalyst 6000 Family FlexWAN Module in Catalyst 6000 Family Switches—Example Output of the show version Command, page 4-30](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show version Command, page 4-30](#)
- [Cisco 7201 Router—Example Output of the show version Command, page 4-31](#)
- [Cisco 7401ASR Router—Example Output of the show version Command, page 4-32](#)
- [VIP in Cisco 7500 Series Routers—Example Output of the show version Command, page 4-32](#)

### Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show version Command

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

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) C5RSM Software (c5rsm-jsv-m), Released Version 11.1(20)CC [biff 128]
CE3_branch Synced to mainline version: 11.1(17.3)CA
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Wed 22-Apr-98 15:23 by biff
Image text-base: 0x60010900, data-base: 0x60A56000

ROM: System Bootstrap, Version 11.1(8)CA1, RELEASE SOFTWARE (f)

Router uptime is 18 hours, 38 minutes
System restarted by reload
System image file is "slot1:rsp-jv-mz.111.20", booted via console

cisco RSP4 (R5000) processor with 131072K/2072K bytes of memory.
R5000 processor, Implementation 35, Revision 2.1 (512KB Level 2 Cache)
Last reset from power-on
G.703/E1 software, Version 1.0.
G.703/JT2 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).
Primary Rate ISDN software, Version 1.0.
Chassis Interface.
1 VIP2 R5K controller (2 Channelized T3).
56 Serial network interfaces.
2 Channelized T3 ports.
123K bytes of non-volatile configuration memory.

8192K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
16384K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x100
```

## Catalyst 6000 Family FlexWAN Module in Catalyst 6000 Family Switches—Example Output of the show version Command

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

```
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 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show version Command

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

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Version 11.1(22)CC [biff 104]
IPATM_CT3_branch Synced to mainline version: 11.1(21.1)CC
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Wed 30-Sep-98 05:45 by biff
Image text-base: 0x600088E0, data-base: 0x60876000

ROM: System Bootstrap, Version 11.1(13)CA, RELEASE SOFTWARE (f)
ROM: 7200 Software (C7200-BOOT-M), Version 11.1(17.5)CC, RELEASE MAINT

7206_1 uptime is 3 days, 19 hours, 4 minutes
```

```
System restarted by reload
System image file is "biff/c7200-j-mz.111_CE.0930", booted via tftp from 224

cisco 7206 (NPE200) processor with 122880K/8192K bytes of memory.
R5000 processor, Implementation 35, Revision 2.1 (512KB 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).

28 Serial network interfaces.
1 Channelized T3 port.

125K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.

8192K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

### Cisco 7201 Router—Example Output of the show version Command

Following is an example of the **show version** command from a Cisco 7201 router:

```
Router# show version
Cisco IOS Software, 7200 Software (C7200P-ADVENTERPRISEK9-M), Version
12.4(biffDEV.061001), INTERIM SOFTWARE Copyright (c) 1986-2006 by Cisco Systems, Inc.
Compiled Sun 01-Oct-06 23:42 by biff
ROM: System Bootstrap, Version 12.4(4r)XD5, RELEASE SOFTWARE (fc1)
BOOTLDR: Cisco IOS Software, 7200 Software (C7200P-KBOOT-M), Version 12.4(TAZ3DEV.060927),
INTERIM SOFTWARE
c7201alpa1 uptime is 5 days, 18 hours, 32 minutes System returned to ROM by power-on
System image file is "disk0:c7200p-adventerprisek9-mz.2006-10-01.biffdev"
This product contains cryptographic features and is subject to United States and local
country laws governing import, export, transfer and use. Delivery of Cisco cryptographic
products does not imply third-party authority to import, export, distribute or use
encryption.
Importers, exporters, distributors and users are responsible for compliance with U.S. and
local country laws. By using this product you agree to comply with applicable laws and
regulations. If you are unable to comply with U.S. and local laws, return this product
immediately.
A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html
If you require further assistance please contact us by sending email to export@cisco.com.
Cisco 7201 (c7201) processor (revision A) with 917504K/65536K bytes of memory.
Processor board ID 222222222222
MPC7448 CPU at 1666Mhz, Implementation 0, Rev 2.2
1 slot midplane, Version 2.255
Last reset from power-on
1 FastEthernet interface
4 Gigabit Ethernet interfaces
2045K bytes of NVRAM.
62443K bytes of USB Flash usbflash0 (Read/Write)
250880K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
65536K bytes of Flash internal SIMM (Sector size 512K).
Configuration register is 0x2
```

### Cisco 7401ASR Router—Example Output of the show version Command

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

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) 7401ASR Software (C7401ASR-J-M), Version 11.1(22)CC [biff 104]
IPATM_CT3_branch Synced to mainline version: 11.1(21.1)CC
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Wed 30-Sep-98 05:45 by biff
Image text-base: 0x600088E0, data-base: 0x60876000

ROM: System Bootstrap, Version 11.1(13)CA, RELEASE SOFTWARE (f)
ROM: 7401ASR Software (C7401ASR-BOOT-M), Version 11.1(17.5)CC, RELEASE MAINT

7206_1 uptime is 3 days, 19 hours, 4 minutes
System restarted by reload
System image file is "biff/c7401ASR-j-mz.111_CE.0930", booted via tftp from 224

cisco 7206 (NPE200) processor with 122880K/8192K bytes of memory.
R5000 processor, Implementation 35, Revision 2.1 (512KB 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).

28 Serial network interfaces.
1 Channelized T3 port.

125K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.

8192K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

### VIP in Cisco 7500 Series Routers—Example Output of the show version Command

Following is an example of the **show version** command from a VIP2 with a PA-MC-T3 installed:

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-JV-M), Released Version 11.1(20)CC [biff 128]
CE3_branch Synced to mainline version: 11.1(17.3)CA
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Wed 22-Apr-98 15:23 by biff
Image text-base: 0x60010900, data-base: 0x60A56000

ROM: System Bootstrap, Version 11.1(8)CA1, RELEASE SOFTWARE (f)

Router uptime is 18 hours, 38 minutes
System restarted by reload
System image file is "slot1:rsp-jv-mz.111.20", booted via console

cisco RSP4 (R5000) processor with 131072K/2072K bytes of memory.
R5000 processor, Implementation 35, Revision 2.1 (512KB Level 2 Cache)
Last reset from power-on
G.703/E1 software, Version 1.0.
G.703/JT2 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).
Primary Rate ISDN software, Version 1.0.
Chassis Interface.
1 VIP2 R5K controller (2 Channelized T3).
56 Serial network interfaces.
2 Channelized T3 ports.
123K bytes of non-volatile configuration memory.

8192K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
16384K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x100

```

Following is an example of the **show version** command from a VIP4 with a PA-MC-T3 installed:

```

Router# show version
Cisco Internetwork Operating System Software
IOS (tm) RSP Software (RSP-JV-M), Released Version 12.0(8)S
Copyright (c) 1986-1999 by cisco Systems, Inc.
Compiled Wed 06-Oct-99 14:30 by biff
Image text-base:0x60010900, data-base:0x60FE2000

ROM:System Bootstrap, Version 11.1(2) [nitin 2], RELEASE SOFTWARE (fc1)
BOOTFLASH:RSP Software (RSP-BOOT-M), Released Version 12.0(8)S [biff-vip4-0628 115]

router uptime is 18 hours, 12 minutes
System returned to ROM by reload at 17:21:25 PDT Wed Oct 13 1999
System restarted at 17:25:09 PDT Wed Oct 13 1999

cisco RSP2 (R4600) processor with 65536K/1072K bytes of memory.
R4600 CPU at 100Mhz, Implementation 32, Rev 2.0
Last reset from power-on
G.703/E1 software, Version 1.0.
G.703/JT2 software, Version 1.0.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
Bridging software.
TN3270 Emulation software.
Chassis Interface.
1 EIP controller (6 Ethernet).
2 VIP2 controllers (1 FastEthernet)(2 Fddi).
2 VIP2 R5K controllers (2 Fddi).
1 VIP4 RM7000 controller (1 Serial)(1 Channelized T3).
6 Ethernet/IEEE 802.3 interface(s)
1 FastEthernet/IEEE 802.3 interface(s)
1 Serial network interface(s)
4 FDDI network interface(s)
1 Channelized T3 port(s)
123K bytes of non-volatile configuration memory.

8192K bytes of Flash internal SIMM (Sector size 256K).
No slave installed in slot 7.
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 Catalyst 5000 family switch, Cisco 7200 series router, Cisco 7200 VXR router, Cisco uBR7200 series router, Cisco 7201 router, Cisco 7301 router, or Cisco 7401ASR router, the *module slot* in a Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router, and the *interface processor slot* in a Cisco 7000 series or Cisco 7500 series router with a VIP. In the FlexWAN module, the **show diag** command is used without the *slot* designation.


**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.

The following sections provide platform-specific output examples using the **show diag** command:

- [Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show diag Command, page 4-34](#)
- [Catalyst 6000 Family FlexWAN Module in Catalyst 6000 Family Switches—Example Output of the show diag Command, page 4-35](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show diag Command, page 4-35](#)
- [Cisco 7201 Router—Example Output of the show diag Command, page 4-36](#)
- [Cisco 7401ASR Router—Example Output of the show diag Command, page 4-36](#)
- [VIP in Cisco 7000 Series Routers and Cisco 7500 Series Routers—Example Output of the show diag Command, page 4-36](#)

### Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show diag Command

Following is an example of the **show diag** command from a Catalyst RSM/VIP2 with a PA-MC-T3 installed:

```
Router# show diag
Slot 1:
  Physical slot 1, ~physical slot 0xC, logical slot 1, CBus 0
  Microcode Status 0x4
  Master Enable, LED, WCS Loaded
  Board is analyzed
  Pending I/O Status: None
  EEPROM format version 1
  C5IP controller, HW rev 2.01, board revision B0
  Serial number: 06747787 Part number: 73-2167-03
  Test history: 0x00 RMA number: 00-00-00
  Flags: cisco 7000 board; 7500 compatible

  EEPROM contents (hex):
    0x20: 01 1E 02 01 00 66 F6 8B 49 08 77 03 00 00 00 00
    0x30: 58 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

  Slot database information:
  Flags: 0x4 Insertion time: 0x1B50 (19:07:47 ago)
```

### Catalyst 6000 Family FlexWAN Module in Catalyst 6000 Family Switches—Example Output of the show diag Command

Following is an example of the **show diag** command from a Catalyst 6000 family FlexWAN module with a PA-MC-T3 installed:

```
Router# show diag

(Additional displayed text omitted from this example.)

Slot 7: Logical_index 14
Board is analyzed ipc ready FlexWAN controller

Slot database information:
Flags: 0x2004Insertion time: unknown

CWAN Controller Memory Size: Unknown

PA Bay 0 Information:
  CT3 single wide PA, 1 port
  EEPROM format version 0
  HW rev 0.00, Board revision UNKNOWN
  Serial number: 00000000 Part number: 00-0000-00
```

### Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show diag Command

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

```
Router# show diag 1
Slot 1:
  CT3 single wide port adapter, 1 port
  Port adapter is analyzed
  Port adapter insertion time 00:03:24 ago
  Hardware revision 1.0          Board revision A0
  Serial number      8526482      Part number    73-3037-01
  Test history       0x0          RMA number     00-00-00
  EEPROM format version 1
  EEPROM contents (hex):
    0x20: 01 A0 01 00 00 82 1A 92 49 0B DD 01 00 00 00 00
    0x30: 05 00 00 00 98 04 27 00 00 00 00 00 00 00 00 00
```

Use additional **show** commands, which display interface and controller information, to verify the success of your PA-MC-T3 port adapter installation and configuration.

### Cisco 7201 Router—Example Output of the show diag Command

Following is an example of the **show diag** command from a Cisco 7201 router:

```
Router# show diag 1
Slot 1:
Dual OC3 POS Port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time 00:02:19 ago
EEPROM contents at hardware discovery:
Hardware Revision : 1.0
PCB Serial Number : JAE07520DYL
Part Number : 73-8220-02
Board Revision : A0
RMA Test History : 00
RMA Number : 0-0-0-0
RMA History : 00
Deviation Number : 0
Product (FRU) Number : PA-POS-20C3
Top Assy. Part Number : 800-21857-02
EEPROM format version 4
EEPROM contents (hex):
0x00: 04 FF 40 03 E3 41 01 00 C1 8B 4A 41 45 30 37 35
0x10: 32 30 44 59 4C 82 49 20 1C 02 42 41 30 03 00 81
0x20: 00 00 00 00 04 00 88 00 00 00 00 CB 94 50 41 2D
0x30: 50 4F 53 2D 32 4F 43 33 20 20 20 20 20 20 20 20
0x40: 20 C0 46 03 20 00 55 61 02 FF FF FF FF FF FF FF
0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

### Cisco 7401ASR Router—Example Output of the show diag Command

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

```
Router# show diag 1
Slot 1:
CT3 single wide port adapter, 1 port
Port adapter is analyzed
Port adapter insertion time 00:03:24 ago
Hardware revision 1.0          Board revision A0
Serial number      8526482     Part number      73-3037-01
Test history       0x0         RMA number       00-00-00
EEPROM format version 1
EEPROM contents (hex):
0x20: 01 A0 01 00 00 82 1A 92 49 0B DD 01 00 00 00 00
0x30: 05 00 00 00 98 04 27 00 00 00 00 00 00 00 00 00
```

### VIP in Cisco 7000 Series Routers and Cisco 7500 Series Routers—Example Output of the show diag Command

Following is an example of the **show diag** command from a VIP2 with a PA-MC-T3 installed:

```
Router# show diag 3
Slot 3:
Physical slot 3, ~physical slot 0xC, logical slot 3, CBus 0
Microcode Status 0x4
Master Enable, LED, WCS Loaded
Board is analyzed
Pending I/O Status: None
EEPROM format version 1
```

```

VIP2 R5K controller, HW rev 2.01, board revision B0
Serial number: 06747787 Part number: 73-2167-03
Test history: 0x00 RMA number: 00-00-00
Flags: cisco 7000 board; 7500 compatible

EEPROM contents (hex):
 0x20: 01 1E 02 01 00 66 F6 8B 49 08 77 03 00 00 00 00
 0x30: 58 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Slot database information:
Flags: 0x4 Insertion time: 0x1B50 (19:07:47 ago)

Controller Memory Size: 64 MBytes DRAM, 8192 KBytes SRAM

PA Bay 0 Information:
  CT3 single wide PA, 1 port
  EEPROM format version 1
  HW rev 1.00, Board revision UNKNOWN
  Serial number: 07503345 Part number: 73-3037-01

PA Bay 1 Information:
  CT3 single wide PA, 1 port
  EEPROM format version 1
  HW rev 1.00, Board revision UNKNOWN
  Serial number: 07503343 Part number: 73-3037-01

```

Following is an example of the **show diag** command from a VIP4 with a PA-MC-T3 installed:

```

Router# show diag 8
Slot 8:
Physical slot 8, ~physical slot 0x7, logical slot 8, CBus 0
Microcode Status 0x4
Master Enable, LED, WCS Loaded
Board is analyzed
Pending I/O Status:None
EEPROM format version 2
VIP4 RM7000 controller, HW rev 2.01, board revision UNKNOWN
Serial number:11500489 Part number:211-18700-71
Test history:0x02 RMA number:00-00-00
Flags: unknown flags 0x7F; 7500 compatible

EEPROM contents (hex):
 0x20:02 22 02 01 00 AF 7B C9 D3 49 0C 47 02 00 00 00
 0x30:02 3A 0C FF FF FF FF FF FF FF FF FF FF FF FF FF

Slot database information:
Flags:0x4 Insertion time:0x3E6C96C (00:01:19 ago)

Controller Memory Size:64 MBytes DRAM, 65536 KBytes SRAM

PA Bay 0 Information:
  CT3 single wide PA, 1 port
  EEPROM format version 1
  HW rev 1.00, Board revision A0
  Serial number:13345087 Part number:73-3037-01

PA Bay 1 Information:
  T3+ Serial PA, 1 ports
  EEPROM format version 1
  HW rev 1.00, Board revision B0
  Serial number:12374558 Part number:

```

## Using the show interfaces Command

Display status information (including the physical slot and interface address) for the interfaces you specify using the **show interfaces** command.

For complete descriptions of interface subcommands and the configuration options available for the individual platforms, 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.

The following sections provide platform-specific output examples using the **show interfaces** command:

- [Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show interfaces Command, page 4-38](#)
- [Catalyst 6000 Family FlexWAN Module in Catalyst 6000 Family Switches—Example Output of the show interfaces Command, page 4-39](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show interfaces Command, page 4-39](#)
- [Cisco 7201 Router—Example Output of the show interfaces Command, page 4-40](#)
- [Cisco 7401ASR Router—Example Output of the show interfaces Command, page 4-40](#)
- [VIP in Cisco 7000 Series Routers or Cisco 7500 Series Routers—Example Output of the show interfaces Command, page 4-41](#)

### Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show interfaces Command

Following is an example of the **show interfaces serial** command from a Catalyst RSM/VIP2 with a PA-MC-T3 in port adapter slot 1:

```
Router# show interfaces serial 1/0/1:0
Serial1/0/1:0 is up, line protocol is up
  Hardware is cyBus T3
  Internet address is 1.1.1.1/24
  MTU 1500 bytes, BW 1536 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
  Last input 19:04:01, output 12:49:52, output hang never
  Last clearing of "show interface" counters 13:09:09
  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
    18722 packets input, 2134308 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants
    82 input errors, 0 CRC, 0 frame, 82 overrun, 0 ignored, 0 abort
    18722 packets output, 2134308 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffers copied, 0 interrupts, 0 failures
    8 carrier transitions no alarm present
  Timeslot(s) Used: 1-24, Transmitter delay is 0 flags, transmit queue length 5
  non-inverted data
```

### Catalyst 6000 Family FlexWAN Module in Catalyst 6000 Family Switches—Example Output of the show interfaces Command

Following is an example of the **show interfaces serial** command with a Catalyst 6000 family FlexWAN module in slot 5, and a PA-MC-T3 port adapter in port adapter slot 0:

```
Router# show interfaces serial 5/0/0/1:0
Serial5/0/0/1:0 is down, line protocol is down
Hardware is T3
MTU 1500 bytes, BW 1536 Kbit, DLY 20000 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 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  0 packets output, 0 bytes, 0 underruns
  0 output errors, 0 collisions, 2 interface resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions alarm present
Timeslot(s) Used: 1-24, Transmitter delay is 0 flags, transmit queue length 999
non-inverted data
```

### Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show interfaces Command

Following is an example of the **show interfaces serial** command from a Cisco 7200 series router with a PA-MC-T3 in slot 1:

```
Router# show interfaces serial 1/0/1:0
Serial1/0/1:0 is up, line protocol is up
Hardware is cyBus T3
Internet address is 1.1.1.1/24
MTU 1500 bytes, BW 1536 Kbit, DLY 20000 usec, rely 255/255, load 1/255
Encapsulation HDLC, loopback not set, keepalive not set
Last input 19:04:01, output 12:49:52, output hang never
Last clearing of "show interface" counters 13:09:09
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
  18722 packets input, 2134308 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants
  82 input errors, 0 CRC, 0 frame, 82 overrun, 0 ignored, 0 abort
  18722 packets output, 2134308 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 output buffers copied, 0 interrupts, 0 failures
  8 carrier transitions no alarm present
Timeslot(s) Used: 1-24, Transmitter delay is 0 flags, transmit queue length 5
non-inverted data
```

### Cisco 7201 Router—Example Output of the show interfaces Command

Following is an example of the **show interfaces** command from a Cisco 7201 router:

```
Router# show interfaces
GigabitEthernet0/0 is up, line protocol is up
  Hardware is MV64460 Internal MAC, address is 0019.56c5.2adb (bia
0019.56c5.2adb)
  Internet address is 209.165.200.225
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 45/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 1000Mb/s, media type is RJ45
  output flow-control is XON, input flow-control is XON
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:07:03, output 00:00:07, output hang never
  Last clearing of "show interface" counters 00:00:04
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 180240000 bits/sec, 430965 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    2222975 packets input, 133378500 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    0 watchdog, 0 multicast, 0 pause input
    0 input packets with dribble condition detected
    0 packets output, 0 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 babbles, 0 late collision, 0 deferred
    0 lost carrier, 0 no carrier, 0 pause output
    0 output buffer failures, 0 output buffers swapped out
```

### Cisco 7401ASR Router—Example Output of the show interfaces Command

Following is an example of the **show interfaces serial** command from a Cisco 7401ASR router with a PA-MC-T3 in slot 1:

```
Router# show interfaces serial 1/0/1:0
Serial1/0/1:0 is up, line protocol is up
  Hardware is cyBus T3
  Internet address is 1.1.1.1/24
  MTU 1500 bytes, BW 1536 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
  Last input 19:04:01, output 12:49:52, output hang never
  Last clearing of "show interface" counters 13:09:09
  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
    18722 packets input, 2134308 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants
    82 input errors, 0 CRC, 0 frame, 82 overrun, 0 ignored, 0 abort
    18722 packets output, 2134308 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffers copied, 0 interrupts, 0 failures
    8 carrier transitions no alarm present
  Timeslot(s) Used: 1-24, Transmitter delay is 0 flags, transmit queue length 5
  non-inverted data
```

## VIP in Cisco 7000 Series Routers or Cisco 7500 Series Routers—Example Output of the show interfaces Command

Following is an example of the **show interfaces serial** command with a VIP2 in interface processor slot 1, and a PA-MC-T3 in port adapter slot 0:

```
Router# show interfaces serial 1/0/0/1:0
Serial1/0/0/1:0 is up, line protocol is up
  Hardware is cyBus T3
  Internet address is 1.1.1.1/24
  MTU 1500 bytes, BW 1536 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
  Last input 19:04:01, output 12:49:52, output hang never
  Last clearing of "show interface" counters 13:09:09
  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
    18722 packets input, 2134308 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants
    82 input errors, 0 CRC, 0 frame, 82 overrun, 0 ignored, 0 abort
    18722 packets output, 2134308 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffers copied, 0 interrupts, 0 failures
    8 carrier transitions no alarm present
  Timeslot(s) Used: 1-24, Transmitter delay is 0 flags, transmit queue length 5
  non-inverted data
```

## Enabling Performance Reports

To enable and disable 1-second transmissions of performance reports through the facility data link (per ANSI T1.403 specification), you must use the following command on both ends of the connection:

```
t1 t1-line-number fdl ansi
```

where: *t1-line-number* is 1 to 28.



### Note

You can use this command *only* when the T1 framing is ESF. Use the **no** form of the command to disable remote performance reports.

## Displaying Remote Performance Reports

To display remote (far-end) performance data, use the following command:

```
show controllers t3 1/0/0/1 remote performance.
```

The following sections provide platform-specific output examples using the **show controllers t3 remote performance** command:

- [Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show controller t3 remote performance Command, page 4-42](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show controller t3 remote performance Command, page 4-42](#)
- [VIP in Cisco 7000 Series Routers or Cisco 7500 Series Routers—Example Output of the show controller t3 remote performance Command, page 4-43](#)

## Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show controller t3 remote performance Command

Following is an example of the **show controllers t3 remote performance** command from a Catalyst RSM/VIP2 with a port adapter in slot 1:

```
Router# show controllers t3 1/0/1 remote performance
T3 1/0 is up. Hardware is CT3 single wide port adapter
CT3 H/W Version : 1.0.0, CT3 ROM Version: 1.1, CT3 F/W Version: 0.23.0
FREEDM version: 1

T1 1 - Remote Performance Data
Data in current interval (356 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
Data in Interval 1:
  1 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  2 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
Data in Interval 2:
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
Total Data (last 2 15 minute intervals):
  1 Path Code Violations
  1 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins,
  2 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
T1 2 - Remote Performance Data
.
.
.
(additional displayed text not shown)
```



### Note

If you do not first enable remote performance data with the **t1 t1-line-number fdl ansi** command, the following is displayed:

```
T1 1 - Remote Performance Data (Not available)
```

## Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show controller t3 remote performance Command

Following is an example of the **show controllers t3 remote performance** command from a Cisco 7200 series router with a port adapter in slot 1:

```
Router# show controllers t3 1/0 remote performance
T3 1/0 is up. Hardware is CT3 single wide port adapter
CT3 H/W Version :1.0.1, CT3 ROM Version :1.1, CT3 F/W Version :2.0.1
FREEDM version:1, reset 0

T1 1 - Remote Performance Data
Data in current interval (640 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs

T1 2 - Remote Performance Data
```

```

Data in current interval (640 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
T1 3 - Remote Performance Data
Data in current interval (7 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs

T1 4 - Remote Performance Data (Not available)

T1 5 - Remote Performance Data (Not available)

T1 6 - Remote Performance Data (Not available)
.
.
.
(additional displayed text not shown)

```

**Note**

If you do not first enable remote performance data with the **t1 t1-line-number fdl ansi** command, the following is displayed:

```
T1 1 - Remote Performance Data (Not available)
```

### VIP in Cisco 7000 Series Routers or Cisco 7500 Series Routers—Example Output of the show controller t3 remote performance Command

Following is an example of the **show controllers t3 remote performance** command from a Cisco 7500 series router with a VIP2 in interface processor slot 1 and a port adapter in port adapter slot 0:

```

Router# show controllers t3 1/0/0/1 remote performance
T3 1/0/0 is up. Hardware is CT3 single wide port adapter
CT3 H/W Version : 1.0.0, CT3 ROM Version: 1.1, CT3 F/W Version: 0.23.0
FREEDM version: 1

T1 1 - Remote Performance Data
Data in current interval (356 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
Data in Interval 1:
  1 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  2 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
Data in Interval 2:
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
Total Data (last 2 15 minute intervals):
  1 Path Code Violations
  1 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins,
  2 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
T1 2 - Remote Performance Data
.

```

```
.
.
(additional displayed text not shown)
```

**Note**

If you do not first enable remote performance data with the **t1 t1-line-number fdl ansi** command, the following is displayed:

```
T1 1 - Remote Performance Data (Not available)
```

## 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 requests 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 that a bad connection.

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

```
Router# ping 10.0.0.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 1.1.1.10, 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 \(t1\)](#),” to finish checking network connectivity.

## Using loopback Commands (t1)

With the loopback test, you can detect and isolate equipment malfunctions by testing the connection between the PA-MC-T3 interface and a remote device such as a modem or a CSU/DSU. The **loopback** subcommand 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**

You must configure a clock rate on the port *before* performing a loopback test. However, if no cable is attached to the port, the port is administratively up, and the port is in loopback mode; you do not have to configure a clock rate on the port *before* performing a loopback test.

Specify loopback for a T1 line using the following command:

```
t1 t1-line-number loopback [local | network {line | payload} | remote {line {fdl {ansi | bellcore} | inband} | payload [fdl] [ansi]}
```

where: *t1-line-number* is 1 to 28.

**Note**

This command requires that you are in T3 controller mode.

Explanations of specific loopback modes are as follows:

<b>local</b>	(Optional.) Loops the router output data back toward the router at the T1 framer and sends an AIS signal out toward the network.
<b>network</b> { <b>line</b>   <b>payload</b> }	(Optional.) Loops the data back toward the network before the T1 framer and automatically sets a local loopback at the HDLC controllers (line) or loops the payload data back toward the network at the T1 framer and automatically sets a local loopback at the HDLC controllers (payload).
<b>remote line fdl</b> { <b>ansi</b>   <b>bellcore</b> }	(Optional.) Sends a repeating, 16-bit ESF data link code word (00001110 11111111 for ANSI; 00010010 11111111 for Bellcore) to the remote end, requesting that it enter into a network line loopback.  Specify the <b>ansi</b> keyword to enable the remote line facility data link (FDL) ANSI bit loopback on the T1 channel, per the ANSI T1.403 specification.  Specify the <b>bellcore</b> keyword to enable the remote SmartJack loopback on the T1 channel, per the TR-TSY-000312 specification.
<b>remote line inband</b>	(Optional.) Sends a repeating, 5-bit inband pattern (00001) to the remote end, requesting that it enter into a network line loopback.
<b>remote payload</b> [ <b>fdl</b> ] [ <b>ansi</b> ]	(Optional.) Sends a repeating, 16-bit ESF data link code word (00010100 11111111) to the remote end, requesting that it enter into a network payload loopback. Enables the remote payload Facility Data Link (FDL) ANSI bit loopback on the T1 channel.  You can optionally specify <b>fdl</b> and <b>ansi</b> , but it is not necessary.

Table 4-14 provides examples of **t1 loopback local** commands for the supported platforms.

**Table 4-14** Examples of t1 loopback local Commands for the Supported Platforms

Platform	Command	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>loopback local</b>	Sets the first T1 line into local loopback	Port adapter in slot 1:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback local</b>
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>loopback local</b>	Sets the first T1 line into local loopback	Port adapter in a FlexWAN module in interface processor slot 5:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback local</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, or Cisco uBR7200 series routers	<b>loopback local</b>	Sets the first T1 line into local loopback	Port adapter in slot 1:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback local</b>
Cisco7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>loopback local</b>	Sets the first T1 line into local loopback	Port adapter in slot 1:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback local</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	<b>loopback local</b>	Sets the first T1 line into local loopback	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback local</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>loopback local</b> <sup>1</sup>	Sets the first T1 line into local loopback	Port adapter on a VIP in interface processor slot 1:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback local</b>

1. Local loopback loops the router output data back toward the router at the T1 framer and send an AIS out toward the network.

Table 4-15 provides examples of **t1 loopback network line** commands for the supported platforms.

**Table 4-15** Examples of t1 loopback network line Commands for the Supported Platforms

Platform	Command	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>loopback network line<sup>1</sup></b>	Sets the first T1 line into network line loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network line</b>
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>loopback network line</b>	Sets the first T1 line into network line loopback	Port adapter in a FlexWAN module in interface processor slot 5: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network line</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, or Cisco uBR7200 series routers	<b>loopback network line<sup>2</sup></b>	Sets the first T1 line into network line loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network line</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>loopback network line<sup>3</sup></b>	Sets the first T1 line into network line loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network line</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	<b>loopback network line<sup>4</sup></b>	Sets the first T1 line into network line loopback	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network line</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>loopback network line</b>	Sets the first T1 line into network line loopback	Port adapter on a VIP in interface processor slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network line</b>

1. Network line loopback loops the data back toward the network (before the T1 framer).

2. Network line loopback loops the data back toward the network (before the T1 framer).
3. Network line loopback loops the data back toward the network (before the T1 framer).
4. Network line loopback loops the data back toward the network (before the T1 framer).

Table 4-16 provides examples of **t1 loopback network payload** commands for the supported platforms.

**Table 4-16** Examples of t1 loopback network payload Commands for the Supported Platforms

Platform	Command	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>loopback network payload<sup>1</sup></b>	Sets the first T1 line into network payload loopback	Port adapter in slot 1: <pre>Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network payload</b></pre>
Catalyst 6000 family FlexWAN module with Catalyst 6000 family switches	<b>loopback network payload</b>	Sets the first T1 line into network payload loopback	Port adapter on a FlexWAN module in interface processor slot 5: <pre>Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3</b> <b>5/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network payload</b></pre>
Cisco 7200 series routers, Cisco 7200 VXR routers, or Cisco uBR7200 series routers	<b>loopback network payload<sup>2</sup></b>	Sets the first T1 line into network payload loopback	Port adapter in slot 1: <pre>Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network payload</b></pre>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>loopback network payload<sup>3</sup></b>	Sets the first T1 line into network payload loopback	Port adapter in slot 1: <pre>Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network payload</b></pre>

**Table 4-16** Examples of t1 loopback network payload Commands for the Supported Platforms (continued)

Platform	Command	Purpose	Example
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	<b>loopback network payload</b> <sup>4</sup>	Sets the first T1 line into network payload loopback	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network payload</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>loopback network payload</b>	Sets the first T1 line into network payload loopback	Port adapter on a VIP in interface processor slot 1:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback network payload</b>

1. Network payload loopback loops just the payload data back toward the network at the T1 framer.
2. Network payload loopback loops just the payload data back toward the network at the T1 framer.
3. Network payload loopback loops just the payload data back toward the network at the T1 framer.
4. Network payload loopback loops just the payload data back toward the network at the T1 framer.

Table 4-17 provides examples of **t1 loopback remote line inband** commands for the supported platforms.

**Table 4-17** Examples of t1 loopback remote line inband Commands for the Supported Platforms

Platform	Command	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>loopback remote line inband</b> <sup>1</sup>	Sets the first T1 line into remote line inband loopback	Port adapter in slot 1:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line inband</b>
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>loopback remote line inband</b>	Sets the first T1 line into remote line inband loopback	Port adapter on a FlexWAN module in interface processor slot 5:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line inband</b>

Table 4-17 Examples of t1 loopback remote line inband Commands for the Supported Platforms (continued)

Platform	Command	Purpose	Example
Cisco 7200 series routers, Cisco 7200 VXR routers, or Cisco uBR7200 series routers	<b>loopback remote line inband<sup>2</sup></b>	Sets the first T1 line into remote line inband loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line inband</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>loopback remote line inband<sup>3</sup></b>	Sets the first T1 line into remote line inband loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line inband</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	<b>loopback remote line inband<sup>4</sup></b>	Sets the first T1 line into remote line inband loopback	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line inband</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>loopback remote line inband</b>	Sets the first T1 line into remote line inband loopback	Port adapter on a VIP in interface processor slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line inband</b>

1. Remote line inband loopback sends a repeating 5-bit inband pattern (of 00001) to the remote end, requesting that it enter into a network line loopback.
2. Remote line inband loopback sends a repeating 5-bit inband pattern (of 00001) to the remote end, requesting that it enter into a network line loopback.
3. Remote line inband loopback sends a repeating 5-bit inband pattern (of 00001) to the remote end, requesting that it enter into a network line loopback.
4. Remote line inband loopback sends a repeating 5-bit inband pattern (of 00001) to the remote end, requesting that it enter into a network line loopback.

Table 4-18 provides examples of **t1 loopback remote line fdl ansi** commands for the supported platforms.

**Table 4-18** Examples of **t1 loopback remote line fd1 ansi** Commands for the Supported Platforms

Platform	Command	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>loop remote line fdl ansi<sup>1</sup></b>	Sets the first T1 line into remote line FDL ANSI bit loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line fdl ansi</b>
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>loop remote line fdl ansi</b>	Sets the first T1 line into remote line FDL ANSI bit loopback	Port adapter in a FlexWAN module in interface processor slot 5: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line fdl ansi</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, or Cisco uBR7200 series routers	<b>loop remote line fdl ansi<sup>2</sup></b>	Sets the first T1 line into remote line FDL ANSI bit loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line fdl ansi</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>loop remote line fdl ansi<sup>3</sup></b>	Sets the first T1 line into remote line FDL ANSI bit loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line fdl ansi</b>
Cisco 7304 PCI port adapter carrier card in a Cisco 7304 router	<b>loop remote line fdl ansi<sup>4</sup></b>	Sets the first T1 line into remote line FDL ANSI bit loopback	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line fdl ansi</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>loop remote line fdl ansi</b>	Sets the first T1 line into remote line FDL ANSI bit loopback	Port adapter on a VIP in interface processor slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote line fdl ansi</b>

1. Remote line FDL ANSI bit loopback sends a repeating 16-bit ESF data link code word (of 0000111011111111) to the remote end, requesting that it enter into a network line loopback.
2. Remote line FDL ANSI bit loopback sends a repeating 16-bit ESF data link code word (of 0000111011111111) to the remote end, requesting that it enter into a network line loopback.
3. Remote line FDL ANSI bit loopback sends a repeating 16-bit ESF data link code word (of 0000111011111111) to the remote end, requesting that it enter into a network line loopback.
4. Remote line FDL ANSI bit loopback sends a repeating 16-bit ESF data link code word (of 0000111011111111) to the remote end, requesting that it enter into a network line loopback.

Table 4-19 provides examples of **t1 loopback remote payload fdl ansi** commands for the supported platforms.

**Table 4-19** Examples of t1 loopback remote payload fdl ansi Commands for the Supported Platforms

Platform	Command	Purpose	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>loopback remote payload fdl ansi<sup>1</sup></b>	Sets the first T1 line into remote payload FDL ANSI bit loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote payload fdl ansi</b>
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>loopback remote payload fdl ansi</b>	Sets the first T1 line into remote payload FDL ANSI bit loopback	Port adapter on a FlexWAN module in interface processor slot 5: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 5/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote payload fdl ansi</b>
Cisco 7200 series routers, Cisco 7200 VXR routers, or Cisco uBR7200 series routers	<b>loopback remote payload fdl ansi<sup>2</sup></b>	Sets the first T1 line into remote payload FDL ANSI bit loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote payload fdl ansi</b>
Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	<b>loopback remote payload fdl ansi<sup>3</sup></b>	Sets the first T1 line into remote payload FDL ANSI bit loopback	Port adapter in slot 1: Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote payload fdl ansi</b>

**Table 4-19** Examples of t1 loopback remote payload fdl ansi Commands for the Supported Platforms (continued)

Platform	Command	Purpose	Example
Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	<b>loopback remote payload fdl ansi<sup>4</sup></b>	Sets the first T1 line into remote payload FDL ANSI bit loopback	Port adapter in a Cisco 7304 PCI port adapter carrier card in slot 3 of the Cisco 7304 router:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 3/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote payload fdl ans</b>
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>loopback remote payload fdl ansi</b>	Sets the first T1 line into remote payload FDL ANSI bit loopback	Port adapter on a VIP in interface processor slot 1:  Router# <b>configure terminal</b> Enter configuration commands, one per line. End with CNTL/Z. Router(config)# <b>controller t3 1/0/0</b> Router(config-controller)# <b>t1 1</b> <b>loopback remote payload fdl ansi</b>

1. Remote payload ANSI bit loopback sends a repeating 16-bit ESF data link code word (of 0001010011111111) to the remote end, requesting that it enter into a network payload loopback.
2. Remote payload ANSI bit loopback sends a repeating 16-bit ESF data link code word (of 0001010011111111) to the remote end, requesting that it enter into a network payload loopback.
3. Remote payload ANSI bit loopback sends a repeating 16-bit ESF data link code word (of 0001010011111111) to the remote end, requesting that it enter into a network payload loopback.
4. Remote payload ANSI bit loopback sends a repeating 16-bit ESF data link code word (of 0001010011111111) to the remote end, requesting that it enter into a network payload loopback.

