



## CHAPTER 4

# Configuring the Multichannel DS1/PRI Interfaces

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To continue your Cisco multichannel DS1/PRI port adapter installation, you must configure the DS1/PRI interfaces. The instructions that follow apply to all supported platforms. Minor differences among 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 4-18](#)

## 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 to change the existing configuration of an interface. The system prompts you for a password if one is 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.

- Step 3** When you enter the correct password, the system displays the privileged-level system prompt (#):

```
Router#
```

---

Proceed to the following section to configure the new interfaces.

# Configuring the Interfaces

After you verify that the new multichannel DS1/PRI port adapter 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 and encapsulations you plan to use on the new interfaces.
- Protocol-specific information, such as IP addresses, if you plan to configure the interfaces for IP routing.
- A decision on whether the new interface will use bridging.
- ISDN switch type, for the configuring of ISDN PRI. (Table 4-1 lists ISDN service provider switch types.)



**Note** The Catalyst 6000 family FlexWAN module does not support ISDN.

- T1 information, for example, clock source, line code, and framing type.
- Channel group and PRI group information and time slot mapping.

**Table 4-1** ISDN Service Provider Switch Types

Keywords by Area	Switch Type
Australia	
basic-ts013	Australian TS013 switches
Europe	
basic-1tr6	German 1TR6 ISDN switches
basic-nwnet3	Norwegian NET3 ISDN switches (phase 1)
basic-net3	NET3 ISDN switches (UK, Denmark, and other nations); covers the Euro-ISDN E-DSS1 signaling system)
basic-net5	NET5 switches (UK and Europe)
primary-net5	European ISDN PRI switches (UK and Europe)
vn2	French VN2 ISDN switches
vn3	French VN3 ISDN switches
Japan	
ntt	Japanese NTT ISDN switches
primary-ntt	Japanese ISDN PRI switches
North America	
basic-5ess	Lucent basic rate switches
basic-dms100	NT DMS-100 basic rate switches
basic-ni1	National (North American) ISDN-1 switches
primary-4ess	Lucent 4ESS switch type for the U.S. (ISDN PRI only)
primary-5ess	Lucent 5ESS switch type for the U.S. (ISDN PRI only)
primary-dms100	NT DMS-100 switch type for the U.S. (ISDN PRI only)
New Zealand	
basic-nznet3	New Zealand NET3 switches

If you installed a new multichannel DS1/PRI or if you want to change the configuration of an existing interface, you must enter configuration mode to configure the new interfaces. If you replaced a multichannel DS1/PRI that was previously configured, the system recognizes the new interfaces and brings each of them up in their existing configurations.

For a summary of the configuration options available and instructions for configuring interfaces on a multichannel DS1/PRI, refer to the appropriate configuration publications listed in the “[Related Documentation](#)” section on page viii.

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

This section contains the following subsections:

- [Performing a Basic Interface Configuration, page 4-3](#)
- [Configuring the Controller, page 4-6](#)
- [Configuring the Interface, page 4-9](#)
- [Configuring Cyclic Redundancy Checks, page 4-10](#)
- [Customizing the Multichannel DS1/PRI Port Adapter, page 4-11](#)

## Performing a Basic Interface Configuration

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

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

```
Router# disable
```

```
Router>
```

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

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

- Step 2** Specify the first interface to configure by entering the **interface serial** subcommand, followed by the interface address of the interface you plan to configure.

Table 4-2 provides examples of the **interface serial** subcommand for the supported platforms.

**Table 4-2 Examples of the interface serial Subcommand for the Supported Platforms**

Platform	Command	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>interface serial</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)	The example is for interface 0 of a port adapter in port adapter slot 0.  Router (config) # <b>interface serial 0/0:0</b> Router (config-if) #
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>interface serial</b> , followed by <i>module-slot/bay/port:channel group</i> (module-slot-number/port-adapter-bay-number/interface-port-number:channel-group-number)	The example is for interface 0 of a port adapter in port adapter bay 0 of a FlexWAN module in module slot 3.  Router (config) # <b>interface serial 3/0/0:0</b> Router (config-if) #
Cisco 7120 series router	<b>interface serial</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)	The example is for interface 0 of a port adapter in port adapter slot 3.  Router (config) # <b>interface serial 3/0:0</b> Router (config-if) #
Cisco 7140 series router	<b>interface serial</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)	The example is for interface 0 of a port adapter in port adapter slot 4.  Router (config) # <b>interface serial 4/0</b> Router (config-if) #
Cisco 7200 series routers and Cisco 7200 VXR routers	<b>interface serial</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)	The example is for interface 0 of a port adapter in port adapter slot 6.  Router (config) # <b>interface serial 6/0:0</b> Router (config-if) #
Cisco 7201 router	<b>interface serial</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)	The example is for interface 0 of a port adapter in port adapter slot 1.  Router (config) # <b>interface serial 1/0:0</b> Router (config-if) #
Cisco uBR7223 router	<b>interface serial</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)	The example is for interface 0 of a port adapter in port adapter slot 1.  Router (config) # <b>interface serial 1/0:0</b> Router (config-if) #
Cisco uBR7246 router	<b>interface serial</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)	The example is for interface 0 of a port adapter in port adapter slot 2.  Router (config) # <b>interface serial 2/0:0</b> Router (config-if) #

**Table 4-2** Examples of the interface serial Subcommand for the Supported Platforms (continued)

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

- Step 3** Assign an IP address and subnet mask to the interface with the **ip address** configuration subcommand, as in the following example:

```
Router(config-if)# ip address 1.1.15.1 255.255.255.0
Router(config-if)#
```

- Step 4** Add any other interface subcommands required to enable routing protocols and adjust the interface characteristics.
- Step 5** 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.
- Step 6** 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 Controller

The following steps make up a basic controller configuration for the multichannel DS1/PRI port adapter on each platform:

- 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** Choose a T1 controller by entering the **controller t1** subcommand, followed by the interface address of the interface you plan to configure.

Table 4-3 provides examples of the **controller t1** subcommand for the supported platforms.

**Table 4-3** Examples of the controller t1 Subcommand for the Supported Platforms

| Platform                                                             | Command                                                                                                                                                              | Example                                                                                                                                                                                        |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalyst RSM/VIP2 in Catalyst 5000 family switches                   | <b>controller t1</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)                              | The example is for interface 0 of a port adapter in port adapter slot 0.<br><br>Router(config)# <b>controller t1 0/0:0</b><br>Router(config-controller)#                                       |
| Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches | <b>controller t1</b> , followed by <i>module-slot/bay/port:channel group</i> (module-slot-number/port-adapter-bay-number/interface-port-number:channel-group-number) | The example is for interface 0 of a port adapter in port adapter bay 0 of a FlexWAN module in module slot 3.<br><br>Router(config)# <b>controller t1 3/0/0:0</b><br>Router(config-controller)# |
| Cisco 7120 series routers                                            | <b>controller t1</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)                              | The example is for interface 0 of a port adapter in port adapter slot 3.<br><br>Router(config)# <b>controller t1 3/0:0</b><br>Router(config-controller)#                                       |
| Cisco 7140 series routers                                            | <b>controller t1</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)                              | The example is for interface 0 of a port adapter in port adapter slot 4.<br><br>Router(config)# <b>controller t1 4/0:0</b><br>Router(config-controller)#                                       |
| Cisco 7200 series routers and Cisco 7200 VXR routers                 | <b>controller t1</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)                              | The example is for interface 0 of a port adapter in port adapter slot 6.<br><br>Router(config)# <b>controller t1 6/0:0</b><br>Router(config-controller)#                                       |
| Cisco 7201 router                                                    | <b>controller t1</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)                              | The example is for interface 0 of a port adapter in port adapter slot 1.<br><br>Router(config)# <b>controller t1 1/0:0</b><br>Router(config-controller)#                                       |

**Table 4-3** Examples of the controller t1 Subcommand for the Supported Platforms (continued)

| Platform                                                        | Command                                                                                                                                                                              | Example                                                                                                                                                                                                                 |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco uBR7223 router                                            | <b>controller t1</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)                                              | The example is for interface 0 of a port adapter in port adapter slot 1.<br><br>Router(config)# <b>controller t1 1/0:0</b><br>Router(config-controller)#                                                                |
| Cisco uBR7246 router                                            | <b>controller t1</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)                                              | The example is for interface 0 of a port adapter in port adapter slot 2.<br><br>Router(config)# <b>controller t1 2/0:0</b><br>Router(config-controller)#                                                                |
| Cisco 7301 router                                               | <b>controller t1</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)                                              | The example is for interface 0 of a port adapter in port adapter slot 1.<br><br>Router(config)# <b>controller t1 1/0:0</b><br>Router(config-controller)#                                                                |
| Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router | <b>controller t1</b> , followed by <i>module-slot/port:channel group</i> (module-slot-number/interface-port-number:channel-group-number)                                             | The example is for interface 0 on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router.<br><br>Router(config)# <b>controller t1 3/0:0</b><br>Router(config-controller)# |
| Cisco 7401ASR router                                            | <b>controller t1</b> , followed by <i>slot/port:channel group</i> (port-adapter-slot-number/interface-port-number:channel-group-number)                                              | The example is for interface 0 of a port adapter in port adapter slot 1.<br><br>Router(config)# <b>controller t1 1/0:0</b><br>Router(config-controller)#                                                                |
| VIP in Cisco 7000 series and Cisco 7500 series routers          | <b>controller t1</b> , followed by <i>slot/port adapter/port:channel group</i> (interface-processor-slot-number/port-adapter-slot-number/interface-port-number:channel-group-number) | The example is for interface 0 of a port adapter in port adapter slot 1 of a VIP in interface processor slot 1.<br><br>Router(config)# <b>controller t1 1/1/0:0</b><br>Router(config-controller)#                       |

- Step 3** In controller configuration mode, enter the **framing [sf | esf]** configuration subcommand to set the framing format, as in the following example:

```
Router(config-controller)# framing esf
```

Use the **no** form of this command to restore the default, SF.

- Step 4** Enter the **clock source [internal | line]** configuration subcommand to set the clock source, as in the following example:

```
Router(config-controller)# clock source internal
```

Use the **no** form of this command to restore the default, line.

- Step 5** Enter the **channel-group** *number timeslots value [speed {56 | 64}]* configuration subcommand to set the channel group, as in the following example:

```
Router(config-controller)# channel-group 0 timeslots 1-24 speed 56
```



**Note** When the multichannel DS1/PRI port adapter is being used with AMI encoding, it must be configured as 64K or invert data mode.



**Note** The channel-group number can be from 0 to 23 and the time slot value can be from 1 to 24. The maximum number of channel groups per each 8-port multichannel DS1/PRI port adapter is 128.

- Step 6** Enter the **pri-group timeslots** *value* configuration subcommand to set the PRI group, as in the following example:

```
Router(config-controller)# pri-group timeslots 1-24
```



**Note** The channel-group number can be from 0 to 23 and the time slot value can be from 1 to 24.

- Step 7** Enter the **description** controller configuration subcommand (containing a line of up to 80 characters describing this controller) to set the description, as in the following example:

```
Router(config-controller)# description Arizona 3 Router; location: building 2
```

- Step 8** Enter the **cablelength** {**long [gain26 | gain36] [0db | -7.5db | -15db | -22.5db]**} configuration subcommand to set the cable length, as in the following example:

```
Router(config-controller)# cablelength long gain26 -15db
```

Enter the **no** form of this command to restore the default, gain36, 0dB.

For the PA-MC-8DSX1 port adapter, set the cable length by entering the **cablelength** {**short [133 | 266 | 399 | 533 | 655]**} command, as in the following example:

```
Router(config-controller)# cablelength short 266
```

Use the **no** form of this command to return to the default, 133. The range of values for the short-haul cable lengths is from 0 to 655 feet.

- Step 9** Enter the **fdl** {**att | ansi**} configuration subcommand to set the Facilities Data Link (FDL), as in the following example:

```
Router(config-controller)# fdl ansi
```

Use the **no** form of this command to disable FDL.



**Note** The **fdl** configuration subcommand is not allowed in SF mode.

- Step 10** Enter the **shutdown** configuration subcommand to shut down the controller, as in the following example:

```
Router(config-controller)# shutdown
```

To exit controller configuration mode and return to global configuration mode, enter the **exit** command.  
To exit configuration mode and return to privileged EXEC mode, use the **end** command or press **Ctrl-Z**.

## Configuring the Interface

The following steps make up a basic interface configuration for the multichannel DS1/PRI port adapter:

- 
- Step 1** At the privileged-level prompt, enter configuration mode and specify that the console terminal will be the source of the configuration subcommands:
- ```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
```
- Step 2** Specify the interface to configure by entering the **interface serial** subcommand, followed by the interface address of the interface you plan to configure. [Table 4-2 on page 4-4](#) provides examples.
- Step 3** Set the encapsulation used by the interface by entering the **encapsulation {frame-relay | hdlc | ppp | smds | x25}** configuration subcommand, as in the following example:
- ```
Router(config-if)# encapsulation ppp
```
- Step 4** In interface configuration mode, set the description by entering the **description** configuration subcommand (containing a line of up to 80 characters describing this interface), as in the following example:
- ```
Router(config-if)# description PPP channel 5
```
- Step 5** Configure additional interfaces as required.
- Step 6** When you have included all of the configuration subcommands to complete the configuration, press **Ctrl-Z** to exit configuration mode.
- Step 7** Write the new configuration to NVRAM as follows:
- ```
Router# copy running-config startup-config
[OK]
Router#
```
- 

To check the interface configuration using **show** commands, proceed to the [“Checking the Configuration” section on page 4-18](#).

## Configuring Cyclic Redundancy Checks

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

Table 4-4 summarizes CRC commands.

**Table 4-4** CRC Commands

| Purpose                       | Command                  | Example                                                                                                                                                                        |
|-------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enable 32-bit CRC.            | <code>crc size</code>    | The example enables 32-bit CRC on a serial interface:<br><pre>Router(config)# interface serial 3/0:0 Router(config-if)# crc 32</pre>                                           |
| Return to default 16-bit CRC. | <code>no crc size</code> | The example disables 32-bit CRC on a serial interface and returns to the default 16-bit CRC:<br><pre>Router(config)# interface serial 3/0:0 Router(config-if)# no crc 32</pre> |

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

In the example that follows, 32-bit CRC is specified. This example applies to all systems in which the multichannel DS1/PRI port adapter is supported.

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

Use the `no crc 32` command to disable 32-bit CRC and return the interface to the default 16-bit CRC (CRC-CITT) setting.

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

Then write the new configuration to NVRAM using the `copy running-config startup-config` command. For command descriptions, refer to the *Configuration Fundamentals Configuration Guide* on Cisco.com.

To check the interface configuration using `show` commands, proceed to the [“Checking the Configuration”](#) section on page 4-18.

## Customizing the Multichannel DS1/PRI Port Adapter

You can customize the DS1/PRI port adapter. The features you can customize have default values that will probably suit your environment and not need to be changed. However, you might need to enter configuration commands, depending on the requirements for your system configuration and the protocols you plan to route on the interface. Perform the tasks in the following sections if you need to customize the DS1/PRI port adapter:

- [Configuring Multichannel T1 Interfaces, page 4-11](#)
- [Configuring Multichannel T1 ISDN PRI Interfaces, page 4-13](#)
- [Specifying T1 Framing, page 4-17](#)
- [Setting the Cable Length, page 4-18](#)

## Configuring Multichannel T1 Interfaces

Following are instructions for a basic multichannel T1 configuration (enabling a controller and specifying IP routing). You might also need to enter other configuration subcommands, depending on the requirements for your system configuration and the protocols you plan to route on the interface. For complete descriptions of configuration subcommands and the configuration options available, refer to the publications listed in the [“Related Documentation” section on page viii](#).

The channel groups must be mapped before the multichannel DS1/PRI controller can be configured. The following are controller commands used to map the channel group (the default variable is listed first):

- **controller t1** *port-adapter-slot-number/interface-port-number* (for Catalyst RSM/VIP2)
- **controller t1** *module-slot-number/port-adapter-bay-number/interface-port-number* (for Catalyst 6000 family FlexWAN module)
- **controller t1** *port-adapter-slot-number/interface-port-number* (for Cisco 7100 series routers, Cisco 7200 series routers, Cisco 7200 VXR routers, Cisco uBR7200 series routers, Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router)
- **controller t1** *module-slot-number/interface-port-number* (for Cisco 7304 PCI Port Adapter Carrier Card in Cisco 7304 router)
- **controller t1** *interface-processor-slot-number/port-adapter-slot-number/interface-port-number* (for VIP)
- **clock source** [*line* | *internal*]
- **framing** [*sf* | *esf*]
- **linecode** [*ami* | *b8zs*]
- **invert data**
- **loopback** [*diagnostic* | *local* | *remote*]
- **shutdown**
- **channel-group** *number timeslots list* [*speed* {**56** | **64**}]

The argument *number* is the channel group 0 to 23.

The argument *list* is a number between 1 and 24. You can enter time slots individually and separate them by commas or enter them as a range separated by a hyphen (for example, 1-3, 8, 9-18). Time slot 0 is an illegal configuration.

Use *speed* specify the DS0 speed of the channel group; 64 kbps is the default.

In the following procedure, press the **Return** key after each configuration step:

- 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** Choose a T1 controller by entering the **controller t1** subcommand, followed by the interface address of the interface you plan to configure. [Table 4-3](#) provides examples of the **controller t1** subcommands for the supported platforms.

- Step 3** At the prompt, specify the clock source for the controller. The **clock source** command determines which end of the circuit provides the clocking signal.

```
Router(config-controller)# clock source line
```



**Note** You can set the clock source to use internal clocking for testing purposes. One end of a T1 circuit must provide the clock source.

- Step 4** Specify the **framing** type:

```
Router(config-controller)# framing esf
```

- Step 5** Specify the **linecode** format:

```
Router(config-controller)# linecode b8zs
Router(config-controller)#
```

- Step 6** Enter the **channel-group** modification command to specify the channel group and time slots to be mapped.



**Note** The maximum number of channel groups per each 8-port multichannel DS1/PRI port adapter is 128.

The following example shows channel group 0 and time slots 1, 3 through 5, and 7 selected for mapping on a VIP:

```
Router(config-controller)# channel-group 0 timeslots 1,3-5,7
Router(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/1/1:0,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/1/1:0,
changed state to up
Router(config-controller)#
```

- Step 7** Specify the interface to modify by entering the **interface serial** subcommand, followed by the interface address of the interface you plan to configure. [Table 4-2](#) provides examples of the **interface serial** subcommand for the supported platforms.

- Step 8** Assign an IP address and subnet mask to the interface with the **ip address** configuration subcommand as in the following example:

```
Router(config-int)# ip address 1.1.15.1 255.255.255.0
Router(config-int)#
```

- Step 9** Add any other configuration subcommands required to enable routing protocols and adjust the interface characteristics.
- Step 10** Use the **no shutdown** command to reenab le the interfaces.
- Step 11** After including all of the configuration subcommands, to complete the configuration, press **Ctrl-Z** (hold down the **Control** key while you press **Z**) to exit configuration mode.
- Step 12** Write the new configuration to memory:
- ```
Router# write memory
```
- The system displays an OK message when the configuration is stored.
- Step 13** Exit the privileged level and return to the user level by entering **disable** at the prompt:
- ```
Router# disable

Router>
```

---

This completes the procedure for creating a basic channelized T1 configuration. Proceed to the [“Checking the Configuration” section on page 4-18](#) to check the interface configuration using **show** commands. For additional information about configuring channelized T1 interfaces, refer to the publications *Wide-Area Networking Configuration Guide* and *Wide-Area Networking Command Reference* on Cisco.com.

## Configuring Multichannel T1 ISDN PRI Interfaces



### Note

---

The Catalyst 6000 family FlexWAN module does not support ISDN.

---

Following are instructions for a basic multichannel T1 ISDN PRI configuration (enabling a controller and specifying IP routing). You might also need to enter other configuration subcommands, depending on the requirements for your system configuration and the protocols you plan to route on the interface. For complete descriptions of configuration subcommands and the configuration options available, refer to the publications listed in the [“Related Documentation” section on page viii](#).

The PRI group must be mapped before the multichannel DS1/PRI controller can be configured (there is only one PRI group for each controller). The following are controller commands used to map the PRI group:

- **isdn switch-type** *switch-type*
- **controller t1** *port-adapter-slot-number/interface-port-number* (for Catalyst RSM/VIP2)
- **controller t1** *port-adapter-slot-number/interface-port-number* (for Cisco 7100 series routers, Cisco 7200 series routers, Cisco 7200 VXR routers, Cisco uBR7200 series routers, Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router)
- **controller t1** *module-slot-number/interface-port-number* (for Cisco 7304 PCI Port Adapter Carrier Card in Cisco 7304 router)
- **controller t1** *interface-processor-slot-number/port-adapter-slot-number/interface-port-number* (for VIP)
- **clock source line**
- **framing esf**

- **linecode b8zs**
- **invert data**
- **loopback** [**diagnostic** | **local** | **remote**]
- **shutdown**
- **pri-group** [**timeslots** *list*][*speed* {**56** | **64**}]

The argument *list* is a number between 1 and 24. (Time slots 1 to 23 represent the B channels, and time slot 24 represents the D channel. You can enter time slots individually and separate them by commas or enter them as a range separated by a hyphen (for example, 1-3, 8, 9-18). The default DS0 speed of the PRI group is 64 kbps.



**Note**

If you do not specify the time slots, the controller is configured for 23 B channels (time slots 1 to 23) and one D channel (time slot 24).

The Catalyst RSM/VIP2 identifies the PRI group as a serial interface by port adapter slot (0 or 1), port number (0 or 1), and time slot 23. For example, the address of the multichannel DS1/PRI port adapter installed in port adapter slot 1, port 1, and time slot 23, would be recognized by the system as serial 1/1:23.

The Catalyst RSM/VIP2 does not support the PA-MC-2T1 multichannel DS1/PRI port adapter.



**Note**

The Catalyst 6000 family FlexWAN module does not support ISDN.

Cisco 7100 series routers, Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers identify the PRI group as a serial interface by port adapter slot number, port number (0 or 1), and time slot 23. For example, the address of the multichannel DS1/PRI port adapter installed in port adapter slot 1, port 1, and time slot 23, would be recognized by the system as serial 1/1:23.

The Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router identify the PRI group as a serial interface by port adapter slot number, port number (0 or 1), and time slot 23. For example, the address of the multichannel DS1/PRI port adapter installed in port adapter slot 1, port 1, and time slot 23, would be recognized by the system as serial 1/1:23.

The Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router identifies the PRI group as a serial interface by port adapter slot number (2 through 5), port number (0 or 1), and time slot 23. For example, the address of the multichannel DS1/PRI port adapter installed in port adapter slot 3, port 1, and time slot 23, would be recognized by the system as serial 3/1:23.

Cisco 7000 series routers and Cisco 7500 series routers identify the PRI group as a serial interface by chassis slot number, port adapter slot (0 or 1), port number (0 or 1), and time slot 23. For example, the address of the multichannel DS1/PRI port adapter installed in chassis slot 4, port adapter slot 1, port 1, and time slot 23, would be recognized by the system as serial 4/1/1:23.

In the following procedure for a basic multichannel T1 ISDN PRI configuration, press **Return** after each configuration step:

**Step 1**

At the privileged-level prompt, enter configuration mode and specify that the console terminal will be the source of the configuration subcommands:

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

- Step 2** Identify the ISDN switch type. In the following example, the switch primary-5ess (a switch for the United States) is identified as the switch type:

```
Router(config)# isdn switch-type primary-5ess
```




---

**Note** The ISDN switch type that you identify is for all ISDN ports installed in the router.

---

- Step 3** Choose a T1 controller by entering the **controller t1** subcommand, followed by the interface address of the interface you plan to configure. [Table 4-3](#) provides examples of the **controller t1** subcommand for supported platforms.

- Step 4** At the prompt, specify the clock source for the controller. The **clock source line** command determines which end of the circuit provides the clocking signal.

```
Router(config-controller)# clock source line
```




---

**Note** You can set the clock source to use internal clocking for testing purposes. One end of a T1 circuit must provide the clock source.

---

- Step 5** Specify the **framing** type:

```
Router(config-controller)# framing esf
```

- Step 6** Specify the **linecode** format:

```
Router(config-controller)# linecode b8zs
Router(config-controller)#
```

- Step 7** Use the **pri-group** modification command to specify the time slots to map. The following examples show PRI-group time slots 1, 3 through 5, and 7 (the B channels) mapped to time slot 24 (the D channel), which is recognized by the system as time slot 23.

For the Catalyst RSM/VIP2:

```
Router(config-controller)# pri-group timeslots 1,3-5,7
Router(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1:23,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1:23,
changed state to up
Router(config-controller)#
```

For Cisco 7100 series routers:

```
Router(config-controller)# pri-group timeslots 1,3-5,7
Router(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to up
Router(config-controller)#
```

For Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers:

```
Router(config-controller)# pri-group timeslots 1,3-5,7
Router(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/1:23,
changed state to down
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/1:23,
changed state to up
Router(config-controller)#
```

For the Cisco 7201 router:

```
Router(config-controller)# pri-group timeslots 1,3-5,7
Router(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to up
Router(config-controller)#
```

For the Cisco 7301 router:

```
Router(config-controller)# pri-group timeslots 1,3-5,7
Router(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to up
Router(config-controller)#
```

For the Cisco 7304 PCI Port Adapter Carrier Card in the Cisco 7304 router:

```
Router(config-controller)# pri-group timeslots 1,3-5,7
Router(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to up
Router(config-controller)#
```

For the Cisco 7401ASR router:

```
Router(config-controller)# pri-group timeslots 1,3-5,7
Router(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1:23,
changed state to up
Router(config-controller)#
```

For the VIP:

```
Router(config-controller)# pri-group timeslots 1,3-5,7
Router(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/1/1:23,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/1/1:23,
changed state to up
Router(config-controller)#
```




---

**Note** In the preceding examples, the line-protocol status for time slot 24 (listed in the output as time slot 23) represents the entire PRI group.

---

- Step 8** Specify the interface to modify by entering the **interface serial** subcommand, followed by the interface address of the interface you plan to configure. For multichannel T1 ISDN PRI, the PRI group is configured using time slot 24, which is recognized by the system as time slot 23 (for example, the VIP2 would be 3/1/1:23).

- Step 9** If IP routing is enabled on the system, assign an IP address and subnet mask to the interface with the **ip address** configuration subcommand as in the following example:

```
Router(config-int)# ip address 1.1.15.1 255.255.255.0
Router(config-int)#
```

- Step 10** Add any other configuration subcommands required to enable routing protocols and adjust the interface characteristics.
- Step 11** Use the **no shutdown** command to re enable the interfaces.
- Step 12** After including all of the configuration subcommands, to complete the configuration, press **Ctrl-Z** (hold down the **Control** key while you press **Z**) to exit configuration mode.
- Step 13** Write the new configuration to memory:

```
Router# write memory
```

The system displays an OK message when the configuration is stored.

- Step 14** Exit the privileged level and return to the user level by entering **disable** at the prompt:

```
Router# disable
```

```
Router>
```

---

This completes the procedure for creating a basic multichannel T1 ISDN PRI configuration. Proceed to the [“Checking the Configuration” section on page 4-18](#) to check the interface configuration information using **show** commands. For dialer interface configuration and additional multichannel T1 ISDN PRI interface configuration information, refer to the publications *Wide-Area Networking Configuration Guide* and *Wide-Area Networking Command Reference* on Cisco.com.

## Specifying T1 Framing

In controller configuration mode, specify T1 framing by entering the **framing [sf | esf]** configuration subcommand, as in the following example:

```
Router(config-controller)# framing sf
```

Use the **no** form of this command to return to the default, ESF framing.



### Note

---

If you specify SF framing, you must have 56-kbps speed or inverted data to avoid errors.

---

## Setting the Cable Length

For the PA-MC-2T1, PA-MC-4T1, and PA-MC-8T1, in controller configuration mode, set the cable length by entering the **cablelength** [long {gain26 | gain 36} {0db | -7.5db | -15db | -22.5db} short {133 | 266 | 399 | 533 | 655}] command, as in the following example:

```
Router(config-controller)# cablelength long gain26 -15db
```

Use the **no** form of this command to return to the default, gain36, 0dB.



**Note**

Each T1 port can operate in long-haul or short-haul mode. In long-haul mode, the user must specify the gain and the line build-out. The default values are gain26 with 0dB line build-out. In short-haul mode, the user must specify the cable length in feet. The range is from 0 to 655 feet. The actual mapping is shown in [Table 4-5](#).

For the PA-MC-8DSX1, in controller configuration mode, set the cable length by entering the **cablelength** {short [133 | 266 | 399 | 533 | 655]} command, as in the following example:

```
Router(config-controller)# cablelength short 266
```

Use the **no** form of this command to return to the default, 133. The range of values for the short-haul cable lengths is from 0 to 655 feet.

[Table 4-5](#) provides the cable length range values for the **cablelength short** command.

**Table 4-5 Mapping of Cable Length Values to Range**

| Range (feet) | Value |
|--------------|-------|
| 0 to 133     | 133   |
| 133 to 266   | 266   |
| 266 to 399   | 399   |
| 399 to 533   | 533   |
| 533 to 655   | 655   |

To check the interface configuration using **show** commands, proceed to the following section, "[Checking the Configuration](#)."

## Checking the Configuration

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

- [Using show Commands to Verify the New Interface Status, page 4-19](#)
- [Using the ping Command to Verify Network Connectivity, page 4-37](#)
- [Using loopback Commands, page 4-38](#)
- [Checking Bit Errors Using a BERT, page 4-41](#)

## Using show Commands to Verify the New Interface Status

Table 4-6 provides a list of **show** commands and their functions. This section will help you to verify that new interfaces are configured and operating correctly and that the multichannel DS1/PRI port adapter appears correctly in them. Sample displays of the output of selected **show** commands appear in the sections that follow. For complete command descriptions and examples, refer to the publications listed in the “[Related Documentation](#)” section on page viii.


**Note**

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

**Table 4-6** Using show Commands

| Command                                                                                                            | Function                                                                                                                                                                   | Example                                     |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>show version</b> or<br><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 controllers t1</b>                                                                                         | Displays the status of each installed T1 interface                                                                                                                         | Router# <b>show controllers t1</b>          |
| <b>show diag slot</b><br><b>Note</b> The <i>slot</i> argument is not required with Catalyst 5000 family switches.  | Displays types of port adapters installed in your system and information about a specific port adapter slot, interface processor slot, or chassis slot                     | Router# <b>show diag 2</b>                  |
| <b>show interfaces type 0</b> or <b>1/</b><br><i>interface-port-number</i>                                         | Displays status information about a specific type of interface (for example, serial) on a Catalyst RSM/VIP2                                                                | Router# <b>show interfaces serial 1/0</b>   |
| <b>show interfaces type module-slot-</b><br><i>number/port-adapter-bay-number/</i><br><i>interface-port-number</i> | Displays status information about a specific type of interface (for example, serial) on a Catalyst 6000 family FlexWAN module                                              | Router# <b>show interfaces serial 3/0/0</b> |
| <b>show interfaces type 3/</b> <i>interface-port-</i><br><i>number</i>                                             | Displays status information about a specific type of interface (for example, serial) in a Cisco 7120 series router                                                         | Router# <b>show interfaces serial 3/0</b>   |
| <b>show interfaces type 4/</b> <i>interface-port-</i><br><i>number</i>                                             | Displays status information about a specific type of interface (for example, serial) in a Cisco 7140 series router                                                         | Router# <b>show interfaces serial 4/0</b>   |

**Table 4-6 Using show Commands (continued)**

| Command                                                                                                           | Function                                                                                                                                                                                                 | Example                                     |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>show interfaces</b> <i>type port-adapter-slot-number/interface-port-number</i>                                 | Displays status information about a specific type of interface (for example, serial) in a Cisco 7200 series router, Cisco 7200 VXR router, Cisco 7201 router, Cisco 7301 router, or Cisco 7401ASR router | Router# <b>show interfaces serial 1/0</b>   |
| <b>show interfaces</b> <i>type 1/interface-port-number</i>                                                        | Displays status information about a specific type of interface (for example, serial) in a Cisco uBR7223 router                                                                                           | Router# <b>show interfaces serial 1/1</b>   |
| <b>show interfaces</b> <i>type 1 or 2/interface-port-number</i>                                                   | Displays status information about a specific type of interface (for example, serial) in a Cisco uBR7246 router                                                                                           | Router# <b>show interfaces serial 2/0</b>   |
| <b>show interfaces</b> <i>type module-slot-number/interface-port-number</i>                                       | Displays status information about a specific type of interface (for example, serial) on a Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router                                                | Router# <b>show interfaces serial 3/0</b>   |
| <b>show interfaces</b> <i>type interface-processor-slot-number/port-adapter-slot-number/interface-port-number</i> | Displays status information about a specific type of interface (for example, serial) on a VIP in a Cisco 7000 series router or Cisco 7500 series router                                                  | Router# <b>show interfaces serial 3/1/0</b> |
| <b>show isdn status</b>                                                                                           | Displays all the ISDN interfaces installed in the router and the ISDN switch type for the interfaces                                                                                                     | Router# <b>show isdn status</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 shut down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the interface is properly connected and terminated. If you still have problems bringing up the interface, contact a service representative for assistance. This section includes the following subsections:

- [Using the show version Commands, page 4-21](#)
- [Using the show diag Command, page 4-26](#)
- [Using the show interfaces Command, page 4-31](#)

Choose the subsection appropriate for your system. Proceed to the [“Using the ping Command to Verify Network Connectivity”](#) section on page 4-37 when you have finished using the **show** commands.

## Using the show version Commands

Display the configuration of the system hardware, the number of each interface type installed, the Cisco IOS software version, the names and sources of configuration files, and the boot images, using the **show version** 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 4-21](#)
- [Catalyst 6000 Family FlexWAN Module—Example Output of the show version Command, page 4-22](#)
- [Cisco 7100 Series Routers—Example Output of the show version Command, page 4-22](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show version Command, page 4-23](#)
- [Cisco 7201 Router—Example Output of the show version Command, page 4-24](#)
- [Cisco 7301 Router—Example Output of the show version Command, page 4-24](#)
- [Cisco 7401ASR Router—Example Output of the show version Command, page 4-25](#)
- [VIP in Cisco 7000 Series Routers and Cisco 7500 Series Routers—Example Output of the show version Command, page 4-26](#)

### 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 a multichannel DS1/PRI port adapter installed:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-PV-M), Version 11.1(20)CC
Synced to mainline version: 11.1(13.5)CA
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Mon 24-Nov-97 23:59 by jroumas
Image text-base: 0x60010900, data-base: 0x60708000
ROM: System Bootstrap, Version 5.3.2(3.2) [kmac 3.2], MAINTENANCE INTERIM
SOFTWARE
ROM: GS Software (RSP-BOOT-M), Version 11.1(8)CA, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)
potent7505-1 uptime is 5 hours, 30 minutes
System restarted by reload
System image file is "potent/rsp-pv-mz.DTP7", booted via tftp from
171.69.209.28
cisco RSP1 (R4700) processor with 65536K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
G.703/E1 software, Version 1.0.
G.703/JT2 software, Version 1.0.
```

```
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.
2 VIP2 controllers (8 Ethernet)(8 T1).
8 Ethernet/IEEE 802.3 interfaces.
3 Serial network interfaces.
8 multichannel T1/PRI ports.
125K bytes of non-volatile configuration memory.
16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

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

Following is an example of the **show version** command from a Catalyst 6000 family FlexWAN module with a PA-MC-8T1 installed:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-PV-M), Version 11.1(20)CC
Synced to mainline version: 11.1(13.5)CA
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Mon 24-Nov-97 23:59 by jroumas
Image text-base: 0x60010900, data-base: 0x60708000
ROM: System Bootstrap, Version 5.3.2(3.2) [kmac 3.2], MAINTENANCE INTERIM
SOFTWARE
ROM: GS Software (RSP-BOOT-M), Version 11.1(8)CA, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)
potent7505-1 uptime is 5 hours, 30 minutes
System restarted by reload
System image file is "potent/rsp-pv-mz.DTP7", booted via tftp from
171.69.209.28
cisco RSP1 (R4700) processor with 65536K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
G.703/E1 software, Version 1.0.
G.703/JT2 software, Version 1.0.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.
2 VIP2 controllers (8 Ethernet)(8 T1).
8 Ethernet/IEEE 802.3 interfaces.
3 Serial network interfaces.
8 multichannel T1/PRI ports.
125K bytes of non-volatile configuration memory.
16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

## Cisco 7100 Series Routers—Example Output of the show version Command

Following is an example of the **show version** command from a Cisco 7120 series router with a PA-MC2T1 installed:

```
Router# show version

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

```

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

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

cisco 7120-bad (EGR) processor with 61440K/69632K bytes of memory.
R527x CPU at 225Mhz, Implementation 40, Rev 10.0, 2048KB L2 Cache
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
2 FastEthernet/IEEE 802.3 interface(s)
125K bytes of non-volatile configuration memory.

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

```

## Cisco 7200 Series 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 multichannel DS1/PRI port adapter installed:

```

Router# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (7200-PV-M), Version 11.1(20)CC
Synched to mainline version: 11.1(13.5)CA
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Mon 24-Nov-97 23:59 by jroumas
Image text-base: 0x60010900, data-base: 0x60708000
ROM: System Bootstrap, Version 5.3.2(3.2) [kmac 3.2], MAINTENANCE INTERIM
SOFTWARE
ROM: GS Software (C7200-BOOT-M), Version 11.1(8)CA, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)
router uptime is 5 hours, 30 minutes
System restarted by reload
System image file is "c7200-mz.DTP7", booted via tftp from
171.69.209.28
cisco 7206 (NPE150) processor with 65536K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
G.703/E1 software, Version 1.0.
G.703/JT2 software, Version 1.0.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.
8 Ethernet/IEEE 802.3 interfaces.
3 Serial network interfaces.
8 Channelized T1/PRI ports.
125K bytes of non-volatile configuration memory.
16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 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
c7201alphan 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 7301 Router—Example Output of the show version Command

Following is an example of the **show version** command from a Cisco router with a multichannel DS1/PRI port adapter installed:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) 7301 Software (C7300-JS-M), Experimental Version 12.2(20020904:004736) [biff 107]
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Mon 09-Sep-02 18:02 by biff
Image text-base:0x600088F8, data-base:0x61A94000

ROM: System Bootstrap, Version 12.2(20020730:200705) [biff-TAZ2_QA_RELEASE_16B 101],
DEVELOPMENT SOFTWARE
BOOTLDR:7301 Software (C7301-BOOT-M), Experimental Version 12.2(20020813:014224)
[biff-TAZ2_QA_RELEASE_17B 101]

7301p2b uptime is 0 minutes
System returned to ROM by reload at 00:01:51 UTC Sat Jan 1 2000
System image file is "tftp://10.1.8.11/tazii/images/c7301-js-mz"

cisco 7301 (NPE-G1) processor (revision A) with 491520K/32768K bytes of memory.
Processor board ID 0
```

```
BCM1250 CPU at 700Mhz, Implementation 1, Rev 0.2, 512KB L2 Cache
1 slot midplane, Version 2.0
```

```
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
3 Gigabit Ethernet/IEEE 802.3 interface(s)
509K bytes of non-volatile configuration memory.
```

```
62976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
32768K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x102
```

### 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 multichannel DS1/PRI port adapter installed:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (7401ASR-PV-M), Version 11.1(20)CC
Synced to mainline version: 11.1(13.5)CA
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Mon 24-Nov-97 23:59 by jroumas
Image text-base: 0x60010900, data-base: 0x60708000
ROM: System Bootstrap, Version 5.3.2(3.2) [kmac 3.2], MAINTENANCE INTERIM
SOFTWARE
ROM: GS Software (C7401ASR-BOOT-M), Version 11.1(8)CA, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)
router uptime is 5 hours, 30 minutes
System restarted by reload
System image file is "c7401ASR-mz.DTP7", booted via tftp from
171.69.209.28
cisco 7206 (NPE150) processor with 65536K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
G.703/E1 software, Version 1.0.
G.703/JT2 software, Version 1.0.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.
8 Ethernet/IEEE 802.3 interfaces.
3 Serial network interfaces.
8 Channelized T1/PRI ports.
125K bytes of non-volatile configuration memory.
16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

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

Following is an example of the **show version** command from a Cisco 7500 series router with a multichannel DS1/PRI port adapter installed:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-PV-M), Version 11.1(20)CC
Synced to mainline version: 11.1(13.5)CA
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Mon 24-Nov-97 23:59 by jroumas
Image text-base: 0x60010900, data-base: 0x60708000
ROM: System Bootstrap, Version 5.3.2(3.2) [kmac 3.2], MAINTENANCE INTERIM
SOFTWARE
ROM: GS Software (RSP-BOOT-M), Version 11.1(8)CA, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)
potent7505-1 uptime is 5 hours, 30 minutes
System restarted by reload
System image file is "potent/rsp-pv-mz.DTP7", booted via tftp from
171.69.209.28
cisco RSP1 (R4700) processor with 65536K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
G.703/E1 software, Version 1.0.
G.703/JT2 software, Version 1.0.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.
2 VIP2 controllers (8 Ethernet)(8 T1).
8 Ethernet/IEEE 802.3 interfaces.
3 Serial network interfaces.
8 multichannel T1/PRI ports.
125K bytes of non-volatile configuration memory.
16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

## Using the show diag Command

Display the types of port adapters installed in your system (and specific information about each) using the **show diag slot** command, where *slot* is the *port adapter slot* in a Cisco 7100 series router, 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 Cisco 7000 series router or Cisco 7500 series router with a VIP. In the FlexWAN module, the **show diag** command is used without the *slot* designation.



**Note**

The *slot* argument is optional for Catalyst 5000 family switches.



**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 diag** command:

- [Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show diag Command, page 4-27](#)
- [Catalyst 6000 Family FlexWAN Module—Example Output of the show diag Command, page 4-27](#)
- [Cisco 7100 Series Routers—Example Output of the show diag Command, page 4-28](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show diag Command, page 4-28](#)
- [Cisco 7201 Router—Example Output of the show diag Command, page 4-29](#)
- [Cisco 7301 Router—Example Output of the show diag Command, page 4-29](#)
- [Cisco 7401ASR Router—Example Output of the show diag Command, page 4-30](#)
- [VIP in Cisco 7000 Series Routers and Cisco 7500 Series Routers—Example Output of the show diag Command, page 4-30](#)

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

Following is an example of the **show diag** command that shows a DS1/PRI port adapter installed in a Catalyst RSM/VIP2:

```
Router# show diag 2
Slot 2:
    Physical slot 2, ~physical slot 0xD, logical slot 2, CBus 0
    Microcode Status 0x4
    Master Enable, LED, WCS Loaded
        Pending I/O Status: None
    EEPROM format version 1
    VIP2 controller, HW rev 2.4, board revision D0
    Serial number: 04371939 Part number: 73-1684-03
    Test history: 0x00 RMA number: 00-00-00
    Flags: cisco 7500
EEPROM contents (hex):
    0x20: 01 15 02 04 00 42 B5 T1 49 06 94 03 00 00 00 00
    0x30: 68 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
[Additional display text omitted]
```

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

Following is an example of the **show diag** command that shows a PA-MC-8T1 installed in a Catalyst 6000 family FlexWAN module:

```
Router# show diag

[Additional display text omitted]

Slot 6: Logical_index 12
    Board is analyzed ipc ready FlexWAN controller

    Slot database information:
    Flags: 0x2004Insertion time: unknown

    CWAN Controller Memory Size: Unknown

    PA Bay 0 Information:
        Multi-channel (T1) PA, 8 ports
        EEPROM format version 0
        HW rev 0.00, Board revision UNKNOWN
```

```
Serial number: 00000000 Part number: 00-0000-00
[Additional display text omitted]
```

### Cisco 7100 Series Routers—Example Output of the show diag Command

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

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




---

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

---

### Cisco 7200 Series 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 that shows a multichannel DS1/PRI port adapter in port adapter slot 1 of a Cisco 7200 series router:

```
Router# show diag 1
Slot 1:
  Physical slot 1, ~physical slot 0xE, 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
  VIP2 controller, HW rev 2.4, board revision D0
  Serial number: 04540965 Part number: 73-1684-03
  Test history: 0x00 RMA number: 00-00-00
  Flags: cisco 7000 board; 7500 compatible
  EEPROM contents (hex):
    0x20: 01 15 02 04 00 45 4A 25 49 06 94 03 00 00 00 00
    0x30: 68 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  Slot database information:
  Flags: 0x4 Insertion time: 0x147C (05:33:22 ago)

  Controller Memory Size: 32 MBytes DRAM, 2048 KBytes SRAM
  PA Bay 0 Information:
    Ethernet PA, 4 ports
    EEPROM format version 1
    HW rev 1.C, Board revision A0
    Serial number: 04953593 Part number: 73-1556-07
  PA Bay 1 Information:
    Multi-channel (T1) PA, 8 ports
    EEPROM format version 0
    HW rev FF.FF, Board revision UNKNOWN
    Serial number: 4294967295 Part number: 255-65535-255
```

## 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 7301 Router—Example Output of the show diag Command

Following is an example of the **show diag** command that shows a multichannel DS1/PRI port adapter in port adapter slot 1 of a Cisco 7301 router:

```
Router# show diag 1
Slot 1:
POS Single Width, Multi Mode Port adapter, 1 port
Port adapter is analyzed
Port adapter insertion time 01:38:29 ago
EEPROM contents at hardware discovery:
Hardware revision 2.2          Board revision A0
Serial number      28672741    Part number      73-3192-06
FRU Part Number:PA-POS-OC3MM=

Test history      0x0          RMA number      00-00-00
EEPROM format version 1
EEPROM contents (hex):
0x20:01 96 02 02 01 B5 82 E5 49 0C 78 06 00 00 00 00
0x30:50 00 00 00 02 08 19 00 00 00 FF FF FF FF FF FF
```



### Note

Input/output data for the console port, auxiliary port, Gigabit Ethernet ports, and CompactFlash Disk are listed in the output of the **show c7300** command, rather than in the output of the **show diag** command.

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

Following is an example of the **show diag** command that shows a multichannel DS1/PRI port adapter in port adapter slot 1 of a Cisco 7401ASR router:

```
Router# show diag 1
Slot 1:
Physical slot 1, ~physical slot 0xE, 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
VIP2 controller, HW rev 2.4, board revision D0
Serial number: 04540965 Part number: 73-1684-03
Test history: 0x00 RMA number: 00-00-00
Flags: cisco 7000 board; 7500 compatible
EEPROM contents (hex):
  0x20: 01 15 02 04 00 45 4A 25 49 06 94 03 00 00 00 00
  0x30: 68 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Slot database information:
Flags: 0x4 Insertion time: 0x147C (05:33:22 ago)

Controller Memory Size: 32 MBytes DRAM, 2048 KBytes SRAM
PA Bay 0 Information:
  Ethernet PA, 4 ports
  EEPROM format version 1
  HW rev 1.C, Board revision A0
  Serial number: 04953593 Part number: 73-1556-07
PA Bay 1 Information:
  Multi-channel (T1) PA, 8 ports
  EEPROM format version 0
  HW rev FF.FF, Board revision UNKNOWN
  Serial number: 4294967295 Part number: 255-65535-255
```

## 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 that shows a DS1/PRI port adapter in port adapter slot 0 on a VIP in interface processor slot 2:

```
Router# show diag 2
Slot 2:
Physical slot 2, ~physical slot 0xD, logical slot 2, CBus 0
Microcode Status 0x4
Master Enable, LED, WCS Loaded
Board is analyzed
Pending I/O Status: None
EEPROM format version 1
VIP2 controller, HW rev 2.4, board revision D0
Serial number: 04371939 Part number: 73-1684-03
Test history: 0x00 RMA number: 00-00-00
Flags: cisco 7500

EEPROM contents (hex):
  0x20: 01 15 02 04 00 42 B5 T1 49 06 94 03 00 00 00 00
  0x30: 68 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Slot database information:
Flags: 0x4 Insertion time: 0x14A4 (00:23:00 ago)

Controller Memory Size: 32 MBytes DRAM, 2048 KBytes SRAM
```

```

PA Bay 0 Information:
  DS1/PRI PA, 1 port
  EEPROM format version 1
  HW rev 1.00, Board revision AO
  Serial number: 3549502 Part number: 73-2620-02

```

## 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 4-31](#)
- [Catalyst 6000 Family FlexWAN Module—Example Output of the show interfaces Command, page 4-32](#)
- [Cisco 7100 Series Routers—Example Output of the show interfaces Command, page 4-33](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show interfaces Command, page 4-33](#)
- [Cisco 7201 Router—Example Output of the show interfaces Command, page 4-34](#)
- [Cisco 7301 Router—Example Output of the show interfaces Command, page 4-35](#)
- [Cisco 7401ASR Router—Example Output of the show interfaces Command, page 4-36](#)
- [VIP in Cisco 7000 Series Routers and Cisco 7500 Series Routers—Example Output of the show interfaces Command, page 4-36](#)

### 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 that shows all of the information specific to the first multichannel DS1/PRI port (port 0) on a Catalyst RSM/VIP2 in port adapter slot 1, channel group 2:

```

Router# show interfaces serial 1/0:2
Serial1/0:2 is down, line protocol is down
  Hardware is Multichannel T1
  Internet address is 1.1.1.10/30
  MTU 1500 bytes, BW 1344 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input 04:18:08, output 04:18:08, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/64/0 (size/threshold/drops)
    Conversations 0/1 (active/max active)
    Reserved Conversations 0/0 (allocated/max allocated)
  5 minute input rate 0 bits/sec, 0 packets/sec

```

```

5 minute output rate 0 bits/sec, 0 packets/sec
  523 packets input, 39030 bytes, 0 no buffer
  Received 513 broadcasts, 0 runts, 0 giants
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  523 packets output, 40076 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 output buffer failures, 0 output buffers swapped out
  2 carrier transitions alarm present
Timeslot(s) Used: 1-24, Transmitter delay is 0 flags, transmit queue length 24

```

Following is an example of the **show interfaces serial** command that shows all of the information specific to the same port on a Catalyst RSM/VIP2 (port 0 in port adapter slot 1) when the port is configured for ISDN PRI:

```

Router# show interfaces serial 1/0:23
Serial1/0:23 is up, line protocol is up(spoofing)
  Hardware is Multichannel T1
  MTU 1500 bytes, BW 64Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  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 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    0 packets output, 0 bytes, 0 underruns
    0 output errors, 0 collisions, 1 interface resets
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions alarm present
  Timeslot(s) Used:24, Transmitter delay is 0 flags, transmit queue length 0

```



**Note**

In the preceding examples, the term “spoofing” indicates that the interface is configured for ISDN PRI. Spoofing is indicated only on time slot 24 (the D channel), which is recognized by the system as time slot 23.

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

Following is an example of the **show interfaces serial** command that shows all of the information specific to the first PA-MC-8T1 port (port 0) in port adapter slot 6, channel group 1:

```

Router# show interfaces serial 6/0/0:1
Serial6/0/0:1 is down, line protocol is down
  Hardware is Multichannel T1
  MTU 1500 bytes, BW 1536 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 16, CRC 16, Data non-inverted
  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, subrate: 64Kb/s, transmit delay is 0 flags
Transmit queue length 999

```

## Cisco 7100 Series Routers—Example Output of the show interfaces Command

Following are examples of the **show interfaces serial** command from a Cisco 7120 series router. In these examples, the eight serial interfaces (0 to 7) are on a port adapter in port adapter slot 3 of a Cisco 7120 series router; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```

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

```

```

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

```

```

Router# show interfaces serial 3/2
Serial3/2 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.2
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text for remaining interfaces omitted]

```



### Note

To use the **show interfaces serial** command with the Cisco 7140 series router, replace the interface address arguments **3/0**, **3/1**, **3/2**, **3/3**, **3/4**, **3/5**, **3/6**, and **3/7** with **4/0**, **4/1**, **4/2**, **4/3**, **4/4**, **4/5**, **4/6**, and **4/7**, respectively.

## 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 that shows all of the information specific to the first multichannel DS1/PRI port (port 0) in port adapter slot 6, channel group 1 on a Cisco 7200 series router:

```

Router# show interfaces serial 6/0:1
Serial6/0:1 is up, line protocol is up (looped)
  Hardware is Multichannel T1
  Internet address is 1.6.0.1/30
  MTU 1500 bytes, BW 1536 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input 00:00:07, output 00:00:07, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair

```

```

Output queue: 0/64/0 (size/threshold/drops)
  Conversations 0/1 (active/max active)
  Reserved Conversations 0/0 (allocated/max allocated)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  87 packets input, 6521 bytes, 0 no buffer
  Received 87 broadcasts, 0 runts, 0 giants
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  87 packets output, 6521 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 output buffer failures, 0 output buffers swapped out
  1 carrier transitions
no alarm present
Timeslot(s) Used:1-24, subrate: 64Kb/s, transmit delay is 0 flags

```



**Note**

In the above example, the term “spoofing” indicates that the interface is configured for ISDN PRI. Spoofing is indicated only on time slot 24 (the D channel), which is recognized by the system as time slot 23.

### 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 7301 Router—Example Output of the show interfaces Command

Following is an example of the **show interfaces** command for a Cisco 7301 router. Most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```
Router# show interfaces
GigabitEthernet0/0 is up, line protocol is up
  Hardware is BCM1250 Internal MAC, address is 0005.dd2c.7c1b (bia 0005.dd2c.7c1b)
  Internet address is 10.1.3.153/16
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Half-duplex, 100Mb/s, media type is RJ45
  output flow-control is off, input flow-control is off
  ARP type:ARPA, ARP Timeout 04:00:00
  Last input 00:00:01, output 00:00:07, output hang never
  Last clearing of "show interface" counters 19:00:50
  Input queue:0/75/63658/0 (size/max/drops/flushes); Total output drops:0
```

(display text omitted)

```
GigabitEthernet0/1 is up, line protocol is up
  Hardware is BCM1250 Internal MAC, address is 0005.dd2c.7c1a (bia 0005.dd2c.7c1a)
  Internet address is 192.18.1.1/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 5/255, rxload 6/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 1000Mb/s, link type is autonegotiation, media type is SX
  output flow-control is off, input flow-control is off
  ARP type:ARPA, ARP Timeout 04:00:00
  Last input 18:56:46, output 00:00:09, output hang never
  Last clearing of "show interface" counters 19:00:52
  Input queue:0/75/16176489/0 (size/max/drops/flushes); Total output drops:0
```

(display text omitted)

```
GigabitEthernet0/2 is up, line protocol is up
  Hardware is BCM1250 Internal MAC, address is 0005.dd2c.7c19 (bia 0005.dd2c.7c19)
  Internet address is 1.1.1.1/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 5/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 1000Mb/s, link type is autonegotiation, media type is SX
  output flow-control is off, input flow-control is off
  ARP type:ARPA, ARP Timeout 04:00:00
  Last input 00:04:42, output 00:00:01, output hang never
  Last clearing of "show interface" counters 19:00:54
  Input queue:0/75/22087/0 (size/max/drops/flushes); Total output drops:0
```

(display text omitted)

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

Following is an example of the **show interfaces serial** command that shows all of the information specific to the first multichannel DS1/PRI port (port 0) in port adapter slot 1, channel group 1 on a Cisco 7401ASR router:

```
Router# show interfaces serial 1/0:1
Serial1/0:1 is up, line protocol is up (looped)
  Hardware is Multichannel T1
  Internet address is 1.6.0.1/30
  MTU 1500 bytes, BW 1536 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input 00:00:07, output 00:00:07, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/64/0 (size/threshold/drops)
    Conversations 0/1 (active/max active)
    Reserved Conversations 0/0 (allocated/max allocated)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    87 packets input, 6521 bytes, 0 no buffer
    Received 87 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    87 packets output, 6521 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
    1 carrier transitions
  no alarm present
  Timeslot(s) Used:1-24, subrate: 64Kb/s, transmit delay is 0 flags
```

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

Following is an example of the **show interfaces serial** command that shows all of the information specific to the first multichannel DS1/PRI port (port 0) on a VIP-equipped Cisco 7500 series router in chassis slot 3, port adapter slot 1, channel group 2:

```
Router# show interfaces serial 3/1/0:2
Serial3/1/0:2 is down, line protocol is down
  Hardware is Multichannel T1
  Internet address is 1.1.1.10/30
  MTU 1500 bytes, BW 1344 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input 04:18:08, output 04:18:08, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/64/0 (size/threshold/drops)
    Conversations 0/1 (active/max active)
    Reserved Conversations 0/0 (allocated/max allocated)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    523 packets input, 39030 bytes, 0 no buffer
    Received 513 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    523 packets output, 40076 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
    2 carrier transitions alarm present
  Timeslot(s) Used: 1-24, Transmitter delay is 0 flags, transmit queue length 24
```

Following is an example of the **show interfaces serial** command that shows all of the information specific to the same port on a VIP-equipped Cisco 7500 series router (port 0 in chassis slot 3, port adapter slot 1) when the port is configured for ISDN PRI:

```
Router# show interfaces serial 3/1/0:23
Serial3/1/0:23 is up, line protocol is up(spoofing)
  Hardware is Multichannel T1
  MTU 1500 bytes, BW 64Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  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 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    0 packets output, 0 bytes, 0 underruns
    0 output errors, 0 collisions, 1 interface resets
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions alarm present
  Timeslot(s) Used:24, Transmitter delay is 0 flags, transmit queue length 0
```


**Note**

In the above examples, the term “spoofing” indicates that the interface is configured for ISDN PRI. Spoofing is indicated only on time slot 24 (the D channel), which is recognized by the system as time slot 23.

## Using the ping Command to Verify Network Connectivity

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

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

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

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

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

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

## Using loopback Commands

If you have difficulty with the multichannel DS1/PRI port adapter configuration or installation, you can troubleshoot the multichannel DS1/PRI port adapter using the **loopback** command. Specify loopback for a T1 controller and T1 channel using the **loopback** command. There are three main loopback modes: diagnostic, local (line and payload), and remote (iboc and esf).

Specify the loopback format using the **loopback [diagnostic | local | remote]** command.



### Note

---

To shut down the T1 controller, use the **shutdown** command at the controller prompt.

---

Diagnostic loopback loops the outgoing transmit signal back to the receive signal and sends an alarm indication signal (AIS) to the network. The syntax of the **loopback diagnostic** command is as follows:

### **loopback [diagnostic]**

Following are examples of setting the first T1 into diagnostic loopback for various supported platforms:

For the Catalyst RSM/VIP2:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback diagnostic
```

For the Catalyst 6000 family FlexWAN module:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 3/0/0
Router(config-controller)# loopback diagnostic
```

For the Cisco 7100 series routers:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 4/0
Router(config-controller)# loopback diagnostic
```

For the Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 2/0
Router(config-controller)# loopback diagnostic
```

For the Cisco 7201 router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback diagnostic
```

For the Cisco 7301 router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback diagnostic
```

For Cisco 7304 PCI Port Adapter Carrier Card in Cisco 7304 router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 3/0
Router(config-controller)# loopback diagnostic
```

For the Cisco 7401ASR router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback diagnostic
```

For the VIP:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 2/1/0
Router(config-controller)# loopback diagnostic
```

Local loopback loops the incoming signal back to the line. The syntax of the **loopback local** command is as follows:

```
loopback [local {payload | line}]
```

Following are examples of setting the first T1 into local loopback for various supported platforms:

For the Catalyst RSM/VIP2:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback local payload
```

For the Catalyst 6000 family FlexWAN module:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 3/0/0
Router(config-controller)# loopback local payload
```

For the Cisco 7100 series routers:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 4/0
Router(config-controller)# loopback local payload
```

For the Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 2/0
Router(config-controller)# loopback local payload
```

For the Cisco 7201 router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback local payload
```

For the Cisco 7301 router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback local payload
```

For Cisco 7304 PCI Port Adapter Carrier Card in the Cisco 7304 router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 3/0
Router(config-controller)# loopback local payload
```

For the Cisco 7401ASR router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback local payload
```

For the VIP:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 2/1/0
Router(config-controller)# loopback local payload
```

The syntax of the **loopback remote** command follows:

```
loopback [remote {esf line | iboc | esf payload}]
```

Remote line inband loopback causes the far end to loop its receive signal back to transmit.

Following are examples of setting the first T1 into remote line inband loopback for various supported platforms:

For the Catalyst RSM/VIP2:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback remote esf line
```

For the Catalyst 6000 family FlexWAN module:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 3/0/0
Router(config-controller)# loopback remote esf line
```

For the Cisco 7100 series routers:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 4/0
Router(config-controller)# loopback remote esf line
```

For the Cisco 7200 series routers, Cisco 7200 VXR routers, and Cisco uBR7200 series routers:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 2/0
Router(config-controller)# loopback remote esf line
```

For the Cisco 7201 router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback remote esf line
```

For the Cisco 7301 router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback remote esf line
```

For Cisco 7304 PCI Port Adapter Carrier Card in the Cisco 7304 router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 3/0
Router(config-controller)# loopback remote esf line
```

For the Cisco 7401ASR router:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 1/0
Router(config-controller)# loopback remote esf line
```

For the VIP:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# controller t1 2/1/0
Router(config-controller)# loopback remote esf line
```

## Checking Bit Errors Using a BERT

To check bit errors using a bit error rate test (BERT), use the following command:

```
[no] t1 bert pattern {2^11 | 2^15 | 2^20 O.153 | 2^20 QRSS | 2^23 | 0s | 1s | alt-0-1} interval  
minutes
```

where

2<sup>15</sup> is an exponential number that represents a pseudorandom repeating pattern that is 32,767 bits long

2<sup>20</sup> is a pseudorandom repeating pattern that is 1,048,575 bits long

2<sup>23</sup> is a pseudorandom repeating pattern that is 8,388,607 bits long

0s is a pattern of all zeroes (00000000...)

1s is a pattern of all 1s (111111...)

*minutes* are 1 to 14400, which designates the time the BERT will run.

To stop the BERT, use the optional **no** form of the command.

Following is an example of this command, where the pseudorandom pattern 2<sup>20</sup> is sent and repeats on the T1 port for 60 minutes:

```
Router# t1 bert pattern 2^20 interval 60
```

The BERT command is not saved in NVRAM. The test patterns from the multichannel DS1/PRI port adapter are framed test patterns; therefore, they are inserted into the payload of a framed T1 signal.

To display the BERT results, use the following EXEC commands: **show controllers t1 number** or **show controllers t1 number brief**.

The following subsections show some examples of displaying BERT results output.

- [Examples of Displaying BERT Output During a Test, page 4-42](#)
- [Examples of Displaying BERT Output After a Completed Test, page 4-44](#)
- [Examples of Displaying BERT Output When the Test is Stopped Prematurely, page 4-46](#)

## Examples of Displaying BERT Output During a Test

Following are examples of how to display BERT output results during a test from various routers:

For the Catalyst RSM/VIP2:

```
Router# show controllers t1 0/0 brief
T1 0/0 is up.
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync        : sync
  DSX1 BERT sync count   : 1
  DSX1 BERT interval    : 2
  DSX1 BERT time remain  : 2
  DSX1 BERT total errs  : 0
  DSX1 BERT total k bits: 43155
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 43155
Applique type is Channelized T1
No alarms detected.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (24 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
Router#
```

For the Cisco 7100 series routers:

```
Router# show controllers t1 4/0
T1 4/0 is up. (Diagnostic Loopback)
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync        : sync
  DSX1 BERT sync count   : 1
  DSX1 BERT interval    : 2
  DSX1 BERT time remain  : 2
  DSX1 BERT total errs  : 0
  DSX1 BERT total k bits: 6165
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 6165
Applique type is Channelized T1
Receiver has no alarms.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (0 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
Router#
```

For the Cisco 7200 series routers, Cisco 7200VXR routers, or Cisco uBR7200 series routers:

```
Router# show controllers t1 2/0
T1 2/0 is up. (Diagnostic Loopback)
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync         : sync
  DSX1 BERT sync count   : 1
  DSX1 BERT interval     : 2
  DSX1 BERT time remain  : 2
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 6165
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 6165
Applique type is Channelized T1
Receiver has no alarms.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (0 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
Router#
```

For the Cisco 7401ASR router:

```
Router# show controllers t1 1/0
T1 1/0 is up. (Diagnostic Loopback)
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync         : sync
  DSX1 BERT sync count   : 1
  DSX1 BERT interval     : 2
  DSX1 BERT time remain  : 2
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 6165
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 6165
Applique type is Channelized T1
Receiver has no alarms.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (0 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
Router#
```

For the VIP on a Cisco 7000 series router or Cisco 7500 series router:

```
Router# show controllers t1 0/0/0 brief
T1 0/0/0 is up.
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync         : sync
  DSX1 BERT sync count   : 1
  DSX1 BERT interval     : 2
  DSX1 BERT time remain  : 2
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 43155
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 43155
Applique type is Channelized T1
No alarms detected.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (24 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
Router#

```



**Note**

---

When the T1 is under BERT (in the running state), its line state is down and the “Total Bit Errors” value is not valid if the “Status” field is “Not Sync.”

---

## Examples of Displaying BERT Output After a Completed Test

Following are examples of how to display BERT output results after the test is complete from various routers:

For the Catalyst RSM/VIP2:

```

Router# show controllers t1 0/0
T1 0/0 is up.
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync        : done
  DSX1 BERT sync count   : 1
  DSX1 BERT interval    : 2
  DSX1 BERT time remain  : 0
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 178785
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 178785
Applique type is Channelized T1
No alarms detected.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (177 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
Router#

```

For the Cisco 7100 series routers:

```

Router# show controllers t1 4/0
%CLEAR-5-COUNTERS: Clear counter on all interfaces by console show cont t1 2/0
T1 4/0 is up. (Diagnostic Loopback)
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync        : done
  DSX1 BERT sync count   : 1
  DSX1 BERT interval    : 2
  DSX1 BERT time remain  : 0
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 178785
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 178785
Applique type is Channelized T1
Receiver has no alarms.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (0 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
Router#

```

For the Cisco 7200 series routers, Cisco 7200 VXR routers, or Cisco uBR7200 series routers:

```
Router# show controllers t1 2/0
%CLEAR-5-COUNTERS: Clear counter on all interfaces by console show cont t1 2/0
T1 2/0 is up. (Diagnostic Loopback)
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync         : done
  DSX1 BERT sync count   : 1
  DSX1 BERT interval     : 2
  DSX1 BERT time remain  : 0
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 178785
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 178785
  Applique type is Channelized T1
  Receiver has no alarms.
  Cablelength is long gain36 0db
  Framing is ESF, Line Code is B8ZS, Clock Source is Line.
  Data in current interval (0 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
Router#
```

For the Cisco 7401ASR Router:

```
Router# show controllers t1 1/0
%CLEAR-5-COUNTERS: Clear counter on all interfaces by console show cont t1 2/0
T1 1/0 is up. (Diagnostic Loopback)
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync         : done
  DSX1 BERT sync count   : 1
  DSX1 BERT interval     : 2
  DSX1 BERT time remain  : 0
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 178785
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 178785
  Applique type is Channelized T1
  Receiver has no alarms.
  Cablelength is long gain36 0db
  Framing is ESF, Line Code is B8ZS, Clock Source is Line.
  Data in current interval (0 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
Router#
```

For the VIP on a Cisco 7000 series router or Cisco 7500 series router:

```
Router# show controllers t1 0/0/0
T1 0/0/0 is up.
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync         : done
  DSX1 BERT sync count   : 1
  DSX1 BERT interval     : 2
  DSX1 BERT time remain  : 0
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 178785
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 178785
  Applique type is Channelized T1
  No alarms detected.
  Cablelength is long gain36 0db
  Framing is ESF, Line Code is B8ZS, Clock Source is Line.
```

```
Data in current interval (177 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
Router#
```



**Note**

---

The “Status” field is irrelevant when the BERT is done. If the “Sync Detected” counter is 0, the Bit Errors fields have no meaning.

---

## Examples of Displaying BERT Output When the Test is Stopped Prematurely

Following are examples of how to display BERT output results when the test is stopped prematurely from various routers:

For the Catalyst RSM/VIP2:

```
Router# show controllers t1 0/0
T1 0/0 is up.
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync         : done
  DSX1 BERT sync count   : 1
  DSX1 BERT interval     : 2
  DSX1 BERT time remain  : 2
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 6166
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 6166
Applique type is Channelized T1
No alarms detected.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (267 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
Router#
```

For the Cisco 7100 series routers:

```
Router# show controllers t1 4/0
T1 4/0 is up. (Diagnostic Loopback)
  DSX1 BERT pattern      : zeros
  DSX1 BERT sync         : done
  DSX1 BERT sync count   : 1
  DSX1 BERT interval     : 2
  DSX1 BERT time remain  : 2
  DSX1 BERT total errs   : 0
  DSX1 BERT total k bits: 6166
  DSX1 BERT errors (last): 0
  DSX1 BERT k bits (last): 6166
Applique type is Channelized T1
Receiver has no alarms.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (58 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
Router#
```

For Cisco 7200 series routers, Cisco 7200 VXR routers, or Cisco uBR7200 series routers:

```
Router# show controllers t1 2/0
T1 2/0 is up. (Diagnostic Loopback)
DSX1 BERT pattern      : zeros
DSX1 BERT sync         : done
DSX1 BERT sync count   : 1
DSX1 BERT interval     : 2
DSX1 BERT time remain  : 2
DSX1 BERT total errs   : 0
DSX1 BERT total k bits: 6166
DSX1 BERT errors (last): 0
DSX1 BERT k bits (last): 6166
Applique type is Channelized T1
Receiver has no alarms.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (58 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
Router#
```

For the Cisco 7401ASR router:

```
Router# show controllers t1 1/0
T1 1/0 is up. (Diagnostic Loopback)
DSX1 BERT pattern      : zeros
DSX1 BERT sync         : done
DSX1 BERT sync count   : 1
DSX1 BERT interval     : 2
DSX1 BERT time remain  : 2
DSX1 BERT total errs   : 0
DSX1 BERT total k bits: 6166
DSX1 BERT errors (last): 0
DSX1 BERT k bits (last): 6166
Applique type is Channelized T1
Receiver has no alarms.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (58 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
Router#
```

For the VIP on a Cisco 7000 series router or Cisco 7500 series router:

```
Router# show controllers t1 0/0/0
T1 0/0/0 is up.
DSX1 BERT pattern      : zeros
DSX1 BERT sync         : done
DSX1 BERT sync count   : 1
DSX1 BERT interval     : 2
DSX1 BERT time remain  : 2
DSX1 BERT total errs   : 0
DSX1 BERT total k bits: 6166
DSX1 BERT errors (last): 0
DSX1 BERT k bits (last): 6166
Applique type is Channelized T1
No alarms detected.
Cablelength is long gain36 0db
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
Data in current interval (267 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
Router#

```



**Note**

---

In the preceding three examples, the “Bit Errors(Sync BERT Started)” counter indicates the number of bit errors during BERT, and the “Bit Errors(Sync last Sync)” counter shows the number of bit errors since the last pattern sync was detected.

---