



## CHAPTER 5

# Configuring the E3 Mode

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To continue your PA-T3/E3-EC port adapter installation, you must configure the serial interfaces. The instructions that follow apply to all supported platforms.

This chapter contains the following sections:

- [Upgrading the Field-Programmable Device Before Configuring the T3 Mode, page 5-1](#)
- [Using the EXEC Command Interpreter, page 5-2](#)
- [Configuring the Card Type, page 5-3](#)
- [Configuring the Interfaces, page 5-3](#)
- [Customizing the PA-T3/E3-EC, page 5-8](#)
- [Checking the Configuration, page 5-9](#)

## Upgrading the Field-Programmable Device Before Configuring the T3 Mode

Before you can configure the T3 mode, you must upgrade the field-programmable device (FPD), if an upgrade is required. An FPD upgrade requirement message appears when the hardware is installed and it is recognized. The FPD upgrade is first available in Cisco IOS Release 12.4(15)T and is available in future releases of Cisco IOS Release 12.4T.

You can perform the upgrade automatically or manually. The automatic upgrade method is preferred.

See the *Field-Programmable Device Upgrades* document for complete information at [http://www.cisco.com/en/US/docs/routers/7200/configuration/feature\\_guides/fpd.html](http://www.cisco.com/en/US/docs/routers/7200/configuration/feature_guides/fpd.html)

Use the following FPD packages for your product:

- c7200p-fpd-pkg for NPE-G2
- c7301-fpd-pkg for Cisco 7301
- c7200-fpd-pkg for NPE-G1 and NPE-400

To upgrade the FPD automatically, follow these instructions:

---

**Step 1** At the command prompt, enter the following command:

```
Router(config)# upgrade fpd auto
```

The following is example text of what is displayed:

```
Router(config)# upgrade fpd path ?
bootflash: Locate FPD image package from bootflash:
disk2: Locate FPD image package from disk2:
ftp: Locate FPD image package from ftp:
http: Locate FPD image package from http:
https: Locate FPD image package from https:
pram: Locate FPD image package from pram:
rcp: Locate FPD image package from rcp:
scp: Locate FPD image package from scp:
tftp: Locate FPD image package from tftp:
Router(config)# upgrade fpd path tftp://0.0.0.0/biff
```

**Step 2** Reload the router or do a OIR of the port adapter with the FPD upgrade image at the /tftpboot/xxxxx location, or place it in some other location such as mentioned in the example.

---

To manually upgrade the FPD, use the following CLI:

```
Router# upgrade hw-module slot slotno fpd file tftp://0.0.0.0/biff/[c7200p-fpd-pkg |
c7301-fpd-pkg | c7200-fpd-pkg]
```

See the *Field-Programmable Device Upgrades* document for complete information at [http://www.cisco.com/en/US/docs/routers/7200/configuration/feature\\_guides/fpd.html](http://www.cisco.com/en/US/docs/routers/7200/configuration/feature_guides/fpd.html)

## Using the EXEC Command Interpreter

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

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

---

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

```
Router> enable
Password:
```

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

```
Router#
```

---

To configure the new interfaces, proceed to the [“Configuring the Interfaces”](#) section on page 5-3.

## Configuring the Card Type

Use the **card type** command to configure or change the card type to T3 or E3 when the card is first inserted into the router. You must use this command before you can proceed with any other configuration tasks.

To enable the card type, issue the command. **card type {t3 | e3}**

**Note**

If you change the card type, you must reboot the router for the configuration to take effect.

## Configuring the Interfaces

After you verify that the new PA-T3/E3-EC is installed correctly (the ENABLED LED goes on), use the privileged-level **configure** command to configure the new interfaces. Have the following information available:

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

If you installed a new PA-T3/E3-EC or if you want to change the configuration of an existing interface, you must enter configuration mode to configure the new interfaces. If you replace a PA-T3/E3-EC 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 PA-T3/E3-EC, refer to the appropriate configuration publications listed in the [“Related Documentation”](#) section on page iv.

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 5-2 for an explanation of the privileged level of the EXEC.)

This section contains the following subsections:

- [Shutting Down an Interface, page 5-4](#)
- [Performing a Basic Configuration, page 5-6](#)
- [Configuring Cyclic Redundancy Checks, page 5-7](#)

## Shutting Down an Interface

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

Follow these steps to shut down an interface:

- Step 1** Enter the privileged level of the EXEC command interpreter (also called enable mode). (See the “Using the EXEC Command Interpreter” section on page 5-2 for instructions.)
- Step 2** At the privileged-level prompt, enter configuration mode and specify that the console terminal is the source of the configuration commands, as follows:  

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
```
- Step 3** Shut down interfaces by entering the **interface serial** command (followed by the interface address of the interface), and then enter the **shutdown** command. Table 5-1 shows the command syntax.
- Step 4** When you have finished, press **Ctrl-Z**—hold down the **Control** key while you press **Z**—or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter.

**Table 5-1** Syntax of the shutdown Command

Platform	Command	Example
Cisco 7200 VXR routers	<b>interface</b> , <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 6.  <pre>Router(config-if)# <b>interface serial 6/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 6/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>
Cisco 7201 router	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in slot 1.  <pre>Router(config)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>
Cisco 7301 router	<b>interface</b> , <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in slot 1.  <pre>Router(config)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#</pre>



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

**Step 5** Write the new configuration to NVRAM as follows:

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

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

**Step 6** Verify that new interfaces are now in the correct state (shut down) using the **show interfaces** command (followed by the interface type and interface address of the interface) to display the specific interface. [Table 5-2](#) provides examples.

**Table 5-2 Examples of the show interfaces Command**

Platform	Command	Example
Cisco 7200 VXR routers	<b>show interfaces serial</b> , <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 6.  Router# <b>show interfaces serial 6/0</b>  Serial 6/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco 7201 router	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 1.  Router# <b>show interfaces serial 1/0</b>  Serial 1/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco 7301 router	<b>show interfaces serial</b> , <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 1.  Router# <b>show interfaces serial 1/0</b>  Serial 1/0 is administratively down, line protocol is down  [Additional display text omitted from this example]

**Step 7** Re-enable interfaces by doing the following:

- a. Repeat Step 3 to re-enable an interface, but substitute the **no shutdown** command for the **shutdown** command.
- b. Repeat Step 4 to write the new configuration to memory. Use the **copy running-config startup-config** command.

- c. Repeat Step 5 to verify that the interfaces are in the correct state. Use the **show interfaces** command followed by the interface type and interface address of the interface.

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

## Performing a Basic Configuration

Following are instructions for a basic configuration: enabling an interface, specifying IP routing, and setting up external timing on a DCE interface. You might also need to enter other configuration commands, depending on the requirements for your system configuration and the protocols you plan to route on the interface. For complete descriptions of configuration commands 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 commands, 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** command, followed by the interface address of the interface you plan to configure. (The command for your port adapter may be different, for example, **interface atm**.) [Table 5-3](#) provides examples.

**Table 5-3** Examples of the interface serial Command

Platform	Command	Example
Cisco 7200 VXR routers	<b>interface serial</b> , <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 6.  Router (config)# <b>interface serial 6/0</b> Router (config-if)#
Cisco 7201 router	<b>interface serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 1.  Router (config)# <b>interface serial 1/0</b> Router (config-if)#
Cisco 7301 router	<b>interface serial</b> , <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 1.  Router (config)# <b>interface serial 1/0</b> Router (config-if)#

- Step 3** Assign an IP address and subnet mask to the interface (if IP routing is enabled on the system) by using the **ip address** command, as in the following example:

```
Router(config-if)# ip address 10.0.0.0 10.255.255.255
```

- Step 4** Add any additional configuration commands required to enable routing protocols and set the interface characteristics.
- Step 5** Re-enable the interfaces using the **no shutdown** command. (See the “[Shutting Down an Interface](#)” section on page 5-4.)
- Step 6** Configure all additional port adapter interfaces as required.
- Step 7** After including all of the configuration commands to complete your configuration, press **Ctrl-Z**—hold down the **Control** key while you press **Z**—or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter prompt.
- Step 8** Write the new configuration to NVRAM as follows:

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

This completes the procedure for creating a basic configuration.

## Configuring Cyclic Redundancy Checks

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

[Table 5-4](#) summarizes cyclic redundancy check (CRC) commands.

**Table 5-4** CRC Commands

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

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

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

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

The preceding command example applies to all systems in which the PA-T3/E3-EC is supported. Use the **no crc 32** command to disable 3-bit CRC 2 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* publication. For more information, see the “[Related Documentation](#)” section on page iv.

## Customizing the PA-T3/E3-EC

You can customize the PA-T3/E3-EC. The features you can customize have default values that will probably suit your environment and need not 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 PA-T3/E3-EC.

- [Setting the Bandwidth, page 5-8](#)
- [Defining the DSU Mode, page 5-8](#)
- [Defining Set Bit \(National\), page 5-9](#)
- [Enabling E3 Scrambling, page 5-9](#)
- [Specifying E3 Framing, page 5-9](#)

## Setting the Bandwidth

In interface configuration mode, reduce effective bandwidth (range of 22 to 34010 kilobits per second) by entering the **dsu bandwidth** configuration command, as in the following example:

```
Router(config-if)# dsu bandwidth 16000
```

Use the **no** form of this command to return to the default, 34010.



### Note

The local port configuration must match the remote port configuration. For example, if you reduce the effective bandwidth to 16000 on the local port, you must do the same on the remote port.

## Defining the DSU Mode

In interface configuration mode, define the DSU interoperability mode by entering the **dsu mode [0 | 1]** configuration command, as in the following example:

```
Router(config-if)# dsu mode 1
```

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



The local port configuration must match the remote port configuration. For example, if you define the DSU interoperability mode as 1 on the local port, you must do the same on the remote port. You need to know what type of DSU is at the remote port to find out if it interoperates with the PA-T3/E3-EC. For E3 serial interfaces, specify mode 0 for connection from a PA-T3/E3-EC to another PA-T3/E3-EC or a Digital Link DSU (DL3100). Specify mode 1 for connection from a PA-T3/E3-EC to a Kentrox DSU.

Also refer to the [Table 1-3 on page 1-4](#) section on for information regarding DSU feature compatibilities.

## Defining Set Bit (National)

In interface configuration mode, define the set bit in G.751 frame (national bit) by entering the **national bit [0 | 1]** configuration command, as in the following example:

```
Router(config-if)# national bit 1
```

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

## Enabling E3 Scrambling

In interface configuration mode, enable E3 scrambling by entering the **scramble** configuration command, as in the following example:

```
Router(config-if)# scramble
```

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

The local port configuration must match the remote port configuration. For example, if you enable scrambling on the local port, you must do the same on the remote port.

## Specifying E3 Framing

In interface configuration mode, specify E3 framing by entering the **framing {g751 | bypass}** configuration command, as in the following example:

```
Router(config-if)# framing g751
```

Use the **no** form of this command to return to the default, G.751 framing.



### Note

If you use the **bypass** option, scrambling must be set to the default, disabled; the DSU mode must be set to the default, 0; and the DSU bandwidth must be set to the default, 34010.

## Checking the Configuration

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

- [Using show Commands to Verify the New Interface Status, page 5-10](#)
- [Using the ping Command to Verify Network Connectivity, page 5-15](#)
- [Using loopback Commands, page 5-16](#)

## Using show Commands to Verify the New Interface Status

Table 5-5 demonstrates how you can use the **show** commands to verify that new interfaces are configured and operating correctly and that the PA-T3/E3-EC appears in them correctly. Sample displays of the output of selected **show** commands appear in the sections that follow. For complete command descriptions and examples, refer to the publications listed in the “[Related Documentation](#)” section on page iv.



**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 5-5** Using show Commands

Command	Function	Example
<b>show version</b> or <b>show hardware</b>	Displays system hardware configuration, the number of each interface type installed, Cisco IOS software version, names and sources of configuration files, and boot images	Router# <b>show version</b>
<b>show controllers</b>	Displays all the current interface processors and their interfaces	Router# <b>show controllers</b>
<b>show diag slot</b>	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 port-adapter-slot-number/ interface-port-number</b>	Displays status information about a specific type of interface (for example, serial) in a Cisco 7200 VXR router and Cisco 7301 router	Router# <b>show interfaces serial 1/0</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 display indicates 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 or show hardware Commands, page 5-11](#)
- [Using the show diag Command, page 5-13](#)
- [Using the show interfaces Command, page 5-14](#)

These subsections offer some platform-specific output examples using the **show** commands. Choose the subsection appropriate for your system. Proceed to the [“Using the ping Command to Verify Network Connectivity” section on page 5-15](#) when you have finished using the **show** commands.

## Using the show version or show hardware Commands

Display the configuration of the system hardware, the number of each interface type installed, the Cisco IOS software version, the names and sources of configuration files, and the boot images, using the **show version** (or **show hardware**) command.

**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.

### Cisco 7200 VXR Routers

Following is an example of the **show version** command from a Cisco 7200 VXR router with the PA-T3/E3-EC:

```
Router# show version

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

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

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

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

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

### Cisco 7201 Router

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
c7201alpha 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

Following is an example of the **show version** command from a Cisco 7301 router with the PA-T3/E3-EC:

```

Router# show version

Cisco IOS Software, 7301 Software (C7301-JS-M), Experimental Version 12.4(xxx)
[biff-7301_testing 101]
Copyright (c) 1986-2006 by Cisco Systems, Inc.
Compiled Sat 19-Aug-06 14:36 by biff
ROM: System Bootstrap, Version 12.3(4r)T2, RELEASE SOFTWARE (fc1)
BOOTLDR: 7301 Software (C7301-BOOT-M), Version 12.2(15)B, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)
ws2_7301 uptime is 2 hours, 51 minutes
System returned to ROM by reload at 11:42:47 UTC Wed Aug 23 2006
System restarted at 11:58:28 UTC Wed Aug 23 2006
System image file is "tftp://10.77.11.10/biff/c7301-js-mz.c7301_testing"
Last reload reason: Reload Command

Cisco 7301 (NPE) processor (revision C) with 491520K/32768K bytes of memory.
Processor board ID 74806832
SB-1 CPU at 700MHz, Implementation 1025, Rev 0.2, 512KB L2 Cache
1 slot midplane, Version 3.0
Last reset from watchdog nmi
3 Gigabit Ethernet interfaces
1 Serial interface
1 Subrate T3/E3 port
509K bytes of NVRAM.

```

```
250880K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
32768K 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 7200 VXR router.



### 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.

Following is an example of the **show diag slot** command that shows a PA-T3/E3-EC in port adapter slot 2 of a Cisco 7200 VXR router:

```
Router# show diag 2

Slot 2:
Enhanced 2 port T3 multichannel Port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time 00:00:50 ago
EEPROM contents at hardware discovery:
PCB Serial Number : JAE103394R8
Hardware Revision : 1.1
Part Number : 73-10698-02
Board Revision : 06
RMA Test History : 00
RMA Number : 0-0-0-0
RMA History : 00
Deviation Number : 85586
Product (FRU) Number : PA-MC-2T3-EC
Version Identifier : V01
Top Assy. Part Number : 68-2713-02
CLEI Code :
EEPROM format version 4
EEPROM contents (hex):
0x00: 04 FF C1 8B 4A 41 45 31 30 33 33 39 34 52 38 40
0x10: 05 44 41 01 01 82 49 29 CA 02 42 30 36 03 00 81
0x20: 00 00 00 00 04 00 88 00 01 4E 52 CB 94 50 41 2D
0x30: 4D 43 2D 32 54 33 2D 45 43 20 20 20 20 20 20 20
0x40: 20 89 56 30 31 20 D9 03 C1 40 CB 87 44 0A 99 02
0x50: C6 8A 20 20 20 20 20 20 20 20 20 20 20 FF FF FF FF
0x60: FF 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 FF
```

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

```

## Using the show interfaces Command

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

For complete descriptions of interface commands and the configuration options available for interfaces, refer to the publications listed in the [“Related Documentation” section on page iv](#).



### 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.

---

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

```

Router# show interfaces serial 1/0

Serial 1/0 is up, line protocol is up
Hardware is PA-2T3/E3-EC
Internet address is 209.165.200.224
MTU 4470 bytes, BW 34010 Kbit, DLY 200 usec,
reliability 255/255, txload 133/255, rxload 133/255
Encapsulation PPP, LCP Open
Open: IPCP, CDPCP, crc 16, loopback not set
Keepalive set (10 sec)
Restart-Delay is 0 secs
Last input 00:00:58, output 00:00:00, output hang never
Last clearing of "show interface" counters 18:20:02
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 17858000 bits/sec, 44603 packets/sec
5 minute output rate 17858000 bits/sec, 44644 packets/sec
2945861066 packets input, 1264008542 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 parity
3 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 3 abort
2946010876 packets output, 1271709372 bytes, 0 underruns
0 output errors, 0 applique, 0 interface resets
0 output buffer failures, 0 output buffers swapped out
0 carrier transitions
R1_npe400#

```

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
```

Proceed to the next section, “[Using the ping Command to Verify Network Connectivity](#),” to check network connectivity of the PA-T3/E3-EC and switch or router.

## Using the ping Command to Verify Network Connectivity

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

Use the **loopback {dte | local | network [line | payload]}** command to troubleshoot the E3 serial port adapter at the physical interface level. The command loops all packets from the E3 interface either back to the interface or from the network back out toward the network. Use the **no** form of the command to remove the loop.

The following examples of the **loopback {dte | local | network line | payload}** command configure loopback modes on the single interface (interface 0) of a one-port E3 serial port adapter in port adapter slot 1 to 7 of a Cisco 7200 VXR router:

- Set the interface into loopback data terminal equipment (DTE) mode as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface serial 1/0
Router(config-if)# loopback dte
```

DTE loopback loops the router output data back toward the router (after the line interface unit).

- Set the interface into local loopback mode as follows:

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

Local loopback loops the router output data back toward the router at the framer.

- Set the interface into network line loopback mode as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface serial 1/0
Router(config-if)# loopback network line
```

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

- Set the interface into network payload loopback mode as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface serial 1/0
Router(config-if)# loopback network payload
```

Network payload loopback loops just the payload data back toward the network at the E3 framer.