



CHAPTER 1

Overview

This chapter describes the Cisco PA-T3/E3-EC port adapter and contains the following sections:

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- [T3 Port Specifications, page 1-3](#)
- [E3 Cable Specifications, page 1-3](#)
- [Unchannelized Interoperability Guidelines for DSUs, page 1-3](#)
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Port Adapter Overview

The PA-T3/E3-EC provides one T3 interface connection using BNC connectors. (See [Figure 1-1](#).) The PA-2T3/E3-EC is a single-width port adapter that provides two T3 interface connections using BNC connectors. (See [Figure 1-2](#).) Hereafter, both versions of this port adapter will be referred to as the PA-T3/E3-EC.

Figure 1-1 PA-T3/E3-EC—Front Panel



Figure 1-2 PA-2T3/E3-EC—Front Panel



Serial network interfaces reside on modular port adapters, which provide a direct connection between the high-speed bus in the router and the external networks. The PA-T3/E3-EC provides a full-duplex synchronous serial E3 interface for transmitting and receiving data at rates of up to 34 megabits per second (Mbps).

The T3 link provides a single high-speed user data channel that appears to the system as a serial interface that may be configured to use the full T3 bandwidth or a smaller portion of the T3 bandwidth. No industry standards exists for subdividing the T3 bandwidth, but the PA-T3/E3-EC is compatible with the proprietary formats of five vendors of T3 DSUs, when used at the far end of the T3 link.

The T3 connection supports the maintenance data link (MDL) channel when using c-bit parity framing as well as local and network loopbacks. Bit error rate testing (BERT) is supported on the T3 link. The PA-T3/E3-EC supports Cisco High-Level Data Link Control (HDLC), Frame Relay, PPP, and Switched Multimegabit Data Service (SMDS) data exchange interface (DXI) encapsulations over the serial interface.

The E3 connection supports both 16- and 32-bit cyclic redundancy checks (CRCs). The default is 16-bit CRCs. To enable 32-bit CRCs, you use a configuration command. For a description of the CRC function, see the [“Configuring Cyclic Redundancy Checks” section on page 5-7](#).

The PA-T3/E3-EC has the following features and physical characteristics:

- The PA-T3/E3-EC transmits and receives data bidirectionally at the T3 rate of 44.736 Mbps.
- The PA-T3/E3-EC conforms to relevant specifications for Digital Signal Level 3 (DS3) circuits.
- The T3 connection, provided by two female BNC connectors for transmit (TX) and receive (RX), requires 734A coaxial cable that has an impedance of 75 ohms.
- The PA-T3/E3-EC supports RFC 1406 and RFC 1407 (CISCO-RFC-1407-CAPABILITY.my). For RFC 1406, Cisco supports all tables except the FarEnd table. For RFC 1407, Cisco does not support FarEnd or Fractional tables. (For information on accessing Cisco MIB files, refer to the *Cisco MIB User Quick Reference* publication.)
- PA-T3/E3-EC microcode is loaded at initialization and is bundled into Cisco IOS software.
- Single- or double-port E3 rate (34 Mbps) connectivity
- Full-duplex synchronous serial E3 interface
- High-speed High-Level Data Link Control (HDLC) data
- Integrated data service unit (DSU) functionality
- Support for 16- and 32-bit cyclic redundancy checks (CRCs)
- Support for G.751 framing or bypass framing
- Support for ATM-DXI, Frame Relay, HDLC, Switched Multimegabit Data Service (SMDS), and PPP serial encapsulations
- Support for national service bits
- Support for remote and local loopback
- HDB3 line coding
- Scrambling and bandwidth reduction
- Online insertion and removal (OIR)
- The one-port PA-T3/E3-EC provides one high-speed interface on the Cisco 7200 VXR routers and the Cisco 7301 router.
- The two-port PA-2T3/E3-EC provides two high-speed interfaces on the Cisco 7200 VXR routers and the Cisco 7301 router.

T3 Port Specifications

The PA-T3/E3-EC T3 port is designed to receive and transmit at the DSX-3 level while driving and receiving from 75-ohm coaxial cables (ATT 734A or equivalent quality coaxial cable). The T3 port connects directly to any equipment with DSX-3-level BNC connectors.

Table 1-1 lists the specifications that the T3 front end is designed to meet.

Table 1-1 Specifications for the T3 Front End

| Parameter | Specification |
|--------------------|--|
| Line rate | 44.736 Mbps (± 20 ppm) |
| Line code | B3ZS (bipolar with three-zero substitution) |
| Impedance | 75 ohms |
| Output pulse shape | ANSI T1.102, pulse amplitude is between 0.36 and 0.85 volts peak |
| Input signal | 0.035-1.1 volts peak |
| Output signal | Able to drive 450 feet (135 meters) of 75-ohm coaxial cable (734A or equivalent) and meet pulse shape template |



Note

The coaxial shield side of the T3 BNC connectors is connected to the router chassis ground.

E3 Cable Specifications

The serial interface cable for the PA-T3/E3-EC, which is a 75-ohm coaxial cable, is used to connect your router to a serial E3 network. Serial cables conform to EIA/TIA-612 and EIA/TIA-613 specifications. The serial ports on the PA-T3/E3-EC are considered to be DTE devices.



Caution

To prevent problems when long cable lengths are required, you *must* ensure that your 75-ohm coaxial cables meet or exceed 734A specifications.

Unchannelized Interoperability Guidelines for DSUs

The PA-T3/E3-EC supports several types of integrated data service units (DSUs). Table 1-2 lists the feature compatibilities of PA-T3/E3-EC DSUs.

Table 1-2 Unchannelized DSU Feature Compatibilities of PA-T3/E3-EC

| Vendor | DSU Model | Full Rate Support | Scrambling Support | Subrate Support |
|--------------|------------|-------------------|--------------------|-----------------|
| Digital Link | DL3100 | Yes | Yes | Yes |
| ADC Kentrox | T3/E3 IDSU | Yes | Yes | Yes |
| Larscom | Access T45 | Yes | Yes | Yes |

Table 1-2 Unchannelized DSU Feature Compatibilities of PA-T3/E3-EC (continued)

| Vendor | DSU Model | Full Rate Support | Scrambling Support | Subrate Support |
|----------|-----------|-------------------|--------------------|-----------------|
| Adtran | T3SU 300 | Yes | Yes | Yes |
| Verilink | HDM2182 | Yes | Yes | Yes |

E3 Interoperability Guidelines for DSUs

The PA-T3/E3-EC supports several types of integrated DSUs. [Table 1-3](#) lists the feature compatibilities of the PA-T3/E3-EC DSUs.

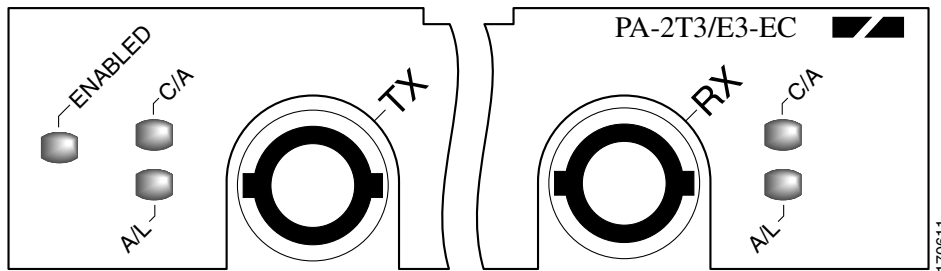
Table 1-3 E3 DSU Feature Compatibilities of PA-T3/E3-EC

| DSU | Full Rate Support | Scrambling Support | Subrate Support |
|---------|-------------------|--------------------|------------------|
| DL3100E | Yes | No ¹ | Yes ¹ |
| Kentrox | Yes | Yes ² | Yes ² |

- DL3100E does not support scrambling. However, the PA-T3/E3-EC can turn on scrambling in DSU mode 0 for connecting to another PA-T3/E3-EC. The PA-T3/E3-EC supports either scrambling (in mode 0) or DL3100E subrate, not both at the same time.
- The PA-T3/E3-EC supports either scrambling or Kentrox subrate, not both at the same time.

LEDs

The PA-T3/E3-EC has three status LEDs located on its faceplate: one ENABLED LED, and an A/L (active/loopback) LED and C/A (carrier/alarm) LED for each port.

Figure 1-3 PA-2T3/E3-EC Status LEDs—Partial Horizontal View

| LED Label | Color | State | Meaning |
|-----------------------|-------|-------|---|
| ENABLE | Green | On | After system initialization, the port is enabled for operation. |
| | — | Off | The port is not enabled for operation. |
| A/L (active/loopback) | Green | On | Port is enabled, loopback is off. |
| | Amber | On | Port is enabled, loopback is on. |
| | — | Off | Port is not enabled. |
| C/A (carrier/alarm) | Green | On | Port is enabled, valid signal without alarms. |

| LED Label | Color | State | Meaning |
|-----------|-------|-------|--|
| | Amber | On | Port is enabled, valid signal with alarms. |
| | — | Off | Port is not enabled. |

In addition to the interface status information provided by the LEDs, you can also retrieve detailed interface status information either through the router console port or through Telnet or Simple Network Management Protocol (SNMP).

Management Information Base

Management Information Base (MIB) attributes are readable and writable across the Integrated Local Management Interface (ILMI) through use of Simple Network Management Protocol (SNMP).

- The one-port PA-T3/E3-EC supports MIB-II (RFC 1213) and the E3 interface MIB (RFC 1407).
- The two-port PA-2T3/E3-EC supports MIB-II (RFC 1213) and the E3 interface MIB (RFC 1407).

Port Adapter Slot Locations on the Supported Platforms

The following sections provides port adapter slot locations and related information:

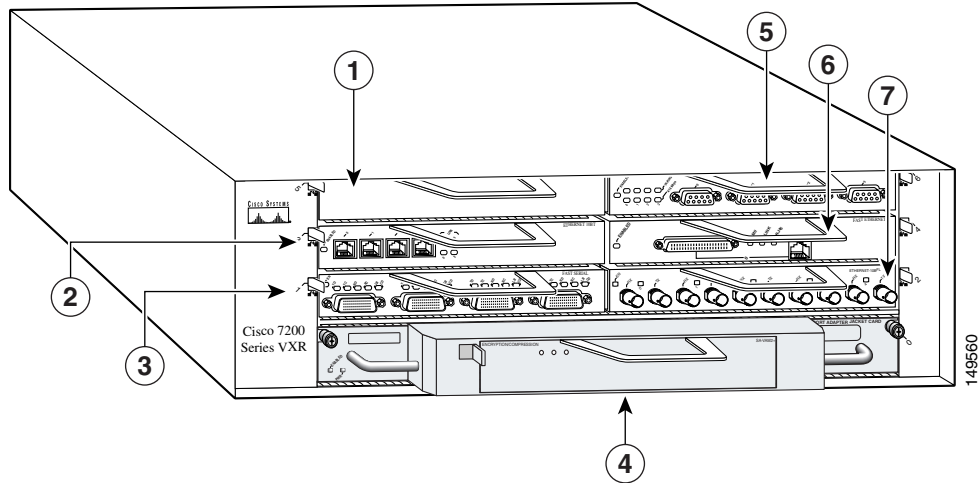
- [Cisco 7200 VXR Routers Slot Numbering, page 1-5](#)
- [Cisco 7301 Router Slot Numbering, page 1-7](#)

Cisco 7200 VXR Routers Slot Numbering

[Figure 1-4](#) shows a Cisco 7206VXR with port adapters installed. This illustration also shows the Port Adapter Jacket Card installed in the I/O controller slot. The Cisco 7204VXR router is not shown; however, the PA-T3/E3-EC can be installed in any available port adapter (slot 1 through 5.)

In the Cisco 7206VXR as a router shelf in a Cisco AS5800 Universal Access Server), port adapter slot 1 is in the lower left position, and port adapter slot 6 is in the upper right position.

Figure 1-4 Port Adapter Slots in the Cisco 7206 XR Router with the Port Adapter Jacket Card



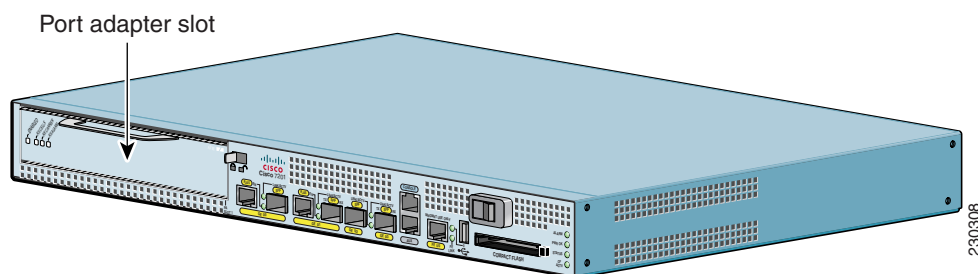
| | | | |
|---|--|---|--------|
| 1 | Slot 5 | 5 | Slot 6 |
| 2 | Slot 3 | 6 | Slot 4 |
| 3 | Slot 1 | 7 | Slot 2 |
| 4 | Slot 7 for the port adapter; Slot 0 for the Jacket Card | | |

Figure 1-4 shows the slot number of port adapters in a Cisco 7200 VXR router with the Port Adapter Jacket Card installed. Port adapter slots in the Cisco 7200 VXR routers are numbered from left to right. With an NPE-G1 or NPE-G2 installed, port adapter slot 0 can accept the Port Adapter Jacket Card. The Port Adapter Jacket Card resides in port adapter slot 0. The port adapter in the Port Adapter Jacket Card resides in port adapter slot 5 on the Cisco 7204 VXR router, or port adapter slot 7 on the Cisco 7206 VXR router.

Cisco 7201 Router Slot Numbering

Figure 1-5 shows the front view of a Cisco 7201 router with a port adapter installed. There is only one port adapter slot (slot 1) in a Cisco 7201 router.

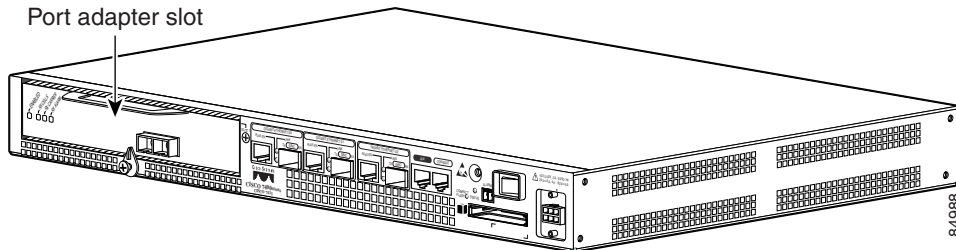
Figure 1-5 Port Adapter Slot in the Cisco 7201 Router



Cisco 7301 Router Slot Numbering

The Cisco 7301 router has one port adapter slot. See [Figure 1-6](#).

Figure 1-6 Port Adapter Slot in the Cisco 7301 Router



Identifying Interface Addresses

This section describes how to identify the interface addresses used for the PA-T3/E3-EC in Cisco 7200 VXR routers. Interface addresses specify the actual physical location of each interface on a router or switch. The interface address is composed of a two-part number in the format *port-adapter-slot-number/interface-port-number*.

Interfaces on the PA-T3/E3-EC installed in a router maintain the same address regardless of whether other port adapters are installed or removed. However, when you move a port adapter to a different slot, the first number in the interface address changes to reflect the new port adapter slot number.



Note

Interface ports are numbered from left to right starting with 0.

[Table 1-4](#) explains how to identify interface addresses

Table 1-4 Identifying Interface Addresses

| Platform | Interface Address Format | Numbers | Syntax |
|--|--|---|--------|
| Cisco 7200 VXR routers | Port-adapter-slot-number/interface-port-number | Port adapter slot—0 through 6 (depends on the number of slots in the router) ¹ Interface port—0 and 1 | 1/0 |
| Port Adapter Jacket Card with the Cisco 7200 VXR router ² | Port-adapter-slot-number/interface-port-number | Port adapter slot—0 through 7 (depends on the number of slots in the router) ³ Interface port—0 and 1 | 1/0 |

Table 1-4 *Identifying Interface Addresses (continued)*

| Platform | Interface Address Format | Numbers | Syntax |
|--------------------|--|---|--------|
| Cisco 7201 router | Port-adapter-slot-number/interface-port-number | Port adapter slot—always 1 Interface port—0 or 1 | 1/0 |
| Cisco 7301 routers | Port-adapter-slot-number/interface-port-number | Port adapter slot—always 1 Interface port—0 or 1 | 1/0 |

1. Port adapter slot 0 is reserved for the Fast Ethernet port on the I/O controller (if present).
2. Port adapter slot 0 can accept the Port Adapter Jacket Card if an NPE-G1 or NPE-G2 is installed.
3. Port adapter slot 0 is reserved for the Fast Ethernet port on the I/O controller (if present).

In Cisco 7200 VXR routers, port adapter slots are numbered from the lower left to the upper right, beginning with port adapter slot 1 and continuing through port adapter slot 4 for the Cisco 7204VXR, and slot 6 for the Cisco 7206VXR. (Port adapter slot 0 is reserved for the optional Fast Ethernet port on the I/O controller—if present.)

The interface addresses of the interfaces on the PA-2T3/E3-EC in port adapter slot 1 are 1/0 and 1/1 (port adapter slot 1 and interfaces 0 and 1). If the PA-2T3/E3-EC was in port adapter slot 4, these same interfaces would be numbered 4/0 and 4/1 (port adapter slot 4 and interfaces 0 and 1).