



CHAPTER 1

Overview

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

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- [T3 Specifications, page 1-3](#)
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Port Adapter Overview

The PA-MC-2T3-EC is a single-width port adapter that provides two T3 interface connections using BNC connectors. (See [Figure 1-2](#).) The PA-MC-T3-EC provides one T3 interface connection using BNC connectors. (See [Figure 1-1](#).) Hereafter, both versions of this port adapter will be referred to as the PA-MC-TE-EC. A channelized T3 provides 28 T1 lines multiplexed into the T3.

The PA-MC-T3-EC supports the following hardware accelerated features.

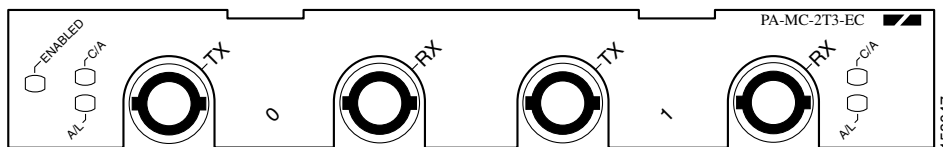
- Multilink PPP (MLPPP)
- Multilink Frame Relay (FRF.16)
- Frame Relay Fragmentation (FRF.12)

For more information on the features, and restrictions, see [Chapter 5, “Configuring the Channelized Mode.”](#)

Figure 1-1 PA-MC-T3-EC—Front Panel



Figure 1-2 PA-MC-2T3-EC—Front Panel



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

- The PA-MC-T3-EC supports channelized operations.
- The PA-MC-T3-EC transmits and receives data bidirectionally at the T3 rate of 44.736 Mbps.
- The PA-MC-T3-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-MC-T3-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-MC-T3-EC microcode is loaded at initialization and is bundled into Cisco IOS software.



Note The PA-MC-T3-EC does not support E1 into channelized T3.

Channelized T3 Overview

In the channelized mode of operation, a PA-MC-T3-EC T3 link is channelized into 28 DS1 data lines in an industry standard multiplexing format.

Each of the T1 lines contains 24 time slots of 64 or 56 kbps each. The T1 lines can support one or more user data channels which appear to the system as serial interfaces. Each serial interface is assigned one or more of the time slots giving the serial interface a bandwidth of $n \times 56$ kbps or $n \times 64$ kbps, where n is the number of time slots assigned. Any unused time slots of the T1 are filled with an idle channel pattern.

The following restrictions apply: A time slot can only be used by one serial interface. A serial interface cannot use time slots from more than one T1 line. Each T3 line can have a maximum of 128 serial interfaces. Unused serial interfaces on one T3 cannot be used by the other T3 line.

The PA-MC-T3-EC supports Cisco High-Level Data Link Control (HDLC), Frame Relay, PPP, and Switched Multimegabit Data Service (SMDS) Data Exchange Interface (DXI) encapsulations over each serial interface.



Note

T1 lines on the PA-MC-T3-EC are numbered 1–28, rather than the more traditional zero-based scheme (0–27) used with other Cisco products. This is to ensure consistency with telco numbering schemes for T1 lines within channelized T3 equipment.

**Note**

The PA-MC-T3-EC does not support the aggregation of multiple T1 lines (called inverse multiplexing or bonding) in hardware for higher bandwidth data rates. MLPPP may be used for this purpose in software.

The T3 section of the PA-MC-T3-EC supports the maintenance data link (MDL) channel when using c-bit parity framing as well as local and network loopbacks. The T1 section of the PA-MC-T3-EC supports facilities data link (FDL) in Extended Superframe (ESF) framing, as well as various loopbacks. Bit error rate (BER) testing is supported on each of the T1 lines, although a test may not be active on more than one T1 line at a time. BER testing may be done over a framed or unframed T1 signal.

Unchannelized T3 Overview

In the unchannelized mode of operation, a T3 link provides a single high speed user data channel, rather than being multiplexed into 28 T1 lines. The data channel 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 standard exists for subdividing the T3 bandwidth, but the PA-MC-T3-EC is compatible with the proprietary formats of five vendors of data service units (DSUs), when used at the far end of the T3 link.

In unchannelized T3 mode, the T3 section sports the maintenance data link (MDL) channel when using c-bit parity framing as well as local and network loopbacks. Bit error rate (BER) testing is supported on the T3 link. The PA-MC-T3-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.

T3 Specifications

The PA-MC-T3-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

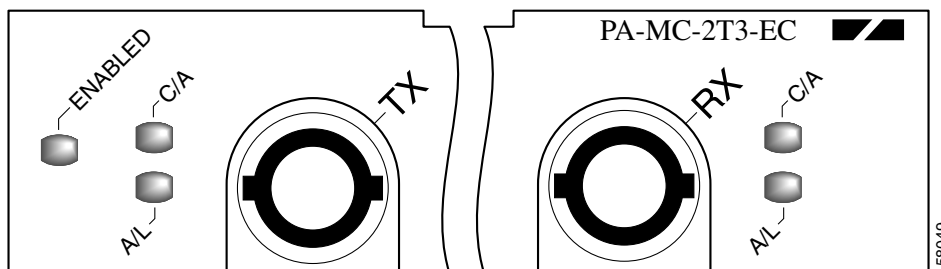
**Note**

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

LEDs

The PA-MC-T3-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-MC-2T3-EC Status LEDs—Partial Horizontal View



LED Label	Color	State	Meaning
ENABLED	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.
	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).

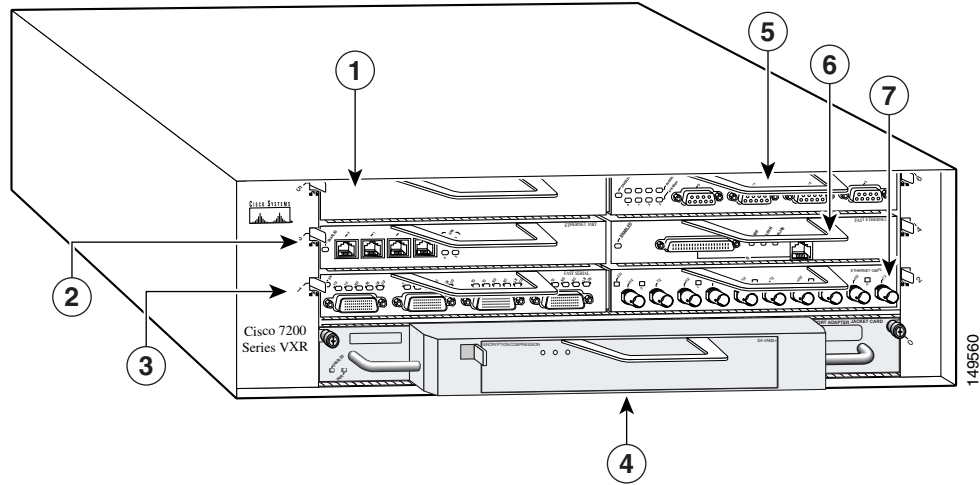
Port Adapter Slot Locations

This section discusses port adapter slot locations on the Cisco 7200 VXR routers.

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-MC-T3-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 Cisco 7206VXR Router with the Port Adapter Jacket Card



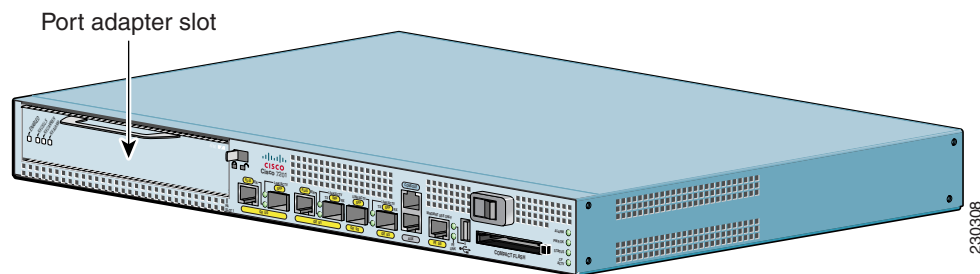
1	Slot 5	5	Slot 6
2	Slot 3	6	Slot 4
3	Slot 1	7	Slot 2
4	Slot 7 for the port adapter slot 0 for the Jacket Card		

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 7204VXR router, or port adapter slot 7 on the Cisco 7206VXR 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.

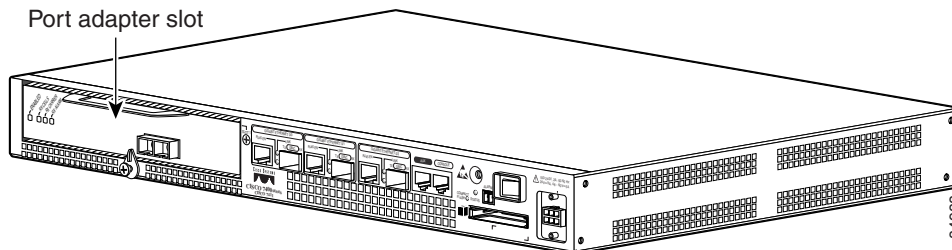
Figure 1-5 Port Adapter Slot in the Cisco 7201 Router



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-MC-T3-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-MC-T3-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 1-2 explains how to identify interface addresses

Table 1-2 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 routers 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
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 2 for the Cisco 7202, slot 4 for the Cisco 7204 and Cisco 7204VXR, and slot 6 for the Cisco 7206 and 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-MC-T3-EC in port adapter slot 1 are 1/0 and 1/1 (port adapter slot 1 and interfaces 0 and 1). If the PA-MC-T3-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).

