Cisco 1- and 2-Port Enhanced Capability Clear Channel Port Adapters

Cisco® 1- and 2-Port Enhanced Capability Clear Channel Port Adapters provide a “two-in-one” portfolio that provides both T3 and E3 trunking capabilities.

Product Overview

The Cisco 1- and 2-Port Enhanced Capability Clear Channel Port Adapters for the Cisco 7200 Series Routers (Cisco 7201 and 7301 Routers) are enhanced two-in-one versions (part numbers PA-T3/E3-EC and PA-2T3/E3-EC) of the earlier Clear Channel T3 and E3 port adapters (part numbers PA- T3+, PA-2T3+, PA-E3, and PA-2E3). These new products assist network implementers by minimizing sparing of both T3 port adapters for the United States and E3 for European and Asian implementations. They provide a new software architecture that allows selecting either T3 or E3 by way of software configuration coupled with a more powerful chipset that lowers CPU usage. The new port adapters lower CPU usage by more than 15 percent (Figure 1).

These new port adapters can perform at line-rate performance with lower CPU usage on the Cisco 7200 Series and Cisco 7201 and Cisco 7301 platforms while providing scalable trunking services. Table 1 lists the router platforms and Cisco IOS® Software releases that support these features.

Table 1. Features Table

Feature	Supporting Platform	Cisco IOS Software Release
Line-rate performance: Up to 34.368 Mbps per E3 port	Cisco 7204VXR and 7206VXR NPE-400, NPE-G1, and NPE-G2 Network Processing Engines, Cisco 7201, and Cisco 7301	12.4(15)T1
Line-rate performance: Up to 44.736 Mbps per T3 port	Cisco 7204VXR, Cisco 7206VXR, Cisco 7201, and Cisco 7301	12.4(15)T1
Lower CPU usage	Cisco 7204VXR, Cisco 7206VXR, Cisco 7201, and Cisco 7301	12.4(15)T1

Figure 1. Cisco 1- and 2-Port Enhanced Capability Clear Channel Port Adapters

Applications

The two-in-one capability of the Cisco 1- and 2-Port Enhanced Capability Clear Channel Port Adapters provides easier sparing and provisioning of new T3 or E3 high-capacity corporate backbones, high-speed access to the global Internet, and trunking connections for service provider internetworking. With integrated DS-1 channel service unit/data service unit (CSU/DSU) functions, the port adapters are compatible with the large number of standards-compliant DS-1 CSU/DSUs on the market. As with the existing packet-over-T3 or E3 port adapters, each T3 or E3 interface can be configured for full-rate or subrate operation that is compatible with a variety of third-party T3 or E3 DSU vendors such as Digital Link, ADC/Kentrox, Larscom, Adtran, and Verilink.

Key Features and Benefits

Table 2 describes the features and benefits of the new port adapters.

Table 2. Features and Benefits of the Cisco 1- and 2-Port Enhanced Capability Clear Channel Port Adapters

Features	Benefits
Operation Modes	
Clear Channel T3 or E3 (unchannelized)	One product provides unchannelized 45-Mbps T3 or 34-Mbps E3 Clear Channel per interface.
Performance[1]	
Line rate	Provides full T3 or E3 line use and throughput
New intelligent software architecture	Lower CPU use increases router efficiency and improves resource usage, enabling more services: • HDLC encapsulation—Fifteen percent less CPU use for NPE-G1 and NPE-G2 • Frame Relay encapsulation—Ten percent less CPU use for NPE-G1 and 14 percent less for NPE-G2 • Point-to-Point Protocol (PPP) encapsulation—Eleven percent less CPU use for NPE-G1 and 13 percent less for NPE-G2

The new port adapters also include the following characteristics:

- One or 2 DS-3 (T3) or E3 lines
- Asynchronous bit serial PPP/High-Level Data Link Control (HDLC) delineation per RFC 1662 on all channels
- Maximum transmission unit (MTU) size: 9000
- Receive and transmit statistics for runts, giants, cyclic redundancy check (CRC) errors, and frame-type counts
- Support for the following serial encapsulation protocols:
  - Frame Relay
  - PPP
  - HDLC

DS-3 Features

- Unchannelized DS-3 supporting subrate and scrambling formats for:
  - Digital Link DL3100
  - ADC/Kentrox DataSMART T3 IDSU

[1] Performance constrained only by processing engine

    - Larscom Access-T45
    - Adtran T3SU 300
    - Verilink DLS2100 HDM2182DSUs
- Full duplex and connectivity at DS-3 rate (44.736 Mbps per port)
- DSX-3 level interface with dual female 75-ohm BNC coaxial connectors per port (separate RX and TX)
- Bipolar three zero substitution (B3ZS) line coding
- C-bit parity and M23 framing
- Internal or network clock selectable per DS-3
- Bit error rate test (BERT) pattern generation and detection per DS-3
- T3 local and line loopback
- Generation and termination of DS-3 Maintenance Data Link (MDL) in C-bit framing
- RFC 1407 MIB support

E3 Features

- Unchannelized E3 supporting subrate and scrambling formats for:
    - Digital Link DL3100
    - ADC/Kentrox DataSMART T3 IDSU
    - Larscom Access-T45
    - Adtran T3SU 300
    - Verilink DLS2100 HDM2182DSUs
- Full duplex and connectivity at E3 rate (34.368 Mbps per port)
- DSX-3 level interface with dual female 75-ohm BNC coaxial connectors per port (separate RX and TX)
- B3ZS line coding
- C-bit parity and M23 framing
- Internal or network clock selectable per T3 or E3
- BERT pattern generation and detection per T3 or E3
- E3 local and line loopback
- Generation and termination of E3 MDL in C-bit framing
- RFC 1407 MIB support

Miscellaneous Features

- Faceplate LEDs for port adapter status
    - PA Ready
    - Port status
    - Active/Loopback status
    - Carrier/Alarm status
- Compliant with DS-3 pulse mask per ANSI T1.102-1993
- Compliant with ANSI T1.102-1993, ANSI T1.404-59, ANSI T1.404-5.10, ANSI T1.404-5.12-14, and Telcordia GR-499

- ANSI T1.404
- ANSI T1.107
- ANSI T1.231-1997
- ANSI T1.107 Far-end Alarm and Control Signals (FEAC)
- ANSI T1.404 MDL
- ANSI FDL
- AT&T FDL

Feature Availability

Table 3 lists the router platforms, processors, and software releases that support the new two-in-one Cisco 1- and 2-Port Enhanced Capability Clear Channel Port Adapters.

Table 3. Feature Availability

Feature	Supporting Platforms	Network Processing Engines	Cisco IOS Software Release
Cisco Enhanced Capability Port Adapters	Cisco 7204VXR, Cisco 7206VXR, Cisco 7201, Cisco 7301, and Cisco Port Adapter Jacket Card	NPE-400, NPE-G1, and NPE-G2	12.4(15)T1

Product Architecture

The port adapters support new algorithms for managing data. On the transmit side, they can either pull packets out of memory (Pull Model) or wait until the main processor pushes the packets to the port adapter (Push Model) for transmission. The Push Model—the most efficient algorithm—is activated only when the port adapters are installed on a Cisco 7204VXR, Cisco 7206VXR, Cisco 7201, or Cisco 7301 platform with the NPE-400, NPE-G1, and NPE-G2 network processing engines. Additionally, they are two-in-one because they can be software-selectable to operate in either T3 or E3 modes.

Chassis and Processors

The Cisco 1- and 2-Port Enhanced Capability Clear Channel Port Adapters are supported on the platforms and processors listed in Table 4.

Table 4. Chassis and Processor Compatibility

Chassis	Processors and Cisco IOS Software Release	Total Number of Port Adapters Supported per Chassis (not line rate)
Cisco 7204VXR and 7206VXR	• NPE-G1-12.4(15)T1 • NPE-G2-12.4(15)T1 • NPE-400-12.4(15)T1	• 6 plus 1 in the jacket card • 6 plus 1 in the jacket card • 6 total
Cisco 7201	12.4(15)T1	1 (1 dual- or 1 single-port adapter)
Cisco 7301	12.4(15)T1	1 (1 dual- or 1 single-port adapter)
Cisco Port Adapter Jacket Card	12.4(15)T1	1 (1 dual- or 1 single-port adapter)

Product Specifications

Table 5. Product Specifications

Product	Specifications
Physical	• Dimensions (H x W x D): Approximately 1 x 6 5/8 x 7 inches (2.5 x 16.8 x 17.8 cm) overall • Approximate weight: 2.5 lb (1.13 KG)
Environmental	• Storage temperature: –38 to 150°F (–40 to 70°C) • Operating temperature, nominal: 77°F (25°C), ranges 0 to 40°C (32 to 104°F) • Storage relative humidity: 5 to 95 percent relative humidity (RH) noncondensing • Operating humidity, nominal: 5 to 85 percent RH noncondensing • Operating humidity, short-term: 5 to 90 percent RH noncondensing • Operating altitude: –60 to 2000 meters
Regulatory Compliance	CE Marking
Safety	• CFR 47, Part 15 Class A • ICES 003 Class A • UL 60950-1 • IEC 60950-1 • EN 60950-1 • CAN/CSA-C22.2 No. 60950-1 • AS/NZS 60950.1
Emissions Requirements	• CFR 47, Part 15 Class A • ICES 003 Class A • CISPR 22 Class A • EN 55022 Class A • EN 300386:2001 • EN 61000-3-2:2000 • EN 61000-3-3:2000 • AS/NZS CISPR 22 Class A • VCCI: V-3/2000.04 Class A
Immunity Requirements	• EN 50082-1 • EN 55024 • EN300 386 • EN61000-6-1 The port adapters meet the following specifications as defined in the reference standards given previously. The approval levels are those required by each country where the product is marketed, sold, and used as detailed by the approval levels of the host system and relevant standards. Investigations will be made against the Cisco quality levels for informational purposes as a measure of system quality. The quality levels are defined as follows: • EN 61000-4-2 ESD 8kV/15kV • EN 61000-4-3 Radiated Immunity 10V/m • EN 61000-4-4 EFT AC 4kV • EN 61000-4-4 EFT DC 4kV • EN 61000-4-4 EFT Sign. Line 1kV/2kV • EN 61000-4-5 Surge AC L-E 4kV • EN 61000-4-5 Surge AC L-L 2kV • EN 61000-4-5 Surge DC 1kV • EN 61000-4-5 Surge Sign. Line 500 V • EN 61000-4-6 RF conducted immunity 10V • EN 61000-4-8 Immunity to magnetic fields 30A • EN 61000-4-11 Voltage dips and interruptions AC Line

Ordering Information

To place an order, visit the Cisco Ordering Home Page and refer to Table 6.

Table 6. Ordering Information

Product Name	Part Number
Cisco 1-Port Enhanced Capability Clear Channel Port Adapter	PA-T3/E3-EC
Cisco 1-Port Enhanced Capability Clear Channel Port Adapter (SPARE)	PA-T3/E3-EC=
Cisco 2-Port Enhanced Capability Clear Channel Port Adapter	PA-2T3/E3-EC
Cisco 2-Port Enhanced Capability Clear Channel Port Adapter (SPARE)	PA-2T3/E3-EC=

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For More Information

For more information about the Cisco 1- and 2-Port Enhanced Capability Clear Channel Port Adapters, contact your local Cisco account representative.

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Europe Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: +31 0 800 020 0791
Fax: +31 0 20 357 1100

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Printed in USA C78-418336-01 7/07

