

## Enhanced Digital Voice Port Adapter for the Cisco 7200 Series

The Cisco® Enhanced Digital Voice Port Adapter (PA-VXC-2TE1+) for the Cisco 7200 Series Router provides high-capacity voice, termination to private branch exchanges (PBXs), and the public switched telephone network (PSTN) for central-site and large-branch office packet-voice applications.

The enhanced digital voice port adapter product line includes the Cisco 2-Port T1, E1 High-Capacity Enhanced Digital Voice Port Adapter (PA-VXC-2TE1+). Supported on the Cisco 7200 Series Router, the port adapter offers industry-leading features and performance (Figure 1).

**Figure 1.** Cisco 2-Port T1 and E1 High-Capacity Enhanced Digital Voice Port Adapter and Cisco 7206VXR Router



The enhanced digital voice port adapter is a highly integrated solution offering voice-channel density and application flexibility. The single-width port adapter incorporates two universal ports that can be configured for either T1 or E1 connection with high-performance digital signal processors (DSP) that support up to 120 channels of compressed voice (refer to Table 1 for number of channels supported by the port adapter). Integrated channel service units/digital service units (CSUs/DSUs) echo cancellation and DS-0 drop-and-insert functions eliminate the need for external line-termination devices and multiplexers, simplifying network design and management.

The enhanced digital voice port adapter offers an end-to-end interoperable voice-over-IP (VoIP) solution. Powerful voice management on the Cisco 7200 Series Router is offered through the CiscoWorks Voice Manager 2.0 Web-based user interface for provisioning, configuration, and monitoring functions. Device-level network management is also available using the Cisco Element Management Framework (EMF)-based Element Management System (EMS). End-to-end network management and fault, configuration, accounting, provisioning, and security (FCAPS) are available using Cisco Info Center, Cisco Provisioning Center (CPC), and third-party FCAPS products.

The enhanced digital-voice port adapter provides a solution for several common applications, including toll bypass, Cisco Unified Communications products, voice over packet (IP, ATM, or Frame Relay), managed customer premises equipment (CPE), and fax gateway services.

## Specifications

Voice-channel support follows:

- Medium complexity; ITU-T codecs supported: G.729a/b, G.726, and G.711
- High complexity; ITU-T codecs supported: G.729, G.729b, G.723.1, G.723.1a, and G.728
- Global System for Mobile Communications (GSM) and Enhanced Full Rate (EFR)
- Fax Relay (Group 3 up to 14.4 kbps)

Table 1 summarizes the number of calls supported on the voice port adapter.

**Table 1.** Number of Channels Supported on Enhanced Digital Voice Port Adapters

Product	Number of High-Complexity Channels	Number of Medium-Complexity Channels	GSM and EFR	Group 3 Fax
PA-VXC-2TE1+	60	120	60	120

## Voice Standards Support

- FRF.11 voice over Frame Relay (VoFR)
- Voice over ATM (VoAAL2 available now on the Cisco 7200 Series Routers from Cisco IOS® Software Release 12.2(2)T, and voice over AAL5 (VoAAL5) and Circuit Emulation Services (CES) available on the Cisco 7200 Series Router)
- H.323 Version 2 voice over IP (VoIP), including Reliability, Availability, and Serviceability (RAS), Fast Connect, and codec negotiation
- H.323v2 and Media Gateway Control Protocol (MGCP) 0.1 call-control protocols

## DSP Features

- Fax Relay: T.30 fax protocol with relay, V.17, V.29, and V.27
- Echo cancellation: 32-ms meeting G.165
- Dual tone multifrequency (DTMF)/R2/MF/SF/CP tone detection and generation
- Dial-pulse detection and generation
- Energy-based voice activity detection (VAD) and codec-specific VAD
- Comfort-noise generator

## Signaling Supported

- E1 channel associated signaling (CAS) and T1 CAS (robbed-bit signaling)
- E1 R2
- Primary Rate Interface (PRI) user and network side
- Transparent Common Channel Signaling (CCS)
- Q.SIG
- FG-D
- Multi-D Channel

## Port Configured as T1 Features

- DS-1 100-ohm interfaces with RJ-48c connectors
- D4 Super Frame (SF) and Extended super Frame (ESF) framing

- Alternate mark inversion (AMI) or binary 8-zero substitution (B8ZS) line encoding
- Full facility-data-link (FDL) support and FDL performance monitoring per ANSI T1.403 or AT&T TR 54016
- Selectable DSX-1 cable length in increments from 0 to 655 feet
- Selectable DS-1 CSU line build-out: 0, -7.5, -15, and -22.5 dB
- Selectable DS-1 CSU receiver gain: 26 or 36 dB
- DS-1 line protection per UL1459/1950, FCC part 68
- Full support for DSX-1 MIB, RFC 1406, including alarm detection and reporting
- DSX-1 MIB remote access supported
- DS-0 Drop and Insert

#### **Port Configured as E1 Features**

- E1 120-ohm (G.703) with RJ-48c connectors
- Software-configurable E1 national bits
- High-density bipolar 3 (HDB3), AMI encoding
- CRC4 and non-CRC4 framing
- Full support for E1 MIB, RFC 1406, including alarm detection and reporting
- DS-0 Drop and Insert

#### **Full Bit-error, Rate-testing Capabilities on Each E1/T1**

- Programmable pseudo-random pattern up to 24 bits in length, including 211-1, 215-1, and 220-1
- 220-1 Quasi-Random Signal Sequence (QRSS), 233-1, all zeros, all ones, and alternating ones and zeros
- 32-bit-error count registers

#### **Supported Loopbacks**

- Line loopback: T1/E1 stream is looped back at the line interface unit (LIU) toward the network.
- Payload loopback: T1/E1 data stream is looped back at the framer toward the network.
- Diagnostic local loopback: T1/E1 data stream is looped back at the framer toward the system.
- Remote loopback: T1 stream is looped back at the LIU toward the network upon request from the far-end through FDL.

#### **Network Management Support**

- Cisco EMF-based element management system (EMS)
- Simple Network Management Protocol (SNMP) protocol-compliant
- Manageable through a MIB browser
- Cisco Information Center for alarm and event management
- Cisco netManager Unified Communications supported
- Netsys

## Country Support

- Approved in most countries
- Software-configurable ring cadence and call progress tones

## Ordering Information

For ordering information, refer to Table 2.

**Table 2.** Ordering Information

Part Number	Description
PA-VXC-2TE1+	Two-Port T1/E1 High-Capacity Enhanced Digital Voice Port Adapter
PA-VXC-2TE1+=	Two-Port T1/E1 High-Capacity Enhanced Digital Voice Port Adapter

## Cisco IOS Software Support

The high-capacity, enhanced digital-voice port adapter is supported in all Cisco IOS Software feature sets, except the Base IP image, starting in the 12.1(2)T and 12.1(3)T releases. The port adapter will continue to be supported in Cisco IOS Software Release 12.4(15)T. There is no support for the digital-voice port adapter in Cisco IOS Software Release 12.4(20)T and later.

Table 3 shows platform and voice signaling support by Cisco IOS Software release for the enhanced digital voice port adapters.

**Table 3.** Platform and Voice Signaling Support by Cisco IOS Software

Signaling	Cisco 7200
T1 CAS, E1 CAS, Q.SIG, PRI Q.931 user and network, R2, T-CCS, and Multi-D Channel	12.1(3)T
Feature D	12.1(5)T
RAI	12.2(4)T
MGCP	12.2(2)T
PA-VXC-2TE1+	12.1(3)T



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