Cisco 2-Port and 4-Port Channelized T3 (DS-0) Shared Port Adapters

The Cisco® I-Flex approach combines shared port adapters (SPAs) and SPA interface processors (SIPs), providing an extensible design that enables service prioritization for data, voice, and video services. Enterprise and service provider customers can take advantage of improved slot economics resulting from modular port adapters that are interchangeable across Cisco routing platforms. The I-Flex design maximizes connectivity options and offers superior service intelligence through programmable interface processors that deliver line-rate performance. I-Flex enhances speed-to-service revenue and provides a rich set of quality of service (QoS) features for premium service delivery while effectively reducing the overall cost of ownership. This data sheet contains the specifications for the Cisco 4-Port and 2-Port Channelized T3 (DS-0) Shared Port Adapters (Cisco Channelized T3 SPAs; refer to Figure 1).

Figure 1. Cisco 4-Port and 2-Port Channelized T3 SPAs

Product Overview

The combination of channelized and clear channel T3 functions makes the Cisco 2- and 4-Port Channelized T3 SPAs ideal for today's rapidly changing WAN environment. As an integral part of a service node where customer bandwidth needs are uncertain, the Cisco Channelized T3 SPA allows service providers to avoid determining beforehand how ports will be allocated between DS-0, DS-1, and DS-3 connections. For enterprise remote-site connection, the flexibility to support DS-0, DS-1, and DS-3 connections means this SPA reduces equipment expenditures by integrating the capabilities and services of numerous port adapters onto a single SPA. It also provides investment protection by growing with the enterprise to meet the needs of today's DS-0 and DS-1 aggregation networks and tomorrow's T3 aggregation networks.

The Cisco Channelized T3 SPA is available in 2- and 4-port options. The ports can be independently configured as clear channel T3, channelized T3 -> T1, N x T1, full-rate T1, channelized T1, fractional T1, or DS-0 connections. When configured as clear channel T3 ports, connections to DS-3 and subrate DS-3 services can be provisioned. When configured as channelized T3 ports, up to 112 T1 links or up to 1023 N x DS-0 channels can be supported,

making the Cisco Channelized T3 SPA a highly flexible interface for WAN provisioning. With integrated data-service-unit (DSU) functions on a per-port basis, the Cisco Channelized T3 SPA is compatible with the large number of standards-compliant DSUs on the market.

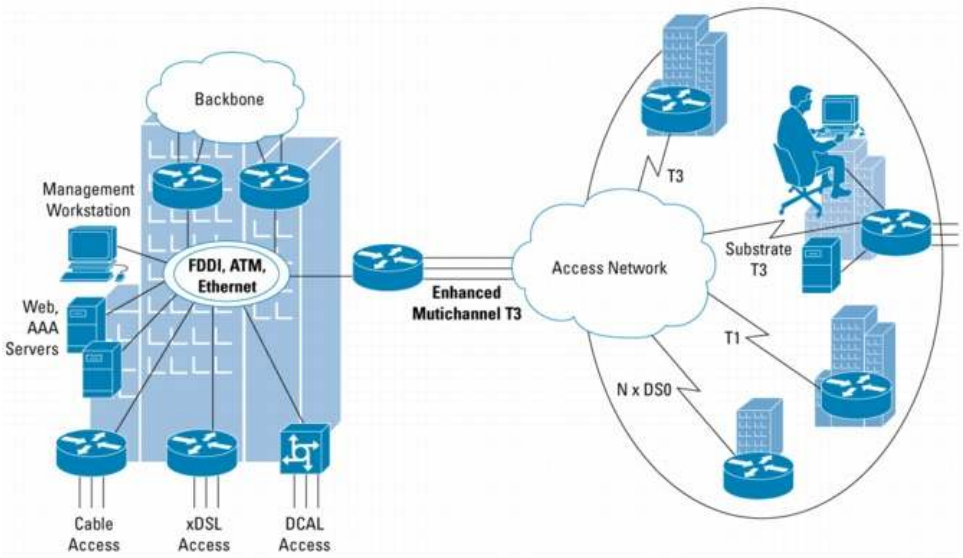
Multilink Point-to-Point Protocol (MLPPP) is supported (in hardware) to enable link aggregation exceeding T1 capacity. Up to 12 individual T1s can be combined within a multilink bundle that appears to be a single IP link. This enables service providers to provision greater-than-T1 bandwidth incrementally, without requiring migration of the circuit and customer premises equipment (CPE) infrastructure to T3 facilities.

The Cisco Channelized T3 SPA is hot-swappable and supports service-transparent online insertion and removal (OIR), allowing removal of the SPA without impacting the interface processor and other SPAs.

Applications

The Cisco Channelized T3 SPA meets a variety of service interconnect requirements, including concurrent support for leased line and Frame Relay (refer to Figure 2). Enterprises and service providers can connect the SPA into these services for aggregation of large numbers of remote-site and Internet service provider (ISP) customers into a central site.

Figure 2. Leased Line and Frame Relay Aggregation



Features and Benefits

The Cisco Channelized T3 SPA offers many advantages, including:

- 2- and 4-port options
- Support for clear channel T3, channelized T3 to T1, n x T1, full-rate T1, channelized T1, fractional T1, or DS-0 connections
- Up to 4 T3 ports, 112 T1 ports, or 1024 n x DS-0 channels
- Integrated DSUs
- Support for all major encapsulations, including MLPPP and multilink Frame Relay (MLFR)
- Support for link fragmentation and interleaving (LFI) over Frame Relay (FRF.12) and MLPPP

The Cisco SPA/SIP portfolio offers the following additional advantages:

- Highly modular, flexible, intelligent interface processors
  - Superior flexibility, supporting a combination of interface types on the same interface processor for consistent services, independent of access technology
  - Pioneering programmable interface processors that provide flexibility for the service diversity required in next-generation networks
  - Innovative design that supports intelligent service delivery without compromising on performance
- Increased speed to service revenue
  - The scalable, programmable Cisco architecture extended to 10 Gbps dramatically improves customer density, increasing potential revenue per platform.
  - Interface breadth (copper, channelized, POS, ATM, and Ethernet) on a modular interface processor allows service providers to roll out new services more quickly, helping ensure that all customers large and small receive consistent, secure, and guaranteed services.
  - High-density Small Form-Factor Pluggable (SFP) interfaces are featured for high-port-count applications with reach flexibility. Future optical technology improvements can be adopted using existing SPAs.
- Dramatically improved return on your routing investment
  - Improved slot economics and increased density reduce capital expenditures (CapEx).
  - The ability to easily add new interfaces as they are needed enables a "pay-as-you-grow" business model.
  - SPAs are shared across multiple platforms, and can be easily moved from one to another, providing consistent feature support, accelerated product delivery, and a significant reduction in operating expenses (OpEx) through common sparing as service needs change.

Product Specifications

Table 1 gives specifications of the Cisco Channelized T3 SPAs.

Table 1. Product Specifications

Features	Descriptions
Product Compatibility	• Cisco 7304 Router • Cisco Catalyst 6500 Series Switches • Cisco 7600 Series Routers • Cisco 12000 Series Routers • Cisco XR 12000 Series Routers • Cisco ASR 1000 Series Router • Cisco ASR 9000 Series Router (4 Port Only)
Port Density per SPA	2- and 4-port options
Physical Interface	• 1.0/2.3 RF connectors (75-ohm impedance) • 1.0/2.3 RF-to-BNC adapter cable option

Features	Descriptions
Protocols	Serial encapsulations: High-Level Data Link Control (HDLC) Point-to-Point Protocol (PPP), RFC 1662 Frame Relay, RFC 1490 Multilink support (bundle limit dependent on number of links per bundle; maximum 12 T1 links per bundle) MLPPP, RFC 1990 MLFR, FRF.16 LFI over Frame Relay (FRF.12) and MLPPP
Features and Functions	Up to 4 T3 ports • Up to 112 T1 ports (28 T1 multiplexed onto a single T3) • Up to 1024 n x DS-0 channels (where n is 1 to 24) with no T3 configured • Up to 400 n x DS-0 channels (where n is 1 to 24) with one or more T3 configured • Full-rate (clear channel) T3, channelized T3 to T1, full-rate T1, channelized T1, and fractional T1 supported • Integrated DSUs • Internal or line-derived (loop) clocking selectable on each T3 or T1 • Loopback capabilities: ◦ Local and remote loopback at the T3 and T1 levels ◦ Response to embedded loopback commands ◦ Insertion of loopback commands into transmitted signal • Bit-error-rate-testing (BERT) pattern generation and detection per channel ◦ Programmable pseudorandom pattern up to 32 bits long • T3: all 0's, all 1's, 215, 220, 220 Quasi-Random Signal Sequence (QRSS), 223, alternating 0's and 1's, 1-in-8, and 3-in-24 • T1: all 0's, all 1's, 211, 215, 220, 220 QRSS, 223, alternating 0's and 1's, 1-in-8, and 3-in-24 ◦ 32-bit error-count and bit-count registers ◦ Fully independent transmit and receive sections ◦ Detection of test patterns with bit error rates up to 10-2 • 24-hour history maintained for error statistics and failure counts, at 15-minute intervals • 16- and 32-bit cyclic redundancy check (CRC); 16-bit default
T1-Specific Features	Full-duplex connectivity at T1 rate (1.536 MHz) • D4 Super Frame (SF) or Extended Super Frame (ESF) framing • ANSI T1.403 and AT&T TR 54016 Facility Data Link (FDL) support • Alarm monitoring: ◦ Alarm indication signal (AIS) ◦ Out of frame (OOF) ◦ Far-end alarm failure (yellow or distant alarm) • Performance data collection: ◦ CRC and bit errors ◦ Framing bit errors (FERR) ◦ Line errored seconds ◦ Far-end errored seconds ◦ Far-end severely errored seconds ◦ Far-end unavailable seconds

Features	Descriptions
T3-Specific Features:	Full-duplex connectivity at T3 rate (44.736 MHz) • C-Bit or M23 framing • Subrate and scrambling support of Quick Eagle Networks (formerly Digital Link), Larscom, ADC Kentrox, Adtran, and Verilink DSUs • Binary 3-zero substitution (B3ZS) line coding • Maintenance data link (MDL) • T3 far-end alarm and control (FEAC) channel support • Line build-out up to 450 ft (135m) • Alarm monitoring: ◦ Alarm indication signal (AIS) ◦ Out of frame (OOF) ◦ Loss of signal (LOS) ◦ Far-end receive failure (FERF) • Performance data collection: ◦ Line coding violation (LCV) ◦ Framing bit errors (FERR) (F- or M-bit errors) ◦ P-bit error counts (path-parity errors) ◦ C-bit error counts ◦ Far-end block error (FEBE) counts

Features	Descriptions
Reliability and Availability	• OIR • Single SPA software reset
MIBs	• RFC 2495 MIB (DS-1/E1 MIB) • RFC 2496 MIB (DS-3 MIB)
Network Management	Simple Network Management Protocol (SNMP)
Physical Specifications	• Weight: 0.75 lb (0.34 kg) • Height: 0.8 in. (2.03 cm) (single height) • Width: 6.75 in. (17.15 cm) • Depth: 7.28 in. (18.49 cm)
Power	• 2-port: 11.3W maximum • 4-port: 13.2W maximum
Environmental Specifications	• Operating temperature: 41 to 104℉ (5 to 40℃) • Storage temperature: –38 to 150℉ (–40 to 70℃) • Operating humidity: 5 to 85% relative humidity • Storage humidity: 5 to 95% relative humidity
Compliance and Agency Approvals	CE Marking Safety • UL 60950 • CSA 22.2 No.60950 • IEC 60950 • EN 60950 • AS/NZS 3260 • TS001 EMC • CFR47 Part 15 • ICES 003 • EN55022 • CISPR 22 • AS/NZ 3548 • VCCI • EN55024 • EN50082-1 • EN61000-6-1 Telecom (T3) • ANSI T1 107 • T1 404 • AT&T 54014 • ANSI T1.231 Telecom (T1) • ANSI T1.403 • AT&T 54016

Ordering Information

To place an order, visit the Cisco Ordering Home Page or refer to Table 2.

Table 2. Ordering Information

Product Name	Part Number
Cisco 2-Port Channelized T3 (DS0) Shared Port Adapter	SPA-2XCT3/DS0
Cisco 4-Port Channelized T3 (DS0) Shared Port Adapter	SPA-4XCT3/DS0
T3 or E3 Cable, 1.0/2.3 RF to BNC-Female, 10 Feet	CAB-T3E3-RF-BNC-F
T3 or E3 Cable, 1.0/2.3 RF to BNC-Male, 10 Feet	CAB-T3E3-RF-BNC-M
T3 or E3 Cable, 1.0/2.3 RF to Open End, 25 Feet	CAB-T3E3-RF-OPEN

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For More Information

For more information about the Cisco SPA/SIP portfolio, visit http://www.cisco.com/go/spa or contact your local Cisco account representative.

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