Data Sheet

Cisco 2-Port, 4-Port, and 8-Port OC-12c/STM-4 Packet over SONET Shared Port Adapters

The Cisco® I-Flex design combines shared port adapters (SPAs) and SPA interface processors (SIPs), using an extensible design that enables service prioritization for voice, video, and data services. Enterprise and service provider customers can use the 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, which 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 2/4/8-Port OC-12c/STM-4 Packet over SONET SPAs (Cisco 2/4/8-Port OC-12 PoS SPAs; refer to Figure 1).

Figure 1. Cisco 2/4/8-Port OC-12 POS SPAs with SFP Optics

PRODUCT OVERVIEW

The Cisco 2/4/8-Port OC-12 POS SPAs are available on high-end Cisco Systems® routing platforms offering the benefits of network scalability with lower initial costs and ease of upgrades. The Cisco SPA/SIP portfolio continues the Cisco focus on investment protection along with consistent feature support, broad interface availability, and the latest technology. The Cisco SPA/SIP portfolio allows different interfaces (Packet over SONET/SDH [POS], ATM, Ethernet, and so on) to be deployed on the same interface processor.

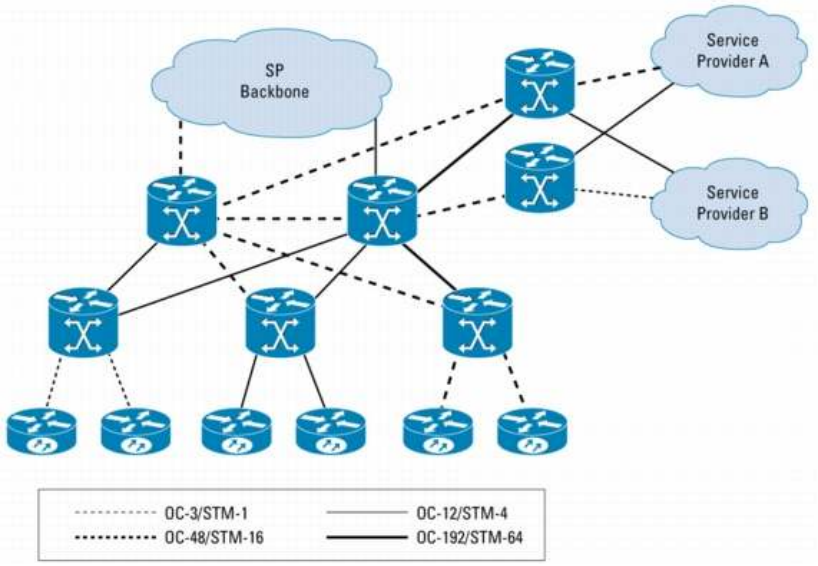
A key feature of these SPAs is the multirate operating mode support. This allows ports to be configured at OC-3 or OC-12 speeds. This gives the flexibility to configure some ports to run at OC-3 speeds, while the rest can run at OC-12 speeds. This requires different optics for different modes. The Cisco 2/4/8-Port OC-12 POS SPAs provide support for Small Form-Factor Pluggable (SFP) interfaces. SFP modules are available in multiple optical reaches from 2 to 80 km.

APPLICATIONS

Cisco 2/4/8-Port OC-12 POS SPAs can be used in multiple applications (Figure 2), including:

- Access and aggregation
- WAN uplinks
- Internet peering

Figure 2. Cisco 2/4/8-Port OC-12 POS SPA Applications



PRIMARY FEATURES AND BENEFITS

The Cisco SPA/SIP portfolio offers many advantages, including:

- Industry's most modular, flexible, intelligent interface processors:
  - Flexibility, providing mix and match 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 provides intelligent delivery of services without compromising on performance.
- Increases speed to service revenue:
  - The future-proof programmable Cisco architecture extended to 10 gigabits per second 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 more quickly roll out new services, helping ensure that all customers large and small receive consistent, secure, and guaranteed services.
  - High-density SFP interfaces are featured for high-port-count applications with reach flexibility. Future optical technology improvements can be adopted using existing SPAs.
- Dramatically improves the financials of your routing purchase:
  - 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 while still offering a high-density solution.
  - 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 for the Cisco 2/4/8-Port OC-12 POS SPAs.

Table 1. Product Specifications for the Cisco 2/4/8-Port OC-12 POS SPAs

Feature	Description
Product compatibility	• Cisco 12000 Routers (2/4/8-port OC-12c) • Cisco CRS-1 Series Routers (8-port OC-12c)
Port density per SPA	• 2 ports • 4 ports • 8 ports
Physical interface	• OC-12c/STM-4 SFP optics module (refer to optical parameters in Table 2) • OC-3c/STM-1 SFP optics module (refer to optical parameters in Table 2) • Visual status indicators (LEDs): - SPA status LED - Per-port LEDs - Carrier and alarm - Active and loopback
Protocols	• RFC 1662 PPP in High-Level Data Link Control (HDLC)-like framing • RFC 2615 Point-to-Point Protocol (PPP) over SONET/SDH • RFC 2427, Multiprotocol Interconnect over Frame Relay • IPv4/IPv6
Features and functions	• Multirate mode support (OC-3 and OC-12) • Synchronization - Local (internal) or loop timed (recovered from network) - Pointer activity monitoring • Local (diagnostic) and line (network) loopback • Payload mapping - POS with 1 + X^43 self-synchronous scrambler • SONET/SDH compliance - Telcordia (Bellcore) GR-253-CORE (as applicable) - ANSI T1.105, T1.231 - ITU-T G.707, G.957, G.825 (as applicable) • Supported SONET/SDH alarm and signal events - Signal failure bit error rate (SF-ber) - Signal degrade bit error rate (SD-ber) - Signal label payload construction (C2) - Path trace byte (J1) - Section - Loss of signal (LoS) - Loss of frame (LoF) - Error counts for B1 - Threshold crossing alarms (TCA) for B1 - Line - Line alarm indication signal (LAIS) - Line remote defect indication (LRDI) - Line remote error indication (LREI) - Error counts for B2 - TCA for B2 - Path - Path alarm indication signal (PAIS) - Path remote defect indication (PRDI) - Path remote error indication (PREI) - Error counts for B3 - TCA for B3 - Loss of pointer (LoP) - Positive stuffing event (PSE) - Negative stuffing event (NSE) - Path unequipped indication signal (PUNEQ) - Path payload mismatch indication signal (PPLM)
Network management	• RFC 2558 MIB (SONET/SDH) • Simple Network Management Protocol (SNMP)

Reliability and availability	• Online insertion and removal (OIR) • Field-replaceable SFP optical modules • 1+1 SONET Automatic Protection Switching (APS) and SDH Linear Multiplexer Section Protection (MSP) protocols • Single SPA software reset
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	• 8xOC-12 max w/o optics = 10.0W • 4xOC-12 max w/o optics = 7.0W • 2xOC-12 max w/o optics = 6.0W
Environmental specifications	• Operating temperature: 41 to 104°F (5 to 40°C) • Storage temperature: –38 to 150°F (–40 to 70°C) • Operating humidity: 5 to 85% relative humidity • Storage humidity: 5 to 95% relative humidity
Compliance and agency approvals	**Safety** • UL 60950 • CSA 22.2-No.60950 • EN60950 • IEC 60950 CB Scheme • ACA TS001 • AS/NZS 3260 • EN60825\IEC60825 laser safety (SR, IR-Class 1) (VSR-Class 1M)1 • 21CFR1040 -FDA Code of Federal Regulations (USA) laser safety (SR, IR-Class 1) (VSR-Class 1M)1 **EMC** • FCC Part 15 (CFR 47) • ICES 003 • EN55022 • CISPR 22 • AS/NZS CISPR22 • VCCI Class A • EN55024 • EN50082-1 • EN61000-6-1 • EN61000-3-2 • EN61000-3-3 **Network Equipment Building System (NEBS)** This product is designed to meet the following requirements (official qualification may be in progress): • SR-3580—NEBS: Criteria levels (Level 3 compliant) • GR-63-Core—NEBS: Physical protection • GR-1089-Core—NEBS: EMC and safety **ETSI** • EN300 386/EN300 386-2 Class B • ETS 300 019 Storage Class 1.1 • ETS 300 019 Transportation Class 2.3 • ETS 300 019 Stationary Use Class 3.1

Table 2 gives optical specifications for the Cisco 1-Port OC-12 POS SPA.

Table 2. Optical Specifications for the OC-12c/STM-4, OC-3c/STM-1 POS SPA

SFP Optics	Maximum Distance
Multimode (MM)	Up to 0.25 mi (500m)
Single-mode (SM)	Up to 1.2 mi (2 km)
SM intermediate reach (IR-1)	Up to 9 mi (15 km)
SM long reach (LR-1)	Up to 25 mi (40 km)
SM extended reach (LR-2)	Up to 50 mi (80 km)

ORDERING INFORMATION

To place an order, visit the Cisco Ordering Homepage or refer to Table 3.

Table 3. Ordering Information

Product Name	Part Number
Cisco 2-Port OC-12c/STM-4 POS SPA	SPA-2XOC12-POS
Cisco 4-Port OC-12c/STM-4 POS SPA	SPA-4XOC12-POS
Cisco 8-Port OC-12c/STM-4 POS SPA	SPA-8XOC12-POS
OC-12c/STM-4, OC-3c/STM-1 SFP, MM	• SFP-OC12-MM • SFP-OC3-MM
OC-12c/STM-4, OC-3c/STM-1 SFP, SM, SR	• SFP-OC12-SR • SFP-OC3-SR
OC-12c/STM-4, OC-3c/STM-1 SFP, SM, IR-1	• SFP-OC12-IR1 • SFP-OC3-IR1
OC-12c/STM-4, OC-3c/STM-1 SFP, SM, LR-1	• SFP-OC12-LR1 • SFP-OC3-LR1
OC-12c/STM-4, OC-3c/STM-1 SFP, SM, LR-2	• SFP-OC12-LR2 • SFP-OC3-LR2

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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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