Cisco 1-, 2-, and 4-Port OC-48c/STM-16c POS/ RPR Shared Port Adapter

The Cisco® Interface Flexibility (I-Flex) design combines shared port adapters (SPAs) and SPA interface processors (SIPs) to help enable service prioritization for voice, video, and data 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 extensible Cisco I-Flex design maximizes connectivity options and offers superior service intelligence through programmable interface processors that deliver line-rate performance. Cisco 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 1-, 2-, and 4-Port OC-48c/STM-16c Packet over SONET/SDH (POS) and Resilient Packet Ring (RPR) Shared Port Adapter (Cisco 1-, 2-, and 4-Port OC-48c/STM-16c POS/RPR SPA; refer to Figure 1).

Product Overview

Figure 1. Cisco 2-Port OC-48c/STM-16c POS/RPR SPA with SFP Optics

The Cisco 1-, 2-, and 4-Port OC-48c/STM-16c POS/RPR SPAs are available on high-end Cisco routing platforms and offers the benefits of network scalability with lower initial costs and easy upgrades. The SPAs continues the Cisco focus on investment protection along with consistent feature support, broad interface availability, and leading-edge technology. The SPAs allow different interfaces (POS, ATM, etc.) to be deployed on the same carrier card.

The Cisco 1-, 2-, and 4-Port OC-48c/STM-16c POS/RPR SPAs use Small Form-Factor Pluggable (SFP) interfaces. SFP modules are available in short-reach (2 km), intermediate-reach (15 km), and long-reach (80 km) optics.

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Applications

The Cisco 1-, 2-, and 4-Port OC-48c/STM-16c POS and RPR SPAs can be used in multiple applications, including:

- Access and aggregation
- WAN uplinks
- Internet peering

These SPAs feature both packet over SONET/SDH for mesh fiber networks (Figure 2) and Resilient Packet Ring for ring fiber topologies (Figure 3). These SPAs comply with the IEEE 802.17 RPR standard and also support the Spatial Reuse Protocol (SRP) for compatibility with existing Dynamic Packet Transport/Resilient Packet Ring (DPT/RPR) networks.

Figure 2. POS Applications

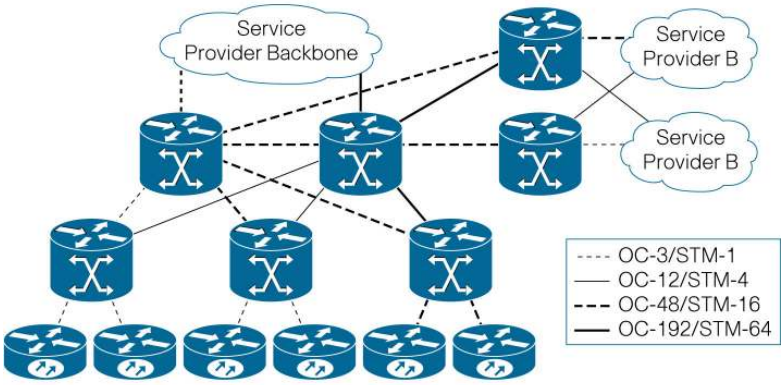
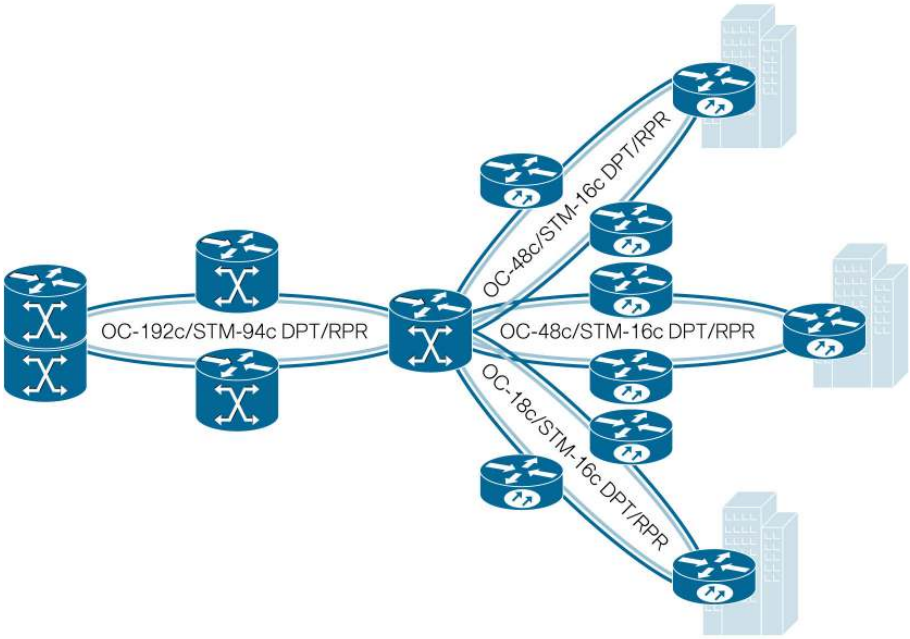


Figure 3. RPR Applications



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Key Features and Benefits

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

- Industry-leading modular, flexible, intelligent interface processors
  - Unmatched flexibility, allowing 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 provides intelligent delivery of services without compromising on performance.
- Increased speed-to-service revenue
  - The scalable, programmable Cisco architecture extended to 2.5 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 more quickly roll out new services, ensuring 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.
- Significant investment protection
  - Improved slot economics and increased density reduce capital expenditures (CapEx).
  - The ability to easily add new interfaces as they are needed facilitates 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 lists product specifications for the Cisco 1-, 2-, and 4-Port OC-48c/STM-16c POS/RPR SPA and Table 2 lists optical specifications.

Table 1. Product Specifications

Description	Specification
Product Compatibility	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(2 port only) Cisco CRS Carrier Routing System(2 and 4 port only)
Port Density per SPA	1, 2, and 4 ports

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Description	Specification
Physical Interface	OC-48c/STM-16c SFP optics module (see optical parameters below) Visual status indicators (LEDs) • SPA status LED • Per port LEDs ◦ Carrier/Alarm ◦ Active/Loopback ◦ Protect (DPT/RPR mode) ◦ Pass Through (DPT/RPR mode)
Protocols (see table below for RPR/SRP support info)	High-Level Data Link Control (HDLC), RFC 2615 Point-to-Point Protocol (PPP), RFC 1662 Frame Relay, RFC 2427 IPv4/IPv6 IEEE 802.17 – Resilient Packet Ring (RPR) IETF 2892 – Spatial Reuse Protocol (SRP)
Features and Functions	Synchronization • Local (internal) or loop timed (recovered from network) • Stratum 3 clock accuracy (± 4.6 ppm) over full operating temperature • Pointer activity monitoring Local (diagnostic) and line (network) loopback Section DCC (SDCC) – Platform-dependent feature Payload mapping • 1 + X^43 self-synchronous scrambler SONET/SDH compliance • Telecordia (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 ◦ Threshold Crossing Alarms (TCA) for B2 • Path ◦ Path Alarm Indication Signal (PAIS) ◦ Path Remote Defect Indication (PRDI) ◦ Path Remote Error Indication (PREI) ◦ Error Counts for B3 ◦ Threshold Crossing Alarms (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)

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Description	Specification
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 lbs (0.34 kg) Height: 0.8 inches (2.03 cm) Width: 6.75 inches (17.15 cm) Depth: 7.28 inches (18.49 cm)
Power	18 Watts maximum (4-port) 15.5 Watts maximum (1-, 2-, and 4-Port) 12 Watts maximum (1-port)
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/NZ 3548 VCCI 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 **European Telecommunications Standard Institute (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

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Table 2. Protocol Mode Availability

SPA Variant	Mode	Cisco 12000	Cisco XR12000	Cisco CRS	Cisco 7600
SPA-1XOC48POS/RPR	POS	12.0(32)SY	SPA not yet supported	SPA not yet supported	12.2(33)SRA
	SRP	TBD			TBD
	802.17	TBD			TBD
SPA-2XOC48POS/RPR	POS	12.0(31)S2	XR3.3	XR3.4	12.2(33)SRA
	SRP	12.0(32)SY	TBD	XR3.8	TBD
	802.17	TBD	TBD	Not supported	TBD
SPA-4XOC48POS/RPR	POS	SPA not yet supported	SPA not yet supported	XR3.4	12.2(33)SRA
	SRP			XR3.8	TBD
	802.17			Not supported	TBD

Note: The OC48 SPAs support tri-mode operation as POS, DPT or 802.17 RPR protocol interfaces. POS mode is provided by all platforms on which the SPA is supported. Additional software support is needed to enable operation in DPT or 802.17 RPR modes. The table above shows the earliest release of support for each SPA on the platform and does not show detail with respect to the SIPs on which the SPA is supported. This datasheet will be updated as support is added, but customers are encouraged to check with their Cisco Representative to get the most up-to-date information on SIP/SPA compatibility.

Table 3. Optical Specifications: Small Form-Factor Pluggable

OC-48c/STM-16c Transceiver Type	Transmit Power	Maximum Power to Receiver, dBm	Receiver Sensitivity, dBm	Power Budget, dB	Receiver Operating Wavelength	Nominal Distance Between Stations
Single-mode short-reach (SR)	–10 dBm min. to –3 dBm max, at 1310 nm	–3	–18	7	1290 to 1565 nm	Up to 1.2 miles (2 km)
Single-mode intermediate-reach (IR-1)	–5 dBm min. to 0 dBm max. at 1310 nm	–5	–18	12	1290 to 1565 nm	Up to 9 miles (15 km)
Single-mode long-reach (LR-2)	–2 dBm min. to 3 dBm max. at 1550 nm	–9	–28	24	1290 to 1565 nm	Up to 50 miles (80 km)

Ordering Information

To place an order, visit the Cisco Ordering Home Page. Table 3 lists ordering information for the Cisco 1-, 2-, and 4-Port OC-48c/STM-16c POS/RPR SPA.

Table 4. Ordering Information

Product Description	Part Number
1 port OC48c/STM-16c POS/RPR Shared Port Adapter	SPA-1XOC48POS/RPR
1-, 2-, and 4-Port OC-48c/STM-16c POS/RPR Shared Port Adapter	SPA-2XOC48POS/RPR
4 port OC48c/STM-16c POS/RPR Shared Port Adapter	SPA-4XOC48POS/RPR
Single-Mode, Short-Reach (SR) SFP Module	SFP-OC48-SR
Single-Mode, Intermediate-Reach (IR) SFP Module	SFP-OC48-IR1
Single-Mode, Long-Reach (LR-2) SFP Module	SFP-OC48-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 account representative.

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