Cisco 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter

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 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter (Cisco 1-Port OC-192 POS/RPR SPA; refer to Figure 1).

Figure 1. Cisco 1-Port OC-192 POS/RPR SPAs with XFP, VSR, and LR Optics

Product Overview

The Cisco 1-Port OC-192 POS/RPR SPA is available on high-end Cisco routing platforms, offering the benefits of network scalability with lower initial costs and easy upgrades. The Cisco SPA/SIP portfolio continues Cisco's 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, etc.) to be deployed on the same interface processor.

The Cisco 1-Port OC-192 POS/RPR SPA provides 10-Gbps Small Form-Factor Pluggable (XFP) interfaces in addition to fixed interfaces. SPA configurations are available to support multiple optical reaches from 300 meters to 80 kilometers.

Applications

The Cisco 1-Port OC-192 POS/RPR SPA can be used in multiple applications, including:

- Access and aggregation
- WAN uplinks
- Internet peering

The Cisco 1-Port OC-192 POS/RPR SPA features both POS for mesh fiber networks (Figure 2) and Resilient Packet Ring (RPR) for ring fiber topologies (Figure 3). This SPA complies with the IEEE 802.17 RPR standard and also supports the Spatial Reuse Protocol (SRP) for compatibility with existing Dynamic Packet Transport (DPT)/RPR networks.

Figure 2. POS Applications

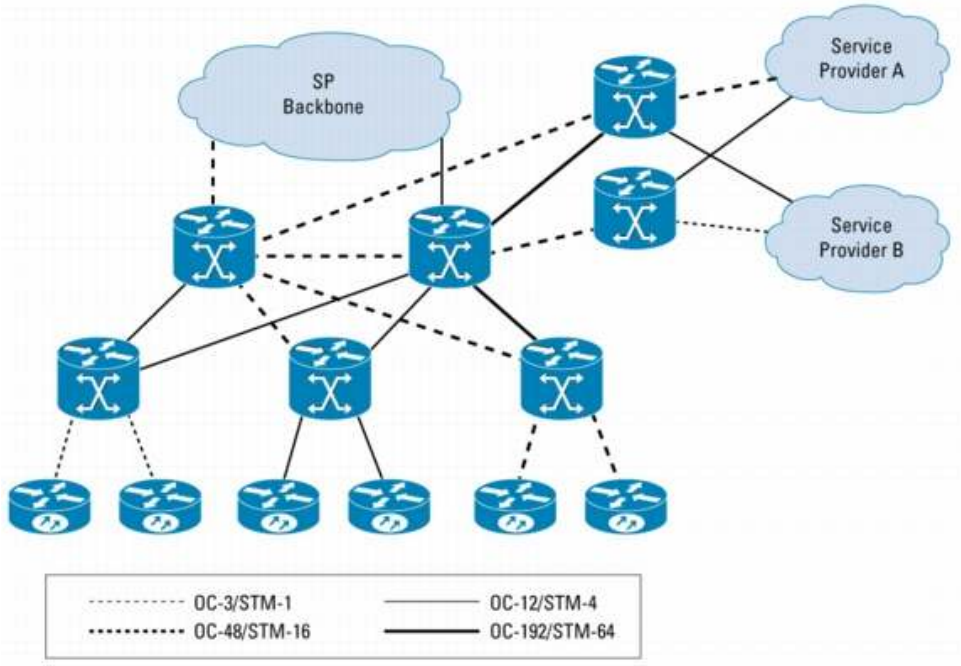
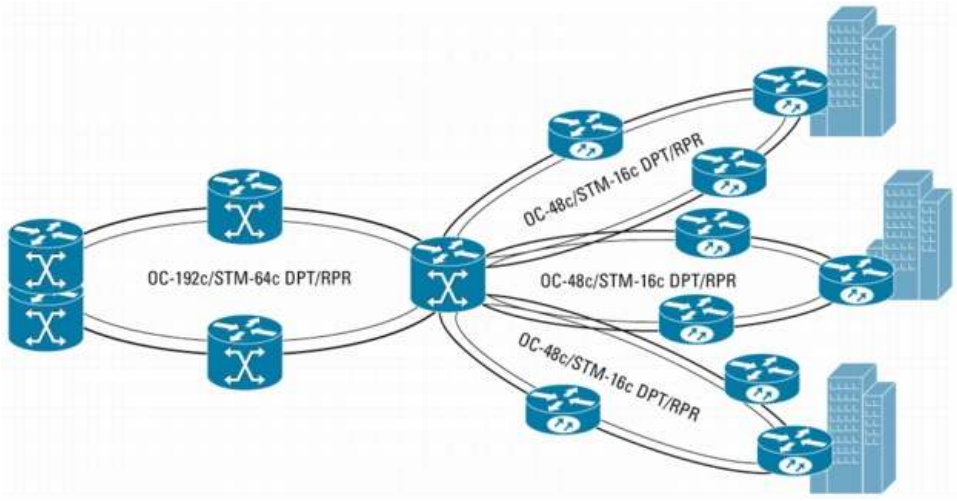


Figure 3. RPR Applications



Features and Benefits

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

- 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 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 1-Port OC-192 POS/RPR SPA.

Table 1. Product Specifications

Features	Descriptions
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 (XFP Optics only) • Cisco ASR 9000 Series Router (XFP Optics only) • Cisco CRS Carrier Routing System
Port Density per SPA	• 1 port • DPT/RPR configuration – two SPAs are needed to connect to one RPR ring
Physical Interfaces	• OC-192c/STM-64c fixed interface or pluggable (XFP) optics module (refer to optical parameters in Tables 3 and 4) • Connector: ◦ XFP-LC connector ◦ Long reach (LR)-SC connector ◦ Very short reach (VSR)-Standard media termination point (MTP) (multipath optical [MPO]) multifiber optical connectors ◦ RPR operation requires a mate cable-part number CBL-RPR-OC192-L or CBL-RPR-OC192-S • Visual status indicators (LEDs): ◦ SPA status LED ◦ Per-port LEDs ◦ Carrier and alarm

Features	Descriptions
	◦ Active and loopback ◦ Protect ◦ Pass-through
Protocols (see Table 2 for RPR/SRP support information)	• High-Level Data Link Control (HDLC), RFC 2615 • Point-to-Point Protocol (PPP), RFC 1662 • Frame Relay, RFC 2427 • IPv4/IPv6 • IEEE 802.17 RPR • IETF 2892-SRP
Features and Functions	• Synchronization ◦ Local (internal) or loop timed (recovered from network) ◦ Layer 3 clock accuracy (± 4.6 ppm) over full operating temperature ◦ Pointer activity monitoring • Local (diagnostic) and line (network) loopback • Section data communication channel (SDCC) –platform-dependent feature • Payload mapping ◦ 1 + x^43 self-synchronous scrambler • SONET/SDH compliance ◦ Telcordia (Bellcore) GR-253-CORE (as applicable) ◦ ANSI T1.105, and T1.231 ◦ ITU-T G.707, G.957, and 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 ◦ Error counts for B2 ◦ Threshold crossing alarms (TCA) for B2 • Line ◦ Line alarm indication signal (LAIS) ◦ Line remote defect indication (LRDI) ◦ Line remote error indication (LREI) • 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 XFP optical modules • 1 + 1 SONET automatic-protection-switching (APS) and SDH linear multiplex-section-protection (MSP) protocols • Single SPA software reset

Features	Descriptions
Physical Specifications	• Weight: 0.75 lb (0.34 kg) • Height: 0.8 in. (2.03 cm) (single height – XFP interface) • Height: 1.6 in. (4.06 cm) (double height – VSR, LR fixed optics) • Width: 6.75 in. (17.15 cm) • Depth: 7.28 in. (18.49 cm)
Power	15.5W 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	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 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

The OC192 Cisco POS/RPR SPA supports 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. Table 2 lists the modes supported on various platforms and software releases at the time of publication of this data sheet. The table shows the earliest supporting release of each platform and does not provide details with respect to the SIPs on which the SPA is supported. This data sheet 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 2. Protocol Mode Availability

SPA Variant	Mode	Cisco 12000	Cisco XR12000	Cisco CRS	Cisco 6500/7600	Cisco ASR 1000
SPA-OC192POS-XFP	POS	12.0(31)S	XR3.2	XR3.2	12.2(18)SXF	IOS XE 2.4.0
	SRP	12.0(32)SY	TBD	TBD	TBD	Not supported
	802.17	TBD	TBD	TBD	TBD	Not supported
SPA-OC192POS-VSR	POS	12.0(32)S	XR3.3	SPA not yet supported	12.2(18)SXF1	SPA not supported
	SRP	12.0(32)SY	TBD		TBD	
	802.17	TBD	TBD		TBD	
SPA-OC192POS-LR	POS	12.0(32)S	XR3.2	SPA not yet supported	12.2(18)SXF	SPA not supported
	SRP	12.0(32)SY	TBD		TBD	
	802.17	TBD	TBD		TBD	

Table 3 gives the fixed optical specifications of the Cisco 1-Port OC-192 POS/RPR SPA.

Table 3. Optical Specifications: Fixed (300 pin)

OC-192c/STM-64c Transceiver Type	Transmit Power	Maximum Power to Receiver, dBm	Minimum Receiver Sensitivity, dBm	Power Budget, dB	Receiver Operating Wavelength	Nominal Distance Between Stations
Very Short Reach (VSR)	–10 dBm min. to –3 dBm max. at 850 nm	–3	–16	6	830–860 nm	1000 feet (300 meters)
Single-Mode (SM) Long Reach (LR)	0 dBm min. to 4 dBm max at 1550 nm	–7	–24	24	1290–1565 nm	Up to 50 miles (80 km)

Table 4 lists the modular optical specifications of the Cisco 1-Port OC-192 POS/RPR SPA.

Table 4. Optical Specifications: Modular (XFP)

OC-192c/STM-64c Transceiver Type	Transmit Power	Maximum Power to Receiver, dBm	Minimum Receiver Sensitivity, dBm	Power Budget, dB	Receiver Operating Wavelength	Nominal Distance Between Stations
Single-Mode (SM) Short Reach (SR)	–6 dBm min to –1 dBm max at 1310 nm	–1	–11	5	1260–1565 nm	Up to 1.25 miles (2 km)
Single-Mode (SM) Intermediate Reach (IR)	–1 dBm min to 2 dBm max at 1550 nm	2	–14	13	1260–1565 nm	Up to 25 miles (40 km)
Single-Mode (SM) Long Reach (LR-2)	0 dBm min to +4.0 dBm max	–7	–24	24	1260–1565 nm	Up to 50 miles (80 km)

Ordering Information

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

Table 5. Ordering Information

Product Name	Part Number
Cisco 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter with XFP Optics	SPA-OC192POS-XFP
Cisco 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter with VSR Optics	SPA-OC192POS-VSR
Cisco 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter with LR Optics	SPA-OC192POS-LR
Single-Mode (SM) Short Reach (SR) XFP Module	XFP-10GLR-OC192SR
Single-Mode (SM) Intermediate Reach (IR-2) XFP Module	XFP-10GER-OC192IR
Single-Mode (SM) Long Reach (LR-2)	XFP-10GZR-OC192LR
Long-Length RPR Mate Cable for Single-Port SRP/RPR SPAs (for RPR operation only)	CBL-RPR-OC192-L
Short-Length RPR Mate Cable for Single-Port SRP/RPR SPAs (for RPR operation only)	CBL-RPR-OC192-S

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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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