Cisco CRS 1-Port OC-768C/STM-256C Tunable WDMPOS Interface Module

The Cisco® CRS-1 Carrier Routing System is the first carrier router offering continuous system operation, unprecedented service flexibility, and system longevity. The Cisco CRS-1 is powered by Cisco IOS® XR Software – a unique self-healing, distributed operating system designed for always-on operation while scaling system capacity up to 92 Tbps. The innovative system architecture combines the Cisco Silicon Packet Processor, the first programmable 40-Gbps application-specific integrated circuit (ASIC), with the Cisco Service Separation Architecture for superior service flexibility and speed to service. The Cisco CRS-1 marks a new era in carrier IP Communications by powering the foundation for network and service convergence today while protecting investments for decades to come.

Product Overview

This data sheet provides detailed product specifications for an important element of the Cisco IP-over-DWDM solution, the Cisco CRS-1 1-Port OC-768c/STM-256c Tunable WDMPOS Interface Module (Figure 1). The module helps service providers to increase efficiencies, improve reliability, and reduce operational and capital costs by eliminating expensive and bulky optical transponder equipment, even as video-based applications rapidly increase traffic in their DWDM networks. The module connects directly into any DWDM network and provides up to 40 Gbps of data throughput across existing 10-Gbps DWDM systems. The module is completely tunable across the C band with 50-GHz spacing and supports high-gain Enhanced Forward Error Correction (EFEC), extending reach up to 1000 kilometers (km) without requiring signal regeneration. For more information about the Cisco CRS-1 or about other interfaces available for the Cisco CRS-1, visit http://www.cisco.com/go/crs.

Figure 1. Cisco CRS-1 1-Port OC-768c/STM-256c Tunable WDMPOS Interface Module

Product Specifications

Table 1 gives specifications of the Cisco CRS-1 1-Port OC-768c/STM-256c Tunable WDMPOS Interface Module.

Table 1. Product Specifications

Feature	Description
Chassis Compatibility	Compatible with all current Cisco CRS-1 and CRS-3 line-card chassis
Software Compatibility	Cisco IOS XR Software Release 3.3 or later for CRS-1 Cisco IOS XR Software Release 4.0.0 or later for CRS-3
Protocols	• Packet over SONET/SDH (POS) • RFC 1619/2615, Point-to-Point Protocol (PPP) over SONET/SDH • RFC 1662, PPP in High-Level Data Link Control (HDLC)-like framing • RFC 2615, PPP over SONET/SDH • HDLC
Port Density	One 1-port OC-768c/STM-256c Tunable WDM POS interface per physical-layer interface module (PLIM)
POS Feature Summary	• Supports a maximum transmission unit (MTU) of up to 9188 bytes • Layer 2 encapsulations: HDLC and PPP; no subinterface support • Alarm reporting: Loss of signal (LOS), loss of frame (LOF), line alarm indicator signal (LAIS), line remote defect indicator (LRDI), path alarm indicator signal (PAIS), loss of pointer (LOP), path remote defect indicator (PRDI), signal failure (SF), signal degrade (SD) • SF and SD alarms are based on monitoring B2 errors with a user-configurable threshold crossing • Error counts: B1, B2, B3, Line FEBE (REI-L), and Path FEBE (REI-P) • Threshold crossing alerts (TCAs) for B1, B2, and B3 with user-configurable threshold • Local (internal) or loop-timed (recovered from network) • Local Stratum 3 clock accuracy over full operating temperature • Pointer activity monitoring: Counters for NEWPTR (arbitrary change in pointer value), PSE (positive stuff event), and NSE (negative stuff event) • Local (diagnostic) and line (network) loopback • $1 + x^{43}$ self-synchronous scrambler
Optical Transport Network (G.709) Feature Summary	• ITU G.709 • Alarm reporting: Loss of Signal (LOF), Loss of OTN Frame (LOF), Loss of OTN Multiframe (LOM), OTU alarm indication signal (OTU-AIS), OTU backward defect indication (OTU-BDI), ODU alarm indication signal (ODU-AIS), ODU open connection indication (ODU-OCI), ODU locked (ODU-LCK), ODU backwards defect indication (ODU-BDI), ODU payload type identifier mismatch (ODU-PTIM), OTU signal fail (OTU_SF_BER), and OTU signal degrade (OTU_SD_BER) • OTU_SF_BER and OTU_SD_BER alarms are based on monitoring OTU BIP errors with a user-configurable threshold crossing • Error counts: OTU BIP, OTU BEI, ODU BIP, and ODU BEI • Threshold crossing alerts (TCAs) for OTU BIP errors (SM-TCA) and ODU BIP errors (PM-TCA) with user-configurable threshold • Local (internal) and line (network) loopback
Forward Error Correction Feature Summary	• FEC Type: G.975.1 I.4 • High gain enhanced forward error correction code • FEC statistics for pre-FEC BER, corrected errors (EC) and uncorrected words (UC)
Optical Feature Summary	• Line rate 42.8 Gbps ±4.6 ppm • Duplex LC faceplate optical connector • Full C-band tunable laser • Configurable Tx optical power (–19 dBm to +1 dBm) • Tx and Rx optical power monitoring • Optical power monitoring accuracy ±2 dB
Reliability and Availability	Online insertion and removal (OIR) without affecting system traffic
Network Management	• Cisco IOS XR Software command-line interface (CLI) • Simple Network Management Protocol (SNMP) • Extensible Markup Language (XML) interface • CraftWorks Interface (CWI)

Feature	Description
Physical Dimensions	• Occupies one PLIM slot • Weight: 8.6 lb (3.9 kg) • Height: 20.6 in. (52.32 cm) • Depth: 11.2 in. (28.4 cm) • Width: 1.8 in. (4.57 cm)
Power	150W
Environmental Conditions	• Storage temperature: –40 to 70°C (–40 to 158°F) • Operating temperature: ◦ Normal: 5 to 40°C (41 to 104°F) ◦ Short-term: –5 to 50°C (23 to 122°F) • Relative humidity: ◦ Normal: 5 to 85% ◦ Short-term: 5 to 90% but not to exceed 0.024 kg water/kg of dry air Short-term refers to a period of not more than 96 consecutive hours and a total of 360 hours but not more than 15 instances in 1 year.

Approvals and Compliance

Tables 2 and 3 give standards compliance information about the Cisco CRS-1 1-Port OC-768c/STM-256c Tunable WDMPOS Interface Module.

Table 2. Compliance and Agency Approvals

Feature	Description
Safety Standards	• UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 Laser Safety • ACA TS001 • AS/NZS 60950 • FDA – Code of Federal Regulations Laser Safety
EMI	• FCC Class A • ICES 003 Class A • AS/NZS 3548 Class A • CISPR 22 (EN55022) Class A • VCCI Class A • BSMI Class A • IEC/EN 61000-3-2: Power Line Harmonics • IEC/EN 61000-3-3: Voltage Fluctuations and Flicker
Immunity (Basic Standards)	• IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8-kV contact, 15-kV air) • IEC/EN-61000-4-3: Radiated Immunity (10V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2-kV power, 1-kV signal) • IEC/EN-61000-4-5: Surge AC Port (4-kV CM, 2-kV DM) • IEC/EN-61000-4-5: Signal Ports (1 kV) • IEC/EN-61000-4-5: Surge DC Port (1 kV) • IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10 Vrms) • IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m) • IEC/EN-61000-4-11: Voltage Dips, Short Interruptions, and Voltage Variations
ETSI and EN	• EN300 386: Telecommunications Network Equipment (EMC) • EN55022: Information Technology Equipment (Emissions) • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: Generic Immunity Standard
Network Equipment Building Standards (NEBS)	This product is designed to meet the following requirements (qualification in progress): • SR-3580: NEBS Criteria Levels (Level 3) • GR-1089-CORE: NEBS EMC and Safety • GR-63-CORE: NEBS Physical Protection

Additional Specifications

Table 3. DWDM Line Interface Specifications

Parameter	DWDM Line Interface
Connector type	LC
Target distance	1000 km
Transmitter	
Power range	–19.0 to 1.0 dBm
Wavelength range	Full Tunable from 1528.77 nm to 1563.86nm (C band – 50 GHz)
Wavelength stability	±1.5 GHz
Extinction ratio (minimum)	8.5 dB
Optical signal-to-noise ratio	45 dB
SBS threshold	15 dBm
Optical Bandwidth (FWHM) (maximum)	25 GHz
Receiver	
Pr (Max) (minimum overload)	5 dBm
Sensitivity (over DWDM systems)	–18.0 dBm[1]
	–22dBm, 2dB penalty
Chromatic dispersion tolerance (1 dB penalty)	–150 to +150 ps/nm
PMD tolerance (2dB penalty)	2.5 ps
OSNR (back to back) (0.5nm Res. BW)	13dB (1 X 10^-15 Post FEC BER)
Single-channel optical link (without DWDM)	
Fiber type	G.652 (SMF), G.653 (DSF) and G.655 (NZ-DSF)
Maximum dispersion	+150 ps/nm
Sensitivity (over dark fiber)	–27 dBm[2] (1 X 10^-15 Post FEC BER)
Attenuation range	0–27 dB
Optical path penalty	1 dB
Path length	80 km (G.652/G.655); 100 km (G.653)[3]
Miscellaneous	
Optical power monitoring	Tx and Rx, ±2 dB accuracy
Notes: 1) Must change default from –17dBm to –18dBm. 2) Must change default RxLOS to –30dBm. Please contact your Cisco systems engineer for support. 3) Proper system design required; network may require Dispersion Compensating Units (DCUs).	

Ordering Information

To place an order, contact your local Cisco representative or visit the Cisco Ordering Home Page. Use the ordering information in Table 4.

Table 4. Ordering Information

Product Part Number	Product Name
1OC768-ITU/C	Cisco CRS-1 1-Port OC-768c/STM-256c (C-band) DWDM PLIM

Cisco Services

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For More Information

For more information about the Cisco CRS-1 1-Port OC-768c/STM-256c Tunable WDMPOS Interface Module, contact your local Cisco representative or visit http://www.cisco.com/go/crs.

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