Cisco CRS-X 4-Port 100GE LAN/OTN Interface Module

The Cisco® CRS-X Carrier Routing System provides outstanding economical scale, IP and optical network convergence, and a proven architecture that's delivered 10 times the capacity over 10 years. The Cisco CRS-X 4-Port 100GE LAN/OTN Interface Module is powered by advanced forwarding application-specific integrated circuits (ASICs), a chipset architecture based on multidimensional engineering, and Cisco IOS® XR Software, a unique distributed operating system.

This Cisco CRS-X interface module (Figure 1) offers the following advanced features and benefits:

- 400-Gbps line-rate throughput per slot, increasing the Cisco CRS capacity to 12.8 Tbps in a single chassis

- Advanced forwarding ASIC to support 100-Gbps single-flow traffic processing with optimized power consumption

- Superior investment protection that maintains the existing Cisco CRS architecture, making it compatible with existing Cisco CRS-1 line cards, Cisco CRS-3 line cards, and physical layer interface modules (PLIMs).

- Support for transparent In-service migration from an existing Cisco CRS-1 or CRS-3

- Space, cost, and power savings with 100-Gbps Cisco CPAK™ optics

- Flexibility through Cisco AnyPort Technology, which introduces 100-Gbps to 40-Gbps and 40-Gbps to 10-Gbps breakout options

Figure 1. Cisco CRS-X 4-Port 100GE LAN/OTN Interface Module

The Cisco CRS 4-Port 100 GE LAN/OTN Interface Module connects into an existing transport network and provides four ports with 100 Gbps of data per port, for 400 Gigabit Ethernet (GE) LAN physical layer (LAN-PHY) transport or Optical Transport Network (OTN) Transport Unit Level 3 (OTU-4) transport. The interface module requires a Modular Services Card (MSC) capable of 400 Gbps, a Forwarding Processor card, or a Label Switch Processor card for operation. It is supported across the Cisco CRS 8-slot, 16-slot, back-to-back, and multichassis systems, based on either an enhanced chassis or traditional chassis. The interface module can operate in either 400-Gbps or 200-Gbps mode. The 400-Gbps mode in a Cisco CRS enhanced chassis-based system allows the interface module to deliver full 400-Gbps line-rate throughput. In 200-Gbps mode, however, two of the four ports are shut down to conserve power.

Product Specifications

Table 1 gives specifications of the Cisco CRS-X 4-port 100GE LAN/OTN Interface Module.

Table 1.   Product Specifications

Feature	Description
Compatibility	• Cisco CRS 8-slot, 16-slot, back-to-back, and multichassis system with Cisco CRS-X fabric • Requires 400-Gbps MSC, Forwarding Processor card, or Label Switch Processor card for operation
Software compatibility	Cisco IOS XR Software Release 5.1.1 or later
Port density	Four ports of 100 Gigabit Ethernet per PLIM slot
Protocols supported	• IEEE 802.3ba compliant • 100GE PHY Monitoring • OTU-4 (single 100-Gbps container) • Encapsulations: ARPA, IEEE 802.2/SAP, and IEEE 802.3/SNAP • IEEE 802.x flow control • 802.1q VLAN support, jumbo frames • IEEE 802.1p tagging • Source and destination MAC accounting and VLAN accounting • Full-duplex operation • 802.1Q VLAN termination • Per-port byte and packet counters for policy drops, oversubscription drops, cyclic redundancy check (CRC) error drops, packet sizes, and unicast, multicast, and broadcast packets • Per-VLAN byte and packet counters for policy drops, oversubscription drops, and unicast, multicast, and broadcast packets • Per-port byte counters for good bytes and dropped bytes
OTN (G.709 feature summary)	ITU G.709 • Alarm reporting: Loss of signal (LOF), loss of OTN frame (LOF), and loss of OTN multiframe (LOM) • 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 of OTU bit-interleaved parity (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
Performance	• 400-Gbps line-rate throughput • Maximum number of interface modules per chassis: 8-slot chassis (8), 16-slot chassis (16)
Reliability and availability	• Line-card online insertion and removal (OIR) support without affecting system
Network management	• Cisco IOS XR Software command-line interface (CLI) • Simple Network Management Protocol (SNMP) • Extensible Markup Language (XML) interface • Craft Works Interface (CWI) • Cisco Active Network Abstraction (ANA)
Physical dimensions	• Occupies one-half slot on a Cisco CRS chassis • Weight: 8.60 lbs (3.9 kg) • Height: 20.6 in. (52.2 cm) • Depth: 11.2 in. (28.4 cm) • Width: 1.8 in. (4.49 cm)
Power	Expected value less than 125W in 400-Gbps mode and less than 75W in 200-Gbps mode

Feature	Description
Environmental conditions	• Storage temperature: -40 to 158°F (-40 to 70°C) • Operating temperature: • Normal: 32 to 104°F (0 to 40°C) • Short-term: 23 to 131°F (-5 to 55°C) • Relative humidity: • Normal: 5 to 85% • Short-term: 5 to 90% but not to exceed 0.024 kg water per kg of dry air **Note:** 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

Table 2 gives standards compliance information for the Cisco CRS-X 4-port 100GE LAN/OTN Interface Module.

Table 2. Compliance and Agency Approvals

Feature	Description
Safety standards	• UL/CSA/IEC/EN 60950-1, 2nd ed, AM 1 • AS/NZS 60950.1 • IEC/EN 60825 Laser Safety • FDA - Code of Federal Regulations Laser Safety
EMI	• FCC Class A • ICES 003 Class A • AS/NZS CISPR 22 Class A • CISPR 22 (EN55022) Class A • VCCI 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. Additional Specifications

100 Gigabit Ethernet CFP Optics Part Numbers	Maximum Distance
CPAK-100G-LR4	Cisco CPAK 4-port 100-Gbps Gigabit Ethernet LR4 (10 km) optics
CPAK-100G-SR10	Cisco CPAK 4-port 100-Gbps Gigabit Ethernet SR10 (100m) optics

Ordering Information

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

Table 4.   Ordering Information

Product Name	Part Number
Cisco CRS-X 4-Port 100GE LAN/OTN Interface Module	4x100GE-LO
Cisco 4-Port 100G CPAK Gigabit Ethernet LR4 (10 km) Optics	CPAK-100G-LR4
Cisco 4-Port 100G SR10 Gigabit Ethernet SR10 (100M) Optics	CPAK-100G-SR10

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For More Information

For more information about the Cisco CRS-X 4-port 100 GE LAN/OTN Interface Module, the Cisco CRS Family, or other available interface, contact your local Cisco representative or visit: http://www.cisco.com/go/crs.

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