Cisco CRS 4-Port 40GE LAN/OTN Interface Module

Product Overview

This data sheet provides detailed product specifications for an important element of the Cisco® Ethernet Optimized solutions: the Cisco CRS 4-Port 40GE LAN/OTN Interface Module (Figure 1). The module connects directly into any 40 Gigabit Ethernet transport network, including traditional OC-768 transport networks, and provides four ports at 40 Gbps of data per port for 40 Gigabit Ethernet LAN physical layer (LAN-PHY) or Optical Transport Network (OTN) Transport Unit Level 3 (OTU-3) transport.

Figure 1. Cisco CRS 4-Port 40GE LAN/OTN Interface Module

Challenge and Solution

Significant dense Packet over SONET (POS) deployments exist despite the overwhelming industry trend toward Ethernet. Operators are looking for POS-like operations, administration, and maintenance (OAM) functions at Ethernet price points with technologies such as OTN G.709 encapsulation. Some operators have traditional transponder systems that can operate only in OC-768 and OTU-3 modes.

In addition, bandwidth growth is leading all markets, including data center operators, to move to 40 Gigabit Ethernet in the aggregation layer to handle growth in the data center.

The Cisco CRS 4-Port 40GE LAN/OTN Interface Module addresses both these needs.

The 4-port 40GE module in OTN mode with multirate serial C Form-Factor Pluggable (CFP) Fiber with Scrambled Encoding (FR) optics addresses the requirements for POS such as OAM functions at Ethernet prices, and the 4-port 40GE module in LAN mode with CFP Long-Reach (LR) or CFP Short-Reach (SR) optics provides a dense 40 Gigabit Ethernet solution for data centers and 10 Gigabit Ethernet aggregation.

Product Specifications

Table 1 lists specifications for the Cisco CRS 4-Port 40GE LAN/OTN 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 4.2.3 or later for Cisco CRS-3 platform
Protocols	• 40 Gigabit Ethernet • OTU-3 • Encapsulations: ARPA, IEEE 802.2/SAP, and IEEE 802.3/SNAP • IEEE 802.x flow control • IEEE 802.1q VLAN support and jumbo frames • IEEE 802.1p tagging • Source and destination MAC address accounting and VLAN accounting
Port density	Four ports of 40 Gigabit Ethernet per physical-layer interface module (PLIM) slot
POS feature summary	Not applicable
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 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 of 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
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) • XML interface • CraftWorks Interface (CWI)
Physical dimensions	• Occupies one PLIM slot • Weight: 11.8 lb (5.3 kg) • Height: 20.6 in. (52.32 cm) • Depth: 11.2 in. (28.4 cm) • Width: 1.8 in. (4.57 cm)
Power	• 185W
Environmental conditions	• Storage temperature: (–40 to 158℉ (–40 to 70℃) • Operating temperature: ◦ Normal: 32 to 104℉ (0 to 40℃) ◦ Short-term: 23 to 131℉ (–5 to 55℃) • Relative humidity: ◦ Normal: 5 to 85% ◦ Short-term: 5 to 90% but not to exceed 0.024 kg water/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 provides standards compliance information, Table 3 provides additional specifications, and Table 4 provides performance monitoring parameters.

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

All specifications in Table 3 are worst-case values for the operational life of the product.

Table 3. Additional Specifications:

40 Gigabit Ethernet CFP Optics	Specifications
CFP-40G-SR4	Supports link lengths of up to 100m and 150m over laser-optimized OM3 and OM4 multimode fiber cables, respectively
CFP-40G-LR4	Supports link lengths of up to 10 km over a standard pair of G.652 single-mode fiber with duplex SC connectors
CFP-40G-FR	Supports link lengths of up to 2 km over a standard pair of single-mode fiber with duplex SC connectors

Performance Monitoring Parameters

Area	Parameter Name		Description
OTN	OTUk SM	ODUk PM	Frame structures
	BBE-SM	BBE-PM	Number of background block errors
	BBER-SM	BBER-PM	Background block error ratio
	ES-SM	ES-PM	Number of errored seconds
	ESR-SM	ESR-PM	Errored seconds ratio
	SES-SM	SES-PM	Number of severely errored seconds
	SESR-SM	SESR-PM	Severely errored seconds ratio
	UAS-SM	UAS-PM	Number of unavailable seconds
	FC-SM	FC-PM	Number of failure counts
FEC	Bit errors		Number of corrected bit errors
	Uncorrectable words		Number of uncorrectable words

Ordering Information

To place an order, contact your local Cisco representative or visit the Cisco Ordering homepage at www.cisco.com. Use the ordering information in Table 5.

Table 4. Ordering Information

Part Number	Product Name
4-40GE-L/OTN	Cisco CRS 4-Port 40 Gigabit Ethernet LAN/OTN Interface Module
CFP-40G-LR4	Cisco multirate 40GBASE-LR4 and OTU3 C4S1-2D1 for SMF, 1310-nm window, SC duplex connector
CFP-40G-SR4	Cisco 40GBASE-SR4 CFP transceiver module for MMF, 4-lanes, 850-nm wavelength, 12-fiber MPO/MTP connector
CFP-40G-FR	Cisco 40GBASE-FR transceiver module in a CFP form factor that supports 2km reach on a single mode fiber

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