Cisco CRS 40x10 Gigabit Ethernet Interface Module

The Cisco® Carrier Routing System (CRS) provides outstanding economical scale, IP and optical network convergence, and a proven architecture. The Cisco CRS modular service cards (MSC) are powered by advanced application-specific integrated circuits (ASICs), a chipset architecture based on multidimensional engineering, and Cisco IOS® XR Software, a unique distributed operating system.

Networks are facing new challenges with the Internet of Everything. Trillions of things have become Internet ready and can start talking to each other, as well as to applications and people. The impact of machine-driven events changes network dynamics and imposes entirely new service requirements. Managing bandwidth is no longer enough. Networks must become more elastic and programmable, capable of adapting and evolving. As part of an evolving and programmable network, the Cisco CRS delivers highly reliable operations and scales easily from single-chassis form factors to a massive multichassis system. Its design offers industry-leading efficiency in power consumption, cooling, and rack-space resources, while providing intelligent service-rich bandwidth capacity. The Cisco CRS supports up to 400-Gbps line rates, and its hardware is backward and forward compatible, helping to protect existing and future investments.

The Cisco CRS 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 ASICs 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 and Cisco CRS-3 line cards and physical layer interface modules (PLIMs)
- 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
- Energy monitor functionality allows real-time power monitoring of each individual component, including PLIMs and line cards, fabric cards, Performance Route Processor (PRP) through Command Line Interface (CLI), beginning with IOS XR Release 5.1.1

This data sheet provides detailed product specifications for the Cisco CRS 40x10 Gigabit Ethernet Interface Module (product number 40x10GE-WLO), shown in Figure 1.

Figure 1. Cisco CRS 40x10 Gigabit Ethernet Interface Module

Product Specifications

Table 1 gives specifications of the Cisco CRS 40x10 Gigabit Ethernet Interface Module.

Table 1. Product Specifications

Feature	Description
Chassis compatibility	• Compatible with enhanced Cisco CRS line-card chassis (400-Gbps mode) • Compatible with legacy Cisco CRS line-chard chassis (200-Gbps mode) • Requires 400-Gbps fabric cards • Requires 400-Gbps modular services card or forwarding processor card for operation
Software compatibility	Cisco IOS XR Software Release 5.1.1 or later
Port density	Forty ports of 10 Gigabit Ethernet per PLIM slot
Protocols supported	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 • 10 Gigabit Ethernet configurable LAN/WAN-PHY support • Synchronous Ethernet • 1588 • OUT-2e
OTN (G.709 feature summary)	ITU G.709 • Alarm reporting: Loss of signal (LOS), 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
Performance	• 400-Gbps line-rate throughput • Maximum number of IM per chassis: 8 slot (8), 16 slot (16)

Feature	Description
Reliability and availability	• Line-card online insertion and removal (OIR) support without affecting the system
Network management	• Cisco IOS XR Software command-line interface (CLI) • Simple Network Management Protocol (SNMP) • Extensible Markup Language (XML) interface • CraftWorks Interface (CWI) • Cisco Active Network Abstraction (ANA)
Physical dimensions	Occupies one-half slot in a Cisco CRS chassis: • Weight: 7.85 lb (3.55 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 < 110W in 400-Gbps mode, <80W in 200-Gbps mode. Energy monitor functionality allows real-time power monitoring of each individual component: PLIMs and line cards, fabric, PRP through CLI beginning with IOS XR Release 5.1.1.
Environmental conditions	Storage temperature: -40 to 158℉ (-40 to 70℃) Operating temperature: • Normal: 41 to 104℉ (5 to 40℃) • Short-term: 23 to 122℉ (-5 to 50℃) 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 not more than 15 days in 1 year. (This refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)

Approvals and Compliance

Table 2 gives standards compliance information for the Cisco CRS 40x10 Gigabit Ethernet 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)

Feature	Description
	• 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

Additional specifications for the Cisco CRS 40x10 Gigabit Ethernet Interface Module are listed in Table 3.

Table 3. Additional Specifications

100 Gigabit Ethernet CFP Optics	Maximum Distance
10 Gigabit Ethernet short-reach (SR) optics (multimode fiber)	300m
10 Gigabit Ethernet long-reach (LR) optics (single-mode fiber)	10 km
10 Gigabit Ethernet extended-reach (ER) optics (single-mode fiber)	40 km
10 Gigabit Ethernet long-haul (ZR) optics (single-mode fiber)	80 km
10 Gigabit DWDM Tunable XFP (50-GHz ITU grid)*	80 km

Ordering Information

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

Table 4. Ordering Information

Product Part Number	Product Name
40x10GE-WLO	Cisco CRS-X 40-port 10 Gigabit Ethernet Interface Module
XC-FP200GTO400G= **XC-MSC200GTO400G=**	Cisco CRS-X Series 200-Gbps to 400-Gbps upgrade license
SFP-10G-SR-X	10 Gigabit Ethernet short-reach (SR) optics (multimode fiber)
SFP-10G-LR-X	10 Gigabit Ethernet long-reach (LR) optics (single-mode fiber)
SFP-10G-ER-X	10 Gigabit Ethernet extended-reach (ER) optics (single-mode fiber)
SFP-10G-ZR	10 Gigabit Ethernet long-haul (ZR) optics (single-mode fiber)
SFP-10G-DWDM	10 Gigabit DWDM Tunable XFP (50-GHz ITU grid)*

Cisco Services

Services from Cisco and our partners help you get the most value from your investments in Cisco converged IP and optical solutions, quickly and cost effectively. We can help you:

- Design, implement, and validate your solution to speed migration and cutover
- Coordinate every step through to interworking and deploy your solution in a predictable, efficient, and accurate way
- Strengthen your team by sharing what we know

We develop award-winning services that incorporate our history of market-changing innovation, which are delivered by deeply experienced engineers using proven methods and automated tools built through more than 28 years of industry leadership.

For More Information

For more information about the Cisco CRS or other available interfaces, visit http://www.cisco.com/go/crs or contact your local account representative.

Learn more about Cisco Services at http://www.cisco.com/go/spservices.

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Printed in USA C78-730792-00 01/14