Cisco CRS Series 4 port 10 Gigabit Ethernet Interface Module

The Cisco® CRS-1 Carrier Routing System is the industry's 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. As part of a video-enabled IP Next-Generation Network (NGN), the Cisco CRS-1 Series delivers continuous, always-on operation that easily scales to support the massive bandwidth requirements of visual networking experiences such as high-definition IPTV and Cisco TelePresence. These services demand a platform that delivers predictable forwarding performance and efficient, intelligent fabric-based multicast replication. The Cisco CRS-1 Series enables the Internet and NGNs to handle the approaching zettabyte era of carrier IP communications while protecting network investments for decades to come.

Product Overview

The Cisco CRS-1 Series 4-Port 10 Gigabit Ethernet Interface Module (Figure 1) provides four line-rate, IEEE 802.3-compliant 10 Gigabit Ethernet interfaces. Physical connections can be made using modular XENPAK pluggable optics. DWDM wavelengths are supported with the proper XENPAK, enabling the Cisco CRS Series router to be directly connected into an optical filter module, such as the Cisco ONS 15454 reconfigurable optical add-drop multiplexer (ROADM). This allows service providers to increase efficiencies, improve reliability, and reduce operational and capital costs through elimination of expensive and bulky optical transponder equipment, even as video-based applications rapidly increase traffic in their DWDM networks.

Figure 1. Cisco CRS-1 Series 4-Port 10 Gigabit Ethernet Interface Module

Features and Benefits

- Four line-rate 10 Gigabit Ethernet full duplex interfaces
- Per-port flexibility for optical reach – selected using the appropriate XENPAK pluggable optical modules
- Compatible with all Cisco CRS Series chassis
- Supports in-use insertion and removal without the need to power down the chassis
- Simple configuration, monitoring, and maintenance

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Product Specifications

Table 1. Product Specifications

Feature	Description
Chassis Compatibility	Compatible with all Cisco CRS-1 and CRS-3 chassis Requires one of the following forwarding engines (for CRS-1 chassis): CRS-FP40 (on CRS-4/S and CRS-8/S only), CRS-MSC-40G-B (on CRS-4/S, CRS-8/S, CRS-16/S, and CRS Multi-chassis) Requires one of the following forwarding engines (for CRS-3 chassis): CRS-FP140 or CRS-MSC-140G
Software Compatibility	Cisco IOS XR Software Release 3.8.1 or later for CRS-1 Cisco IOS XR Software Release 4.0.0 or later for CRS-3
Port Density	Four ports of 10 Gigabit Ethernet per card
Ethernet	Encapsulations: ARPA, IEEE 802.2/SAP, IEEE 802.3/SNAP IEEE 802.x flow control 802.1q VLAN support, jumbo frames IEEE 802.1p tagging Source/destination MAC accounting and VLAN accounting
Reliability and Availability	Online insertion and removal (OIR) without affecting system traffic Field-replaceable XENPAK optical modules
Network Management	Cisco IOS XR Software command-line interface (CLI) Simple Network Management Protocol (SNMP) Extensible Markup Language (XML) interface
Physical Dimensions	Occupies one PLIM slot Weight: 8.3 lb (3.8 kg) Height: 20.6 in. (52.2 cm) Depth: 11.2 in. (28.4 cm) Width: 1.8 in. (4.49 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 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. 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

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Feature	Description
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 (10 V/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 (30 A/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 Systems (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

Parameter	DWDM 1530.33-1560.61 nm	Long Reach 1310 nm (LR+)	Extended Reach 1550 nm (ER+)
Connector Type	SC	SC	SC
Target Distance	80 km	10 km	40 km
Transmitter			
Power out (maximum)	3 dBm	0.5 dBm	4 dBm
Power out (minimum)	–1.0 dBm	–8.2 dBm	–4.7 dBm
Receiver			
P (RMax) (overload)	–7.0 dBm	0.5 dBm	–1.0 dBm
P (RMin) (sensitivity)	–24.0 dBm	–14.4 dBm	–15.8 dBm
Optical Link			
Fiber type	G.652 (SMF)	G.652 (single-mode fiber [SMF])	G.652 (SMF)
Optical path penalty	3.0 dB	3.2 dB	4.1 dB
Compliance	IEEE 802.3ae 10GBASE	IEEE 802.3ae 10GBASE-LR	IEEE 802.3ae 10GBASE-ER

Ordering Information

To place an order, visit: Cisco Ordering Home Page.

Table 4. Ordering Information

Product Part Number	Product Name
4-10GE(=)	Cisco CRS-1 Series 4x10GE Interface Card

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Product Part Number	Product Name
XENPAK-10GB-LR+(=)	XENPAK 10GBASE-LR+ Optics Module
XENPAK-10GB-ER+(=)	XENPAK 10GBASE-ER+ Optics Module
DWDM-XENPAK-60.61= to DWDM-XENPAK-30.33=	XENPAK 10GBASE DWDM Modules (32 ITU 100-GHz wavelengths)

Service and Support

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For More Information

For more information about the Cisco CRS-1 Series 4-Port 10 Gigabit Ethernet Interface Module, contact your local account representative or visit: www.cisco.com/go/crs

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