

CISCO 2-PORT GIGABIT ETHERNET AND OC-12 PACKET-OVER-SONET BACKCARDS

For the Cisco MGX 8800/8900 Series Route Processor Module XF

The Cisco® 2-Port Gigabit Ethernet and 2-Port OC-12 Packet-over-SONET (POS) backcards for the Cisco MGX 8800/8900 Series Route Processor Module (RPM) XF (part numbers MGX-2GE and MGX-2OC12POS) are designed for use with the Cisco MGX® 8800 and MGX 8900 Series wide-area edge switches. These backcards are for use with the Cisco MGX 8800/8900 Series MGX-RPM-XF-512 to provide up to OC-24 of bandwidth for IP services in the new world of data networking.

The Cisco MGX multiservice switches offer the industry's widest breadth of service interfaces and unmatched deployment flexibility. By integrating Cisco IOS® Software capabilities with carrier-class ATM functions, the Cisco MGX 8800 provides a single-box solution for IP + ATM service deployment.

The Cisco RPM-XF 2-port backcards support hot-pluggable physical interfaces for flexible configuration of varying connector types and drive distances (refer to Figure 1).

Figure 1. Cisco 2-Port Gigabit Ethernet and 2-Port OC-12 POS Backcards for the Cisco MGX 8800/890 Series RPM-XF



TECHNICAL SPECIFICATIONS

Hardware Overview

The Cisco 2-port backcards are single-height line cards for the Cisco MGX 8850 and MGX 8950. Features include:

- Single-height, 2-port OC-12 POS backcard, with hot-pluggable Small Form-Factor Pluggable Modules (SFP) to provide single and multimode interfaces
- Single-height, 2-port Gigabit Ethernet backcard, with hot-pluggable SFP modules to provide a variety of Ethernet physical interfaces

Primary Features

The Cisco 2-port Gigabit Ethernet backcard (part number MGX-2GE) provides the following primary features:

- Efficient, high-performance bandwidth utilization—Two full-duplex 1-Gbps channels provide the bandwidth required to meet the most demanding user requirements, such as faster access to Web pages, real-time video, large file transfers, and other data-intensive applications.

- Optimized for IP-based Differentiated Services—The Cisco Gigabit Ethernet solution supports Internet-based multiservice networks based on IP. The Cisco Gigabit Ethernet implementation places the IP layer directly above the SONET layer and eliminates the overhead required to run IP over ATM over SONET.
- Configurable clock sources—The Cisco 2-port Gigabit Ethernet backcard can provide the clock source for the Gigabit Ethernet link and also retrieve the clock source from the network.
- Configurable loopbacks for troubleshooting—The Cisco 2-port Gigabit Ethernet backcard can configure both an internal loopback (loops outbound traffic back toward the front card) and a network loopback (loops inbound traffic back toward the network).
- SFP hot-swapping and security—The Cisco 2-port Gigabit Ethernet backcard is hot-swappable and can be removed and replaced even when the interfaces are not shut down.
- Card online-insertion-and-removal (OIR) support—The Cisco 2-port Gigabit Ethernet backcard can detect the insertion and removal the Cisco 2-port Gigabit Ethernet backcard.
- MAC address filtering—Address filtering can indicate when to accept or discard traffic based on a match for unicast or multicast entries.
- Layer 2 features—The Cisco 2-port Gigabit Ethernet backcard supports Ethernet 2.0, IEEE 802.3 Logical Link Control (LLC) Protocol, IEEE 802.3 Subnetwork Access Protocol (SNAP) with LLC, and 802.1q encapsulation support for IEEE VLANs, 802.3z-compliant
- Link management (autonegotiation)—The Cisco 2-port Gigabit Ethernet backcard allows devices at either end of the link segment to negotiate common data service functions.
- Flow control between gigabit links—The Cisco 2-port Gigabit Ethernet backcard can implement Layer 2 flow control using 802.3 pause frames.
- Interface MAC address assignment

The Cisco 2-port Gigabit Ethernet driver performs the following tasks:

- Initializes the Gigabit Ethernet driver subsystem at Cisco IOS Software boot time
- Initializes and configures the Gigabit Ethernet backcard
- Downloads the Gigabit Ethernet backcard firmware images
- Collects statistics for the command-line interface (CLI) and Simple Network Management Protocol (SNMP)
- Manages alarm and trap events after insertion, removal, and hot-swap
- Manages interface status and configuration changes
- Processes events and alarms
- Monitors data-path hardware failures
- Controls front- and backcard port and card status LEDs

The Cisco 2-port OC-12 POS backcard (part number MGX-2OC12POS) provides the following primary features:

- Efficient, high-performance bandwidth utilization—OC-12 performance of 622 Mbps provides the bandwidth required to meet the most demanding user requirements, such as faster access to Web pages, real-time video, large file transfers, and other data-intensive applications. The Cisco POS implementation offers a 25 to 30 percent gain in efficiency over multiservice IP traffic now running over ATM networks. It achieves this efficiency gain by eliminating the overhead required in ATM implementations, such as ATM cell header, IP-over-ATM encapsulation, and segmentation and reassembly (SAR).
- Optimized for IP-based Differentiated Services—The Cisco POS solution supports Internet-based multiservice networks based on IP. The Cisco POS implementation places the IP layer directly above the SONET layer and eliminates the overhead required to run IP over ATM over SONET.
- Configurable clock sources—The Cisco 2-port OC-12 POS backcard can provide the clock source for the POS link and also retrieve the clock source from the network.
- Configurable loopbacks for troubleshooting—The Cisco 2-port OC-12 POS backcard can configure both an internal loopback (loops outbound traffic back toward the front card) and a network loopback (loops inbound traffic back toward the network).
- Alarm processing—The Cisco 2-port OC-12 POS backcard implements SONET alarms that are fully Bellcore GR-253-compliant.

- SFP hot-swapping and security—The Cisco 2-port OC-12 POS backcard is hot-swappable and can be removed and replaced even when the interfaces are not shut down.
- Card OIR support—The Cisco 2-port OC-12 POS backcard has support to detect the insertion and removal of the 2-port OC-12 POS backcard.

The Cisco 2-port OC-12 POS backcard uses the Cisco 2-port POS driver, which performs the following tasks:

- Initializes the POS driver subsystem at Cisco IOS Software boot time
- Initializes and configures the POS backcard
- Downloads the POS backcard firmware images
- Collects statistics for the CLI and SNMP
- Manages alarm and trap events after insertion, removal, and hot-swap
- Manages interface status and configuration changes
- Processes events and alarms
- Monitors data-path hardware failures
- Controls front- and backcard port and card status LEDs

Table 1 gives technical specifications of the new Cisco backcards.

Table 1. Technical Specifications of Cisco 2-Port Backcards

	Cisco 2-Port OC-12 POS Backcard	Cisco 2-Port Gigabit Ethernet Backcard
Dimensions (H x W x D)	7 x 1 x 4.5 in. (7.78 x 2.54 x 11.43 cm)	7 x 1 x 4.5 in. (17.78 x 2.54 x 11.43 cm)
Power	Unit power budget: 15W	Unit power budget: 15W
Weight	0.75 lb	0.65 lb
Mean time between failure (MTBF)	> 100,000 hr	> 100,000 hr
Operational temperature	0° to 50°C (32° to 122°F)	0° to 50°C (32° to 122°F)
Interface specifications	<ul style="list-style-type: none"> • Optical power budget: 12 db • Transmit power: –15 to –8 dBm • Receive power: –28 to –8 dBm • Typical maximum distance: 9.3 miles (15 km) 	<ul style="list-style-type: none"> • 1000BASE-SX (multimode fiber) SFP option <ul style="list-style-type: none"> – Power budget: 8.0 dB – Transmit power: –4.5 dBm maximum to –9.0 dBm minimum – Receive power: –17.0 dBm • 1000BASE-LX (single-mode fiber) SFP option <ul style="list-style-type: none"> – Power budget: 11.0 dB – Transmit power: –3.5 dBm maximum to –9 dB minimum – Receive power: –20.0 dBm • 1000BASE-ZX (single-mode fiber) SFP option <ul style="list-style-type: none"> – Power budget: 20.0 dB – Transmit power: +3.0 dBm maximum to –2.0 dBm minimum – Receive power: –22.0 to 0 dBm • 1000BASE-T SFP option <ul style="list-style-type: none"> – RJ-45 Ethernet connector

	Cisco 2-Port OC-12 POS Backcard	Cisco 2-Port Gigabit Ethernet Backcard
LEDs	<ul style="list-style-type: none"> • Fail (yellow, one per card) • Additional LEDs on SFPs 	<ul style="list-style-type: none"> • Fail (yellow, one per card) • Additional LEDs on SFPs
Connector	<ul style="list-style-type: none"> • LC-duplex connector 	<ul style="list-style-type: none"> • LC-duplex connector • Optional SFPs: <ul style="list-style-type: none"> – 1000BASE-SX multimode, compliant with IEEE 802.3z specifications – 1000BASE-LX/LH single mode, compliant with IEEE 802.3z specifications – 1000BASE-ZX single mode, compliant with IEEE 802.3z specifications – 1000BASE-T RJ-45, compliant with IEEE 802.3z specifications
Encapsulation	<ul style="list-style-type: none"> • IETF RFC 1619, Point-to-Point Protocol (PPP) over SONET • IETF RFC 1662, PPP in High-Level Data Link Control (HDLC)-like framing • IETF RFC 2615, PPP over SONET/SDH with 1 + 43 self-synchronous payload scrambling 	<ul style="list-style-type: none"> • MAC with full-duplex operation and flow control • Hardware address filtering on received frames of up to 4000 address entries • 802.3x flow control • Ethernet encapsulation formats: <ul style="list-style-type: none"> – Ethernet Version 2 – 802.2 Service Advertisement Protocol (SAP) – 802.2 SNAP • 802.1Q VLANs
Alarm processing	Loss of signal (LOS), loss of frame (LOF), line alarm indicator signal (LAIS), path alarm indicator signal (PAIS), loss of pointer (LOP), line remote defect indicator (LRDI), path remote defect indicator (PRDI), signal failure (SF), signal degrade (SD), line remote error indicator (line FEBE), path remote error indicator (path FEBE)	
Performance monitoring	<ul style="list-style-type: none"> • Error counts for B1, B2, and B3 • Threshold crossing alerts (TCA) for B1, B2, and B3 with settable threshold 	
Synchronization	<ul style="list-style-type: none"> • Local (internal) or loop timed (recovered from network) • 20-ppm clock accuracy • Protection switching • Local (diagnostic) and line (network) loopback • Payload mapping • ATM 1 + X43 self-synchronous scrambler 	

	Cisco 2-Port OC-12 POS Backcard	Cisco 2-Port Gigabit Ethernet Backcard
Electrical, safety, and standards compliance	<ul style="list-style-type: none"> • EMI/ESD compliance <ul style="list-style-type: none"> – FCC Part 15 Class A – Bellcore GR1089-CORE – IEC 801-2 – EN55022 • Safety compliance <ul style="list-style-type: none"> – EN 60950 – UL 1950 • Bellcore Network Equipment Building Standards (NEBS): Level 3 compliant • Optical safety: IEC 825-1 (Class 1) 	

ORDERING INFORMATION

Table 2 below outlines the proper part numbers for the respective cards.

Table 2. Cross Reference of SFP Transceivers to Backcards

Backcard Part Number	SFP Part Number	SFP Product ID	Wavelength (nm)	Fiber Type	Maximum Distance (meters)	Connector Type ¹
MGX-2OC12POS	10-1829-01	SMFIR-622-SFP	1310	Single mode	15,000	LC
MGX-2OC12POS	10-1827-01	SMFLR-622-SFP	1310	Single mode	40,000	LC
MGX-2GE	30-1301-01	GLC-SX-MM	850	Multimode	200 (with 62.5-micrometer core) or 500 (with 50-micrometer core)	LC
MGX-2GE	30-1299-01	GLC-LH-SM	1300	Single mode	10,000	LC
MGX-2GE	10-1837-01	GLC-ZX-SM	1550	Single mode	70,000	LC
MGX-2GE	30-1410-02	GLC-T	—	—	100	RJ-45

¹ LC connectors are manufactured under license from Optical Fiber Systems (formerly Lucent Technologies). The LC is a small form-factor interconnect based on the RJ-45 telephone interface. LC is a fiber duplex connector that has a ferrule size of 1.25 micrometers as compared with the 2.5 micrometers for FC- and SC-type connectors.

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