CHAPTER 1

Overview: 4-Port Channelized OC-12 Line Card

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4-Port Channelized OC-12 Line Card Overview

The 4-Port Channelized OC-12/STM-4 ISE line card provides Cisco XR 12000 Series Routers with four OC-12c/STM-4c ports that can be channelized to DS3/E3, OC-3c/STM-1c, or OC-12c/STM-4c. The line card supports both SONET and SDH framing and provides DS-3/E3 aggregation for the Cisco XR 12000 Series Router. For SDH, both AU-3 and AU-4 mappings are supported. Table 1-1 lists the mappings and channelization that are supported on the 4-Port Channelized OC-12/STM-4 ISE Line Card.

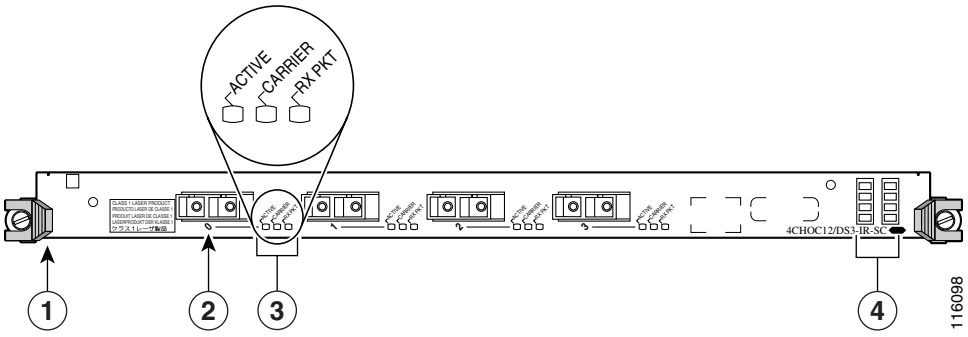
Table 1-1 Supported SONET and SDH Channelization Modes

SONET Channelization	SDH-AU3 Channelization	SDH-AU4 Channelization
STS-12c	STM-4, AU4-4-4c	STM-4
STS-3c	STM-1, AU4	STM-1
STS-1:DS-3[1]	STM-1 and AU3:VC-3:DS-3/E3	STM-1 and AU4:TUG-3:VC3:DS-3/E3

1. All valid combinations of these modes are supported

The line card interfaces with the Cisco XR 12000 Series Router switch fabric and provides a full-duplex short cable (SC), single-mode, intermediate-reach optical interface. Figure 1-1 shows the front view of this line card.

Figure 1-1 4-Port Channelized OC-12 line card



1	Ejector lever (one at each end)	**3**	Status LEDs
2	Port 0	**4**	Alphanumeric LEDs

Router Hardware Installation

For Cisco XR 12000 Series Router hardware installation and configuration information, refer to the installation and configuration guide for your router. The guide includes information on the router switch fabric and how it affects the operation of line cards, as well as line card slot locations, slot width, and other requirements.

Supported Platforms

The 4-Port Channelized OC-12 Line Cards are supported on all Cisco XR 12000 Series Routers.

Note To support the requirements of this line card, the Cisco XR 12000 Series Router must have at least one clock and scheduler card (CSC) installed. For additional information, refer to the installation and configuration guide for your Cisco XR 12000 Series Router.

Product Specifications

Table 1-2 provides specifications regarding the engine supported, the Cisco IOS XR software release, the chassis supported, and per-chassis port densities.

Table 1-2 Product Specifications

Line Card	Forwarding Engine	Cisco IOS XR Software Release	Chassis supported	Per-Chassis Port Densities
4-Port Channelized OC-12 Line Card	Engine 3	Cisco IOS XR Software Release 3.8.0	Cisco XR 12006	5 maximum ports per chassis
			Cisco XR 12010	9 maximum ports per chassis
			Cisco XR 12016	15 maximum ports per chassis
			Cisco XR 12404	3 maximum ports per chassis
			Cisco XR 12406	5 maximum ports per chassis
			Cisco XR 12410	9 maximum ports per chassis
			Cisco XR 12416	15 maximum ports per chassis
			Cisco XR 12810	9 maximum ports per chassis
			Cisco XR 12816	15 maximum ports per chassis

Physical and Electrical Specifications

Table 1-3 provides details about the physical and electrical specifications of the Cisco XR 12000 Series Router 4-Port Channelized OC-12 Line Card.

Table 1-3 Physical and Electrical Specifications

Line Card	Dimensions	Weight	Power	Memory	LEDs
4CHOC12/DS3-IR-SC	Height: 14.5 in. (36.8 cm) Depth: 18.5 in. (46.9 cm)	6.0 lb (2.7 kg)	140 W	Route: 512-MB Packet: 512-MB	Active Carrier Packet receive

Optical Specifications

Table 1-4 provides details about the optical specifications of the Cisco XR 12000 Series Router 4-Port Channelized OC-12 Line Card.

Table 1-4 Optical Specifications

Line Card	4CHOC12/DS3-IR-SC
Connector type	SC
Wavelength	1310 nm
Fiber type	Single-mode fiber (SMF)
Core size	9/125 micrometers
Cable distance	15 km
Link power budget (GE-253)	0 to 12 dB
Transmit power	-15 to -8 dBm
Receive power	-28 to -7 dBm

Ordering Information

To place an order, contact your local Cisco Systems representative or visit the ordering page on the Cisco website. Use the ordering information in Table 1-5.

Table 1-5 Ordering Information

Product Part Number	Product Name
4CHOC12/DS3-IR-SC	Cisco XR 12000 Series Router 4-Port Channelized OC-12/STM-16 (DS3) Line Card

4-Port Channelized OC-12 Line Card Hardware and Software Compatibility

For successful installation and configuration of the 4-Port Channelized OC-12 line card, ensure that the compatible hardware and the Cisco IOS XR Software Release are installed. This section provides details regarding the compatible Cisco IOS XR Software Release and the hardware revision requirements.

Cisco IOS XR Software Release Requirements

Table 1-6 lists the Cisco IOS XR software release that is compatible with the 4-Port Channelized OC-12 line card.

Table 1-6 4-Port Channelized OC-12 line card and IOS XR Software Release Compatibility

Channelized Line Card	Cisco IOS XR Software Release
4-Port Channelized OC-12 Line Card	Cisco IOS XR Software Release 3.8.0

Hardware Revision Requirements

To ensure compatibility with the software, your channelized line card should have a specific hardware revision number. The number is printed on a label affixed to the component side of the card. The hardware revision number can be displayed by using the **show diag** *0/1/cpu0* command.

Table 1-7 lists the hardware revision number for the 4-Port Channelized OC-12 Line Card.

Table 1-7 4-Port Channelized OC-12 line card Hardware Revision Requirements

Channelized Line Card	Minimum Hardware Revision Number	
4-Port Channelized OC-12/STM-16 ISE	73-7397-*yy* (where *yy* is a number from 01 to 14)	800-18816-*xx* (where *xx* is a number from 01 to 10)

4-Port Channelized OC-12 Line Card LEDs

See Figure 1-1 for the location of the LEDs on the 4-Port Channelized OC-12 line card. The different operating states of the status LEDs are shown in Table 1-8.

Table 1-8 4-Port Channelized OC-12 Line Card Status LED Descriptions

LED	Color/Activity	Description
Active	Off	Port is administratively down, or diagnostics are running.
	Solid Green	Port is administratively up.
Carrier	Off	Port is operationally down.
	Solid Green	Port is up and frames are received.
Rx PKT	Blinking Green	Line card is receiving data.

Alphanumeric LEDs

The 4-Port Channelized OC-12 Line Cards have two four-digit alphanumeric LED displays at one end of the faceplate (near the ejector lever) that display a sequence of messages indicating the state of the card. In general, the LEDs do not come on until the route processor (RP) recognizes and powers up the card. As it boots, the line card displays a sequence of messages similar to those in Table 1-9.

Note Some messages might appear in brief and for a short time. Also, some messages listed in Table 1-9 may not appear on your line card.

Table 1-9 Alphanumeric LED Messages During a Typical Initialization Sequence

LED Display[1]	Meaning	Source of LED Display
IOX RUN	Line card is enabled and ready for use.	Line Card (LC)
MBI RUN	Minimal boot image (MBI) is running.	Route Processor (RP)
MANT MoDE	Line card or router is running in a maintenance mode.	RP
DIAG LNCH	Field diagnostic is being launched.	RP
DDNL FAIL	Field diagnostic download has failed.	RP
DIAG RUN	Field diagnostic utility is running.	RP
DIAG TOUT	Field diagnostic is timed-out.	RP
DIAG PASS	Field diagnostic run has passed.	RP
DIAG FAIL	Field diagnostic run has failed.	RP
UNSU UNSU	Line card type is not supported.	RP
LOW MEM	Line card or router is running in low memory.	RP
NOTP	Line card is not present.	RP
NOPW	Line card is not powered on.	RP
PWRD	Line card is powered on.	RP
BOOT	Line card is booting.	RP
ADON	Line card is administratively down.	RP
RSET	Line card is in reset state.	RP
BRDN	Line card is being brought down.	RP
PWRD	Line card is present and is powered on.	RP
DGDL	Field diagnostic is downloading.	RP
DGUN	Field diagnostic is not running in a monitored state.	RP

1. The entire LED sequence shown in Table 1-9 might occur too quickly for you to read; therefore, this sequence is provided in tabular form as baseline information on how a line card should function at startup.

4-Port Channelized OC-12 Line Card Interface Specifications

The physical layer interface for the channelized OC-12 line card is Optical Carrier-12 (OC-12, the specification for SONET STS-12c transmission rates). The channelized OC-12 line card is designed to support both SONET and SDH mode of operation. In SONET mode, the OC-12 port can be channelized to carry STS-12c, STS-3c, STS1:DS3, or a combination of STS-3c and STS-1:DS3. In SDH mode, AU4 and AU3 are supported. By default, the controller comes up in 12xSTS-1 mode. The OC-12 line card provides a single 2.488-Mbps interface for all supported platforms.

Each channelized OC-12 line card has one pair of short cable (SC) type fiber receptacles to allow connection to single-mode optical fiber. Packet data is transported using Point-to-Point Protocol (PPP), Frame Relay, or HDLC and is mapped into the STS-12c frame (RFC 1619). The 4-Port Channelized OC-12 Line Card supports the following MIBs:

- CISCO-ENTITY-ASSET-MIB
- CISCO-ENTITY-SENSOR-MIB
- CISCO-SONET-MIB
- CISCO-ENTITY-VENDORTYPE-OID-MIB
- DS3/E3-MIB (RFC 2496)
- ENTITY-MIB
- FR DTE MIB
- IF-MIB (RFC 2863)
- MIB-2 (RFC 1213)
- SONET MIBs (RFC 3592, 2558)