Data Sheet

Cisco 7304 1-Port OC-48c/STM-16 Packet over SONET/SDH Line Card

OC-48c/STM-16 Connectivity for Edge Routing with High-Touch IP Service Delivery

Product Overview

The Cisco® 7304 Router is designed for the network edge where high-performance IP services are required to enable profitability, service differentiation, and business agility. Using a compact, 4-rack-unit (4-RU), modular (4-slot) form factor, the Cisco 7304 Router delivers high-touch IP services at optical speeds necessary for applications in the high-end enterprise, service provider edge, and for service provider-managed customer premises equipment (CPE).

High-performance services are critical in these implementations, and the Cisco 7304 Router delivers an evolving set of hardware-accelerated IP services through the Parallel Express Forwarding (PXF) IP Services Processor technology patented by Cisco Systems®. The Cisco 7304 Router provides a range of optical connectivity from OC-3/STM-1 to Gigabit Ethernet, OC-48 performance, an architecture engineered for high availability, and multiprotocol support. With two Gigabit Ethernet ports built into the system, the Cisco 7304 Router is the optical evolution of Cisco 7x00 Series routers.

The Cisco 7304 1-Port OC-48c/STM-16 Packet over SONET/SDH Line Card (Figure 1) is well suited as a high-speed uplink in numerous solutions. Examples include use as a WAN uplink for a CPE device to use as an uplink from the edge to the distribution layer or core in various network deployments. Using the Cisco Network Services Engine (NSE)-100 Route Processor on the Cisco 7304 Router, this line card can use multiprotocol capability from Cisco IOS® Software and PXF technology to deliver hardware-accelerated IP network services.

Figure 1
1-Port OC-48c/STM-16 Packet over SONET/SDH Line Card for the Cisco 7304 Router

Key Features and Benefits

Line Card Features

- SONET/SDH Framing
- 1+1 SONET automatic protection switching (APS) and SDH multiplex section protection (MSP), per port, per line card, and per chassis
- SONET/SDH errors, alarms, performance monitoring, synchronization, etc.
- Online Insertion and Removal (OIR)

Cisco 7304 Router System Features

- Compact (4RU), modular, Network Equipment Building Standards (NEBS)-3 compliant system
- Redundant Route Processor capable (enabled through future software upgrade)
- Front-to-back airflow
- Centralized PXF for hardware-accelerated features (Cisco Express Forwarding, Turbo access control list [ACL], Netflow v8, etc.)
- Multiprotocol and feature support using Cisco IOS Software

Encapsulations

- RFC 1661, Point-to-Point Protocol (PPP)
- RFC 1662, PPP in High-Level Data Link Control (HDLC)-like Framing
- RFC 2615, PPP over SONET/SDH with 1+x43 Self-Synchronous Payload Scrambling

Rack Density

Table 1 shows the rack and chassis density of the line card.

Table 1. Chassis and Rack Density[1, 2]

OC-48c/STM-16 POS/SDH Line Card	Cisco 7304 Chassis Density	Cisco 7304 Rack Density
7300-1OC48POS-xx	4 OC-48/STM-16 and 2 Gigabit Ethernet (GE) ports	44 OC-48/STM-16 and 22 GE ports

1. Configured with:
   One NSE-100 per Cisco 7304 Router chassis
   Four 1-port OC-48 POS line cards per Cisco 7304 Router chassis
   11 Cisco 7304 Router chassis per 7-foot rack
2. Note that this is an oversubscribed system with the NSE-100

Minimum Software Revision

- Cisco IOS Software Release 12.2(20)S

Ordering Information

- To order, visit http://www.cisco.com/public/ordering_info.shtml.

Table 2 lists ordering information for the Cisco 7304 1-Port OC-48c/STM-16 Packet over SONET/SDH Line Card.

Table 2. Ordering Information

Part Number	Description
7300-1OC48POS-SMS	Cisco 7304 1-Port OC-48c/STM-16 Packet over SONET/SDH Line Card, single mode-short reach (SM-SR)
7300-1OC48POS-SMS=	Cisco 7304 1-Port OC-48c/STM-16 Packet over SONET/SDH Line Card (SM-SR), spare
7300-1OC48POS-SMI	Cisco 7304 1-Port OC-48c/STM-16 Packet over SONET/SDH Line Card, single mode-intermediate reach (SM-IR)
7300-1OC48POS-SMI=	Cisco 7304 1-Port OC-48c/STM-16 Packet over SONET/SDH (SM-IR), spare

Please note that "=" denotes a spare order (that is, Cisco 7300-1OC48POS-SMS= would be the spare part number if the line card is not ordered within a chassis.)

Technical Specifications

Physical Specifications

- Occupies one bay in a Cisco 7304 Router chassis
- One OC-48c/STM-16 port supported per line card
- Up to four Cisco 7304 1-port OC48POS-X modules supported in a 4-slot chassis
- Weight: 3.0 lb/1.36 kg
- Mean time between failure (MTBF): 5.5 years for system configuration
- Indicators and LEDs: See Table 3
- Connector Type: SC
- Optical Specifications: See Table 4
- Environmental Conditions:
  - Operating temperature: 32 to 104°F (0 to 40°C)
  - Storage temperature: –4 to 149°F (–20 to 65°C)
  - Relative humidity: 5 to 90 percent, noncondensing
  - Operating altitude: –500 to 6500 feet

Table 3 provides the LED definitions for the line card, and Table 4 lists the optical specifications.

Table 3. LED Definition

LED Label	Color	State	Function
LC Status	Green/Yellow	Green	Line card is online
		Yellow	Line card bootstrapping in progress
		Off	Line card is offline
OIR	Green	Green	Line card is ready for OIR extraction
		Off	Default (online)
Carrier/Alarm	Green/Yellow	Green	Valid SONET signal has been detected with no alarm condition
		Yellow	Valid SONET signal has been detected but an alarm condition is present
		Off	No valid SONET signal has been detected
Port Active/Loopback	Green/Yellow	Green	Port has been configured and is enabled
		Yellow	Port is in diagnostic loopback mode
		Off	Port has not been configured

Table 4. Optical Specifications

Fiber Interface	Transmit Power		Wavelength		Input Power	Input Sensitivity	Loss Budgets	Nominal Distance
	Min.	Max.	Min.	Max.	Max.	Min.		Max.
SM-SR	–10 dBm	–3 dBm	1266nm	1360 nm	–3 dBm	–18 dBm	0 to 7 dB	1.2 mi (2km)
SM-IR	–5 dBm	0 dBm	1260 nm	1360 nm	0 dBm	–18 dBm	0 to 12 dB	9 mi (15 km)

SONET/SDH Specifications

SONET/SDH-Compatible Specifications:

- Telecordia (Bellcore) GR-253-CORE (as applicable)
- ITU-T G.707, G.957, G.825 (as applicable)
- Support for 1+1 SONET APS as per GR-253-CORE—per port, per line card, per chassis (as applicable)
- Support for 1+1 SDH Multiplex Section Protection (MSP) as per G.783 Annex A—per port, per line card, per chassis (as applicable)

SONET/SDH Errors, Alarms, and Performance Monitoring

- Signal Failure bit error rate (SF-BER)
- Signal Degrade bit error rate (SD-BER)
- Signal Label Payload Construction (C2)
- Section:
  - Loss of Signal (LoS)
  - Loss of Frame (LoF)
  - Error Counts for B1
  - Threshold Crossing Alarms (TCA) for B1

- Line:
  - Line Alarm Indication Signal (LAIS)
  - Line Remote Defect Indication (LRDI)
  - Line Remote Error Indication (LREI)
  - Error Counts for B2
  - Threshold Crossing Alarms (TCA) for B2
- Path:
  - Path Alarm Indication Signal (PAIS)
  - Path Remote Defect Indication (PRDI)
  - Path Remote Error Indication (PREI)
  - Error Counts for B3
  - TCA for B3
  - Loss of Pointer (LoP)
  - New Pointer Events (NEWPTR)
  - Positive Stuffing Event (PSE)
  - Negative Stuffing Event (NSE)
  - Path Unequipped Indication Signal (PUNEQ)
  - Path Payload Mismatch Indication Signal (PPLM)

SONET/SDH Synchronization

- Local (Internal) Timing (for interrouter connections over dark fiber or wavelength-division multiplexing [WDM] equipment)
- Loop (Line) Timing (for connection to SONET/SDH equipment)
- ±20 pluggable port modules (ppm) Clock Accuracy over Full Operating Temperature

Network Management

- SONET MIB (RFC 1595), Performance Statistics for Timed Intervals (current, 15-minute, multiple 15-minute, and 1-day intervals)
  - Regenerator Section
  - Multiplex Section
  - Path Errored Seconds
  - Severely Errored Seconds
  - Severely Errored Framed Seconds
- Please see NSE-100 data sheet for more MIB support

Regulatory Compliance

Safety Compliance

- UL 1950
- CAN/CSA C22.2 No. 950-95
- EN60825-1 Laser Safety (Class 1)

- 21CFR 1040 Laser Safety
- EN60950
- IEC 60950
- TS 001
- AS/NZS 3260

EMC Compliance

- FCC Part 15 (CFR 47) Class A
- VCCI Class A
- EN55022 Class A
- CISPR 22 Class A
- AS/NZS 3548 Class A
- EN55024
- CE Marking
- EN50082-1
- ETS300386

NEBS Level 3 Compliance

- GR-1089-Core, Electromagnetic Compatibility and Electrical Safety
- GR-63-CORE – NEBS: Physical Protection

Service and Support

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For More Information

For more information about the Cisco 7304 routers, visit http://www.cisco.com/en/US/products/hw/routers/ps352/index.html or contact your local Cisco account representative.

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