

Cisco OC-3/STM-1 Packet-over-SONET/SDH Line Card for Cisco 12000 Series Routers

THE CISCO OC-3/STM-1 PACKET-OVER-SONET/SDH LINE CARD IS A HIGH-CAPACITY, HIGH-PERFORMANCE INTERFACE THAT IS IDEAL FOR EDGE FEATURE SUPPORT AND CUSTOMER ACCESS APPLICATIONS. THE FOUR-PORT OC-3/STM-1 CARD MAY BE ORDERED WITH MULTIMODE, SINGLE MODE INTERMEDIATE REACH, AND SINGLE MODE LONG REACH OPTICS ENABLING CUSTOMERS TO CONNECT DIRECTLY TO FIBER OR TRADITIONAL SONET/SDH SOLUTIONS.

Figure 1 Cisco OC-3/STM-1 Packet-over-SONET/SDH Line Card

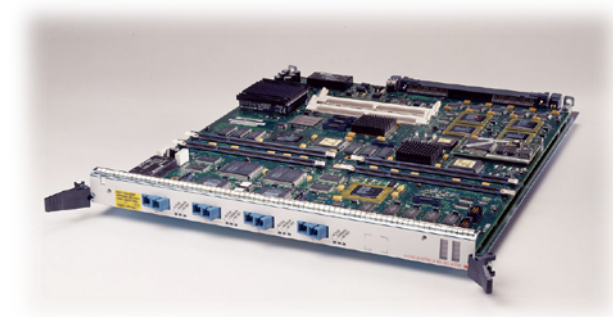


Table 1 Feature Highlights

Feature	Description
Port Density	Four concatenated OC-3/STM-1 ports
Edge Support	CAR, EAAL, MPLS, CoS, and NetFlow
Cisco IOS®	Rich Software feature set and advanced networking features
Optics	Multimode, single intermediate reach, and single mode long reach
Cost Per Bit	\$53 per Mbps

Feature Summary

Packet Layer Support

- Multiple virtual output queues, eliminating head-of-line blocking
- 512-KB burst buffers, which smooth out the arriving packet bursts
- 64 MB/64 MB packet buffer memory for Transmission Control Protocol (TCP) goodput
- Configurable with up to 256 MB of code and route table memory
- A Cisco Express Forwarding (CEF) table that can accommodate up to one million forwarding entries
- Application-specific integrated circuit (ASIC)-based queuing
- Class of service (CoS) support
- IP-based congestion management

SONET/SDH Layer

- Standards compliant SONET/SDH interface
- 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
 - Error counts for B1, B2, B3
 - Threshold Crossing Alerts (TCA) for B1, B2, B3 with settable threshold

- Synchronization
 - Local (internal) or loop timed (recovered from network)
 - 20 ppm clock accuracy
 - Pointer activity monitoring
- Protection switching
 - Support both SONET APS and SDH MSP protocols
- Local (Diagnostic) and line (Network) loopback
- Payload mapping
 - IETF RFC 1619 Point-to-Point Protocol (PPP) over SONET/SDH
 - ATM 1 + X43 self synchronous scrambler

Software Features

- Weighted Random Early Discard/Deficit Round Robin (WRED/DRR)
- Committed Access Rate (CAR)
- Access Control List (ACL)
- Multicast forwarding
- NetFlow
- Multi Protocol Label Switching (MPLS)
- MPLS traffic engineering using Routing with Resource Reservation (RRR)
- MPLS VPN and CoS¹

Specifications

Physical

- Occupies a single slot
- Weight: 6 lb. (2.7 kg)
- Height: 14 in. (35.6 cm)
- Depth: 18 in. (45.7 cm)

Environmental

- Operating temperature: 32 to 104 F (0 to 40 C)
- Storage temperature: –4 to 149 F (–20 to 65 C)
- Relative humidity: 10 to 90%, noncondensing

Regulatory Compliance

SONET/SDH

- Telcordia (Bellcore GR-253 as applicable)
- ITU-T G.957 (as applicable)
- ITU-T G.958 (as applicable)

Safety

- UL 1950
- CSA 22.2-No. 950
- EN60950
- EN41003
- AUSTEL TS001

1. Post initial FCS release

- AS/NZS 3260
- EN60825 laser safety (Class 1)

EMI

- FCC Class A
- AS 3548 Class A
- EN55022 Class A
- VCCI Class 1

Immunity

- IEC-1000-4-2 ESD
- IEC-1000-4-3 radiated immunity
- IEC-1000-4-4 EFT
- IEC-1000-4-5 surge
- IEC-1000-4-6 low Frequency common immunity
- IEC-1000-4-11 voltage dips and sags
- IEC-1000-3-2 power line harmonics

NEBS

- SR-3580—NEBS: Criteria levels (Level 3 compliant)
- GR-63-Core—NEBS: Physical protection
- GR-1089-Core—NEBS: EMC and safety

ETSI

- ETS-300386-2 switching equipment

LEDs

- Enable
- Receive carrier
- Receive packets
- Alpha-numeric management display

Connector

- SC duplex

Encapsulation

- IETF RFC 1661, PPP over SONET/SDH
- IETF RFC 1662, PPP in HDLC like Framing
- IETF RFC 1490, Frame-Relay encapsulation

Network Management

- CiscoView
- Simple Network Management Protocol (SNMP)
- SONET MIB RFC 1595 supported through SNMP
- Management Information Base (MIB)-II
- IP Manager

System-Level Requirements

- A minimum of one clock scheduler card (CSC) is required for OC-3/STM1 deployment
- Release 11.2 (11 GS2 or higher)
- Release 12.0 (2 S or higher)

Table 2 Optical Power Budget Packet over SONET/SDH Cisco 12000 OC-3/STM-1 Optics

Parameter	Multimode Fiber 1261-1360 nm	Intermediate Reach 1261-1360 nm IR-1	Long Reach 1280-1335 nm LR-1
Line Rate	155.52 Mbps		
Connector Type	SC		
Launch Power (Max.)	-14 dBm	-8 dBm	0 dBm
Launch Power (Min.)	-18.5dBm	-15 dBm	-5 dBm
Receiver Power (Max)	-14 dBm	-8 dBm	-8 dBm
Receiver Power (Min.)	-30 dBm	-31 dBm	-34 dBm
Optical Path Power Penalty	1 dB	1 dB	1 dB
Power Budget	11.5 dB	16 dB	29 dB
Maximum Distance ¹	2 km	15 km	40 km

1. Worst-case scenario considering fiber, connectors, patch panel, and splices.

Note: a typical single-mode optical cable has a transmission loss of 0.4-0.5 dB/km at the 1310 nm region. The splicing loss will be 0.2-0.3 dB each, and splicing will be made at every one to three kilometers (conduit) or two to five kilometers (direct burial).

Table 3 Product Availability and Part Numbers

Product Descriptions	Part Number	Availability
Four Port OC-3/STM-1 SONET/SDH Multimode LC with SC Connector	LC-4 OC-3-POS-MM	Now
Four Port OC-3/STM-1 SONET/SDH Single-Mode IR LC with SC Connector	LC-4 OC-3-POS-SM	Now
Four Port OC-3/STM-1 SONET/SDH Long Reach LC with SC Connector	4 OC-3-POS-LR-SC	Now

Route Table Memory		Packet Buffer Memory	
Product Number	Description	Product Number	Description
MEM-DFT-GRP/LC-64	64-MB GRP and LC Program/Route Memory (1x64-MB)		
MEM-GRP/LC-128	128-MB GRP and LC Program/Route Memory (1x128-MB)	Default	Line Card Buffer Memory, 64-MB/64-MB (Tx/Rx)
MEM-GRP/LC-256	256-MB GRP and LC Program/Route Memory (2x128-MB)		

For additional information, please visit our Web site at
<http://www.cisco.com/warp/customer/cc/cisco/mkt/core/120>
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