

Cisco 10000 Series Six-Port OC-3c/STM-1 Packet-over-SONET/SDH Interface Module

The Cisco 10000 Series six-port OC-3c/STM-1 POS line card is a high-capacity, high-performance interface that enables service providers to offer dedicated Internet access services and peering to other service providers at OC-3c/STM-1 rates. With its line-rate OC-3c/STM-1 capacity (155 Mbps), this Cisco 10000 Series module provides a powerful combination of scalability and flexibility - enabling service providers to substantially increase the data load over their optical transport infrastructure.

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Key Benefits

Efficient, High-Performance Bandwidth Utilization

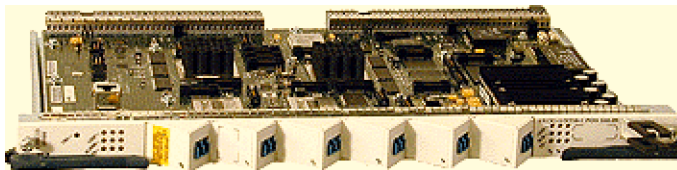
The Cisco 10000 Series six-port OC-3c/STM-1 PoS card provides the unique advantages of efficient bandwidth utilization combined with line-rate performance.

A major advantage of mapping IP packets directly into SONET/SDH technology is the ability to provide superior performance. OC-3c/STM-1 line-rate performance of 155 Mbps provides the increased bandwidth required by many ISPs to handle the most demanding user requirements such as faster access to the Internet and data-intensive applications such as real-time video and large file transfers.

Fault-Tolerant Backbone Connectivity

The Cisco 10000 Series six-port OC-3c/STM-1 PoS module implements SONET APS and SDH MSP, a valuable tool to support network resiliency, fault tolerance,

Figure 1
 Cisco 10000 Series
 Six-Port OC-3c/STM-1
 Packet-over-SONET/
 SDH Line Card



and increased overall network availability. APS provides a very fast Layer 1 mechanism to support 1:1 redundant transmission circuits between SONET devices. APS allows rapid switchover from the working fiber to the protection fibers in case of a fiber cut or module failure, signal failure, or signal degradation, thereby increasing the network overall resiliency, minimal loss of data, and reduction in time-consuming reroutes of data.

Compatibility and Interoperability Reduces Costs

POS protects the customer's investment by providing a high-performance backbone connection that optimizes existing fiber in the network while remaining compatible with the existing equipment in the network.

The Cisco 10000 Series six-port OC-3c/STM-1 PoS module is fully compatible with standard OC-3c/STM-1 POS implementations." By enabling customers to more efficiently use existing fiber and reuse currently installed platforms, the Cisco 10000 Series POS implementation saves the customer money and improves the overall efficiency of the network.

Hardware Features

- Six-port OC-3c/STM-1 SONET/SDH interface with LC, single-mode, intermediate-reach (IR) connector
- Interface supports single-mode, IR fiber (maximum distance 15 km)
- Unit power budget, 28W
- NEBS Level 3 compliant
- Interface: LC single mode, intermediate reach connector
- Hot swappable, no slot dependency

High-Availability Features

- Supports per-port SONET Automatic Switching Protection (ASP)
- Supports per-port SDH Multiplex Section Protection (MSP)
- Supports online insertion and removal (OIR)
- Supports Cisco IOS Software Route Processor Redundancy Plus (RPR+)
- Supports alarms (SONET-based alarms)

SONET/SDH Compliance

- Standards-compliant SONET interface
 - GR253 compliant
 - ITU G.707 and G.957 compliant
- 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), and 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)
 - 4.6 ppm clock accuracy
- Protection switching
 - Support for SONET APS and SDH MSP protocols
 - Local (diagnostic) and line (network) loopback
- Payload mapping
 - IETF RFC 1619 Point-to-Point Protocol (PPP) over SONET
 - Frame relay

Physical Specifications

- Weight: 4.75 lb (2.16 kg)
- Dimensions: 16.0 x 1.21 x 9.97 in. (40.64 x 2.83 x 25.32 cm) (H x W x D)

Product Regulatory Compliance

Environmental Conditions

- Storage temperature: -38 to 150 F (-40 to 70 C)
- Operating temperature, nominal: 41 to 104 F (5 to 40 C)
- Operating temperature, short term: 23 to 131 F (-5 to 55 C)
- Storage relative humidity: 5 to 95% relative humidity (RH)
- Operating humidity, nominal: 5 to 85% RH
- Operating humidity, short term: 5 to 90% RH
- Operating altitude: -60 to 4000m

Product Regulatory Approvals

- UL60950/CAN/CSA-C22.2 No. 60950-00, third edition, dated December 1, 2000, with no deviation considered to be less stringent than IEC 60950
- EN60950 with Amendments 1-4, for CE Marking to the LVD directive
- IEC 60950 third edition with Amendments 1-4, including all national/group deviations
- AS/NZS 60950:2000
- AS/NZS 3260-1993 with Amendments 1-4
- ACA TS001-1997

Laser Safety

- 21 CRF 1040, Subchapter J
 - EN60825-1
 - EN60825-2

Electromagnetic Emissions Certification

- AS/NZ 3548:1995 (including Amd I + II) Class B
- EN55022:1998 Class B
- CISPR 22:1997
- EN55022:1994 (including Amd I+ II)
- 47 CFR Part 15:2000 (FCC) Class B
- VCCI V-3/01.4 Class 2
- CNS-13438:1997 Class B
- GR1089:1997 (including Rev1: 1999)

Immunity

- EN300386:2000-TNE EMC requirements; product family standard; high priority of service; central office and non-central office locations
- EN50082-1:1992/1997
- EN50082-2:1995—Generic Immunity Standard, Heavy Industrial
- CISPR24:1997
- EN55024:1998—Generic ITE Immunity Standard
- EN61000-4-2:1995+AMD I + II-ESD, Level 4, 8-kV contact, 15-kV air
- IEC-1000-4-3:1995+AMD 1-Radiated Immunity, 10 V/m
- IEC-1000-4-4:1995—Electrical Fast Transients, Level 4, 4 kV/B
- IEC-1000-4-5:1995+AMD 1—DC Surge Class 3; AC surge Class 4
- EN61000-4-6:1996+AMD 1—RF Conducted Immunity, 10V rms
- EN61000-4-11:1995—Voltage Dips and Sags
- ETS300 132-2:1996+corregendum, Dec. 1996
- GR1089:1997 (including Rev1: 1999)

Network Equipment Building Systems

- Level 3 compliant
- Telcordia SR-3580 Criteria Levels, issued November 1995
- GR1089-Core: Electromagnetic Compatibility & Electrical Safety, issued February 1999
- GR63-Core: Physical Protection Requirements, issued April 2002
- SBC equipment requirements: TP76200 MP and TP76400 MP
- Verizon equipment requirements: SIT.NEBS.TE.NPI.2002.010

LEDs

- Carrier Detect (CA) (green-logical inverse of LOS, one per port)
- Alarm (yellow-On indicates the presence of a port alarm, one per port)
- Loopback (LOOP) (yellow-On indicates the data path is in loopback, one per port)
- Fail (yellow-On when a board failure is detected, one per card)

Encapsulation

- IETF RFC 1661, PPP
- ETF RFC 1662, PPP in High-Level Data Link Control (HDLC)-like Framing
- IETF RFC 1490, Frame Relay encapsulation

Network Management

- Network Management via
 - Telnet (CLI)
 - Console port (CLI)
 - Simple Network Management Protocol (SNMP)
- MIB-II
- RFC 1213
- SONET/SDH MIB RFC 1595

Power Budget

- Unit power: 28W

Optical Power Budget

- Power budget: 12 db
- Transmit power: -15 to -8 dBm
- Receive power: -28 to -8 dBm
- Typical maximum distance: 9.3 miles (15 km)

Product System Requirements and Compatibility

Hardware Requirements

- *Chassis*—The 4-port OC3 POS line card is supported on all Cisco 10000 Series chassis
- *Performance routing engines (PREs)*—The 4-port OC3 POS line card is supported on all PREs available on the Cisco 10000 Series

Software Requirements

Initial IOS Releases: The 4-port OC3 POS line card is supported in 12.0(20)ST, 12.0(22)S, 12.2(8)BZ and later Cisco IOS® releases. For the latest IOS release information, refer to:

<http://www.cisco.com/cgi-bin/front.x/Support/HWSWmatrix/hwswwmatrix.cgi>

Ordering Information

Part Number	Description
ESR-6OC3/P-SMI	Six-port OC-3c/STS-3c/STM-1 PoS, Single Mode, Intermediate Reach
ESR-6OC3/P-SMI=	Six-port OC-3c/STS-3c/STM-1 PoS, Single Mode, Intermediate Reach, SPARE

Service and Support

Cisco Systems offers a wide range of service and support options for its customers. More information on Cisco service and support programs and benefits can be found at:

http://www.cisco.com/public/Support_root.shtml.



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