Data Sheet

Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 Optical Services Module

Cisco 7600 Series Optical Services Modules (OSMs) for channelized Synchronous Optical Network (SONET) and Synchronous Digital Hierarchy (SDH) services provide for the rapid, efficient addition of circuits within existing optical connections. When an OC-12/STM-4 circuit is established, all channels from OC-3c/STM-1 to DS0 can be remotely provisioned, eliminating the need for the multiplexer line-card installations that are normally required to increase the available number of electrical circuits.

Coupled with numerous interfaces and native edge-aggregation services such as Multiprotocol Label Switching (MPLS) and Quality-of-Service (QoS), the Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM meets aggregation site connectivity requirements. Using channelized interfaces to receive multiplexed T1/E1 and higher-speed circuits on a single pair of optical fibers, service providers and large enterprises can save dramatically on power, floor space, local-loop charges, and equipment costs.

The Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM can accept both clear-channel T3 traffic and multiplexed circuits from OC-3/STM-1, T3/E3, T1/E1, and DS0. Service features include support for IP and MPLS traffic, Class-Based Weighted Fair Queuing (CBWFQ), Low-Latency Queuing (LLQ), and Weighted Random Early Detection (WRED). Also included is support for hardware-enabled Multilink Point-to-Point Protocol (MLPPP), capable of up to 168 T1/E1 bundles supporting up to 12 T1/E1 links per bundle. In deployments where infrastructure protection is essential, these modules support SONET and SDH protection switching (automatic protection switching/multiplex section protection [APS/MSP]) in four-fiber configurations. With this combination of features and performance, Cisco provides a versatile electrical interface for the easy upgrade to the advanced network architectures provided by Cisco 7600 Series routers.

The Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM is ideal for several applications, including:

- Service provider edge offices or data centers aggregating circuits from multiple customer sites and locations
- Enterprises requiring bandwidth expansions (onsite multiplexers can be eliminated by directly receiving delivery of the “optical pipe”)

Figure 1
Cisco 7600 Series 1-Port Channelized OC-12/ STM-4 OSM

The Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM can efficiently aggregate several DS0, T1/E1, T3/E3, and OC3/STM-1 circuits into a service provider point of presence (POP) or enterprise headend (Figure 2).

Figure 2
Aggregation Scenario for Channelized OC-12/STM-4 Applications

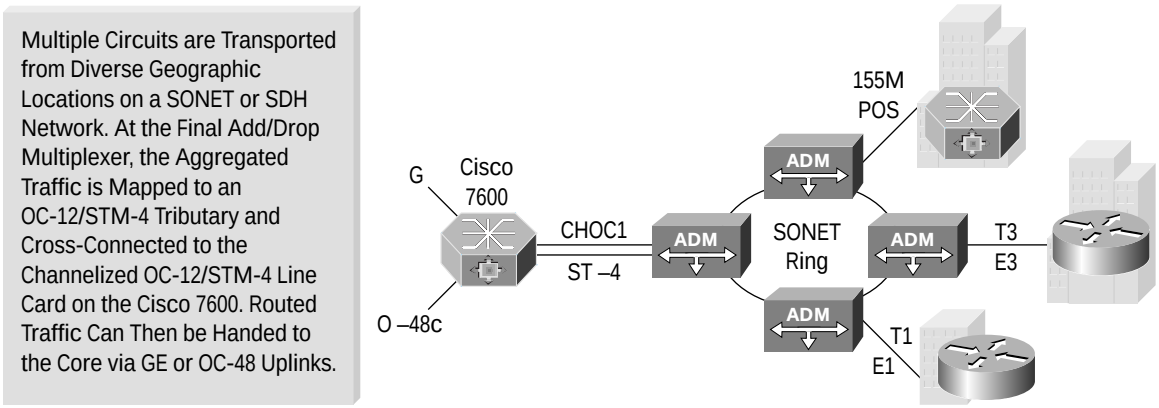

Table 1 describes the features provided in the Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM.

Table 1 Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM Features

Feature	Benefit
Encapsulations	Offers PPP, Frame Relay, and Cisco High-Level Data Link Control (HDLC).
MLPPP	Provides hardware-enabled MLPPP with up to 168 bundles and 12 T1/E1 links per bundle. QoS features such as CBWFQ and LLQ can also be applied over an MLPPP bundle.
Channel support	Supports up to 1023 channels per OC-12/STM-4 port with mixtures of POS OC-3/STM-1, T3/E3, nxT1/E1, or nxDS0.
CBWFQ	Implements CBWFQ using the Cisco modular QoS command-line interface (CLI) (Cisco MQC) framework. CBWFQ manages link congestion by guaranteeing minimum bandwidth to predetermined traffic classes while fairly serving other classes of traffic in the network. CBWFQ on the Channelized OC-12/STM-4 can be implemented on logical interfaces, including nxDS0, nxT1/E1, T3/E3, and OC-3/STM-1.
LLQ	Implements LLQ using the Cisco MQC framework. LLQ manages link congestion by guaranteeing minimum bandwidth, giving highest priority to predetermined traffic classes while fairly serving other classes of traffic in the network. LLQ on the Channelized OC-12/STM-4 can be implemented on logical interfaces, including nxDS0, T1/E1, T3/E3, and OC-3/STM-1.
WRED	Implements WRED using the Cisco MQC framework. The WRED algorithm provides congestion avoidance on network interfaces by providing buffer management, and by allowing Transmission Control Protocol (TCP) traffic to throttle back before buffers are exhausted. This helps avoid tail drops and global synchronization issues, maximizing network usage and TCP-based application performance. WRED can be implemented on logical interfaces, including nxDS0, T1/E1, T3/E3, and OC-3/STM-1.
MPLS	Plays several critical roles as an edge device, as a label-edge router for pure MPLS-based networks, and as a provider-edge device for MPLS virtual private networks (MPLS VPNs). The Cisco 7600 Series supports RFC-2547 and RFC-2547-bis-based MPLS VPNs.

Table 1 Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM Features

Feature	Benefit
1023 virtual routing and forwarding (VRF) instances per chassis for MPLS VPN Layer 3 applications	Offers increased service density for MPLS/VPN services.
Upgradable programmed feature sets using the Cisco Parallel Express Forwarding (PXF) IP Services Processor	Offers greater flexibility to support new features through software upgrades, while delivering performance similar to application-specific integrated circuit (ASIC)-based designs.
256 MB direct memory access (DMA)	Supports larger traffic shaping queues. Enhanced OSMs support a minimum of 8000 QoS queues.
APS and MSP support	Offers 1+1 protection switching to improve reliability, providing additional protection against component and transport architecture.
Additional 4 ports of Gigabit Ethernet	Offers simultaneous WAN and LAN access to meet diverse applications.
Optical delivery of leased-line circuits	Eliminates patch panels and cabling of multiple electrical circuits. Eliminates the need for an onsite fiber multiplexer. Reduces the per-circuit charges associated with "premises" terminations.
Reduced power consumption	Aggregates circuit terminations onto a single line card.
Compatible with Cisco 7600 Series and Cisco Catalyst® 6500 Series chassis	Offers flexibility and investment protection for customers with an installed base of either chassis.
Future support for Layer 2 network services	Provides network architectures based on Frame Relay and ATM over MPLS.

Supported SONET and SDH Mapping

Table 2 lists SONET and SDH mapping information for the Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM.

Table 2 SONET and SDH Mapping Information for the Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM

SONET	• POS to STS-12c • POS to STS-3c • Clear channel or sub-rate T3 • Channelized T3 (28 x T1) • T1/VT1.5 • nxDS0:T1
SDH	• POS to STM-4 • POS to STM-1 *AU-3 mapping* • Clear-channel E3 • Clear-channel T3 • Sub-rate T3 • E1 • E1 (21):T3 • nxDS0:E1 *AU-4 mapping* • Clear-channel E3 • E1 • nxDS0:E1

Optical Specifications

Table 3 lists optical specifications for the Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM.

Table 3 Optical Specifications for the Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM

Fiber Interface	Output Power		Input Sensitivity	Input Power	Wavelength	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
LC connector	–15.0 dBm	–8.0 dBm	–28.0 dBm	–8.0 dBm	1270 nm	1380 nm

Ordering Information

Table 4 lists ordering information for the Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM.

Table 4 Ordering Information for the Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS0 OSM

Product Number	Description
OSM-1CHOC12/T1-SI	1-port Channelized OC-12/STM-4 OSM, single-mode intermediate-reach optics with LC connectors (128-MB DRAM default)
OSM-1CHOC12/T1-SI=	Spare 1-port Channelized OC-12/STM-4 OSM, single-mode intermediate-reach optics with LC connectors (128-MB DRAM default)
MEM-OSM-256MB	256-MB error-correcting code (ECC) memory for Cisco Optical Services Modules (optional)
MEM-OSM-512MB	512-MB ECC memory for Cisco Optical Services Modules (optional)

Note: The "=" at the end of the part number denotes a spare module (for example, an OSM-1CHOC12/T1-SI= is a spare module, when not ordered in a system).

Minimum Software Release

Cisco IOS® Software Release 12.1(13)E3

Technical Specifications

SONET and SDH Feature Support

- GR-253-CORE
- G.707, G825, and G957

DS3 Features

- Channelized DS3 with 28 DS1s or 21 E1s
- Unchannelized DS3 supporting sub-rate and scrambling formats for Digital Link, ADC/Kentrox, Lar-scom, Adtran, and Verilink digital service units (DSUs)
- C-bit parity and M23 framing
- Bit error rate tester (BERT)
- Local, line, and remote loopback
- DS3 facility data link (FDL)
- Far End Alarm and Control (FEAC) channel
- RFC 1407 Management Information Base (MIB) support
- ANSI T1.107

E3 Features

- Unchannelized E3
- G.751 E3 framing
- BERT
- Network loopback
- RFC 1407 MIB support

T1 Features

- Super Frame and Extended Super Frame (SF/ESF)
- BERT
- Local, line, and remote loopback
- Generates and terminates FDL in ESF framing
- RFC 1406 MIB support
- ANSI T1.107

E1 Features

- Unframed E1 or basic and cyclic-redundancy-check (CRC)-4 G.706 framing
- BERT
- Local and line loopback
- Generation and termination of HDLC data link in national use bit
- RFC 1406 MIB support
- G.704

SONET Alarms and Error Indicators

Section

- Loss of signal (LOS)
- Loss of frame (LOF)

Line

- Alarm indication signal (AIS)-L
- Remote defect indicator (RDI)-L
- Remote error indicator (REI)-L

STS path

- LOP-P
- AIS-P
- UNEQ-P
- TIM-P
- RDI-P
- PLM-P

Virtual tunnel path

- LOP-V
- NDF-V
- AIS-V
- CV-V
- UNEQ-V
- RDI-V
- REI-V
- RFI-V
- TIM-V
- PLM-V

SDH Alarms and Error Indicators

Multiplex section

- MS-AIS
- MS-RDI
- MS-REI

Regenerator section

- LOS
- LOF

Higher-order path

- AU-LOP
- AU-AIS
- HP-UNEQ
- HP-TIM
- HP-RDI
- HP-PLM

Lower-order path

- TU-LOP
- TU-NDP
- TU-AIS
- TU-LOM
- BIP-2/B3
- LP-UNEQ
- LP-RDI, LP-REI
- LP-RFI

- LP-TIM
- LP-PLM

T3 Alarms

- AIS
- Out of frame (OOF)
- Far-end receive failure
- Far-end block error (C-bit parity)
- FEAC

E3 Alarms

- LOS
- AIS
- OOF

T1 Alarms

- AIS
- LOF
- Resource availability indicator (RAI)

E1 Alarms

- AIS
- LOF
- RAI

Network Management

- Fully configurable using the Cisco IOS Software CLI
- Telnet (using CLI)
- Console port (using CLI)
- Simple Network Management Protocol (SNMP)
- DS3 MIB (RFC 1407)
- DS1 MIB (RFC 1406)
- MIB-II (RFC 1213)
- SONET MIB (RFC 1595)

Physical Features

- Occupies one slot in any Cisco 7600 Series chassis or Cisco Catalyst 6500 Series chassis
- Line-card optical connectors
- One OC-12/STM-4
- Four Gigabit Ethernet optical ports per OSM (requires gigabit interface converters [GBICs])

- Dimensions (H x W x D): 1.2 x 14.4 x 16 in. (3.0 x 35.6 x 40.6 cm)
- Power required: 118W
- Status indicators and interfaces:
  - Green (operational)
  - Red (faulty)
  - Orange (module booting or running diagnostics)

Environmental Conditions

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

Safety

UL 1950 Third Edition

CSA 22.2 No. 950 Third Edition

EN 60950

IEC 60950

TS001

EMC

FCC Part 15 (CFR 47) Class A

ICES-003 Class A

EN55022 Class A

CISPR22 Class A

AS/NZS 3548 Class A

VCCI Class A

EN55024

ETS300 386

EN50082-1

EN61000-3-2

EN61000-3-3

EN61000-6-1

Industry Standards

GR-63-Core Network Equipment Building Standards (NEBS) Level 3 (pending)

GR-1089-Core NEBS Level 3 (pending)

ETSI 300 019 Storage Class 1.1

ETSI 300 019 Transportation Class 2.3

ETSI 300 019 Stationary Use Class 3.1

Service and Support

Cisco offers numerous service and support offerings for both service provider and enterprise customers. Cisco has earned the highest customer satisfaction ratings in the industry by providing the world-class service and support necessary to deploy, operate, and optimize networks. Whether the goal is speed to market, maximizing network availability, or enhancing customer satisfaction and retention, Cisco is committed to the success of its customers.

For More Information

For more information about Cisco service and support programs and benefits, visit:

http://www.cisco.com/en/US/support/index.html

For more information about Cisco 7600 Series routers, contact your Cisco account representative or visit:

http://www.cisco.com/go/7600

For ordering information, visit:

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

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