

Cisco 10000 Series OC-12 ATM Line Card

The Cisco 10000 Series single-port OC-12 Asynchronous Transfer Mode (ATM) line card provides both the performance and the density to scale networks efficiently and reliably. Combined with the Cisco 10000's leading-edge performance in IP services, the OC-12 ATM uplink module delivers wire-rate (622 Mbps Synchronous Optical Network/Synchronous Digital Hierarchy [SONET/SDH]) Layer 2 connectivity across ATM networks

Product Description

The Cisco 10000 Series single-port OC-12 ATM line card features high-performance programmable Segmentation and Reassembly (SAR), adapted for various applications including advanced traffic management, cell scheduling and integrated buffer management. The programmable feature of the SAR allows flexibility for software upgrades and to support new standards. By mapping IP class of service (CoS) to ATM quality of service (QoS) on the Cisco 10000 Series ATM line cards, the flow of mission-critical data can be effectively managed across heterogeneous IP and ATM networks.

Key Benefits

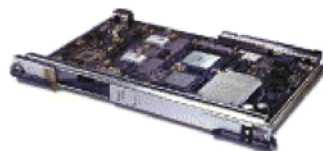
Line Rate OC-12 Performance

The OC-12 ATM module is a standards-based ATM solution supporting line rate (622 Mbps) performance at 64-byte packets to provide an excellent uplink between leased line customers and ISP backbone ATM devices.

Per-VC and Per-VP Traffic Shaping

The Cisco 10000 Series OC-12 ATM module supports both Per-VC and per-VP traffic Shaping. This is a function typically provided on ATM edge devices to ensure that bursty traffic conforms to a predetermined "contract." More specifically, traffic shaping ensures that traffic from one VC does not adversely impact another, resulting in data loss. This function is very important when connecting to an ATM WAN or public ATM network especially when the ATM switches enable traffic policing that will discard all traffic that exceeds the predetermined contract at the ingress of the switch.

Figure 1
Cisco 10000 Series
OC-12 ATM Line Card



The Cisco 10000 Series OC-12 ATM module supports traffic shaping in the high performance PXF network processor. Providing traffic shaping on a per-VC and per-VP basis allows flexibility and control over every VC and VP configured.

Standards-Based ATM Implementation for Interoperability

The OC-12 ATM module is a standards-based ATM interface enabling customers to fully integrate the Cisco 10000 Series into existing ATM networks. The module supports User Network Interface (UNI) Versions 3.x and 4.0 and Integrated Local Management Interface (ILMI) Version 4.0 (including permanent virtual circuit [PVC] auto discovery feature). Standard ATM traffic management categories (nrt-VBR and UBR) are supported, as is request for comment (RFC) 2684 support for AAL5 logical link control.

By implementing a standards-based version of ATM, Cisco ensures that the customer will be able to easily and quickly integrate the Cisco 10000 Series into their current ATM network. Further, by using standard OAM F4/F5, customers will enjoy lower management and administrative expenses and improved overall manageability.

Features

ATM Features

- Supports ATM Forum traffic management service categories: non-real time variable bit rate (nrt-VBR) and universal bit rate (UBR)
- Supports User-Network Interface (UNI) Versions 3.0 and 3.1
- Supports Integrated Local Management Interface (ILMI) permanent virtual circuit (PVC) autodiscovery feature
- Supports up to 8000 PVCs per module; up to 8000 PVCs per platform; up to 8000 UBR PVCs; up to 2000 nrt-VBR PVCs on the leased-line Cisco IOS(r) trains, beginning with Version 12.0(20)ST; up to 32,000 virtual circuits per platform; up to 16,000 virtual circuits per port on the broadband aggregation Cisco IOS trains, beginning with Version 12.2(2)BY
- Offers full support for virtual path identifier (VPI) and virtual circuit identifier (VCI) address width (16-bit VCI, 8-bit VPI)
- Supports PVCs and permanent virtual path (PVPs)
- Supports per-virtual circuit queuing and shaping for nrt-VBR
- Supports Class-Based Weighted Fair Queuing (CBWFQ) and Priority Queuing for nrt-VBR virtual circuits
- Offers RFC 1483 support for routed protocols

- Offers RFC 2684 support for ATM adaption layer 5 (AAL5) Logical Link Control (LLC)/subnetwork attachment point Subnet Access Protocol (SNAP) encapsulations and AAL5 Mux IP Version 4 encapsulation
- Supports PVCs over AAL5
- Supports call admission control (does not allow configuration of nrt-VBR PVCs if requested bandwidth is not available on the port)
- Supports OA&M F4/F5 segment and end-to-end loopback
- Supports OA&M management (allows management of PVCs using this feature via OA&M)
- Supports SONET/SDH OC-12 STS-12c/STM-4c framing format

Packet Layer Features

- Supports all IP routing protocols
- Supports application of QoS (Priority Queuing/CBWFQ, Weighted Random Early Detection [WRED], committed access rate [CAR]) to each nrt-VBR PVC, and to all UBR PVCs as a group using Cisco modular command-line interface (CLI)
- Supports ATM cell loss priority (CLP) bit
- Supports multicast
- Supports access control lists (ACLs)
- Supports Multiprotocol Label Switching (MPLS)
- Frame mode MPLS over ATM
- MPLS Cell mode with LC-ATM support. This value-added feature allows service providers with existing ATM backbone to upgrade their switches with label switch controller to support the MPLS control plane. It is a great value proposition, enabling new services to be provisioned over the infrastructure while protecting the investment.
- Supports turbo QoS classification, NetFlow accounting, 802.1Q VLAN, policy-based routing, per-packet load balancing, and generic routing encapsulation (GRE) tunneling

Software Features

- Support for all IP routing protocols
- QoS (such as WRED, CAR, and so on) can be applied to each nrt-VBR PVC and to all UBR PVC's as a group
- Multicasting (PIM-SM)
- Access lists
- Simple Network Management Protocol (SNMP) support
- Multi-protocol Label Switching (MPLS)

High-Availability Features

- Supports 1+1 redundancy per port line card using automatic protection switching (APS)
- Supports 1+1 line-card redundancy for card failover
- Supports online insertion and removal (OIR)
- Supports Cisco IOS Software Route Processor Redundancy Plus (RPR+)
- Supports alarms (SONET-based alarms)

Specifications

Physical

- Occupies a single slot
- SC duplex connector
- Interface: single mode, intermediate reach
- Hot swappable, no slot dependency
- Weight: 4.75 lbs. (2.16 Kg)
- Dimensions: 16.0 x 1.12 x 9.97 in. (40.64 x 2.83 x 25.32 cm) (H x W x D)
- Network Equipment Building Systems (NEBS) Level 3 compliant

Environmental

- 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 m to 4000 m

Regulatory Compliance

Safety

- UL 1950, Third Edition (Safety of Information Technology Equipment, Including Electrical Business Equipment), with No D3 Deviations
- CSA 22.2 No. 950-95 Third Edition (Safety of Information Equipment Technology, Including Electrical Business Equipment)

- EN 60950 (Safety of Information Equipment Technology, Including Electrical Business Equipment) incorporating Amendments 1, 2, 3, and 4, with all National Deviations
- IEC 950 incorporating Amendments 1, 2, 3, and 4, with all National Deviations
- ACA TS001 1997 Test Report and Statement of Compliance AS/NZS3260 incorporating Amendments 1, 2, 3 and 4

Electromagnetic Emissions Certification

- FCC Part 15 Class B
- EN55022: 1998 Class B
- CISPR 22: 1997 Class B
- CFR 47 Part 15 Class A
- ICES -003, Issue 2, Class B, April 1995
- VCCI V-3/97.04 Class II
- AS/NZS 3548:1992, Class B
- CNS-13438 Class B - BSMI (BCIQ) in Taiwan

Immunity

EN61000-4-2	ESD immunity
EN61000-4-3	Radiated RF field immunity
EN61000-4-4	Immunity to electrical fast transients
EN61000-4-5	Surge immunity
EN61000-4-6	RF conducted immunity
EN61000-4-6	RF conducted immunity
EN61000-4-11	Dips and sags (AC input)
EN61000-3-2	Power line harmonics (AC input)

Network Equipment Building Systems

- NEBS: criteria levels (Level 3 compliant)
- NEBS: physical protection
- NEBS: EMC and safety
- GR-1089-Core
- GR-63-Core
- SR-3580

European Telecommunication Standards Institute

- *ETS 300 386-1*—Levels for equipment with a "high priority of service" that is installed in "locations other than Telecommunication centers"
- *ETS 300 386-2: 1997*—Levels for equipment with a "high priority of service" that is installed in "locations other than Telecommunication centers"
- *ETSI 300 132-2: December 1994*—Power supply interfaces at the input to telecommunications equipment Sections 4.8, 4.9

LEDs

- Carrier status (green, 1 per card)
- Packet received (green, 1 per card)
- Packet transmitted (green, 1 per card)
- Loopback (yellow, 1 per card)
- Alarm (yellow, 1 per card)
- Enable (green, 1 per card)
- Fail (yellow, 1 per card)

ATM Standards

- The ATM Forum Traffic Management Specification Version 4.0
- The ATM Forum 622.08 Mbps Physical Layer Specification
- The ATM UNI Version 3.1
- UNI 4.0 Traffic management specification
- ILMI Specification Version 4.0

Network Management

- SNMP
- Cisco Discovery Protocol
- SNMP MIB-II (RFC 1213)
- AToM MIB (RFC 1695)
- ILMI MIB
- SONET MIB

Power Budget

- Unit power: 30W

Optical Power Budget

- Power budget: 12db
- Transmit power: -15 to -8dBm

- Receive power: -28 to -8 dBm
- Typical maximum distance: 9.3 miles (15Km)

Electromagnetic Emissions Certifications

- FCC Part 15 Class A
- ICES-003 Class A
- VCCI Class B
- EN55022 Class B
- CISPR22 Class B
- CE Marking
- AS/NZS3548 Class B

Product System Requirements and Compatibility

Hardware Requirements

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

Software Requirements

Initial IOS Releases: The line card is supported in 12.0(10)SL and later Cisco IOS(r41) releases. For the latest IOS release information, refer to:

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

Ordering Information

Part Number	Description
ESR-10C-12-ATM	OC-12 ATM uplink line card for the Cisco 10000 Series
ESR-10C-12-ATM =	OC-12 ATM uplink line card for the Cisco 10000 Series, 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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