Data Sheet

Cisco 12000 Series ATM Line Cards

The Cisco® 12000 Series ATM line cards expand the connectivity options for Cisco 12000 Series routers, enabling service providers to attach Cisco 12000 routers directly to existing ATM infrastructures.

CISCO ISE ATM INTERFACES—DELIVERING ROBUST HIGH-SPEED EDGE FUNCTIONALITY

Service providers face the challenge of meeting customer demand by building scalable, feature-rich networks that can deliver value-added services such as private IP connectivity, integrated data, voice, and video services, and tiered service offerings at all interface rates without compromising density or line-rate performance. The Cisco IP Services Engine (ISE) ATM line cards (Figures 1 and 2) provide the same powerful feature set as the standard ATM line cards and go a step further to accommodate service provider requirements by combining an extensive set of service-enabling edge features with advanced ATM traffic management and sophisticated IP/Multiprotocol Label Switching (MPLS)-to-ATM quality-of-service (QoS) functions, without compromising line-rate performance.

Figure 1. Cisco 12000 Series 4-Port OC-12/STM-4 ATM ISE Line Card

Figure 2. Cisco 12000 Series 4-Port OC-3/STM-1 ATM ISE Line Card

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PRODUCT FEATURES

Table 1 describes the basic features on the Cisco 12000 Series ATM line cards.

Table 1. Product Features

Feature	Description
Performance	• Up to 3.4-Mpps aggregated line rate for 64-byte packets (ISE cards)
Reliability and Availability	• Online insertion and removal (OIR), enabling insertion and removal of line cards without impacting traffic • Route Processor Redundancy Plus (RPR+) • Nonstop forwarding (NSF) and stateful switchover (SSO) • Mean time between failure (MTBF) in excess of 80,000 hours
Security	• Extended access control lists (ACLs) (filtering) per virtual circuit • Unicast Reverse Path Forwarding (URPF) (antispoofing checks) • NetFlow Version 5 (denial-of-service [DoS] tracking)
Network Management	• Cisco IOS® Software command-line interface (CLI) • Modular QoS CLI • Simple Network Management Protocol (SNMP) • MIB-II • Interim Local Management Interface (ILMI) MIB • Modular QoS CLI (MQC) MIB • ATM MIB (RFC 1695) • Cisco ATM Adaption Layer 5 (AAL5) MIB • Cisco ATM EXT MIB • IF MIB • SONET MIB (RFC 2558) • Cisco IETF ATM2 PVCTRAP MIB • MPLS Traffic Engineering (MPLS TE) MIB • Cisco Class-Based QoS MIB

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Feature	Description
Packet Layer	• IP Version 4 (IPv4) • IP Version 6 (IPv6) (supported on ISE line cards) • IP Multicast forwarding • Maximum transmission unit (MTU) of 9180 bytes • Basic MPLS switching • MPLS CoS • MPLS/VPN provider edge functions • MPLS VPN: Carrier Supporting Carrier (CsC) with IPv4 Border Gateway Protocol (BGP)-label distribution • MPLS VPN: Interprovider VPN (Inter-AS) with IPv4 BGP-label distribution • Multicast VPN • Any Transport over MPLS (AToM) (Martini draft)—AAL5oMPLS, port, virtual path, and virtual circuit cell relay, cell packing, and ATM Forum TM 4.0 cell policing support • MPLS TE • Committed access rate (CAR) • NetFlow Version 5 (sampled), Version 8 (aggregated), and Version 9 • MPLS-aware NetFlow • Layer 2 Tunneling Protocol Version 3 (L2TPv3)
ATM Layer	• Support for up to 2047 virtual circuits per port • Support for up to 8 class-of-service (CoS) queues per virtual circuit, including one Low-Latency Queuing (LLQ) queue per virtual circuit • User-Network Interface (UNI)/Network Node Interface (NNI) cell format—8 UNI virtual-path-identifier (VPI) bits (0–255), 12 NNI VPI bits (0–4000), 16 virtual-channel-identifier (VCI) bits (0-64,000) over any VPI/VCI combination within the full range • Support for up to 255 virtual paths per port • Switched-virtual-circuit (SVC) signaling (point-to-point connections) • SVC signaling (point-to-multipoint connections) • UNI Version 3.0/3.1 (including ILMI) • Multiprotocol Encapsulation over AAL5 • Classical IP over ATM; client and Address Resolution Protocol (ARP) server
SONET/SDH Layer	• Standards-compliant SONET/SDH interface • Synchronization, including local (internal) or loop timed (recovered from network); 20-ppm clock accuracy over full operating temperature range; and pointer activity monitoring • Local (diagnostic) and line (network) loopback

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Feature	Description
Traffic Management	• Traffic management – Constant bit rate (CBR) – Real-time variable bit rate (VBR-rt) and non-real-time variable bit rate (VBR-nrt) – Unspecified bit rate (UBR) (including optional peak cell rate [PCR]) – Traffic shaping on a per-virtual circuit/virtual path basis (shaping granularity: minimum of 1 kbps, compliant with I.371 granularity definition) – Per-virtual circuit queuing and buffering – Configurable queue depth – Per-virtual circuit Weighted Random Early Detection (WRED) – Per-virtual circuit Modified Deficit Round Robin (MDRR), including LLQ – Cell-loss-priority (CLP) bit setting – Virtual circuit bundling
Operations, Administration, and Maintenance (OAM)	• OAM – F4 and F5 OAM – Alarm indication signal (AIS) and remote defect indication (RDI) alarms and loopback cell
Protocols	• Classical IP over ATM; Client and Address Resolution Protocol (ARP) Server (RFCs 1577, 1755, and 1626) • Multiprotocol Encapsulation over AAL5 (RFC 1483) with support for Logical Link Control Protocol (LLC)/Subnetwork Access Protocol (SNAP), IP multiplexer, and Network Layer Protocol Identifier (NLPID) encapsulation • UNI Versions 3.0 and 3.1 (including ILMI) • F4 and F5 OAM AIS and RDI alarms and loopback • OAM continuity check • Default IP MTU for use over ATM AAL5 (RFC 1626) • ATM Signaling Support for IP over ATM (RFC 1755)

PRODUCT SPECIFICATIONS

Table 2 provides specifications for the different Cisco 12000 Series ATM line cards.

Table 2. Product Specifications

Line Card	Forwarding Engine	Cisco IOS Software Release	Chassis Supported	Per-Chassis Port Densities
4-Port OC-12 ATM ISE **4-Port OC-12c/STM-4c ATM ISE**	Engine 3	12.0(25)S or higher	Cisco 12816, 12416, and 12016 Cisco 12810, 12410, and 12010 Cisco 12406 and 12006 Cisco 12012 Cisco 12404 Cisco 12008	60 OC-12c/STM-4c ports 36 OC-12c/STM-4c ports 20 OC-12c/STM-4c ports 20 OC-12c/STM-4c ports 12 OC-12c/STM-4c ports 12 OC-12c/STM-4c ports

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Line Card	Forwarding Engine	Cisco IOS Software Release	Chassis Supported	Per-Chassis Port Densities
4-Port OC-3 ATM ISE **4-Port OC-3c/STM-1 ATM ISE**	Engine 3	12.0(26)S2 or higher	Cisco 12816, 12416, and 12016 Cisco 12810, 12410, and 12010 Cisco 12406 and 12006 Cisco 12012 Cisco 12404 Cisco 12008	60 OC-3c/STM-1c ports 36 OC-3c/STM-1c ports 20 OC-3c/STM-1c ports 20 OC-3c/STM-1c ports 12 OC-3c/STM-1c ports 12 OC-3c/STM-1c ports

PHYSICAL AND ELECTRICAL SPECIFICATIONS

Table 3 provides details about the physical and electrical specifications of the Cisco 12000 Series ATM line cards.

Table 3. Physical and Electrical Specifications

Line Card	Dimensions	Weight	Power	Route Memory	LEDs
4-Port OC-12 ATM ISE	• Height: 14.5 in. (36.8 cm) • Depth: 18.5 in. (45.7 cm)	11.4 lb (5.17 kg)	150W maximum	• Route: 512 MB, upgradable to 1 GB • Packet: 512 MB	• Line-active LED • Rx carrier LED • Rx cells LED • Alphanumeric management display
4-Port OC-3 ATM ISE	• Height: 14.5 in. (36.8 cm) • Depth: 18.5 in. (45.7 cm)	11.4 lb (5.17 kg)	150W maximum	• Route: 512 MB, upgradable to 1 GB • Packet: 512 MB	• Line-active LED • Rx carrier LED • Rx cells LED • Alphanumeric management display

OPTICAL SPECIFICATIONS

Table 4 provides details about the optical specifications of the Cisco 12000 Series ATM line cards.

Table 4. Optical Specifications

Line Card	Tx	Power	Rx	Power	Target Distance (km)*	Wavelength (nm)	Fiber Type	Compliance**	
	P_{Tmax} (dBm)	P_{Tmin} (dBm)	P_{Rmax} (dBm)	P_{Rmin} (dBm)				Telcordia	ITU
OC-12								GR-253	G.957
OC-12 ATM SM	–8	–15	–7	–28	15	–	Single-mode fabric (SMF)		
OC-12 ATM MM* **	–14	–20	–14	–26	2	1300	Multimode fabric (MMF)		

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Line Card	Tx Power		Rx Power		Target Distance (km)*	Wavelength (nm)	Fiber Type	Compliance**	
	P_{Tmax} (dBm)	P_{Tmin} (dBm)	P_{Rmax} (dBm)	P_{Rmin} (dBm)				Telcordia	ITU
OC-3								GR-253	G.957
4OC3X/ATM-MM-SC	–14	–20	–14	–30	2	1310	MMF		
4OC-3/ATM-ISE-IR-SC	–8	–15	–8	–29	15	1310	SMF		

* Target distances are used for classification only and not for specification.

** Contact your Cisco account team for details about compliance level to these standards.

*** There are no Telcordia or ITU specifications for multimode SONET/SDH interfaces.

ENVIRONMENTAL, APPROVALS, AND COMPLIANCE

Table 5 gives standards-compliance information about the Cisco 12000 Series ATM line cards.

Table 5. Compliance and Agency Approvals

Feature	Description
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, operating conditions – Up to 95%, noncondensing, nonoperating conditions
Safety	• UL 1950 • CSA 22.2-No. 950 • EN60950 • IEC 60950 CB Scheme • ACA TS001 • AS/NZS 3260 • EN60825/IEC60825 laser safety • FDA Code of Federal Regulations (USA) laser safety
EMI	• FCC CFR 47-PART 15 1998 Class A • ICES 003 Class A • AS/NZS 3548 Class A • EN55022 Class B (up to 1 GHz) • VCCI Class A • CISPR 22 Class B (up to 1 GHz) • BSMI/CNS 13438:1997 Class A

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Feature	Description
Immunity (Basic Standards)	• IEC-1000-3-2 Power Line Harmonics • IEC-61000-3-3 Voltage Fluctuations and Flicker • IEC-1000-4-2 ESD (8-kV contact, 15-kV air) • IEC-1000-4-3 Radiated immunity (10 V/m) • IEC-1000-4-4 EFT (2-kV power port, 1-kV signal port) • IEC-1000-4-5 Surge A/C port (4-kV CM, 2-kV DM) • IEC-1000-4-5 Surge signal port (2-kV CM, 1-kV DM) • IEC-1000-4-5 Surge D/C port (0.5-kV CM, 0.5-kV DM) • IEC-1000-4-6 Low-frequency conductive immunity (10V) • IEC-1000-4-11 Voltage dips and sags • EN55024/CISPR24 ITE Immunity
ETSI and EN	• EN 300 386 /EN 300 386-2 Class B Telecommunications Network Equipment (EMC)
Network Equipment Building Standards (NEBS)	This product is designed to meet the following requirements: • GR-1089-CORE EMC and Safety • GR-63-CORE Physical Protection • SR-3580 NEBS Criteria Levels (Level 3)

ORDERING INFORMATION

To place an order, contact your local Cisco representative or visit the ordering page on the Cisco Website. Use the ordering information in Table 6.

Table 6. Ordering Information

Product Part Number	Product Name
4OC12X/ATM-IR-SC	4-port OC-12/STM-4 ATM single-mode, intermediate-reach ISE line card with SC Connector
4OC12X/ATM-MM-SC	4-port OC-12/STM-4 ATM multimode ISE line card with SC connector
4OC3X/ATM-IR-SC	Cisco 12000 Series 4-Port OC-3c/STM-1c ATM ISE Line Card, single-mode
4OC3X/ATM-MM-SC	Cisco 12000 Series 4-Port OC-3c/STM-1c ATM ISE Line Card, multimode
4OC3X/ATM-BLANK	Blank faceplate for Cisco 12008 and 12012 chassis

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FOR MORE INFORMATION

For more information about the Cisco 12000 Series ATM line cards, contact your local Cisco representative or visit http://www.cisco.com/go/12000.

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Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

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