DATASHEET

ATM PICs

Juniper Networks ATM and ATM2 Physical Interface Cards (PICs) offer flexible, highly-available solutions for the termination of ATM access networks, and provide support for the progressive transition to an all-IP / MPLS infrastructure. The ATM2 PICs provide a very rich and robust set of quality of service (QoS) and traffic management features aimed at facilitating:

- The seamless and progressive network transformation from a legacy ATM backbone to an all-IP / MPLS infrastructure
- The introduction of new revenue-generating IP services to ATM-connected enterprises, such as Layer 2 and Layer 3 provider-provisioned VPNs

ATM2 Physical Interface Cards (PICs)

Supported by both the Juniper Networks M-series and T-series routers, the ATM2 PICs are available in 2-port OC-12, 1-port OC-12, and 2-port OC-3 versions. The ATM2 PICs leverage the JUNOS operating system's MPLS traffic engineering and hardware-based QoS capabilities to deliver seamless transport of multiservice traffic over the IP / MPLS infrastructure. Designed to provide rich, granular ATM QoS and signaling functionalities, the ATM2 PICs are a key element in the delivery of a guaranteed high-quality, end-to-end user experience.

Features and Applications

As bandwidth needs continue to increase, migrations of legacy data service and voice traffic to a converged IP / MPLS infrastructure must maintain the premium-quality service levels that users expect and rely upon. Hard-won brand equity and service revenues must be protected, and service degradation is intolerable.

Juniper Networks understands these critical considerations, and delivers the hardware and software-based solutions to gracefully migrate business-critical traffic from ATM environments to a converged IP / MPLS network infrastructure. The ATM and ATM2 PICs are central enablers of this network transformation, and are based upon a very robust set of JUNOS IP / MPLS and ATM service capabilities.

Examples of applications enabled by the ATM and ATM2 PICs include:

Multiservice transport over MPLS

- Circuit Cross-Connect for multiservice transport over an IP / MPLS infrastructure
- Comprehensive support for “draft Martini” functionality
- Ethernet over ATM (per RFC 2684)

VPN Services

- Support for Layer 3 provider-provisioned VPNs over ATM interfaces
- Support for Layer 2 provider-provisioned VPNs
- Support for draft Kompella and draft Martini, as well as Virtual Private LAN Services (VPLS)
- Full suite of additional VPN services

ATM Interfaces

4-port ATM DS-34-port ATM E3	The four-port ATM DS-3 and ATM E3 PICs are ideal for the following applications: ▪ Backbone links ▪ Links between smaller service providers and larger providers supplying transit service ▪ Peering links ▪ Edge aggregation Throughput: ▪ ATM DS-3 PIC: 45 Mbps · ▪ ATM E3 PIC: 30 MbpsSupported by all M-series routers.
2-portATM OC-3/STM-1	The 2-port OC-3/STM-1 PIC provides an ideal solution for building backbones or edge networks using high-speed OC-3/STM-1 circuits. Delivers predictable throughput at 155 Mbps. Supported by all M-series routers and the T320 Router.
1-portATM OC-12/STM-4	The 1-port OC-12/STM-4 PIC is ideal for migrating backbones and access networks to higher speeds. Delivers predictable throughput at 622 Mbps. Supported by all M-series routers and the T320 Router.
2-port ATM2 OC-3/STM-1	Enhanced ATM2 PICs offer improvements in traffic visibility, control and diagnostics. Delivers predictable throughput at 155 Mbps. Key applications: ▪ Consolidation of ATM networks ▪ Tiered IP Services to ATM connected enterprises ▪ Granular ATM QoS capabilities Supported by all M-series routers and the T320 Router.
1-port ATM2 OC-12/STM-4	Enhanced ATM2 PICs offer improvements in traffic visibility, control and diagnostics. Delivers predictable throughput at 622 Mbps. Key applications: ▪ Consolidation of ATM networks ▪ Tiered IP Services to ATM connected enterprises ▪ Granular ATM QoS capabilities Supported by all M-series routers.

2-port ATM2 OC-12/STM-4	Enhanced ATM2 PICs offer improvements in traffic visibility, control and diagnostics. Dual port version enables industries highest rack density of 128 OC-12 ports per 7' rack. Delivers predictable throughput at 622 Mbps. Key applications: ▪ Consolidation of ATM networks ▪ Tiered IP Services to ATM connected enterprises ▪ Granular ATM QoS capabilities Supported by M40e, M160, and T-series routers.

ATM2 Feature Highlights

Network Transformation Features	**Description**
Mapping of ATM QoS to IP/MPLS QoS	ATM CLP bit to MPLS EXP bit
ATM UBR, rt-VBR, nrt-VBR, and CBR support	▪ Peak rate, sustained rate, and burst length support for VBR· ▪ Sustained peak rate with zero burst length for CBR ▪ Configurable buffer usage
Queuing, Classification, and CoS enablement	▪ Per Virtual Circuit (VC) or Virtual Path (VP) output traffic shaping · o Shaping granularity of at least 64 Kbps· o Support for four queues per Virtual Circuit (VC) o Maximum burst size: 4000 cells· ▪ Support for two modes of CoS queue priority· o Strict Priority · o Alternate Priority · ▪ Weighted Round Robin (WRR) with priority queuing· ▪ Configurable Queue Length · ▪ Support for RED congestion management· ▪ Support for Early Packet discard congestion control
ATM2 Features	**Description**
ATM2 PIC cell formats and VCI/VPI enhancements	Mode — VPI support — UNI/NNI support Cell Relay - Port Mode — 12 bit VPI — UNI or NNI Cell Relay - VP Mode — 8 bit VPI — UNI only AAL5 CCC or IP Mode — 8 bit VPI — UNI only Wider range of cell formats supported
ATM2 PIC VPI/VCI range enhancements	Support for entire VCI range (16 bits) Support for entire VPI range ▪ 8 bits for UNI ▪ 12 bits for NNI
ATM2 PIC cell relay support Circuit Cross Connect Draft Martini support	NNI signaling information passed to LSP Supported for Cell Relay port mode only Key feature for multiservice transit

ATM2 PIC cell relay promiscuous mode Circuit Cross ConnectDraft Martini support	Allows forwarding of all cells on a port, independent of VCI number Key feature for multiservice transit
ATM AAL5 mode support (draft Martini)	Supports transport of ATM AAL5 CSPS-SDUs traveling on particular ATM PVCs across the MPLS network to other ATM PVCs.
ATM cell mode (draft Martini)	Every cell received on a pre-defined ATM PVC or PVP on the ingress LSR is encapsulated and sent across the LSP to the egress LSR. Also supports grouping of ATM cells as defined by the draft Martini standard

Signaling, diagnostic, instrumentation, CLI and maintenance enhancements	**Description**
F4 and F5 OAM loopback cells	Enabled and disabled via software
Support for remote and local loopback testing	Troubleshooting enhancement
ILMI support	Users can enable ILMI on ATM interfaces
ATM counter support	Per VC and Per VP counters OAM cell counters
Idle cell/unassigned cells transmission	Transmission of idle cells for rate adaptation
SNMP support	Support for MIB2 (RFC 1213), ATM MIB (RFC1695), and SONET MIB

Port Density and Platform support

Platform	**ATM DS-3**	**ATM E3**	**ATM OC-3/STM-1**	**ATM OC-12/STM-4**	**ATM2 OC-3/STM-1**	**ATM2 OC-12/STM-4**	**ATM2 OC-12/STM-4**
	4-port	4-port	2-port	1-port	2-port	1-port	2-port
M5							
Per Chassis	16	16	8	4	8	4	—
Per Rack	240	240	120	60	120	60	—
M10							
Per Chassis	32	32	16	8	16	8	—
Per Rack	480	480	240	120	240	120	—
M20							
Per Chassis	64	64	32	16	32	16	—
Per Rack	320	320	160	80	160	80	—
M40							
Per Chassis	128	128	64	32	64	32	—
Per Rack	256	256	128	64	128	64	—

M40e							
Per Chassis	128	128	64	32	64	32	64
Per Rack	256	256	128	64	128	64	128
M160							
Per Chassis	128	128	64	32	64	32	64
Per Rack	256	256	128	64	128	64	128
T320							
Per Chassis	—	—	32	16	32	—	32
Per Rack	—	—	96	48	96	—	96
T640							
Per Chassis	—	—	—	—	—	—	64
Per Rack	—	—	—	—	—	—	128

— = Not applicable

Specifications

Specification	Description
General	▪ 16-MB SDRAM memory for ATM SAR ▪ AAL5 encapsulations o ATM-VC-MUX o ATM-NLPID o ATM-Cisco-LLPID o ATM-SNAP o ATM-CCC-VC-MUX ▪ ATM switch ID ▪ F5 Operation, Administration, and Maintenance ▪ ATM and SONET/SDH standards compliant o ATM over SONET Scrambler o Cell Scrambling - UNI specifications o SONET APS o SONET level error detection ▪ SDH MSP ▪ Internal and loop timing
Interfaces	ATM DS-3 and ATM E3 PICs ▪ 10 ft / 3.05 m posilock SMB to BNC ▪ Four pairs of TX and RX coaxial cables

	ATM OC-3/STM-1 PICs and ATM2 OC-3/STM1 PICs ▪ MM optical interface o Connector: SC duplex connector (62.5 um) o Length: maximum distance 1.2 miles / 2 km; ATM Forum af-phy-0046 o Wavelength: 1,270 to 1,380 nm o Average Launch Power: -20 to -14 dBm o Receiver Saturation: -14 dBm o Receiver Sensitivity: -30 dBm ▪ SMIR optical interface o Connector: SC duplex connector o Length: maximum distance 9.3 miles / 15 km o Wavelength: 1,260 to 1,360 nm o Average Launch Power: -15 to -8 dBm o Receiver Saturation: -8 dBm o Receiver Sensitivity: -28 dBm
	ATM OC-12/STM-4 and ATM2 OC-12/STM-4 PICs ▪ MM optical interface o Connector: SC duplex connector (62.5 um) o Length: maximum distance 546.8 yards / 500 meters o Wavelength: 1,270 to 1,380 nm o Average Launch Power: -20 to -14 dBm o Receiver Saturation: -14 dBm o Receiver Sensitivity: -26 dBm ▪ SMIR optical interface o Connector: SC duplex connector o Length: maximum distance 9.3 miles / 15 km o Wavelength: 1,274 to 1,356 nm o Average Launch Power: -15 to -8 dBm o Receiver Saturation: -8 dBm o Receiver Sensitivity: -28 dBm
Configurable Framing Option	ATM DS-3 PIC ▪ C-bit with ATM direct mapping ▪ C-bit with PLCP framing (default) ▪ M23 ATM direct mapping ▪ M23 with PLCP framing
	ATM E3 PIC ▪ G.751 direct mapped ▪ G.751 with PLCP encapsulation (default) ▪ G.832 ATM direct mapping
LEDs	One tricolor LED per port Green Port is online with no alarms or failures Amber Port is online with alarms or remote failures Red Port is active with a local alarm; failure detected Off Port is not enabled

Agency Approvals

Safety

- CAN/CSA-C22.2 No. 60950-00/UL 60950—Third Edition, Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products—Part 1: Equipment Classification, Requirements and User's Guide
- EN 60825-2 Safety of Laser Products—Part 2: Safety of Optical Fiber Communication Systems
- EN 60950, Safety of Information Technology Equipment

EMC

- AS/NZS 3548 Class A (Australia / New Zealand)
- BSMI Class A (Taiwan)
- EN 55022 Class A Emissions (Europe)
- FCC Part 15 Class A (USA)
- VCCI Class A (Japan)

Immunity

- EN 61000-3-2 Power Line Harmonics
- EN 61000-4-2 ESD
- EN 61000-4-3 Radiated Immunity
- EN 61000-4-4 EFT
- EN 61000-4-5 Surge
- EN 61000-4-6 Low Frequency Common Immunity
- EN 61000-4-11 Voltage Dips and Sags
- NEBS Designed to meet these standards
- GR-63-CORE: NEBS, Physical Protection
- GR-1089-CORE: EMC and Electrical Safety for Network Telecommunications Equipment
- SR-3580 NEBS Criteria Levels (Level 3 Compliance)

ETSI

ETS-300386-2 Switching Equipment Telecommunication Network Equipment Electromagnetic Compatibility Requirements

Ordering Information

PIC	Platform	Model Number
ATM DS-3		
4-port with cable	M5, M10	PE-4DS3-ATM
	M20, M40	P-4CHDS3-ATM
	M40e, M160	PB-4DS3-ATM
ATM E3		
4-port with cable	M5, M10	PE-4E3-ATM
	M20, M40	P-4E3-ATM
	M40e, M160	PB-4E3-ATM

ATM OC-3/STM-1		
Multimode, 2-port	M5, M10	PE-2OC3-ATM-MM
	M20, M40, M40e	P-2OC3-ATM-MM
	M40e, M160, T320	PB-2OC3-ATM-MM
Single-mode, intermediate reach, 2-port	M5, M10	PE-2OC3-ATM-SMIR
	M20, M40, M40e	P-2OC3-ATM-SMIR
	M40e, M160, T320	PB-2OC3-ATM-SMIR
ATM OC-12/STM-4		
Multimode, 1-port	M5, M10	PE-1OC12-ATM-MM
	M20, M40, M40e	P-1OC12-ATM-MM
	M40e, M160, T320	PB-1OC12-ATM-MM
Single-mode, intermediate reach, 1-port	M5, M10	PE-1OC12-ATM-SMIR
	M20, M40, M40e	P-1OC12-ATM-SMIR
	M40e, M160, T320	PB-1OC12-ATM-SMIR
ATM2 OC-3/STM-1		
Multimode, 2-port	M5, M10	PE-2OC3-ATM2-MM
	M20, M40	P-2OC3-ATM2-MM
	M40e, M160, T320	PB-2OC3-ATM2-MM
Single-mode, intermediate reach, 2-port	M5, M10	PE-2OC3-ATM2-SMIR
	M20, M40, M40e	P-2OC3-ATM2-SMIR
	M40e, M160, T320	PB-2OC3-ATM2-SMIR
ATM2 OC-12/STM-4		
Multimode, 1-port	M5, M10	PE-1OC12-ATM2-MM
	M20, M40, M40e	P-1OC12-ATM2-MM
	M40e, M160	PB-1OC12-ATM2-MM
Single-mode, intermediate reach, 1-port	M5, M10	PE-1OC12-ATM2-SMIR
	M20, M40, M40e	P-1OC12-ATM2-SMIR
	M40e, M160	PB-1OC12-ATM2-SMIR
ATM2 OC-12/STM-4		
Multimode, 2-port	M40e, M160, T320, T640	PB-2OC12-ATM2-MM
Single-mode, intermediate reach, 2-port	M40e, M160, T320, T640	PB-2OC12-ATM2-SMIR

How to Buy Juniper Networks Products and Services

If you would like more information, you can:

Call: Inside USA (866) 298 – 6428. Outside USA (978) 589 - 0500

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