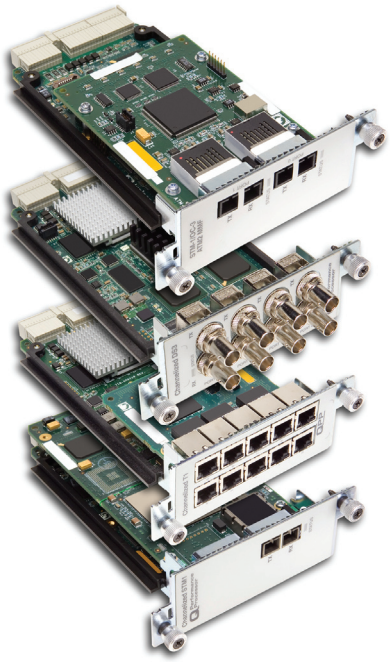
Datasheet

Juniper Networks IQ PICs



Juniper Networks IQ PICs deliver a variety of service interconnect technologies such as Frame Relay, PPP, and HDLC. The IQ PICs offer high-density clear channel and fractional connectivity. These PICs enable service providers to deploy stable, highly reliable, dedicated leased line circuits to carry business-critical data in a variety of businesses, both large and small. In addition to providing affordable access, the Channelized IQ PICs enable maximum flexibility through rate limiting and multilink services, allowing service providers to deliver IP services as customer needs dictate.

Product Overview

The IQ PICs are mounted on Flexible PIC Concentrators (FPCs), which are inserted into a slot in Juniper Networks M-series and T-series routers. Each PIC occupies a single slot on an FPC. The PICs receive incoming packets from the network and transmit outgoing packets to the network. During this process, each PIC performs framing and high-speed signaling for its media type. Before transmitting outgoing data packets, the PICs encapsulate the packets received from the FPCs.

Juniper Networks PICs enhance network scalability and flexibility in both edge and core networks by supporting predictable performance, standards-based features, granular class-of-service (CoS), and a wide range of port densities and speeds.

Juniper Networks IQ PICs:

- 4-port Channelized DS3 IQ
- 1-port Channelized OC12 IQ
- 1-port Channelized OC3 IQ
- 1-port Channelized STM1 IQ
- 10-port Channelized T1 IQ
- 10-port Channelized E1 IQ
- 4-port Clear Channel E3 IQ

Features and Benefits

Intelligent Queuing

The IQ PICs provide comprehensive CoS services with up to eight queues per physical/logical interface, which helps to facilitate service creation on a per-customer basis. This includes per-DLCI queuing, fine granularity of rate control and scheduling, Weighted Round-Robin (WRR) scheduler and strict priority queuing, Weighted Random Early Detection (WRED), ingress and egress policing, and egress shaping. The IQ PICs support a flexible set of encapsulations including PPP, HDLC, Frame Relay, CCC, and TCC.

Key CoS Features

- Granular CoS on a per-interface basis
- CoS is implemented at line rate
  - No performance impact regardless of the number of interfaces or number of queues configured per PIC
- Implements Priority Queue Deficit WRR on all the interfaces
- Supports Weighted RED (WRED) on all queues
  - Up to 4 drop profile curves supported per queue
  - Allows multiple classes of traffic to share the queue, but have different CoS treatments based on class
- Supports hierarchical CoS
  - Allows shaping and scheduling at the physical level
  - Allows shaping and scheduling at the interface level
- Supports up to 4 levels of priority scheduling per interface
- Supports strict high-priority level to provide low-latency and low-jitter traffic path for a high-priority traffic class

CoS Scaling

- Supports 768 schedulers per PIC and 3072 schedulers per FPC slot
- Supports 4096 queues per PIC and 16K queues per FPC slot
- Supports 64 WRED user-configurable drop profiles per PIC
- Up to 8 queues configurable per interface
- Up to 8 queues configurable per DLCI

Statistics

- L2 per packet and per byte transmit counter per interface
- L2 per packet and per byte queued and transmit counters per queue
- L2 per packet and per byte RED drop counters per queue and per drop precedence
- BERT transmit and error counters for all interfaces

Diagnostic Support

- Per-interface BERT with full range of algorithms and error insertion support
- Local and remote diagnostic loopback
- Interface-specific alarms

LEDs

One tricolor per port:

- Off – Not enabled
- Green – Online with no alarms or failures
- Amber – Online with alarms for remote failures
- Red – Active with a local alarm; router has detected a failure

Channelization Matrix

PIC Type	OC12 Interfaces	OC3 Interfaces	DS3 Interfaces	DS1 Interfaces	E1 Interfaces	DS0 Interfaces
4-port ChDS3	N/A	N/A	4 per PIC	28 per DS3	N/A	24 per DS1
1-port ChOC3	N/A	1 per PIC	3 per PIC	28 per DS3	N/A	24 per DS1
1-port STM1	N/A	1 per PIC	N/A	N/A	63 per PIC	32 per E1
1-port OC12	1 per PIC	4 per PIC	3 per OC3	28 per DS3	N/A	24 per DS1
10-port T1	N/A	N/A	N/A	10 per PIC	N/A	24 per DS1
10-port E1	N/A	N/A	N/A	N/A	10 per PIC	32 per E1
4-port E3	N/A	N/A	N/A	N/A	N/A	N/A

Specifications

Features	
Extensive Diagnostics	CSU/DSU T1 subrate and scrambling BERT patterns for T1, DS3, NxDS0 Alarm and error reporting FDL and inband loopback
Granular Accounting and Statistics	4096 sets of L2 counters Per packet/byte Tx/Rx counters Per queue drop counters
Dense Multilevel Connectivity	768 customer channels per PIC Channelization to NxDS0 Dynamic channel reprovisioning Multilink support for NxT1, NxE1, NxDS0

IQ PIC Product Specifications	
4-port Channelized DS3	Data Service Unit (DSU) functionality BNC coaxial cable connectors
1-port Channelized OC3	DSU functionality SMIR optical interface (Bellcore GR-253-CORE compliant) Connector: SC duplex connector Length: 9.3 miles/15 km Wavelength: 1260 to 1360 nm Average launch power: -15 to -8 dBm Receiver saturation: -8 dBm Receiver sensitivity: -28 dBm
1-port Channelized STM1	DSU functionality SMIR optical interface (Bellcore GR-253-CORE compliant) Connector: SC duplex connector Length: 9.3 miles/15 km Wavelength: 1260 to 1360 nm Average launch power: -15 to -8 dBm Receiver saturation: -8 dBm Receiver sensitivity: -28 dBm
1-port Channelized OC12	Data Service Unit (DSU functionality SMIR optical interface (Bellcore GR-253-CORE compliant) Connector: SC duplex connector Length: 9.3 miles/15 km Wavelength: 1260 to 1360 nm Average launch power: -15 to -8 dBm Receiver saturation: -8 dBm Receiver sensitivity: -28 dBm
10-port T1	DSU functionality 120-ohm RJ-48C connectors
10-port E1	DSU functionality 120-ohm RJ-48C connectors
4-port E3	DSU functionality 120-ohm RJ-48C connectors
Physical	Height: 1” Width: 4” Depth: 7”
MIB Support	Interface-MIB (RFC1573) SNMP DS1 MIB DS3 MIB
MTBF	200,000 hours
Subrate and Scrambling: IQ PICs with DS3 support provide interoperability with the following vendors:	Digital Link/Quick Eagle Kentrox Larscom Adtran Verilink

Agency Approvals	
Safety	CAN/CSA-C22.2 No. 60950-00/UL 60950 – Third Edition, Safety of Information Technology Equipment EN 60950, Safety of Information Technology Equipment Certification – FIPS 140-2 Level 1 certification – Stateful Firewall - ICSA certified
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 Telecommunications Network Equipment Electromagnetic Compatibility Requirements

Ordering Information

PIC Type	M7i, M10i	M120, M320, T320, T640, TX	M20, M40
4-port Channelized DS3	PE-4CHDS3-QPP	PB-4CHDS3-QPP	P-4CHDS3-QPP
1-port Channelized OC3	PE-1CHOC3-SMIR-QPP	PB-1CHOC3-SMIR-QPP	P-1CHOC3-SMIR-QPP
1-port Channelized STM1	PE-1CHSTM1-SMIR-QPP	PB-1CHSTM1-SMIR-QPP	P-1CHOC3-SMIR-QPP
1-port Channelized OC12	PE-1CHOC12SMIR-QPP	PB-1CHOC12SMIR-QPP	P-1CHOC12SMIR-QPP
10-port T1	PE-10CHT1-RJ48-QPP	PB-10CHT1-RJ48-QPP	P-10CHT1-RJ48-QPP
10-port E1	PE-10CHE1-RJ48-QPP	PB-10CHE1-RJ48-QPP	P-10CHE1-RJ48-QPP
4-port E3	PE-4E3-QPP	PB-4E3-QPP	P-4E3-QPP

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Juniper Networks develops purpose-built, high-performance IP platforms that enable customers to support a wide variety of services and applications at scale. Service providers, enterprises, governments and research and education institutions rely on Juniper to deliver a portfolio of proven networking, security and application acceleration solutions that solve highly complex, fast-changing problems in the world's most demanding networks. Additional information can be found at www.juniper.net.

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