Product Description

Juniper Networks® PTX Series Routers are architected to deliver industry leading system density in a feature-optimized design that delivers the ability to scale, rapidly qualify and deploy, and reliably support their core—at almost half the power of other core routers. Powered by Junos Express chip set the PTX Series deliver line rate, low latency packet performance, at up 480 Gbps per slot, even for the smallest packet sizes. The 2-port 100G DWDM PIC continues to build on the Supercore value by delivering the first phase of Junipers Packet-Optical vision for the PTX family, giving Service Providers the ability to deploy up to 32 ports of tunable, long reach 100G DWDM Router interfaces for ultra-high speed packet optical core applications.

With a 2-port 100GbE CFP PIC and the 2-port 100G DWDM PIC the PTX Series gives Service Providers the benefit of allowing them to pick the right interface for their network and not give up port density.

The 2-port 100G DWDM PIC is a key component in deploying a simplified, collapsed packet-optical core network architecture. By shifting the coherent transponder into the router Service Providers can remove cost, and they don’t pay a 100G “long reach penalty” on port density in the PTX.

Architecture and Key Components

The 2-port 100G DWDM PIC leverages the latest OIF compliant optical technology to deliver an interface that can be tuned to any of 96 ITU extended C-Band channels. The 2-port 100G DWDM PIC provides a DP-QPSK optical interface and utilizes a coherent MODEM ASIC to provide SD-FEC ensuring the longest reach possible for transmission on legacy Fiber infrastructure. The 2-port 100G DWDM PIC supports full OTN performance monitoring, and full control and monitoring via JUNOS CLI and SNMP.

Long Reach 100G DWDM in the PTX Router: Enabling Simplified, Reliable, Lower Cost Network Designs

As Network Operators seek ways to accommodate unrelenting growth while trying to contain costs, they seek next generation solutions that can scale efficiently. By integrating transponder functions into the core router, SP’s can free up rack space, reduce power consumption and reduce the cost, which takes a step closer to converging layers in the core. The 2-port 100G DWDM PIC gives Operators the ability to begin that migration without making the sacrifice of port density found in competitive alternatives.
In the top example of figure 2, a standard configuration using 100G CFP PIC’s in the PTX Routers and DWDM Switching Systems consist of 2 CFP’s and a transponder at 2 sites, for a total of 4 CFP’s and 2 transponders. In the bottom configuration the 2-port 100G DWDM PIC is used at each end, creating a simplified, more efficient, lower cost solution.

Features and Benefits

The 2-port 100G DWDM PIC delivers:

- Up to 32 ports of tunable 100G DWDM per PTX5000
- OTU-4 Framing
- Support for distances in excess of 2000km
- Fully tunable to any of 96 ITU extended C-Band Channels (50Ghz Spacing)
- Full OTN Monitoring and control
- Junos CLI and SNMP Interfaces
- Concatenated Forward Error Correction with SD-FEC inner code and GFEC outer code

The following table lists the number of 10GbE and 100GbE interfaces supported per chassis

<table>
<thead>
<tr>
<th>Table 1: PIC Interfaces Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Platform</strong></td>
</tr>
<tr>
<td>PTX5000</td>
</tr>
<tr>
<td>PTX3000</td>
</tr>
</tbody>
</table>

Table 2: PIC Feature Details

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported Platforms</td>
<td>PTX5000, PTX3000</td>
</tr>
<tr>
<td>Data rate</td>
<td>OTU4v mode: 127.14 Gbits/s</td>
</tr>
<tr>
<td>Optics</td>
<td>DP-QPSK with Coherent Receiver</td>
</tr>
<tr>
<td>Connector Type</td>
<td>LC - Straight</td>
</tr>
<tr>
<td>Channel range</td>
<td>191.25 Thz to 196 Thz.</td>
</tr>
<tr>
<td>Framing</td>
<td>ODU4v</td>
</tr>
<tr>
<td>Forward Error Correction</td>
<td>G.709 FEC + SD-FEC</td>
</tr>
<tr>
<td>OSNR sensitivity</td>
<td>14.5 dB EOL</td>
</tr>
<tr>
<td>CD tolerance</td>
<td>50,000 ps/nm</td>
</tr>
<tr>
<td>PMD tolerance</td>
<td>80 ps DGD</td>
</tr>
<tr>
<td>Tx optical output power</td>
<td>-2 dBm</td>
</tr>
<tr>
<td>Rx optical input power</td>
<td>-18 to -5 dBm</td>
</tr>
</tbody>
</table>

Software Features

Complete monitoring, provisioning and management of the 2-port 100G OTN PIC is provided through JunOS. The on board OTN framer provides full access to ITU-T G.709 OTN overhead. Specifically, the following functionality is supported:

- Support of all JunOS CLI commands for the PTX5000 features including the ability to fully manage the 2-port 100G OTN PIC
- SNMP v2c and v3 support
- Support for RFC 3591 – Definitions of Managed Objects for the Optical Interface Type and draft-galimbe-kunze-black-link-mib-00
- Performance monitoring for all relevant OTN and Optical counters and guages, including 15min and 24Hr buckets and associated TCAs
- GR-1093 based state management for OTN PICs and OTN 100G ports
- Fault management and suppression based on ITU-T G.798 for the OTN layer

Physical Dimensions
• 7.75” x 11” (196.8mm x 279.4mm)

Weight
• 20 lbs (9.07kg)

Power
• 311 watts (Maximum)

Network Management
• Simple Network Management Protocol (SNMP)
• JunosSpace Command-Line Interface (CLI)

Standards Compliance and Interoperability

Optical Standards
• Telcordia GR-63 Issue 4: 2012
• FDA CDRH21 CFR-1040

Environment
• Operating Temperature: 32° to 104° F, 0° to 40° C
• Storage Temperature: -40° to 158° F, -40° to 70° C
• Relative Humidity: (Operating) 5 to 90% non-condensing

Safety
• CAN/CSA-C22.2 No. 60950-1 (2007) Information Technology Equipment - Safety
• UL 60950-1 (2nd Ed.) Information Technology Equipment - Safety
• EN 60950-1 (2005) Information Technology Equipment - Safety
• IEC 60950-1 (2005) Information Technology Equipment - Safety (All country deviations)

Electromagnetic Compatibility
• EN 300 386 V1.4.1 (2008) Telecom Network Equipment - EMC requirements
• EN 55024 +A1+A2 (1998) Information Technology Equipment immunity Characteristics

EMI
• FCC CFR 45, Part 15 Class A (2009) USA Radiated Emissions
• VCCI Class A (2007) Japanese Radiated Emissions
• BSMI CNS 13438 and NCC C6357 Taiwan Radiated Emissions
• AS/NZS CISPR22:2009

Customer Specific Requirements
• GR-1089-Core Issue 5 (2009) EMC and Electrical Safety for Network Telecommunications Equipment
• SR-3580 (2007) NEBS Criteria Levels (Level 3)
• ETSI EN 300 019: Environmental Conditions & Environmental Tests for Telecommunications Equipment
• ETSI EN 300 019-2-1 (2000) – Storage
• ETSI EN 300 019-2-2 (1999) – Transportation
• ETSI EN 300 019-2-3 (2003) – Stationary Use at Weather-protected Locations
• ETS 300753 (1997) – Acoustic noise emitted by telecommunications equipment
• 1 TR 9 (2005) Deutsche Telekom EMC Specification
• British Telecom EMC Immunity Requirements (2004)
• ITU-T K.21 (2003) Resistibility of telecommunication equipment installed in customer premises to over voltages and over currents

Mandatory Power Supply Markings
• Power Supply integrated in system (with metal enclosure or open frame)
  - China CCC
  - Argentina IRAM/S-mark

Juniper Networks Services and Support
Juniper Networks is the leader in performance-enabling services that are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to maximize operational efficiency while reducing costs and minimizing risk, achieving a faster time to value for your network. Juniper Networks ensures operational excellence by optimizing the network to maintain required levels of performance, reliability, and availability. For more details, please visit www.juniper.net/us/en/products-services/.

Ordering Information

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
<th>Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1-PTX-2-100G-C-WDM-C</td>
<td>2-port 100G DWDM PIC</td>
<td>PTX5000, PTX3000</td>
</tr>
</tbody>
</table>
About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.