PTX10002-36QDD FIXED CONFIGURATION ROUTER DATASHEET

Product Overview

Juniper's high-performance, sustainable, and automated WAN solutions help providers and enterprises react to evolving market conditions quickly. The PTX10002-36QDD router, based on Juniper's custom Express 5 silicon is integral to Juniper's automated WAN solutions. It empowers you to:

— Accelerate service delivery with world-class products supporting innovative architectures

— Deliver massively scalable and sustainable routing solutions for space and power-constrained provider and enterprise networks

— Reduce TCO with highly flexible, high-performance, and sustainable platforms built for the most demanding environments

Product Description

Juniper Networks® PTX Series Packet Transport Routers transform the transport network with innovations that deliver unprecedented throughput efficiency at the lowest cost per bit. The PTX10002-36QDD is a 2 U fixed-configuration 800GbE router with industry-leading performance and power efficiency. This 800GbE routing platform unleashes a massive 28.8Tbps capacity supporting 36x800GbE/72x400GbE interfaces with inline MACsec. The PTX10002-36QDD extends the industry-leading PTX routing portfolio to meet and exceed the highest throughput and scale requirements of carrier-grade networks in an ultra-compact form factor. The PTX10002-36QDD supports a myriad of mission-critical network roles, such as core, peering, data center interconnect and data center edge, metro aggregation, and AI data center networking, for service and cloud providers, as well as enterprise networks. With its elastic architecture and precise traffic controls, the PTX10002 gives customers the freedom to develop and deliver new services anywhere in the network without compromising the service experience.

The Evolving Landscape

New traffic dynamics such as mobile, video, and cloud-based services are transforming traditional network patterns and topologies. Stratified, statically designed, and manually operated networks must evolve to support the constantly growing volumes of traffic quickly and economically. Many operators have seen their profits stagnate and TCO increase under the burden of these growing traffic volumes. Cloud and service providers need to become more agile to optimize their existing network resources, shorten planning cycles, and remove rigid network layers.

Operators are facing multiple challenges in the current environment:

- Static scale: Provider and enterprise network backbones handle the full weight of network traffic. It is paramount that core networks are inherently designed for scalability and efficiency. This 800GbE-capable platform, with 10/40/100/400/800GbE inline MACsec, empowers network operators to maintain pace with traffic growth incrementally with an elegant, elastic, redundant ultra-compact router.
- Static architecture: Virtualized services and the explosion of cloud-based applications are creating increasingly unpredictable traffic patterns. To handle this unpredictability, service providers need an adaptable platform like the PTX10002-36QDD that scales across the WAN transport in a plethora of roles with flexible programmability to support any service, anywhere.
- Power costs: With the ever-increasing bandwidth demands and associated power utilization projected for WAN routing, power efficiency is of paramount concern. Leading the industry with Express 5 silicon's unparalleled power efficiency, the

PTX10002-36QDD minimizes your environmental footprint while maximizing performance by integrating 36x 800GbE or 72x 400GbE interfaces through dual-LC connectors in a compact 2 U form factor. This significantly reduces power costs and advances sustainability objectives including space and carbon footprint.

- Facility limitations: Service providers cannot grow their facilities exponentially forever. They need innovations that provide a low-touch deployment model optimized around space availability, facility power requirements, and floor weight thresholds. Transport-oriented central office locations have the added burden of meeting European Telecommunications Standards Institute (ETSI) standard depth. The PTX10002-36QDD is designed with sustainable efficiency to operate under space and resource constrained environments.

Architecture and Key Components

The PTX10002-36QDD brings physical and virtual innovation to provider and enterprise WAN networks. This router streamlines integration and deploys seamlessly in existing 400GbE WAN environments with a dense 72x 400GbE interface configuration through 2x 400GbE dual LC or dual-CS connectors. The PTX10002-36QDD fixed-configuration router provides an extensible platform to scale-out provider and enterprise WAN backbone architectures, ensuring a consistent user experience across geographies. The PTX10002-36QDD meets all existing core, peering, Data Center Interconnect (DCI), data center edge, metro aggregation, and AI data center networking requirements, easily fitting into provider and enterprise networks in multiple mission critical roles, including:

- **Core routing**: The PTX10002-36QDD employs a massively scalable yet compact U form-factor with scalable BGP, filters, and security with 8M Counters; encapsulated IP filtering, sampling, port mirroring; and >200K Transit LSP.
- **Peering**: The PTX10002-36QDD is perfect to scale-out peering in space and power-constrained environments with full traffic visibility and L3 services including advanced scale and security; filters, RIB/FIB, NS BGP at scale; 8M counters; encapsulated IP; filtering, sampling, and port mirroring; DDoS detection with flex filter offset and Corero mitigation. The compact PTX10002-36QDD offers high routing scale for full traffic statistics visibility and deep buffers.
- **Data center edge**: The PTX10002-36QDD is also a flexible data center edge solution supporting: EVPN/VXLAN/MPLS, expansion to innovative data center technologies, multicast (VXLAN OISM), stitching, and more.
- **DCI**: The PTX10002-36QDD is an excellent data center interconnect router with advanced EVPN, VXLAN, and data center connectivity including: EVPN/VXLAN, ECN/PFC, and in-band telemetry. The PTX10002-36QDD offers secure inline MACsec with no compromise in throughput or latency, an extended range enabled by 400GbE ZR/ZR+ and 800GbE optics, and hardware readiness for 800GbE ZR/ZR+ optics.
- **Metro aggregation**: With advanced L2/L3 services the compact PTX10002-36QDD is also well suited for metro aggregation roles including: CFM/LFM – Y.1731; MC-LAG; hierarchical QoS; BIER; SRv6.
- **AI data center networking**: The PTX10002-36QDD also offers a high radix routing platform with deep buffers and a cell-based switch fabric making it a superior spine or leaf in AI data center networking environments. AI data center networking capabilities include efficient, deep-buffered interfaces, scalable cell-based fabric design, VOQ scheduling, RoCEv2, Adaptive Load Balancing, 8M Counters, built-in IPFIX and INT-MD, and more.

Innovations in Silicon

Physical innovations at the silicon level enable the PTX10002-36QDD fixed-configuration router to boost industry-leading performance and throughput efficiency numbers at optimal power efficiency.

Express 5 Silicon

The PTX10002-36QDD is powered by the highly scalable, next-generation ASIC in the Express silicon family. Juniper Express 5 silicon brings industry-leading inline MACsec (port based and VLAN based) for all 800GbE interfaces (28.8Tbps encryption/decryption per chip) with universal multi-rate QDD800 and QSFP56-DD. Juniper Express 5 silicon delivers consistent low latency, 8M counters, 10M-plus FIB, 100,000-plus SR tunnels, 256 AES MACsec encryption supported on all ports, and wire-rate packet performance for IP traffic without sacrificing the optimized system power profile. Preserving the spirit of the previous generation Express silicon family, Juniper Express 5 silicon incorporates a 3D memory architecture into the base design, offering the industry's highest packet performance per gigabit in the fewest rack units. It also provides dynamic table memory allocation for massive IP routing scale while delivering tremendous power efficiency gains at <0.05 Watts/Gig.

Features and Benefits

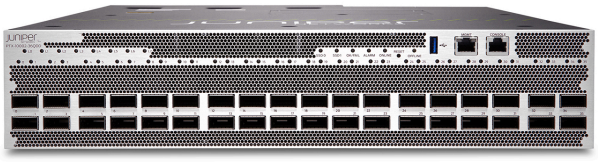
Performance is one of the guiding design principles for the PTX Series Packet Transport Routers. This focus empowers providers and enterprise customers with superior scale to match increased traffic levels and network engineering challenges with predictable system latency. Ultimately, this improves the overall service experience, delivers best-in-class resiliency, and ensures that services meet strict customer SLAs.

Operational cost efficiency is the other guiding design principle for the PTX Series routers, focusing on power, space, and weight—fundamental concerns that impact service providers' operational budget with respect to growing traffic. Elevating the standard for power efficiency, the PTX10002-36QDD not only seamlessly supports 800G ZR and ZR+ in every port but also implements industry-leading, power-saving measures. Tailoring its power consumption to specific use cases, it features automatic shutdown capability for unused packet forwarding engines (PFEs), MACsec engines, and more. Additionally, the router integrates environmental management policies for optics, ensuring that components like fans operate at optimal speeds based on the specific optics in use.

Infinite programmability with automation and telemetry brings virtual innovations to the cloud and service provider core, while Juniper Paragon Pathfinder, an open, standards-based solution optimizes both the IP layer and the transport layer with simplicity and precision. Paragon Pathfinder (formerly NorthStar Controller) is a cloud-native SDN controller that simplifies traffic engineering, making it easier for you to leverage benefits provided by transport service paths, such as MPLS/RSVP, segment routing, and network slicing.

Table 1. PTX10002 Features and Benefits

Feature	Feature Description	Benefit
System capacity	The PTX10002-36QDD scales to 28.8 Tbps in a single chassis, featuring flexible interface configuration options: • 36x 800GbE with QDD800 • 72x 400GbE with dual LC / dual CS Connectors • 36x 400GbE with QSFP56DD • 288x 100GbE with QDD800 breakout • 144x 100GbE with QSPF56DD breakout • 36x 100GbE with QSFP28 • 36x 40GbE with QSFPP • 144x 10GbE with 4x10GbE QSFPP • 36x 10GbE with SFP+ through QSA adapter, MAM1Q00A-QSA	The PTX10002-36QDD gives cloud and service providers and enterprise customers the performance and scalability needed to outpace growing traffic demands.
High availability (HA) hardware	The PTX10002-36QDD are built with hardware redundancy for cooling, power supplies, and forwarding. The platform offers power supply 1+1 redundancy and front-to-back (AFO) fan trays with 2+1 redundancy.	HA is critical for service providers to maintain an always-on infrastructure base and meet stringent SLAs across the core.
Packet **performance**	The PTX10002-36QDD uses the latest Express 5 silicon that delivers dense 100/400/800GbE. Express 5 silicon also supports MACsec encryption on every interface including 36 x 800GbE.	Exceptional packet processing capabilities help alleviate the challenge of scaling the network as traffic levels increase while optimizing IP/MPLS transit functionality around superior performance and fast deployment.
Compact form factor	With cutting-edge innovation in power and cooling technology, the PTX10002-36QDD provides 28.8 Tbps in an ultra-compact 2 U form factor with power-optimized scale and efficiency.	Space efficiency is a critical requirement for peering Internet exchange points, peering collocations, central offices, and regional networks, especially in emerging markets.
Security	The PTX Series Packet Transport routers use a combination of hardware-based mechanisms like MACsec and software-based features like firewall filters and DDoS to provide scalable security. Inline MACsec is supported on all ports with no compromise in throughput or latency.	Inline data plane delivers MACsec security with no throughput or latency penalties in addition to control plane security with DDoS.



PTX10002-36QDD

PTX10002-36QDD Specifications

Feature	PTX10002-36QDD
System throughput	28.8 Tbps
Forwarding capacity	Up to 10B pps

Feature	PTX10002-36QDD
Maximum 10GbE port density	144
Maximum 25GbE port density	144
Maximum 40GbE port density	36
Maximum 50GbE port density	288 (hardware supported, software support pending)
Maximum 100GbE port density	288
Maximum 200GbE port density	72
Maximum 400GbE port density	72
Maximum 800GbE port density	36
Dimension (WxHxD)	17.3 x 3.5 x 25.5 in (44 x 8.89 x 64.7 cm)
Rack units	2 U

Feature	PTX10002-36QDD
Weight	55.6 lb (25.2 kg)
CPU	Intel Ice Lake-D 10-Core 3.0 GHz CPU
RAM	128 GByte SDRAM
SSD	200 GB x 2
Power supply	2x3000 Watts (AC / DC) (36 x 800G or 72 x 400G) 2x2200 Watts (AC / DC) (36 x 400G mode)
Cooling (front-to-back fan)	3 hot-swappable redundant fans
Packet buffer	32 GByte

PTX10002 Software Feature Table

Feature	PTX10002-36QDD
MPLS-TE	Yes
MPLS LSR	Yes
SRv6	Yes
ROCEv2	Yes
Firewall filters ACL	Yes
Adaptive Load Balancing	Yes
SPRINGv4	Yes
SPRINGv6	Yes
DDoS control plane	Yes
Hierarchical QoS	Yes
JFlow/SFlow	Yes
BGP FlowSpec, EPE, URPF, L3VPN	Yes
Integrated routing and bridging (IRB)	Yes
Telemetry, NETCONF/YANG	Yes
Zero Touch Provisioning (ZTP)	Yes
PCEP, BGP-LS	Yes
Fast restoration	Yes
Operation, Administration, and Maintenance (OAM)	Yes
Timing features	Sync-E, PTP Class-C Capable

Management Interfaces

- 1 small form-factor pluggable transceiver (SFP/SFP+) port or Precision Time Protocol (PTP) Grandmaster
- 10/100/1000BASE-T (RJ-45) Ethernet management port
- SMB in, SMB out, 10 MHz in, 10 MHz out
- One RJ45 console port
- USB 3.0 interface
- BITS RJ-45 Interface

Environmental Safety Requirements for Chassis

- Operating temperature: 0° C to 40° C
- Storage temperature: –40° C to 70° C
- Relative humidity (operating): 5 to 90% non-condensing
- GR-3160-CORE (DC NEBS)
- ETSI EN 300 019: Environmental Conditions & Environmental Tests for Telecommunications
- ETSI EN 300 019-2-1 Storage (ETSI EN 300 019-1-1 Class 1.2)
- ETSI EN 300 019-2-2 Transportation (ETSI EN 300 019-1-2 Class 2.3)
- ETSI EN 300 019-2-3 Stationary Use at Weather-protected Locations (ETSI EN 300 019-1-3 Class 3.2)

Environmental Safety Requirements for Optics

- CFR, Title 21, Chapter 1, Subchapter J, Part 1040
- REDR c 1370 OR CAN/CSA-E 60825-1 - Part 1
- IEC 60825-1
- IEC 60825-2

Safety and Compliance

Safety

- CAN/CSA-C22.2 No. 62368-1
- UL 62368-1
- UL/CSA 60950-1
- IEC 62368-1 (All country deviations): CB Scheme report

Electromagnetic Compatibility

- FCC 47 CFR Part 15
- ICES-003 / ICES-GEN
- BS EN 55032
- BS EN 55035
- EN 300 386 V1.6.1
- EN 300 386 V2.2.1
- BS EN 300 386
- EN 55032
- CISPR 32
- EN 55035
- CISPR 35
- IEC/EN 61000 Series
- IEC/EN 61000-3-2
- IEC/EN 61000-3-3
- AS/NZS CISPR 32
- VCCI-CISPR 32
- BSMI CNS 15936
- KS C 9835 (Old KN 35)
- KS C 9832 (Old KN 32)
- KS C 9610 142
- BS EN 61000 Series
- Customer-Specific Compliance Statements
  - GR-1089-Core, Issue 8
  - Juniper Inductive GND (IGS)

  - Deutsche Telekom (DT) 1TR9
  - British Telecommunications (BT) GS7
- Compliance Statement for Argentina
  - EQUIPO DE USO IDÓNEO

Environmental Compliance


Restriction of Hazardous Substances (ROHS) 6/6


Silver PSU Efficiency


Recycled material


Waste Electronics and Electrical Equipment (WEEE)


Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)


China Restriction of Hazardous Substances (ROHS)

Telco

- Common Language Equipment Identifier (CLEI) code

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 https://www.juniper.net/us/en/products.html.

Automated Support and Prevention

Juniper's Automated Support and Prevention consists of an ecosystem of tools, applications, and systems targeted towards simplifying and streamlining operations, delivering operational efficiency, reducing downtime, and increasing your network's ROI running Juniper Networks Junos operating system. Automated Support and Prevention brings operational efficiency by automating several time-consuming tasks such as incident management, inventory management, proactive bug notification, and on-demand EOL/EOS/EOE reports. The Junos Space® Service Now and Service Insight service automation tools are standard entitlements of all Juniper Care contracts.

Warranty

For warranty information, please visit https://support.juniper.net/support/warranty/

Ordering Information

Product Number	Description
PTX10002 HW SKUs	
PTX10002-36QDD	PTX10002-36QDD fully configured system with 2 PSUs (Choose AC/DC 3KW/2.2KW) 3 Fans and Junos EVO 64-bit
PTX10002-36QDD-S	JNP10002 CHAS, 36X800G, JUNOS EVO, Spare
PTX10002-36QDDL-S	JNP10002 CHAS, 36X800G, JUNOS EVO Limited, Spare
JNP-2200W-AC2	AC PS 2200W, AFO, Spare
JNP-2200W-DC2	DC PS 2200W, AFO, Spare
JNP-3000W-AC-AFO	AC PS 3000W, AFO, Spare
JNP-3000W-DC-AFO	DC PS 3000W, AFO, Spare
JNP10002-FAN2	Fan Tray, JNP10002, BX FFF, Spare
JNP10002-4P-TL-RMK	JNP10002, 4-Post Rack Mount Kit, Spare
JNP10002-2P-TL-RMK	JNP10002, 2-Post Rack Mount Kit, Spare
PKG-PTX10002-S	PTX10002 Shipping Container, Spare
PTX10002-36QDD-BB	PTX10002 CHAS, 36X800G, JUNOS EVO, Base
PTX10002-36QDDL-BB	PTX10002 CHAS, 36X800G, JUNOS EVO Limited, Base
JNP-2200W-AC2-BB	AC PS 2200W, AFO, Base
JNP-2200W-DC2-BB	DC PS 2200W, AFO, Base
JNP-3KW-AC-AFO-BB	AC PS 3000W, AFO, Base
JNP-3KW-DC-AFO-BB	DC PS 3000W, AFO, Base
JNP10002-FAN2-BB	Fan Tray, JNP10002, BX FFF, Base
PTX10002 SW SKUs	
S-PTX800GMSEC-P	SW, PTX800G, MACsec 800G, w/o CS, Perpetual
S-PTX-288C-A1-P	SW, PTX 800G Gen 28.8T, A1 tier, w/o CS, Perpetual
S-PTX-288C-A2-P	SW, PTX 800G Gen 28.8T, A2 tier, w/o CS, Perpetual
S-PTX-288C-P1-P	SW, PTX 800G Gen 28.8T, P1 tier, w/o CS, Perpetual
S-PTX-288C-P2-P	SW, PTX 800G Gen 28.8T, P2 tier, w/o CS, Perpetual
S-PTX-288C-P3-P	SW, PTX 800G Gen 28.8T, P3 tier, w/o CS, Perpetual
S-PTX-144C-P1-P	SW, PTX 800G Gen 14.4T, P1 tier, w/o CS, Perpetual
S-PTX-144C-P2-P	SW, PTX 800G Gen 14.4T, P2 tier, w/o CS, Perpetual
S-PTX-144C-P3-P	SW, PTX 800G Gen 14.4T, P3 tier, w/o CS, Perpetual
S-PTX-800G-P1-P	SW, PTX 800G Gen 800G PAYG, P1 tier, w/o CS, Perpetual
S-PTX-800G-P2-P	SW, PTX 800G Gen 800G PAYG, P2 tier, w/o CS, Perpetual
S-PTX-800G-P3-P	SW, PTX 800G Gen 800G PAYG, P3 tier, w/o CS, Perpetual

Ordering Information

Virtual PTX10002 is available for lab evaluations of PTX features and capabilities. To run Virtual PTX in a test environment, please contact your local Juniper account team for more information.

About Juniper Networks

Juniper Networks believes that connectivity is not the same as experiencing a great connection. Juniper's AI-Native Networking Platform is built from the ground up to leverage AI to deliver the best and most secure user experiences from the edge to the data center and cloud. Additional information can be found at Juniper Networks (www.juniper.net) or connect with Juniper on X (Twitter), LinkedIn, and Facebook.

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