QDD-400G-LR4-10

Part number: 740-096176

Optics Overview

Juniper Networks offers a complete portfolio of modular and fixed-chassis routers and switches for both WAN and data center networks. These solutions span Juniper's MX-Series Universal Routing Platform and PTX-Series Packet Transport Routers to EX-Series Ethernet Switches and QFX-Series Data Center Switches among others. Depending on deployment scenarios, Juniper's platforms support different pluggable optic modules that can be selected based on speed, distance, form-factor, and wavelength among other relevant attributes.

Additional Resources

Hardware Compatibility Tool

HCT contains a regularly updated database of Juniper's transceivers, DACs, and AOCs along with information regarding compatibility with Juniper's platforms and interface modules.

https://apps.juniper.net/hct/home/

Product Description

QSFP-DD 400G-LR4-10, SMF 10 km; Standard Temperature (0 through 70°C); Duplex LC/PC Receptacle

Overview

Part Number	740-096176
Speed	400 Gigabit Ethernet
Breakout Capable	No
Transceiver Type	QSFP-DD
Product Type	Optical Transceiver
Connector	Duplex LC
Monitoring Available	Yes
Digital Optical Monitoring	Yes

Note:

- Monitoring Available - Can measure received optical power and display in CLI.
- Digital Optical Monitoring - Full support for SFF-8636.
- Common Optic - The common optics product line provides competitively priced single-SKU optics offerings for use across Juniper routing, switching, and security platforms.

Specifications

Standard: 100G Lambda MSA, 400G-LR4-10, IEEE Std 802.3cu, 400GBASE-LR4-6

MSA compliance (SFF, for e.g. SFF-8665)	QSFP-DD MSA, QSFP-DD Hardware Specification for QSFP Double Density 8X Pluggable Transceivers, Rev 5.1. Common Management Interface Specification (CMIS), Rev 4.0
Digital Diagnostic Monitoring	Temperature Supply voltage TX bias current TX power RX power
Signaling rate, each lane	Host lane: PAM4; 26.5625 GBd ± 100 ppm Media lane: PAM4; 53.125 GBd ± 100 ppm
Transmitter fibers	1
Transmitter wavelengths (range)	1264.5 nm to 1277.5 nm 1284.5 nm to 1297.5 nm 1304.5 nm to 1317.5 nm 1324.5 nm to 1337.5 nm
Receive lane wavelengths (range)	1264.5 nm to 1277.5 nm 1284.5 nm to 1297.5 nm 1304.5 nm to 1317.5 nm 1324.5 nm to 1337.5 nm
Transmitter output power, each lane (minimum)	-2.7 dBm
Transmitter output power, each lane (maximum)	5.1 dBm
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane (maximum)	3.9 dB
Receiver input power, each lane (minimum)	-9 dBm
Receiver input power, each lane (maximum)	5.1 dBm
Receiver sensitivity (OMA), each lane (maximum)	For TECQ<1.4 dB: -6.8 dBm For 1.4 dB ≤ TECQ ≤ 3.9 dB: -8.2 + TECQ dBm
Stressed receiver sensitivity (OMA) each lane (maximum)	-4.3 dBm
Cable type	SMF
Core size/cladding	9/125 µm

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Distance	10 km
Maximum Power consumption (W)	12 W
Operating Temperature (range)	0° C to 70° C
Storage temperature	–40° C to 85° C
Typical Weight & Dimensions	Weight: 0.2 kg Height: 13.5 mm Width: 18.35 mm Depth: 93.26 mm

Supported Platforms

Platform	Introduced Release	Additional Information
Routing		
ACX7100-32C	Junos OS Evolved 22.1R1	
ACX7100-48L	Junos OS Evolved 22.1R1	
ACX7509	Junos OS Evolved 21.4R1	
MX240	Junos OS 21.1R1	
MX304	Junos OS 22.2R1	
MX480	Junos OS 21.1R1	
MX960	Junos OS 21.1R1	
MX2010	Junos OS 21.1R1	
MX2020	Junos OS 21.1R1	
MX10004	Junos OS 22.3R1	
MX10008	Junos OS 21.4R1	
PTX10001-36MR	Junos OS Evolved 20.4R1	
PTX10003	Junos OS Evolved 21.4R1	
PTX10004	Junos OS Evolved 20.3R1	
PTX10008	Junos OS Evolved 20.4R1	
PTX10016	Junos OS Evolved 21.2R2	
Switching		
QFX5130-32CD	Junos OS Evolved 22.1R1	
QFX5220-32CD	Junos OS Evolved 22.1R1	
QFX5230-64CD		
QFX5700	Junos OS Evolved 23.2R1	

Supported Interface Modules

Line Cards

Name	Description	Platforms and Introduced Releases	
400 Gigabit Ethernet			
ACX7509-FPC-4CD	ACX7509 4X200GE/4X400GE LINE CARD	ACX7509 Junos OS Evolved 21.4R1	
MX10K-LC9600	The MX10K-LC9600 (Model number: JNP10K-LC9600) is a fixed-configuration 24-port line card, which provides a line rate throughput of 9.6 Tbps	MX10004 Junos OS 22.3R1	MX10008 Junos OS 21.4R1
MX304-LMIC16	The MX304-LMIC16-BASE is a 16-port line card that supports maximum data throughput of 1.6 TB ingress and 1.6 TB egress	MX304 Junos OS 22.2R1	
PTX10K-LC1201-36CD	PTX10K 36 ports of 400 Gigabit Ethernet that provide 14.4-Tbps line rate processing speeds	PTX10004 Junos OS Evolved 20.3R1 PTX10016 Junos OS Evolved 21.2R2	PTX10008 Junos OS Evolved 20.4R1
PTX10K-LC1202-36MR	36-port line card that has thirty-two QSFP28 ports capable of supporting 100-Gbps speed, and four QSFP56-DD ports capable of supporting 400-Gbps speed	PTX10004 Junos OS Evolved 22.2R1 PTX10016 Junos OS Evolved 22.2R1	PTX10008 Junos OS Evolved 22.2R1

Modular Port Concentrators (MPCs)

Name	Description	Platforms and Introduced Releases	
400 Gigabit Ethernet			
MPC10E-10C	MPC10E-10C-MRATE/MPC10E-10C-P-BASE, 10 x QSFP28/QSFP56-DD multirate port line card	MX240 Junos OS 21.1R1 MX960 Junos OS 21.1R1	MX480 Junos OS 21.1R1

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Name	Description	Platforms and Introduced Releases	
MPC10E-15C	MPC10E-15C-MRATE/MPC10E-15C-P-BASE, 15 x QSFP28/QSFP56-DD multirate port line card	MX240 Junos OS 21.1R1 MX960 Junos OS 21.1R1	MX480 Junos OS 21.1R1
MX2K-MPC11E	The MX2K-MPC11E is a fixed-configuration Module Port Concentrator (MPC) which delivers bandwidth up to 4-Tbps per MPC slot for MX2020 and MX2010 routers.	MX2010 Junos OS 21.1R1	MX2020 Junos OS 21.1R1

Why buy optics from Juniper?

There is value in choosing Juniper over 3rd party optics

✓ Full testing, validation, and JTAC support for Juniper optics

- Power, Electrical, and Management interfaces tested at the system level.
- Extended temperature and functional testing in DVT chamber using fully loaded systems.
- Full software integration into JUNOS/EVO for seamless part recognition, functionality, and telemetry.
- Latest qualification status and optics specifications published on Hardware Compatibility Tool.

✓ Single-source provider for 1G to 400G on a variety of optical technologies

- Juniper's optics portfolio is maintained and constantly refreshed based on vendor availability.
- Automatic supply chain diversity and supply continuity - multiple optics suppliers fulfilled through Juniper.

✓ Rigorous evaluation of optical vendors

- Juniper ensures uniformity across all vendors by standardizing P-Specs for management, specs, and logs.
- Vendors are scored based on engineering and supply-chain analysis.
- Factory audits and critical component evaluation (Ex. Who is supplying the laser?).

Aren't 3rd party optics the same?

Optics may be a commodity, but some things are too good to be true

× Juniper does not Provide JTAC support for 3rd party optics

- JTAC will only assist with host-related issues unrelated to the use of 3rd party optics.

× Not all optics are the same - standards compliance does not guarantee quality or performance

- Third-party providers lack system-level knowledge and testing.
- No guarantee of vendor reliability or accountability.

× Newer technologies (ex. Coherent 400G ZR/ZR+) are complex and not simply plug-and-play

- Significant software integration necessary to enable full functionality, management, and telemetry.
- Use of unqualified 3rd party high-power optics can damage the host equipment.

× Third-party providers simply can't scale

- Incomplete solution offerings and fast turnaround times only for limited quantities.
