

# Optic Modules

## Product Description

Juniper Networks® has platforms ranging from the Juniper Networks CTP Series Circuit to Packet Platforms, BX Series Multi-Access Gateways, E Series Broadband Services Routers, M Series Multiservice Edge Routers, MX Series 3D Universal Edge Routers, to the T Series Core Routers. These platforms support multiple interface types and technologies such as Ethernet, ATM, and SONET. Depending on the deployment scenario, they support different pluggable optic modules that can be selected based on distance, form factor, and wavelength. This

datasheet is intended to guide the user through the various options available when choosing an optic module for a given platform depending on the architecture.

## Features and Benefits

The following table lists the different pluggable optic modules and supported platforms, along with the technical specifications for each.

Table 1: Optic Modules Matrix

| SKU            | Description                                                                                                                                                      | Platforms                                            | Interface Type | Form Factor | Standard     | λ (TX) (nm) | λ (RX) (nm) | Media  | Cable                               | Max Reach |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------|-------------|--------------|-------------|-------------|--------|-------------------------------------|-----------|
| CTP-SFP-IGE-LX | Small form-factor pluggable (SFP) 1000BASE-LX Gigabit Ethernet optic module.                                                                                     | CTP2008, CTP2024, and CTP2056                        | GbE            | SFP         | 1000BASE-LX  | 1310        |             | SMF    | 9/125                               | 10 km     |
|                |                                                                                                                                                                  |                                                      |                |             |              |             |             | MMF    | 50/125                              | 550 m     |
|                |                                                                                                                                                                  |                                                      |                |             |              |             |             |        | 62.5/125                            | 550 m     |
| CTP-SFP-IGE-SX | SFP 1000BASE-SX Gigabit Ethernet optic module.                                                                                                                   | CTP 2008, CTP2024, and CTP2056                       | GbE            | SFP         | 1000BASE-SX  | 850         |             | MMF    | 50/125                              | 550 m     |
|                |                                                                                                                                                                  |                                                      |                |             |              |             |             |        | 62.5/125                            | 275 m     |
| CTP-SFP-IGE-T  | SFP 1000BASE-T Gigabit Ethernet module (uses Cat 5 cable).                                                                                                       | CTP 2008, CTP2024, and CTP2056                       | GbE            | SFP         | 1000BASE-T   |             |             | Copper | 4 twisted pair, Category 5 shielded | 100 m     |
| RX-10KM-SFP    | 1-port 10 km GbE SFP adapter: provides (1) SFP Gigabit Ethernet single-mode (10 km) physical port with an LC full duplex connection. Works with ERX-GIGESFP-IOA. | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440 | GbE            | SFP         | 1000BASE-LX  | 1310        |             | SMF    | 9/125                               | 10 km     |
| RX-550M-SFP    | 1-port 550 m GbE SFP adapter: provides (1) SFP Gigabit Ethernet multimode (550 M) physical port with an LC full duplex connection. Works with ERX-GIGESFP-IOA.   | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440 | GbE            | SFP         | 1000BASE-SX  | 850         |             | MMF    | 50/125                              | 550 m     |
|                |                                                                                                                                                                  |                                                      |                |             |              |             |             |        | 62.5/125                            | 275 m     |
| RX-70KM-SFP    | 1-port 70 km GbE SFP adapter: provides (1) SFP Gigabit Ethernet single-mode (70 km) physical port with an LC full duplex connection. Works with ERX-GIGESFP-IOA. | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440 | GbE            | SFP         | 1000BASE-ZX  | 1550        |             | SMF    | 9/125                               | 70 km     |
| RX-FXSM-SFP    | 1-port 10 km FE SFP adapter: provides (1) SFP Fast Ethernet single-mode (10 km LX) physical port. SC connector type. Works with ERX-8FXSFP-IOA.                  | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440 | FE             | SFP         | 100BASE-LX10 | 1310        |             | SMF    | 9/125                               | 10 km     |

| SKU             | Description                                                                                                                                   | Platforms                                                                                                | Interface Type | Form Factor | Standard                              | <sup>1</sup> (TX) (nm) | <sup>1</sup> (RX) (nm) | Media                     | Cable                               | Max Reach |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------|-------------|---------------------------------------|------------------------|------------------------|---------------------------|-------------------------------------|-----------|
| RX-GET-SFP      | 1000BASE-T GbE SFP for all E Series GbE input/output adapters (IOAs) that accept pluggable interfaces (uses Cat 5 cable with RJ45 connector). | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440                                                     | GbE            | SFP         | 1000BASE-T                            |                        |                        | Copper                    | 4 twisted pair, Category 5 shielded | 100 m     |
| SFP-IFE-FX      | SFP 100BASE-FX Fast Ethernet optic module.                                                                                                    | MX240, MX480, MX960                                                                                      | FE             | SFP         | 100BASE-FX                            | 1310                   |                        | MMF                       | 62.5/125                            | 2 km      |
| SFP-IGE-FE-E-T  | SFP capable of support 10/100/1000 speeds.                                                                                                    | MX240, MX480, MX960                                                                                      | GbE/FE/E       | SFP         | 10BASE-T;<br>100BASE-T;<br>1000BASE-T |                        |                        | Copper                    | 4 twisted pair, Category 5 shielded | 100 m     |
| SFP-IGE-LH      | SFP 1000BASE-LH Gigabit Ethernet optic module.                                                                                                | M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, BX7000, T320, T640, SRX3400, SRX3600                   | GbE            | SFP         | 1000BASE-ZX                           | 1550                   |                        | SMF                       | 9/125                               | 70 km     |
| SFP-IGE-LX      | SFP 1000BASE-LX Gigabit Ethernet optic module.                                                                                                | M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, BX7000, T320, T640, SRX3400, SRX3600, SRX5600, SRX5800 | GbE            | SFP         | 1000BASE-LX                           | 1310                   |                        | SMF                       | 9/125                               | 10 km     |
|                 |                                                                                                                                               |                                                                                                          |                |             |                                       |                        |                        | MMF                       | 50/125                              | 550 m     |
|                 |                                                                                                                                               |                                                                                                          |                |             |                                       |                        |                        |                           | 62.5/125                            | 550 m     |
| SFP-IGE-SX      | SFP 1000BASE-SX Gigabit Ethernet optic module.                                                                                                | M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, BX7000, T320, T640, SRX3400, SRX3600, SRX5600, SRX5800 | GbE            | SFP         | 1000BASE-SX                           | 850                    |                        | MMF                       | 50/125                              | 550 m     |
|                 |                                                                                                                                               |                                                                                                          |                |             |                                       |                        |                        |                           | 62.5/125                            | 275 m     |
| SFP-IGE-T       | SFP 1000BASE-T Gigabit Ethernet optic module (uses Cat 5 cable).                                                                              | M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, BX7000, T320, T640, SRX3400, SRX3600, SRX5600, SRX5800 | GbE            | SFP         | 1000BASE-T                            |                        |                        | Copper                    | 4 twisted pair, Category 5 shielded | 100 m     |
| SFP-IOC48-IR    | SFP OC-48 optic module, intermediate reach.                                                                                                   | E120, E320, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640                                      | OC48/STM16     | SFP         | IR-1                                  | 1310                   |                        | SMF                       | 9/125                               | 15 km     |
| SFP-IOC48-LR    | SFP OC-48 optic module—long reach.                                                                                                            | E120, E320, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640                                      | OC48/STM16     | SFP         | LR-2                                  | 1550                   |                        | SMF                       | 9/125                               | 80 km     |
| SFP-IOC48-SR    | SFP OC-48 optic module—short reach.                                                                                                           | E120, E320, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640                                      | OC48/STM16     | SFP         | SR-1                                  | 1310                   |                        | SMF                       | 9/125                               | 2 km      |
| SFP-FE20KT13R15 | SFP 100BASE-BX Fast Ethernet optics, Tx 1310 nm / Rx 1550 nm for 10 km transmission.                                                          | MX240, MX480, MX960                                                                                      | FE             | SFP         | 100BASE-BX10-U                        | 1310                   | 1550                   | SMF (single strand fiber) | 9/125                               | 10 km     |

| SKU             | Description                                                                                                                                                                          | Platforms                                                                                                                 | Interface Type | Form Factor | Standard        | <sup>1</sup> (TX) (nm) | <sup>1</sup> (RX) (nm) | Media                     | Cable | Max Reach |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------|-------------|-----------------|------------------------|------------------------|---------------------------|-------|-----------|
| SFP-FE20KT15R13 | SFP 100BASE-BX Fast Ethernet optics, Tx 1550 nm / Rx 1310 nm for 10 km transmission.                                                                                                 | MX240, MX480, MX960                                                                                                       | FE             | SFP         | 100BASE-BX10-D  | 1550                   | 1310                   | SMF (single strand fiber) | 9/125 | 10 km     |
| SFP-GE10KT13R14 | SFP module supporting 1000BASE-BX10, UPLINK, at 10 km (Tx1310 nm / Rx1490). A single fiber is used for both transmit and receive. UPLINK SFP must be matched with DOWNLINK SFP.      | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640, T1600 | GbE            | SFP         | 1000BASE-BX10-U | 1310                   | 1490                   | SMF (single strand fiber) | 9/125 | 10 km     |
| SFP-GE10KT13R15 | SFP module supporting 1000BASE-BX10, UPLINK, at 10 km (Tx1310 nm / Rx1550). A single fiber is used for both transmit and receive. UPLINK SFP must be matched with DOWNLINK SFP.      | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640, T1600 | GbE            | SFP         | N/A             | 1310                   | 1550                   | SMF (single strand fiber) | 9/125 | 10 km     |
| SFP-GE10KT14R13 | SFP supporting 1000BASE-BX10, DOWNLINK, at 10 km (Tx1490 nm / Rx1310 nm). A single fiber is used for both transmit and receive. UPLINK SFP must be matched with DOWNLINK SFP.        | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640, T1600 | GbE            | SFP         | 1000BASE-BX10-D | 1490                   | 1310                   | SMF (single strand fiber) | 9/125 | 10 km     |
| SFP-GE10KT15R13 | SFP module supporting 1000BASE-BX10, DOWNLINK, at 10 km (Tx1550 nm / Rx1310 nm). A single fiber is used for both transmit and receive. UPLINK SFP must be matched with DOWNLINK SFP. | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640, T1600 | GbE            | SFP         | N/A             | 1550                   | 1310                   | SMF (single strand fiber) | 9/125 | 10 km     |
| SFP-GE40KM      | SFP supporting 1000BASE-EX Gigabit Ethernet optic module, 40 km.                                                                                                                     | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, MX240, MX480, MX960                                                 | GbE            | SFP         | 1000BASE-LX     | 1310                   |                        | SMF                       | 9/125 | 40 km     |
| SFP-GE40KT13R15 | SFP module supporting 1000BASE-BX, UPLINK, at 40 km (Tx1310 nm / Rx1550 nm). A single fiber is used for both transmit and receive. UPLINK SFP must be matched with DOWNLINK SFP.     | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640, T1600 | GbE            | SFP         | N/A             | 1310                   | 1550                   | SMF (single strand fiber) | 9/125 | 40 km     |
| SFP-GE40KT15R13 | SFP module supporting 1000BASE-BX, DOWNLINK, at 40 km. (Tx1550 nm / Rx1310 nm). A single fiber is used for both transmit and receive. UPLINK SFP must be matched with DOWNLINK SFP.  | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640, T1600 | GbE            | SFP         | N/A             | 1550                   | 1310                   | SMF (single strand fiber) | 9/125 | 40 km     |
| SFP-OC12-IR     | OC12/STM4 pluggable transceiver (SFP)—intermediate range.                                                                                                                            | E120, E320, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640                                                  | OC12/STM4      | SFP         | IR-1            | 1310                   |                        | SMF                       | 9/125 | 15 km     |
| SFP-OC12-LR     | OC12/STM4 pluggable transceiver (SFP)—long range.                                                                                                                                    | E120, E320, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640                                                  | OC12/STM4      | SFP         | LR-1            | 1310                   |                        | SMF                       | 9/125 | 40 km     |

| SKU                  | Description                                                                                              | Platforms                                                                                                          | Interface Type | Form Factor | Standard    | <sup>1</sup> (TX) (nm)         | <sup>1</sup> (RX) (nm) | Media | Cable    | Max Reach |
|----------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------|-------------|-------------|--------------------------------|------------------------|-------|----------|-----------|
| SFP-OC12-SR          | OC12/STM4 pluggable transceiver (SFP)—short range.                                                       | E120, E320, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640                                           | OC12/STM4      | SFP         | SR-1        | 1310                           |                        | SMF   | 9/125    | 2 km      |
| SFP-OC3-IR           | SFP OC3 intermediate reach (IR) SM optic module—15 km.                                                   | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640 | OC3/STM1       | SFP         | IR-1        | 1310                           |                        | SMF   | 9/125    | 15 km     |
| SFP-OC3-LR           | SFP OC3 long reach (LR) SM optic module—40 km.                                                           | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640 | OC3/STM1       | SFP         | LR-1        | 1310                           |                        | SMF   | 9/125    | 40 km     |
| SFP-OC3-SR           | SFP OC3 short reach (SR) MM optic module—2 km.                                                           | E120, E320, ERX310, ERX705, ERX710, ERX1410, ERX1440, M7i, M10i, M40e, M120, M320, MX240, MX480, MX960, T320, T640 | OC3/STM1       | SFP         | -           | 1310                           |                        | MMF   | 50/125   | 2 km      |
|                      |                                                                                                          |                                                                                                                    |                |             |             |                                |                        |       | 62.5/125 | 2 km      |
| SFPP-10GE-ER         | SFP+ 10GbE pluggable transceiver, SMF, 1550 nm for 40 km transmission.                                   | MX960, MX480, MX240                                                                                                | 10GbE          | SFP+        | 10GBASE-ER  | 1550                           |                        | SMF   | 9/125    | 40 km     |
| SFPP-10GE-LR         | SFP+ 10GbE pluggable transceiver, SMF, 1310 nm for 10 km transmission.                                   | MX240, MX480, MX960, T640, T1600                                                                                   | 10GbE          | SFP+        | 10GBASE-LR  | 1310                           |                        | SMF   | 9/125    | 10 km     |
| SFPP-10GE-LRM        | SFP+ 10GbE pluggable transceiver, MMF, 1310 nm for 220 m transmission.                                   | MX960, MX480, MX240                                                                                                | 10GbE          | SFP+        | 10GBASE-LRM | 1310                           |                        | MMF   | 50/125   | 220 m     |
|                      |                                                                                                          |                                                                                                                    |                |             |             |                                |                        |       | 62.5/125 | 220 m     |
| SFPP-10GE-SR         | SFP+ 10GbE pluggable transceiver, MMF, 850 nm for 300 m transmission.                                    | MX240, MX480, MX960, T640, T1600                                                                                   | 10GbE          | SFP+        | 10GBASE-SR  | 850                            |                        | MMF   | 50/125   | 300 m     |
|                      |                                                                                                          |                                                                                                                    |                |             |             |                                |                        |       | 62.5/125 | 33 m      |
| XENPAK-1XGE-ER       | XENPAK 10GbE pluggable optic module, 10GBASE-ER, 40 km reach.                                            | M120, M320, T320, T640                                                                                             | 10GbE          | XENPAK      | 10GBASE-ER  | 1550                           |                        | SMF   | 9/125    | 40 km     |
| XENPAK-1XGE-LR       | XENPAK 10GbE pluggable optic module, 10GBASE-LR, 10 km reach.                                            | M120, M320, T320, T640                                                                                             | 10GbE          | XENPAK      | 10GBASE-LR  | 1310                           |                        | SMF   | 9/125    | 10 km     |
| XENPAK-1XGE-SR       | XENPAK 10GbE pluggable optic module, 10GBASE-SR, MMF, 26-300 m reach.                                    | M120, M320, T320, T640                                                                                             | 10GbE          | XENPAK      | 10GBASE-SR  | 850                            |                        | MMF   | 50/125   | 300 m     |
|                      |                                                                                                          |                                                                                                                    |                |             |             |                                |                        |       | 62.5/125 | 33 m      |
| XENPAK-1XGE-ZR       | XENPAK 10GbE pluggable optic module, 10GBASE-ZR, SMF, 80 km reach.                                       | M120, M320, T320, T640                                                                                             | 10GbE          | XENPAK      | 10GBASE-ZR  | 1550                           |                        | SMF   | 9/125    | 80 km     |
| XFP-10G-CBAND-T50-ZR | 10GbE DWDM XFP, 80 km reach, tunable across C-Band 50 GHz channel spacing, compliant with ITU-T G.698.1. | MX240, MX480, MX960, T640, T1600                                                                                   | 10GbE          | XFP         | 10GBASE-ZR  | 50 GHz Tunable C-BAND ITU Grid |                        | SMF   | 9/125    | 80 km     |
| XFP-10GE-ER          | 10GbE 40 km single-mode pluggable interface.                                                             | E120, E320, SRX3400, SRX3600, SRX5600, SRX5800                                                                     | 10GbE          | XFP         | 10GBASE-ER  | 1550                           |                        | SMF   | 9/125    | 40 km     |

| SKU                 | Description                                                                                | Platforms                                               | Interface Type    | Form Factor | Standard   | <sup>1</sup> (TX) (nm) | <sup>1</sup> (RX) (nm) | Media | Cable    | Max Reach |
|---------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------|-------------|------------|------------------------|------------------------|-------|----------|-----------|
| XFP-10GE-LR         | 10GbE XFP pluggable transceiver; single-mode 1310 nm 10 km reach.                          | E120, E320, SRX3400, SRX3600, SRX5600, SRX5800          | 10GbE             | XFP         | 10GBASE-LR | 1310                   |                        | SMF   | 9/125    | 10 km     |
| XFP-10G-E-OC192-IR2 | Dual rate 10GbE pluggable transceiver for 10GbE and OC192, 1550 nm for 40 km transmission. | M120, M320, MX240, MX480, MX960, T320, T640             | 10GbE/OC192/STM64 | XFP         | 10GBASE-ER | 1550                   |                        | SMF   | 9/125    | 40 km     |
| XFP-10GE-SR         | 10GbE short reach multimode pluggable interface.                                           | E120, E320, SRX3400, SRX3600, SRX5600, SRX5800          | 10GbE             | XFP         | 10GBASE-SR | 850                    |                        | MMF   | 50/125   | 300 m     |
|                     |                                                                                            |                                                         |                   |             |            |                        |                        |       | 62.5/125 | 33 m      |
| XFP-10G-L-OC192-SR1 | Dual rate 10GbE pluggable transceiver for 10GbE and OC192, 1310 nm for 10 km transmission. | M120, M320, T320, T640, MX240, MX480, MX960             | 10GbE/OC192/STM64 | XFP         | 10GBASE-LR | 1310                   |                        | SMF   | 9/125    | 10 km     |
| XFP-10G-S           | 10GbE pluggable transceiver, 850 nm for 300 m transmission.                                | M120, M320, MX240, MX480, MX960, T320, T640             | 10GbE             | XFP         | 10GBASE-SR | 850                    |                        | MMF   | 50/125   | 300 m     |
|                     |                                                                                            |                                                         |                   |             |            |                        |                        |       | 62.5/125 | 33 m      |
| XFP-10G-Z-OC192-LR2 | Dual rate 10GbE pluggable transceiver for 10GbE and OC192, 1550 nm for 80 km transmission. | M120, M320, T320, T640, MX240, MX480, MX960, E120, E320 | 10GbE/OC192/STM64 | XFP         | 10GBASE-ZR | 1550                   |                        | SMF   | 9/125    | 80 km     |

SFP (form factor) = small form-factor pluggable transceiver

SMF (media) = single-mode fiber-optic

MMF (media) = multimode fiber-optic

XFP (form factor) = 10-gigabit small form-factor pluggable transceiver

## Ordering Information

The SKU and the platforms support are listed in the table above.

## 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](http://www.juniper.net).

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