



## XFP15040100DC21

Juniper Networks® XFP-10GE-ER Compatible 10GBase-ER XFP Transceiver (SMF, 1550nm, 40km, LC, DOM)

### Product Description

This Juniper Networks® XFP-10GE-ER compatible XFP transceiver provides 10GBase-ER throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1550nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Juniper Networks® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

### Features:

- INF-8077i Compliance
- Temperature-stabilized EML transmitter and PIN receiver
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



### Applications:

- 10GBase-ER Ethernet
- Access, Metro and Enterprise
- 8x/10x Fibre Channel

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*For your product safety, please read the following information carefully before any manipulation of the transceiver:*



#### ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



#### LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

*The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.*

### Absolute Maximum Ratings

| Parameter              | Symbol           | Min. | Max. | Unit |
|------------------------|------------------|------|------|------|
| Maximum Supply Voltage | V <sub>cc3</sub> | -0.5 | 3.6  | V    |
|                        | V <sub>cc5</sub> | -0.5 | 6    | V    |
| Storage Temperature    | T <sub>S</sub>   | -40  | 85   | °C   |
| Operating Temperature  | T <sub>O</sub>   | -5   | 70   | °C   |
| Operating Humidity     | RH               | 5    | 85   | %    |
| Receiver power         | R <sub>MAX</sub> |      | -1   | dBm  |
| Maximum bitrate        | B <sub>max</sub> |      | 11.3 | Gbps |

### Electrical Characteristics (TOP=25°C, V<sub>cc</sub>=3.3Volts)

| Parameter                      | Symbol               | Min. | Typ. | Max. | Unit | Notes |
|--------------------------------|----------------------|------|------|------|------|-------|
| Power Supply Voltage           | V <sub>cc3</sub>     | 3.15 | 3.30 | 3.43 | V    |       |
|                                | V <sub>cc5</sub>     | 4.75 | 5.0  | 5.25 | V    |       |
| Power Supply Current           | I <sub>cc</sub>      |      |      | 1061 | mA   |       |
| Power Consumption              | P <sub>DISS</sub>    |      |      | 3.5  | W    |       |
| Transmitter                    |                      |      |      |      |      |       |
| Differential data input swing  | V <sub>in,pp</sub>   | 120  |      | 850  | mV   |       |
| Input differential impedance   | Z <sub>in</sub>      | 80   | 100  | 120  | Ω    |       |
| Receiver                       |                      |      |      |      |      |       |
| Differential data output swing | V <sub>out, pp</sub> | 300  |      | 850  | mV   |       |
| Output differential impedance  | Z <sub>in</sub>      | 80   | 100  | 120  | Ω    |       |

## Optical Characteristics

| Parameter                                 | Symbol     | Min. | Typ. | Max.  | Unit | Notes |
|-------------------------------------------|------------|------|------|-------|------|-------|
| <b>Transmitter</b>                        |            |      |      |       |      |       |
| <b>Optical Power (average)</b>            | $P_{AVE}$  | -4   |      | 4     | dBm  | 1     |
| <b>Optical Modulation amplitude (OMA)</b> | $P_{OMA}$  | -2.1 |      |       | dBm  | 2     |
| <b>Transmitter and Dispersion Penalty</b> | TDP        |      |      | 2     | dB   |       |
| <b>Optical Extinction Ratio</b>           | ER         | 8.2  |      |       | dB   |       |
| <b>Optical Wavelength</b>                 | $T\lambda$ | 1530 | 1550 | 1565  | nm   |       |
| <b>Insertion loss</b>                     | IL         |      | 0.35 |       |      |       |
| <b>Receiver</b>                           |            |      |      |       |      |       |
| <b>Receiver Sensitivity (average)</b>     | $R_{AVE}$  |      |      | -15.8 | dBm  | 3     |
| <b>Receiver Sensitivity (OMA)</b>         | $R_{OMA}$  |      |      | -14.1 |      | 2     |
| <b>Receiver overload</b>                  | $P_{max}$  | -1   |      |       | dBm  | 4     |
| <b>Receiver wavelength</b>                | $R\lambda$ | 1260 |      | 1565  | nm   |       |

### Notes:

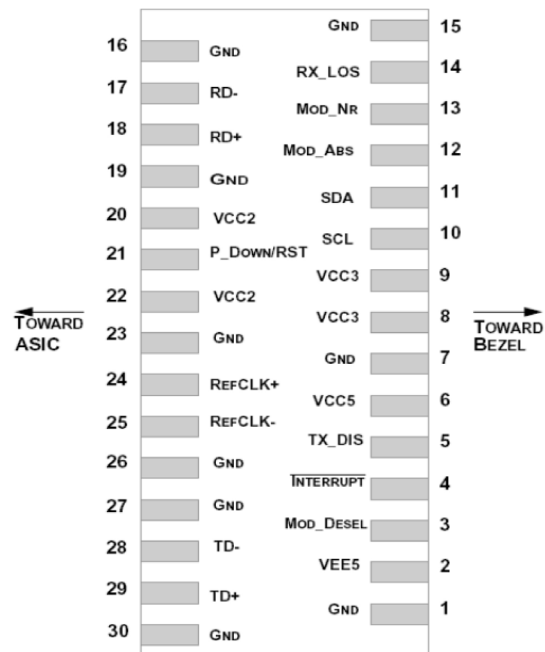
1. Coupled into a Single mode fibre
2. Per IEEE 802.3ae specification
3. Average power, back-to-back, @10.31Gbps, BER 1E-12, PRBS 231-1.
4. Exceeding the Receiver overload can physically damage the module. Please use appropriate attenuation.

## Pin Descriptions

| Pin | Symbol     | Name/Descriptions                                                                                                                                                                                                                                                                                                   | Ref. |
|-----|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1   | GND        | Module Ground                                                                                                                                                                                                                                                                                                       |      |
| 2   | Vee5       | (not required)                                                                                                                                                                                                                                                                                                      |      |
| 3   | MOD_DESEL  | Module De-select; When Held low allows the module to respond to 2-wire serial interface. LVTTTL-I                                                                                                                                                                                                                   |      |
| 4   | /INTERRUPT | Interrupt; Indicates presence of an important condition which can be read via the 2-wire serial interface. LVTTTL-O                                                                                                                                                                                                 | 2    |
| 5   | TX_DIS     | Transmitter Disable. Logic1 indicates laser output disabled, LVTTTL-I                                                                                                                                                                                                                                               |      |
| 6   | VCC5       | +5V Power Supply (Not required)                                                                                                                                                                                                                                                                                     |      |
| 7   | GND        | Module Ground                                                                                                                                                                                                                                                                                                       | 1    |
| 8   | VCC3       | +3.3V Power Supply                                                                                                                                                                                                                                                                                                  |      |
| 9   | VCC3       | +3.3V Power Supply                                                                                                                                                                                                                                                                                                  |      |
| 10  | SCL        | 2-Wire Serial Interface Clock. LVTTTL-I                                                                                                                                                                                                                                                                             | 2    |
| 11  | SDA        | 2-Wire Serial Interface Data Line. LVTTTL-I/O                                                                                                                                                                                                                                                                       | 2    |
| 12  | MOD_Abs    | Indicates Module is not present. Grounded in the Module. LVTTTL-O                                                                                                                                                                                                                                                   | 2    |
| 13  | MOD_NR     | Module Not Ready; Indicating Module Operational Fault. Open-collector. LVTTTL-O                                                                                                                                                                                                                                     | 2    |
| 14  | RX_LOS     | Loss of Signal indication. Logic 1 indicates loss of Signal. Open-collector. LVTTTL-O                                                                                                                                                                                                                               | 2    |
| 15  | GND        | Module Ground                                                                                                                                                                                                                                                                                                       | 1    |
| 16  | GND        | Module Ground                                                                                                                                                                                                                                                                                                       | 1    |
| 17  | RD-        | Receiver Inverted Data Output. CML-O                                                                                                                                                                                                                                                                                |      |
| 18  | RD+        | Receiver Non-Inverted Data Output. CML-O                                                                                                                                                                                                                                                                            |      |
| 19  | GND        | Module Ground                                                                                                                                                                                                                                                                                                       | 1    |
| 20  | VCC2       | +1.8V Power Supply (Not required).                                                                                                                                                                                                                                                                                  | 3    |
| 21  | P_DOWN/RST | Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode. LVTTTL-I<br>Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. LVTTTL-I |      |
| 22  | VCC2       | +1.8V Power Supply (Not required)                                                                                                                                                                                                                                                                                   | 3    |
| 23  | GND        | Module Ground                                                                                                                                                                                                                                                                                                       | 1    |
| 24  | REFCLK+    | Reference Clock (Not required)                                                                                                                                                                                                                                                                                      |      |
| 25  | REFCLK-    | Reference Clock (Not required)                                                                                                                                                                                                                                                                                      |      |
| 26  | GND        | Module Ground                                                                                                                                                                                                                                                                                                       | 1    |
| 27  | GND        | Module Ground                                                                                                                                                                                                                                                                                                       | 1    |
| 28  | TD-        | Transmitter Inverted Data Input. CML-I                                                                                                                                                                                                                                                                              |      |
| 29  | TD+        | Transmitter Non-Inverted Data Input. CML-I                                                                                                                                                                                                                                                                          |      |
| 30  | GND        | Module Ground                                                                                                                                                                                                                                                                                                       | 1    |

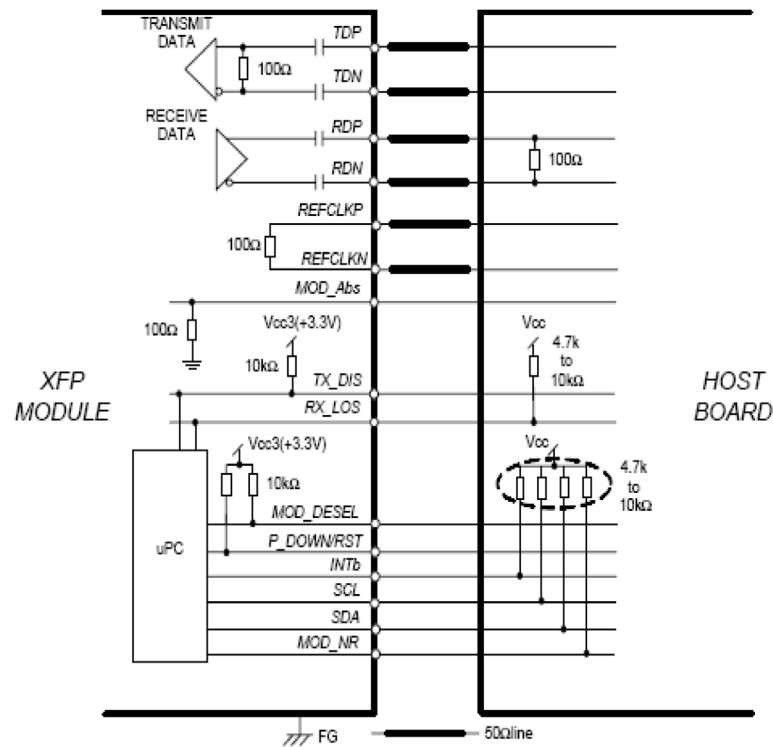
**Notes:**

1. Module ground pins GND are isolated from the module case and chassis ground within the module.
2. Open collector; should be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.6V on the host board.
3. The pins are open within module.



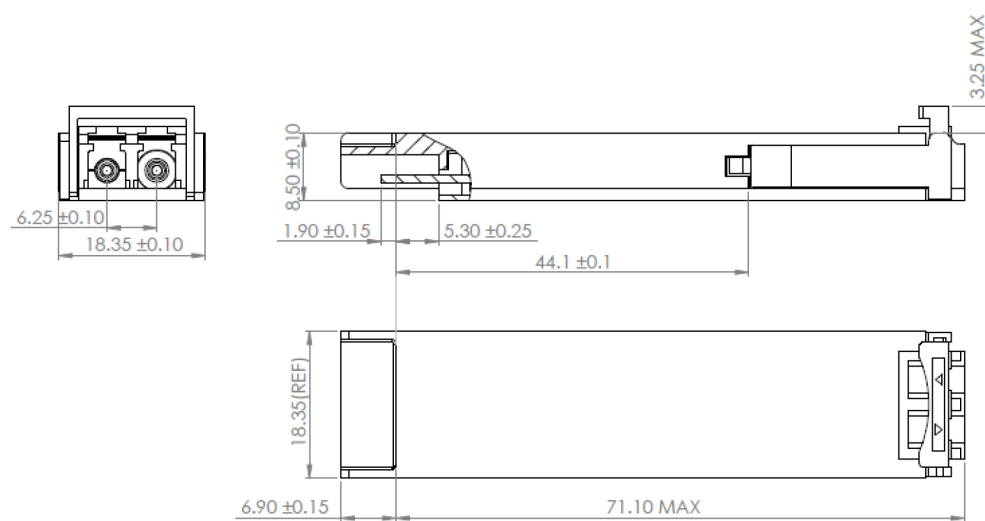
Pin-out of connector Block on Host board

## Recommended Circuit Schematic



## Mechanical Specifications

Small Form Factor Pluggable (XFP) transceivers are compatible with the dimensions defined by the XFP Multi-Sourcing Agreement (MSA).



**EEPROM Information**

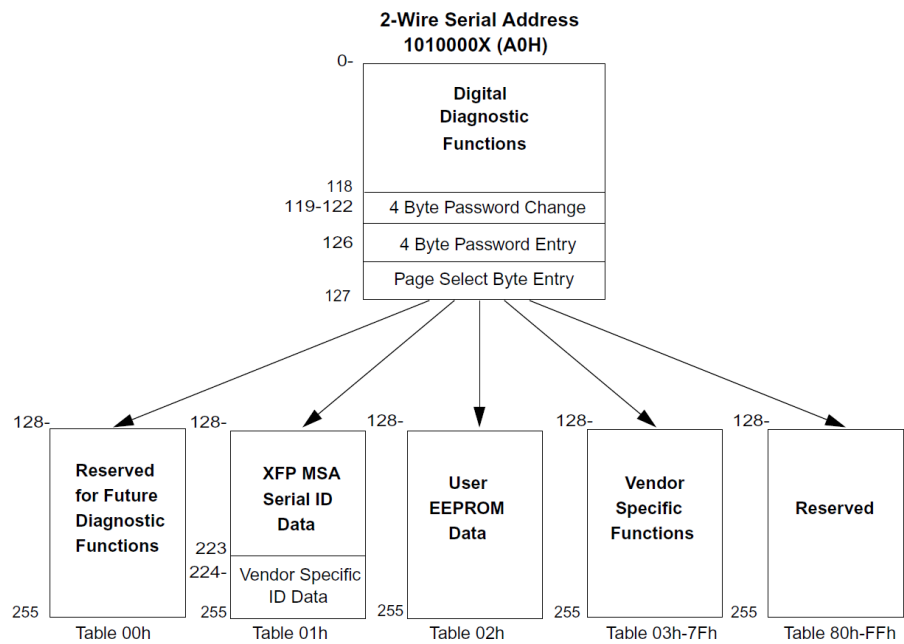
**Management Interface**

XFP 2-wire serial interface is specified in the Chapter 4 of the XFP MSA specification. The XFP 2-wire serial interface is used for serial ID, digital diagnostics, and certain control functions. The 2-wire serial interface is mandatory for all XFP modules. The 2-wire serial interface address of the XFP module is 1010000X(A0h). In order to access to multiple modules on the same 2-wire serial bus, the XFP has a MOD\_DESEL(module deselect pin). This pin (which is pull high or deselected in the module) must be held low by the host to select of interest and allow communication over 2-wire serial interface. The module must not respond to or accept 2-wire serial bus instructions unless it is selected.

**XFP Management Interface**

XFP Management interface is specified in the Chapter 5 of the XFP MSA specification. The Figure 1 shows the structure of the memory map. The normal 256 Byte address space is divided into lower and upper blocks of 128 Bytes. The lower block of 128 Byte is always directly available and is used for the diagnostics and control functions that must be accessed repeatedly. Multiple blocks of memories are available in the upper 128 Bytes of the address space. These are individually addressed through a table select Byte which the user enters into a location in the lower address space. The upper address space tables are used for less frequently accessed functions and control space for future standards definition.

EEPROM memory map specific data field description is as below:



# About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

