

Product Features

- Compliant with ITU-T G.691 STM-64 L-64.2
- Compliant to IEEE Std 802.3-2005 10Gb Ethernet 10GBase-ZR/ZW
- XFP MSA Rev. 4.5 compliant
- Full digital diagnostic management interface
- XFP MSA package with duplex LC connector
- Cooled EML Transmitter
- Up to 11.3Gb/s bi-directional data links
- Class 1 laser safety certified
- Commercial operating temperature: 0 °C to +70 °C
- Up to 80km on 9/125µm SMF
- RoHS Compliant



Applications

- 80km 10G CWDM Network
- 80km 10G Ethernet 10GBASE-ZR/ZW
- 80km 10G Fiber Channel

Descriptions

LX335xCDR XFP transceivers, according to 10 Gigabit Small Form Factor Pluggable Module Multi-Sourcing Agreement (XFP-MSA) INF-8077i Revision 4.5, are designed for serial optical data communications at 9.95 Gb/s to 11.3 Gb/s. They meet the requirements for 80km 10G CWDM Network, IEEE Std 802.3-2005 10G Ethernet 10GBase-ZR/ZW and 80km 10G Fiber Channel.

LX335xCDR are compliant with RoHS.

Ordering Information

Table 1. Ordering Information

| Part Number | Transmitter | Output Power | Receiver | Sensitivity | Reach | Temp | DDM | RoHS |
|-------------|-------------|--------------|----------|-------------|-------|----------|-----------|-----------|
| LX3351CDR | 1471nm EML | 0 ~ +4dBm | APD | < -24dBm | 80km | 0 ~ 70°C | Available | Compliant |
| LX3352CDR | 1491nm EML | 0 ~ +4dBm | APD | < -24dBm | 80km | 0 ~ 70°C | Available | Compliant |
| LX3353CDR | 1511nm EML | 0 ~ +4dBm | APD | < -24dBm | 80km | 0 ~ 70°C | Available | Compliant |
| LX3354CDR | 1531nm EML | 0 ~ +4dBm | APD | < -24dBm | 80km | 0 ~ 70°C | Available | Compliant |
| LX3355CDR | 1551nm EML | 0 ~ +4dBm | APD | < -24dBm | 80km | 0 ~ 70°C | Available | Compliant |
| LX3356CDR | 1571nm EML | 0 ~ +4dBm | APD | < -24dBm | 80km | 0 ~ 70°C | Available | Compliant |
| LX3357CDR | 1591nm EML | 0 ~ +4dBm | APD | < -24dBm | 70km | 0 ~ 70°C | Available | Compliant |
| LX3358CDR | 1611nm EML | 0 ~ +4dBm | APD | < -24dBm | 70km | 0 ~ 70°C | Available | Compliant |

Electrical Pin Description

Table 2. Electrical Pin Description

| Pin | Logic | Symbol | Name/Description | Note |
|-----|-----------|------------------|---|------|
| 1 | - | GND | Module Ground | 1 |
| 2 | - | V _{EE5} | Optional -5.2V Power Supply - Not Required | - |
| 3 | LVTTL-I | Mod_DeSel | Module De-select; When held low allows module to respond to 2-wire serial interface | - |
| 4 | LVTTL-O | Interrupt | Interrupt; Indicates presence of an important condition which can be read over the 2-wire serial interface | 2 |
| 5 | LVTTL-I | TX_DIS | Transmitter Disable; Turns off transmitter laser output | - |
| 6 | - | V _{CC5} | +5V Power Supply | - |
| 7 | - | GND | Module Ground | 1 |
| 8 | - | V _{CC3} | +3.3V Power Supply | - |
| 9 | - | V _{CC3} | +3.3V Power Supply | - |
| 10 | LVTTL-I/O | SCL | 2-Wire Serial Interface Clock | 2 |
| 11 | LVTTL-I/O | SDA | 2-Wire Serial Interface Data Line | 2 |
| 12 | LVTTL-O | Mod_Abs | Indicates Module is not present. Grounded in the Module | 2 |
| 13 | LVTTL-O | Mod_NR | Module Not Ready; Indicating Module Operational Fault | 2 |
| 14 | LVTTL-O | RX_LOS | Receiver Loss Of Signal Indicator | 2 |
| 15 | - | GND | Module Ground | 1 |
| 16 | - | GND | Module Ground | 1 |
| 17 | CML-O | RD- | Receiver Inverted Data Output | - |
| 18 | CML-O | RD+ | Receiver Non-Inverted Data Output | - |
| 19 | - | GND | Module Ground | 1 |
| 20 | - | V _{CC2} | +1.8V Power Supply - Not Required | - |
| 21 | LVTTL-I | 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. Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. | - |
| 22 | - | V _{CC2} | +1.8V Power Supply - Not Required | - |
| 23 | - | GND | Module Ground | 1 |
| 24 | PECL-I | RefCLK+ | Reference Clock Non-Inverted Input, AC coupled on the host board - Not Required | 3 |
| 25 | PECL-I | RefCLK- | Reference Clock Inverted Input, AC coupled on the host board - Not Required | 3 |
| 26 | - | GND | Module Ground | 1 |
| 27 | - | GND | Module Ground | 1 |
| 28 | CML-I | TD- | Transmitter Inverted Data Input | - |
| 29 | CML-I | TD+ | Transmitter Non-Inverted Data Input | - |
| 30 | - | GND | Module Ground | 1 |

Notes:

1. Module ground pins Gnd are isolated from the module case.
2. Shall be pulled up with 4.7KΩ to 10KΩ to a voltage between 3.15V and 3.45V on the host board.
3. Reference Clock is not required. If present, it will be ignored.

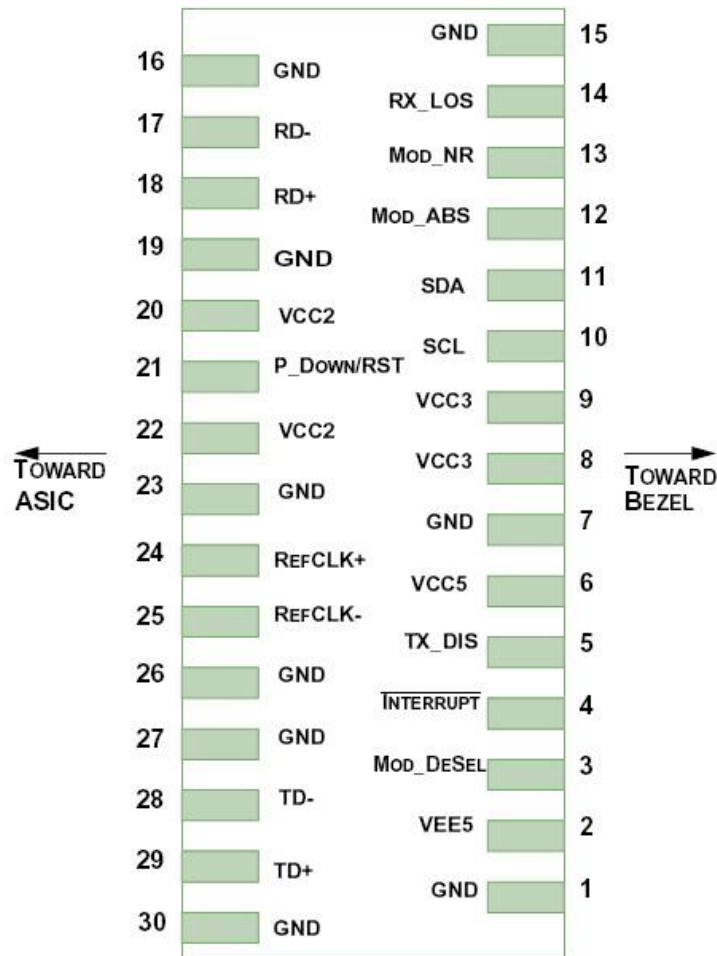


Figure 1. Host PCB XFP Pinout Top View

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Table 3. Absolute Maximum Ratings

| Parameter | Symbol | Minimum | Maximum | Unit |
|---------------------|------------------|---------|---------|------|
| Storage Temperature | T _s | -40 | 85 | °C |
| Relative Humidity | RH | 5 | 95 | % |
| Supply Voltage | V _{CC3} | -0.5 | 4.0 | V |
| Supply Voltage | V _{CC5} | -0.5 | 6.0 | V |

Recommended Operating Conditions

Table 4. Recommended Operating Conditions

| Parameter | Symbol | Min | Typ | Max | Unit |
|--|------------------|-------|------|-------|------|
| Operating Case Temperature (Commercial) | T _C | 0 | - | 70 | °C |
| Supply Voltage | V _{CC3} | 3.135 | 3.3 | 3.465 | V |
| Supply Voltage | V _{CC5} | 4.75 | 5.00 | 5.25 | V |
| Data Rate | - | 9.95 | - | 11.3 | Gb/s |

Transceiver Electrical Characteristics

Table 5. Transceiver Electrical Characteristics

| Parameter | Symbol | Minimum | Typical | Maximum | Unit | Notes |
|----------------------------------|---------------------------------|--------------------------|---------|--------------------------|-------------------|-------|
| Supply Current | I _{CC3} | - | - | 750 | mA | - |
| Supply Current | I _{CC5} | - | - | 500 | mA | - |
| Power Dissipation | P _D | - | - | 3500 | mW | - |
| Transmitter | | | | | | |
| Input Differential Impedance | Z _{IN} | - | 100 | - | Ω | - |
| Differential Data Input Swing | V _{IN, P-P} | 120 | - | 1000 | mV _{P-P} | - |
| Tx_Disable, P_Down/RST | V _{IH} | 2.0 | - | V _{CC3} +0.3 | V | - |
| | V _{IL} | -0.3 | - | 0.8 | V | - |
| Transmit Disable Assert Time | - | - | - | 10 | us | - |
| Receiver | | | | | | |
| Output Differential Impedance | Z _O | - | 100 | - | Ω | - |
| Differential Data Output Swing | V _{OUT, P-P} | 340 | - | 850 | mV _{P-P} | 1 |
| Data Output Rise Time, Fall Time | t _r , t _f | 24 | - | - | ps | 2 |
| Rx_LOS, Mod_NR, Interrupt | V _{OH} | V _{CCHOST} -0.5 | - | V _{CCHOST} +0.3 | V | 3 |
| | V _{OL} | 0 | - | 0.4 | V | 3 |

Notes:

- Internally AC coupled, but requires a external 100Ω differential termination.
- 20–80%.
- Loss Of Signal is an open collector output. Should be pulled up with a 4.7kΩ-10kΩ resistor on the host board.

Transmitter Optical Characteristics

Table 6. Transmitter Optical Characteristics

| Parameter | Symbol | Minimum | Typical | Maximum | Unit | Notes |
|------------------------------|-----------------|---------|---------|---------|------|-------|
| Launch Average Optical Power | P _o | 0 | - | +4 | dBm | 1 |
| Center Wavelength Range | λ _c | 1464.5 | - | 1617.5 | nm | - |
| Center Wavelength Tolerance | Δλ _c | -6.5 | - | 6.5 | nm | - |

| | | | | | | |
|-----------------------------------|--|-----|---|-----|-----|---|
| Extinction Ratio | EX | 9.0 | - | - | dB | 2 |
| Spectral Width (-20dB) | $\Delta\lambda$ | - | - | 0.3 | nm | - |
| Side Mode Suppression Ratio | SMSR | 30 | - | - | dB | - |
| Dispersion Penalty @ 1600ps/nm | DP | - | - | 3 | dB | 2 |
| Average Optical Power (Laser Off) | P _{OFF} | - | - | -30 | dBm | 1 |
| Eye Diagram | ITU-T G.691 SDH STM S-64.2b compatible | | | | | 2 |

Notes:

1. The optical power is launched into 9/125 μ m SMF.
2. Measured with a PRBS 2³¹-1 test pattern @ 9.953Gb/s.

Receiver Optical Characteristics

Table 7. Receiver Optical Characteristics

| Parameter | Symbol | Minimum | Typical | Maximum | Unit | Notes |
|--|------------------|---------|---------|---------|------|-------|
| Center Wavelength | λ_c | 1460 | - | 1620 | nm | - |
| Receiver Sensitivity (P _{avg}) | S | - | - | -24 | dBm | 1 |
| Receiver Overload (P _{avg}) | P _{OL} | -7.0 | - | - | dBm | 1 |
| Optical Return Loss | ORL | 27 | - | - | dB | - |
| LOS De-Assert | LOS _D | - | - | -25 | dBm | - |
| LOS Assert | LOS _A | -34 | - | - | dBm | - |
| LOS Hysteresis | - | 0.5 | - | - | dB | - |

Notes:

1. Measured with worst ER; 1550nm; 9.953Gb/s, PRBS 2³¹-1 test pattern, BER<10⁻¹².

Recommended Host Board Power Supply Filter Network

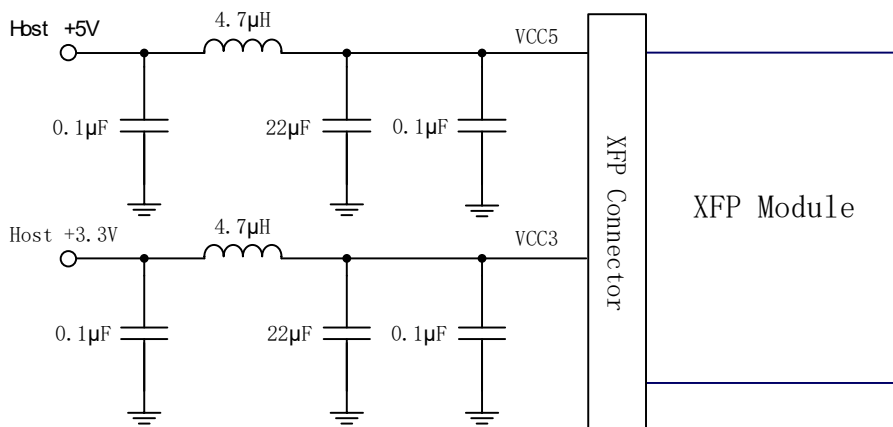


Figure 2. Recommended Host Board Power Supply Filter Network

Recommended Application Interface Block Diagram

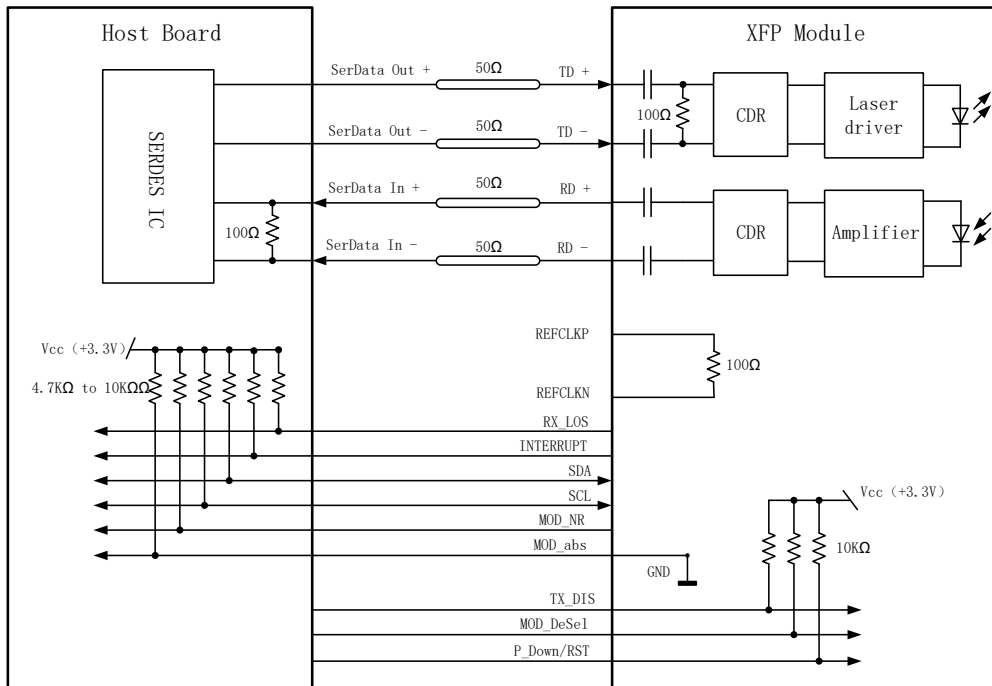


Figure 3. Recommended Application Interface Block Diagram

Mechanical specifications

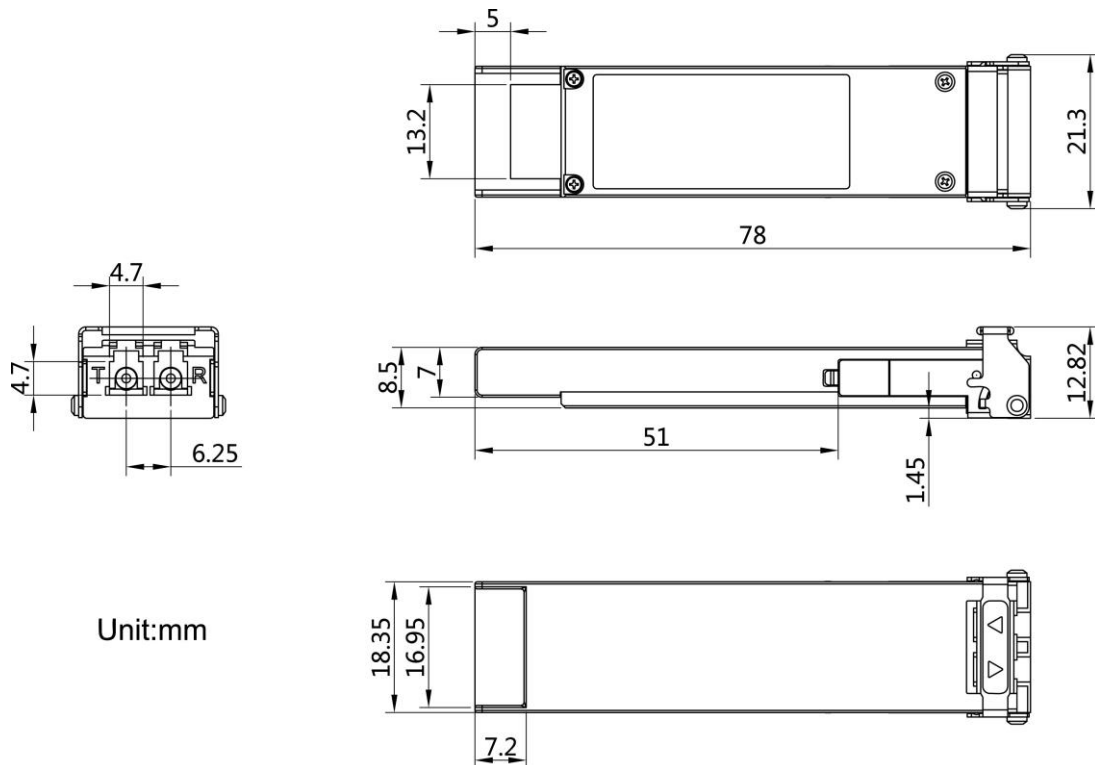


Figure 4. Outline Drawing

Revision History

| Date | Rev. # | Description | Modified By |
|-------------|---------------|---------------------|--------------------|
| 06/09/2021 | V1.0 | Preliminary Release | Zeyan Li |

For More Information

Linktel Technologies Co., Ltd

info@linkteltech.com

www.linkteltech.com

Linktel USA

1601 McCarthy Blvd #9, Milpitas, CA 95035, USA

Tel: +1 408 807 0482

Email: linktelus@linkteltech.com

jimli@linkteltech.com

Linktel International (Except USA)

E12, No. 52 Liufang Road, East-Lake Hi-tech Development Zone, Wuhan, China

Tel: +86 27 8792 9207

Email: ailsagong@linkteltech.com

Linktel China

E12, No. 52 Liufang Road, East-Lake Hi-tech Development Zone, Wuhan, China

Tel: +86 27 8792 9213

Email: lifan@linkteltech.com