

SFP-16GB-CW-49-40-BR-PRO

Brocade® (Formerly) Compatible TAA Compliant 16GBase-CWDM Fibre Channel SFP+ Transceiver (SMF, 1490nm, 40km, DOM, 0 to 70C, LC)

Features

- SFF-8432 and SFF-8472 Compliance
- Cooled EML transmitter and PIN receiver
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Single-mode Fiber
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



Applications:

- 16x Gigabit Ethernet over CWDM
- 8x/10x Fibre Channel
- Access, Metro and Enterprise
- Mobile Fronthaul CPRI/OBSAI

Product Description

This Brocade® (Formerly) SFP+ transceiver provides 16GBase-CWDM Fibre Channel throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1490nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Brocade® (Formerly) 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. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

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

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products.



Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4.
- ESD to the LC Receptacle: compatible with IEC 61000-4-3.
- EMI/EMC: compatible with FCC Part 15 Subpart B Rules, EN55022:2010.
- Laser Eye Safety: compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1, 2.
- RoHS: compliant with EU RoHS 2.0 directive 2015/863/EU.

CWDM Available Wavelengths

| Wavelengths | Min. | Typ. | Max. |
|-------------|--------|------|--------|
| 47 | 1464.5 | 1471 | 1477.5 |
| 49 | 1484.5 | 1491 | 1497.5 |
| 51 | 1504.5 | 1511 | 1517.5 |
| 53 | 1524.5 | 1531 | 1537.5 |
| 55 | 1544.5 | 1551 | 1557.5 |
| 57 | 1564.5 | 1571 | 1577.5 |
| 59 | 1584.5 | 1591 | 1597.5 |
| 61 | 1604.5 | 1611 | 1617.5 |

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------------|--------|------|--------|------|------|-------|
| Maximum Supply Voltage | Vcc | -0.5 | | 4.5 | V | |
| Storage Temperature | Tstg | -40 | | 85 | °C | |
| Operating Case Temperature | Tc | 0 | | 70 | °C | |
| Operating Humidity | RH | 5 | | 85 | % | |
| Data Rate | BR | 4.25 | 14.025 | | Gbps | |

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--------------------------------|---------|-------|------|-------|----------|-------|
| Power Supply Voltage | Vcc | 3.135 | 3.30 | 3.465 | V | |
| Power Supply Current | Icc | | | 550 | mA | |
| Transmitter | | | | | | |
| Differential Data Input Swing | VIN | 180 | | 850 | mV | 1 |
| Input Differential Impedance | ZIN | 90 | 100 | 110 | Ω | |
| Tx_Disable | Disable | VIH | 2.0 | Vcc | V | |
| | Enable | VIL | 0 | 0.8 | V | |
| Tx_Fault | Fault | VOH | 2.0 | Vcc | V | |
| | Normal | VOL | 0 | 0.8 | V | |
| Receiver | | | | | | |
| Differential Data Output Swing | VOUT | 300 | | 900 | mV | 2 |
| LOS | High | 2.0 | | Vcc | V | |
| | Low | | | 0.8 | V | |

Notes:

1. PECL input. Internally AC-coupled and terminated.
2. Internally AC-coupled.

Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|-----------------------------|-----------------|-----------------|-------------|-----------------|------|-------|
| Transmitter | | | | | | |
| Centre Wavelength | λ_C | $\lambda_C-6.5$ | λ_C | $\lambda_C+6.5$ | nm | |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | |
| Side-Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Average Output Power | POUT | -1 | | +3 | dBm | 1 |
| Extinction Ratio | ER | 8.2 | | | dB | |
| Receiver | | | | | | |
| Centre Wavelength | λ_C | 1260 | | 1620 | nm | |
| Receiver Sensitivity | S | | | -14 | dBm | 2 |
| Receiver Overload | POL | 0.5 | | | dBm | 2 |
| LOS De-Assert | LOSD | | | -15 | dBm | |
| LOS Assert | LOSA | -28 | | | dBm | |
| LOS Hysteresis | LOSH | 0.5 | | | dB | |

Notes:

1. The optical power is launched into the SMF.
2. Measured with a PRBS 2³¹-1 test pattern @14025Mbps, BER ≤1×10⁻¹².

Timing and Electrical Specifications

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|--|----------------|------|------|------|------|
| Tx_Disable Negate Time | T_on | | | 2 | ms |
| Tx_Disable Assert Time | T_off | | | 100 | μs |
| Time To Initialize Including Reset of Tx_Fault | T_init | | | 300 | ms |
| Tx_Fault Assert Time | T_fault | | | 100 | μs |
| Tx_Disable To Reset | T_reset | 10 | | | μs |
| LOS Assert Time | T_loss_on | | | 100 | μs |
| LOS De-Assert Time | T_loss_off | | | 100 | μs |
| Serial ID Clock Rate | T_serial_clock | | 100 | 400 | KHz |
| MOD_DEF (0:2) - High | VOH | 2 | | Vcc | V |
| MOD_DEF (0:2) - Low | VIL | | | 0.8 | V |

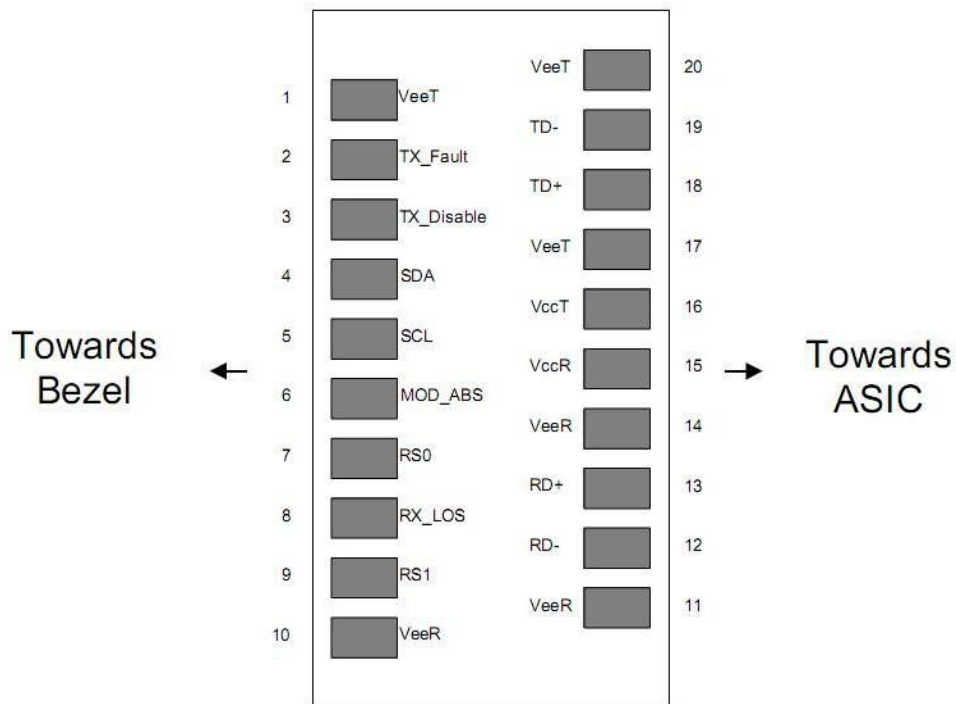
Pin Descriptions

| Pin | Symbol | Name/Descriptions | Ref. |
|-----|------------|--|------|
| 1 | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |
| 2 | Tx_Fault | Transmitter Fault. LVTTTL-O. | 2 |
| 3 | Tx_Disable | Transmitter Disable. Laser output disabled on “high” or “open.” LVTTTL-I. | 3 |
| 4 | SDA | 2-Wire Serial Interface Data (Same as MOD-DEF2 in INF-8074i). LVTTTL-I/O. | |
| 5 | SCL | 2-Wire Serial Interface Clock (Same as MOD-DEF2 in INF-8074i). LVTTTL-I. | |
| 6 | MOD_ABS | Module Absent. Connect to VeeT or VeeR in the module. | 4 |
| 7 | RS0 | Rate Select 0. Not Used. | 5 |
| 8 | LOS | Loss of Signal Indication. “Logic 0” indicates normal operation. LVTTTL-O. | 2 |
| 9 | RS1 | Rate Select 1. Not Used. | 5 |
| 10 | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| 11 | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| 12 | RD- | Receiver Inverted Data Out. AC Coupled. CML-O. | |
| 13 | RD+ | Receiver Non-Inverted Data Out. AC Coupled. CML-O. | |
| 14 | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| 15 | VccR | Receiver Power Supply. | |
| 16 | VccT | Transmitter Power Supply. | |

| | | | |
|----|------|--|---|
| 17 | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |
| 18 | TD+ | Transmitter Non-Inverted Data In. AC Coupled. CML-I. | |
| 19 | TD- | Transmitter Inverted Data In. AC Coupled. CML-O. | |
| 20 | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |

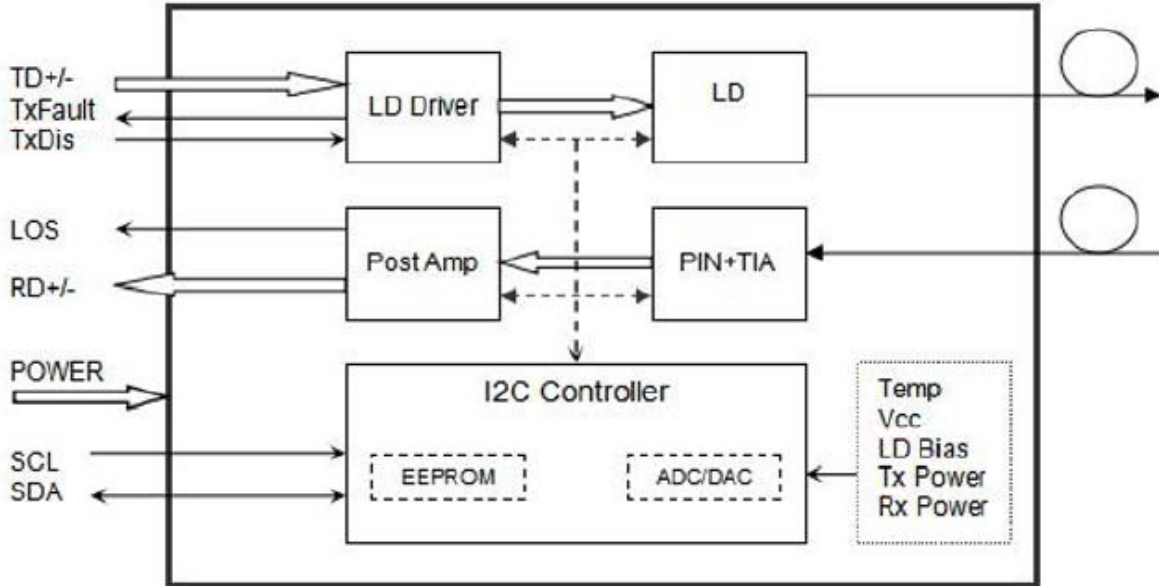
Notes:

1. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
2. This contact is an open collector/drain output and should be pulled up to the Host_Vcc with resistor in the range 4.7kΩ to 10kΩ. Pull-ups can be connected to one or several power supplies; however, the host board design shall ensure that no module contract has voltage exceeding module VccT/R+0.5V.
3. Tx_Disable is an input contact with a 4.7kΩ to 10kΩ pull-up resistor to VccT inside the module.
4. MOD_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull the contract up to Host_Vcc with a resistor in the range from 4.7kΩ to 10kΩ. MOD_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.
5. Internally pulled down per SFF-8431.

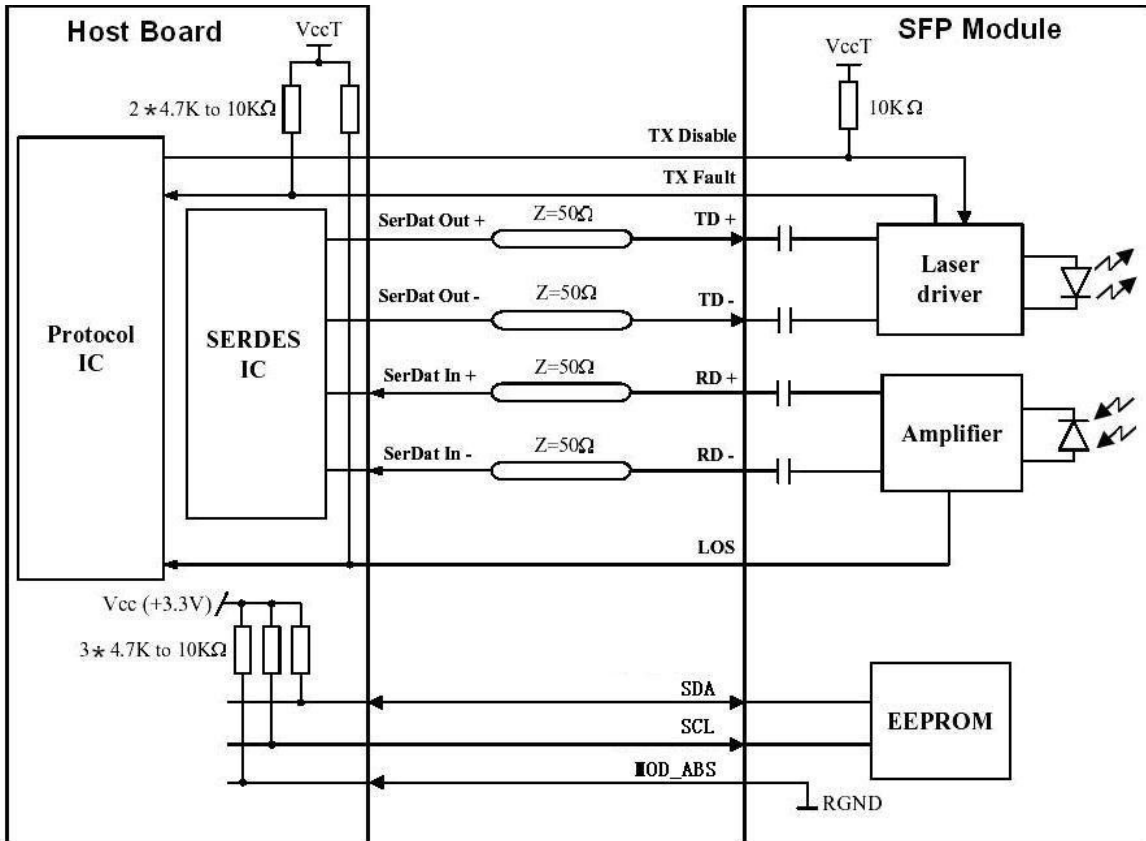


Pin-Out of Connector Block on the Host Board

Transceiver Functional Diagram



Recommended Interface Circuit Schematic

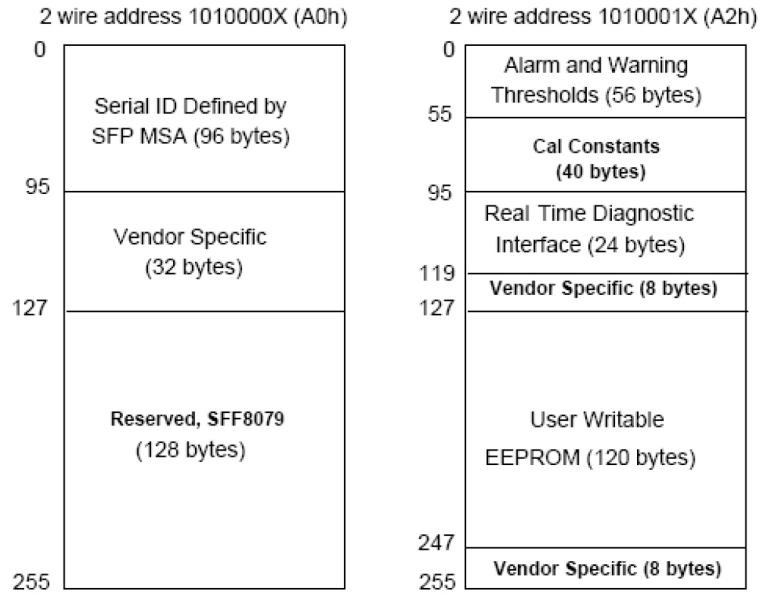


Mechanical Specifications



EEPROM Information

EEPROM memory map-specific data field description is as below:



About Us:

Proline Options is one of North America's leading providers of transceivers and high speed cabling. With a reputation for quality, tested products that cover the connectivity spectrum, Proline Options has a solution for you regardless of the specification.

At Proline Options, every product is tested in its intended application - never batch or spec tested only. We run bandwidth, distance and IOS network tests. We have documented an impressive 0.03% failure rate over the last 10 years. To continue this rate of success we invest millions annually in our own on-site testing lab.



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