

1442040G1-C

ADTRAN® 1442040G1 Compatible TAA 1000Base-BX 2-Channel SFP Transceiver (SMF, 1490nmTx/1310nmRx, 40km, LC, DOM, -40 to 85C)

Features:

- INF-8074 and SFF-8472 Compliance
- Simplex LC Connector
- Fabry Perot transmitter and PIN receiver
- Single-mode Fiber
- Industrial Temperature -40 to 85 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



Applications:

- 1000Base-BX Ethernet
- 1x Fibre Channel
- Access (FTTx) and Enterprise

Product Description

This ADTRAN® 1442040G1 compatible SFP transceiver provides 1000Base-BX 2-Channel throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1490nmTx/1310nmRx via an LC connector. It is guaranteed to be 100% compatible with the equivalent ADTRAN® 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.

ProLabs'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

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-----------------------------|------------|------|------|------|------|
| Maximum Supply Voltage | Vcc | -0.5 | | 3.6 | V |
| Storage Temperature | TS | -40 | | 85 | °C |
| Operating Case Temperature | Tc | -40 | | 85 | °C |
| Operating Relative Humidity | RH | | | 95 | % |
| Data Rate | FE | | 100 | | Mbps |
| | OC-3/STM-1 | | 155 | | Mbps |
| | STM-4 | | 622 | | Mbps |
| | FC | | 1063 | | Mbps |
| | GBE | | 1250 | | Mbps |

Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|----------------|------|------|-----------------|------|-----------------------------|
| Power Supply Voltage | Vcc | 3.15 | 3.3 | 3.45 | V | |
| Power Supply Current | Icc | | | 300 per channel | mA | |
| Transmitter | | | | | | |
| LVPECL Compatible Inputs (Differential) | Vin | 400 | | 2000 | mVpp | AC coupled inputs (Note 5) |
| Input Impedance (Differential) | Zin | 85 | 100 | 115 | ohm | Rin > 100 kohm @DC |
| TX_FAULT | Fault | 2 | | Vcc+0.3 | V | |
| | Normal | 0 | | 0.5 | | |
| TX_Dis | Disable | 2 | | Vcc+0.3 | V | |
| | Enable | 0 | | 0.8 | | |
| Receiver | | | | | | |
| CML Outputs (Differential) | Vout | 400 | | 800 | mVpp | AC coupled outputs (Note 5) |
| Output impedance (Differential) | Zout | 85 | 100 | 115 | ohm | |
| RX_LOS | LOS | 2 | | Vcc+0.3 | V | |
| | Normal | 0 | | 0.8 | V | |
| MOD_DEF (0:2) | VoH | 2.5 | | | V | With Serial ID |
| | VoL | 0 | | 0.5 | V | |

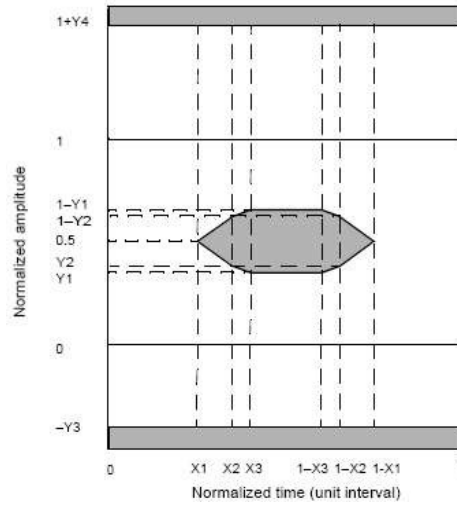
Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--------------------------------|----------------------------------|------|----------|------|------|-------|
| 9µm Core Diameter SMF | L | | 40 | | km | |
| Data Rate | | | 100~1250 | | Mbps | |
| Transmitter | | | | | | |
| Center Wavelength | λ_c | 1290 | 1310 | 1330 | nm | |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | |
| Average Output Power | P _{out} | -3 | | 2 | dBm | 1 |
| Extinction Ratio @ 1250 Mbps | ER | 6 | | | dB | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Rise/Fall Time (20%~80%) | t _r /t _f | | | 0.26 | ns | |
| Output Optical Eye (Note 2) | Compliant with IEEE 802.3ah-2004 | | | | | 5 |
| TX_Disable Assert Time | t _{off} | | | 10 | Us | |
| P _{out} @TX_Disable | P _{out} | | | -45 | dBm | |
| Receiver | | | | | | |
| Center Wavelength | λ_c | 1480 | 1490 | 1500 | nm | |
| Receiver Sensitivity @1250Mbps | P _{min} | | | -24 | dBm | 4 |
| Receiver Overload | P _{max} | -3 | | | dBm | |
| Return Loss | | 12 | | | dB | |
| Optical Path Penalty | | | | 1 | dB | |
| LOS De-Assert @1250Mbps | LOSD | | | -25 | dBm | |
| LOS Assert | LOSA | -35 | | | dBm | |
| LOS Hysteresis | | 0.5 | | | dB | |

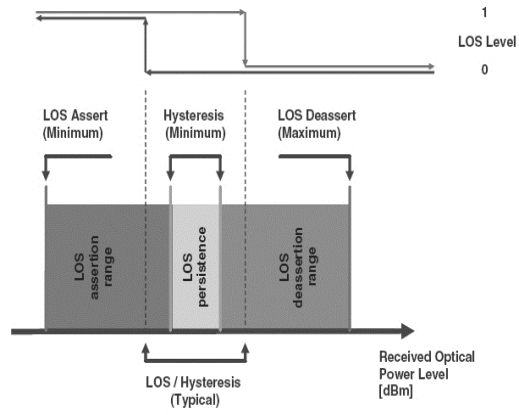
Notes:

1. Output is coupled into a 9/125µm single-mode fiber.
2. Filtered measured with a PRBS 2⁷-1.
3. LVPECL logic, internally AC coupled.
4. Minimum average optical power measures at BER less than 1E-12, with a 2⁷-1 PRBS and ER=9 dB

5. Eye Pattern Mask



6. LOS Hysteresis



Pin Descriptions

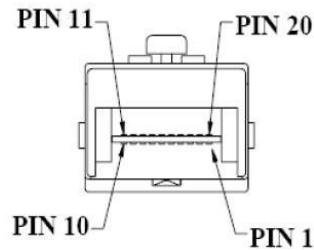
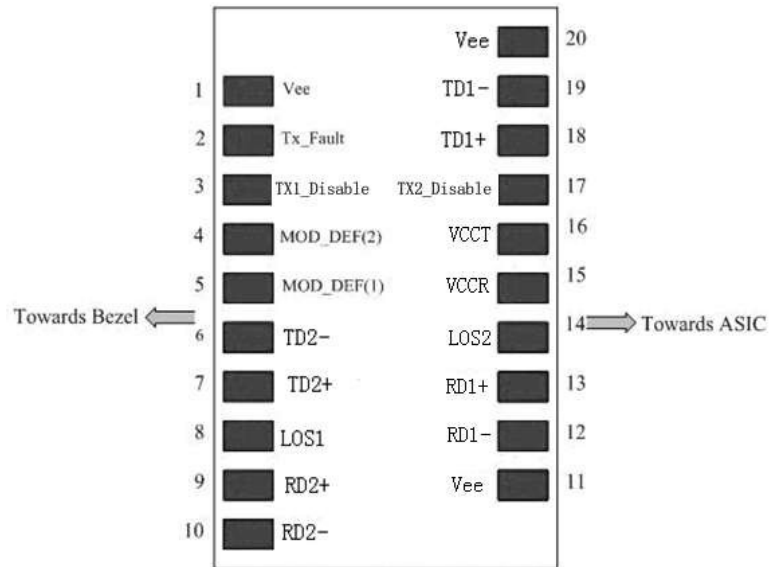
| Pin | Symbol | Channel No. | Function | Ref. |
|-----|-------------|-------------|---------------------------------------|---|
| 1 | VeeT | Common | Transmitter Ground | Note 3 |
| 2 | TX Fault | Common | Transmitter Fault Indication | Note 8 |
| 3 | TX1_Disable | 1 | Transmitter Disable of Ch1 | Note 1, module disables on high or open |
| 4 | MOD-DEF2 | Common | Two-Wires Interface Data | Note 2, 2wire serial ID interface SDA |
| 5 | MOD-DEF1 | Common | Two-Wires Interface Clock | Note 2, 2wire serial ID interface SCL |
| 6 | TD2- | 2 | Inverted Transmit Data Input of Ch2 | Note 6 |
| 7 | TD2+ | 2 | Transmit Data Input of Ch2 | Note 6 |
| 8 | LOS1 | 1 | Loss of Signal of CH1. | Note 7 |
| 9 | RD2+ | 2 | Received Data output of Ch2 | Note 4 |
| 10 | RD2- | 2 | Inverted Received Data output of Ch2 | Note 4 |
| 11 | VEE | Common | Transceiver Ground | Note 3 |
| 12 | RD2- | 1 | Inverted received Data output of Ch1. | Note 4 |
| 13 | RD2- | 2 | Received Data output of Ch1 | Note 4 |
| 14 | LOS2 | 2 | Loss of Signal of CH2 | Note 7 |
| 15 | VCCR | Common | Receiver power | Note 5, 3.3V \pm 5% |
| 16 | VCCT | Common | Transmitter Power | Note 5, 3.3V \pm 5% |
| 17 | TX2_Disable | 2 | Transmitter Disable of Ch2 | Note 1, Module disables on high or open |
| 18 | TD1+ | 1 | Transmit Data Input of Ch1 | Note 6 |
| 19 | TD1- | 1 | Inverted Transmit Data Input of Ch1 | Note 6 |
| 20 | VEE | Common | Transceiver Ground | Note 6 |

Notes:

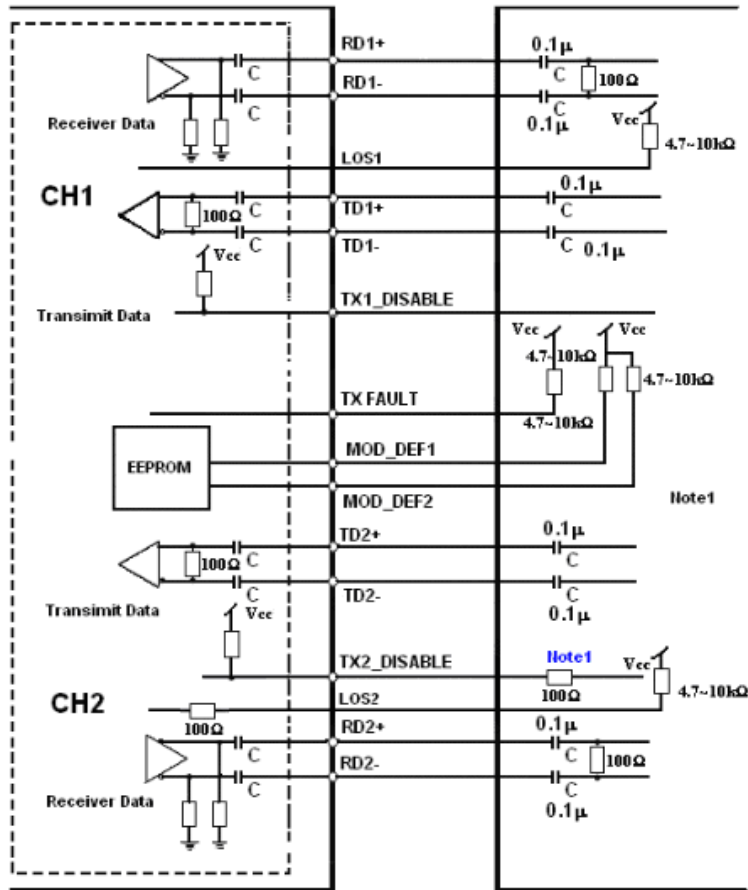
- TX_Disable1,2 are an input that us used to shut down the transmitter optical output. It is pulled up within the module with a 4.7K-10K_resistor. It's states are:
 Low (0-0.8V): Transmitter on
 (>0.8, <2.0V): Undefined
 High (2.0-3.465V): Transmitter Disabled
 Open: Transmitter Disabled
- Mod-Def 1,2. These are the module definition pins. They should be pulled up with a 4.7K-10K_resistor on the host board. The pull-up voltage shall be VccT or VccR.
 Mod-Def 1 is the clock line of two wire serial interfaces for serial ID. Mod-Def 2 is the data line of two wire serial interface for serial ID.
- VEE may be internally connected within the SFO module.
- RD1, 2-/+ : These are the differential receiver outputs. They are AC couples 100_ differential lines which should be terminated with 100_(differential) at the user SERDES. The AC coupling is done inside the

module and is this not required on the host board.

5. VccT, VccR are the power supplies. They are defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 600mA@3.3V. Vcc may be internally connected within the SFP transceiver module.
6. TD1, 2-/+: These are the differential transmitter inputs. They are AC coupled, differential lines with 100_ohm differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.
7. LOS 1,2 (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K– 10KΩ resistor. Pull up voltage between 2.0V and Vcct, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.4V.
8. TX Fault report transceiver status as following:
TX Fault is an open collector/drain output, which should be pulled up with a 4.7K–10K_ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicated a laser fault of some kind either in Channel 1 or Channel 2. The Host shall read Channel1/2: A2H/AAH: 110 for details: TX Fault from channel 1 if bit 2 is set in [A2H:110]; TX Fault from channel 2 if bit 2 is set in [B2H: 110]. Low indicated normal operation. In the low state, the output will be pulled to < 0.8V.



Recommended Circuit Schematic

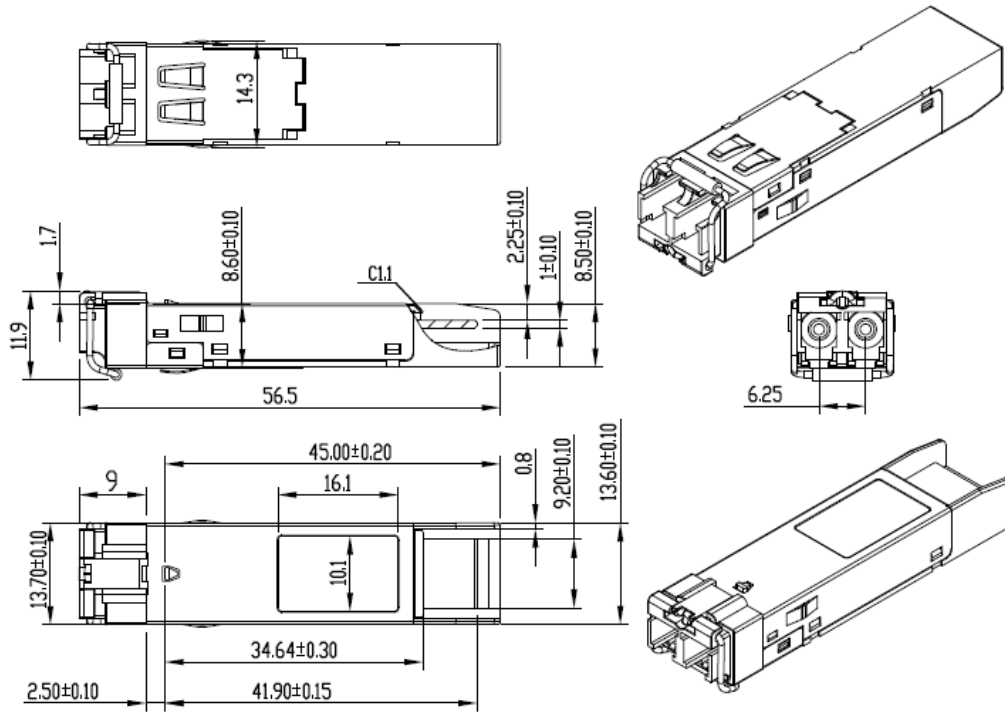


Laser Emission



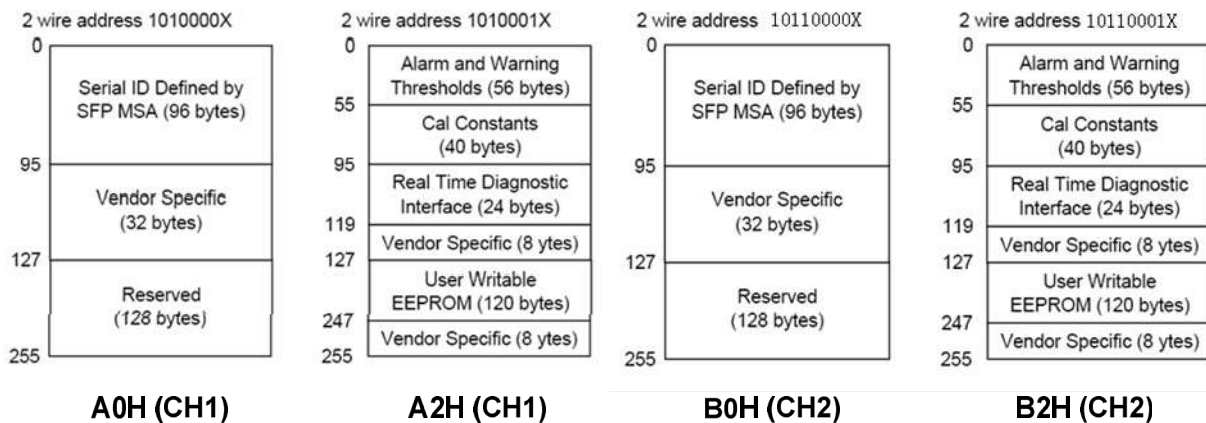
Mechanical Specifications

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



EEPROM Information

EEPROM memory map specific data field description is as below:



About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



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