



PT1-S1-4203L

www.palconnusa.com

Product Overview

The PT1-S1-4203L of Small Form Factor Pluggable (SFP) transceiver module is specifically designed for high performance integrated duplex data link over single mode optical fiber. The high-speed laser diode and photo diode are provided as a light source and a detector, respectively. An EEPROM contained the detailed product information for the host equipment is accessed by the 2-wire serial CMOS EEPROM protocol. It complies with SFP MSA, SONET/SDH standards, Class 1 laser products, EN60825, and EN60950.



Features

- RoHS Compliant
- Operation Temperature: -40°C~+85°C
- 1310nm uncooled FP LD
- 20Km link distance_(indicative only)
- Hot pluggable
- Metal enclosure, low EMI
- Single 3.3V power supply
- Low Power Dissipation

Applications

- Metro Access Rings
- Point-to-Point networking
- OC-3
- Suitable for Fast Ethernet



PT1-S1-4203L

www.palconnusa.com

Ordering Information

| | | | | | | | | | | | | | | | | | |
|---|---------------------------------|--|-------------------------------|---------------------------------|--|---------------------------------|-------------------------------|--|-------------------------------|---------------------------------|--|---|-----------------------------|--|--|--|--|
| <p>P T 1 - S 1 - 4 2 0 3 L</p> <p>a b - X - c d e f - g h</p> | | <p>Function parameter</p> <p>P: may be Blank, or 000~999→ Pigtail length (unit : cm)</p> <p>C: or 0-9 → Case Color (0: Black, 1: Blue)</p> <p>S: or B/F→ Shield (B: Backward , F: Forward ,X:Non)</p> <p>1-4 → Composite Specifications</p> <p>1: Case Color Blue + Shield Forward</p> <p>W: 2: Case Color Blue + Shield Backward ,Lead pin X 6 (TB-Half Shield ,Lead pin X 6)</p> <p>3: Case Color Blue + Full Shield Backward,Lead pin X 4</p> <p>4:Case Color Black + Full Shield Backward,Lead pin X 6</p> | | | | | | | | | | | | | | | |
| | | <p>Function distinction</p> <p>may be Blank, or P (P→ Pigtail),or C(Case Color),or S (S→ Shield) , or W (W→ Composite Specifications) , or F (F→POF) , or I(I→DDMI)</p> | | | | | | | | | | | | | | | |
| | | <p>Potential energy & temperature</p> <table border="1"> <tr> <td>I→AC/AC PECL 0°C~70°C RoHS</td> <td>W→DC/AC TTL 0°C~70°C RoHS</td> </tr> <tr> <td>J→AC/AC PECL -40°C~85°C RoHS</td> <td>N→DC/DC PECL -40°C~85°C RoHS</td> </tr> <tr> <td>K→AC/AC TTL 0°C~70°C RoHS</td> <td>O→DC/DC TTL 0°C~70°C RoHS</td> </tr> <tr> <td>L→AC/AC TTL -40°C~85°C RoHS</td> <td>P→DC/DC TTL -40°C~85°C RoHS</td> </tr> <tr> <td>M→DC/DC PECL 0°C~70°C RoHS</td> <td>R→DC/DC PECL -10°C~85°C RoHS</td> </tr> <tr> <td>Q→AC/AC TTL -10°C~85°C RoHS</td> <td>X→DC/AC TTL -40°C~85°C RoHS</td> </tr> </table> | I→AC/AC PECL 0°C~70°C RoHS | W→DC/AC TTL 0°C~70°C RoHS | J→AC/AC PECL -40°C~85°C RoHS | N→DC/DC PECL -40°C~85°C RoHS | K→AC/AC TTL 0°C~70°C RoHS | O→DC/DC TTL 0°C~70°C RoHS | L→AC/AC TTL -40°C~85°C RoHS | P→DC/DC TTL -40°C~85°C RoHS | M→DC/DC PECL 0°C~70°C RoHS | R→DC/DC PECL -10°C~85°C RoHS | Q→AC/AC TTL -10°C~85°C RoHS | X→DC/AC TTL -40°C~85°C RoHS | | | |
| I→AC/AC PECL 0°C~70°C RoHS | W→DC/AC TTL 0°C~70°C RoHS | | | | | | | | | | | | | | | | |
| J→AC/AC PECL -40°C~85°C RoHS | N→DC/DC PECL -40°C~85°C RoHS | | | | | | | | | | | | | | | | |
| K→AC/AC TTL 0°C~70°C RoHS | O→DC/DC TTL 0°C~70°C RoHS | | | | | | | | | | | | | | | | |
| L→AC/AC TTL -40°C~85°C RoHS | P→DC/DC TTL -40°C~85°C RoHS | | | | | | | | | | | | | | | | |
| M→DC/DC PECL 0°C~70°C RoHS | R→DC/DC PECL -10°C~85°C RoHS | | | | | | | | | | | | | | | | |
| Q→AC/AC TTL -10°C~85°C RoHS | X→DC/AC TTL -40°C~85°C RoHS | | | | | | | | | | | | | | | | |
| | | <p>Operating voltage</p> <p>3→3.3V</p> <p>5→5V</p> | | | | | | | | | | | | | | | |
| | | <p>Distance</p> <p>D1~D9 : D1→100M, D2→200M</p> <p>01~99 : 01→1km, 10→10km</p> <p>00→100km</p> | | | | | | | | | | | | | | | |
| | | <p>Optical connector</p> <p>1→FC</p> <p>2→SC</p> <p>3→ST</p> <p>4→LC</p> | | | | | | | | | | | | | | | |
| | | <p>Wavelength</p> <table border="1"> <tr> <td>M3→Multi-mode 850 nm</td> <td>S1→Single-mode 1310 nm</td> <td>S3→For Bi-direction : Single-mode Tx1310 / Rx1550 nm</td> </tr> <tr> <td>M4→Multi-mode 1310 nm</td> <td>S2→Single-mode 1550 nm</td> <td>S4→For Bi-direction : Single-mode Tx1550 / Rx1310 nm</td> </tr> <tr> <td>00~99 (CWDM Wavelength)</td> <td></td> <td>S5→For Bi-direction : Single-mode Tx1310 / Rx1490 nm</td> </tr> <tr> <td></td> <td></td> <td>S6→For Bi-direction : Single-mode Tx1490 / Rx1310 nm</td> </tr> </table> | M3→Multi-mode 850 nm | S1→Single-mode 1310 nm | S3→For Bi-direction : Single-mode Tx1310 / Rx1550 nm | M4→Multi-mode 1310 nm | S2→Single-mode 1550 nm | S4→For Bi-direction : Single-mode Tx1550 / Rx1310 nm | 00~99 (CWDM Wavelength) | | S5→For Bi-direction : Single-mode Tx1310 / Rx1490 nm | | | S6→For Bi-direction : Single-mode Tx1490 / Rx1310 nm | | | |
| M3→Multi-mode 850 nm | S1→Single-mode 1310 nm | S3→For Bi-direction : Single-mode Tx1310 / Rx1550 nm | | | | | | | | | | | | | | | |
| M4→Multi-mode 1310 nm | S2→Single-mode 1550 nm | S4→For Bi-direction : Single-mode Tx1550 / Rx1310 nm | | | | | | | | | | | | | | | |
| 00~99 (CWDM Wavelength) | | S5→For Bi-direction : Single-mode Tx1310 / Rx1490 nm | | | | | | | | | | | | | | | |
| | | S6→For Bi-direction : Single-mode Tx1490 / Rx1310 nm | | | | | | | | | | | | | | | |
| | | <p>Bit rate</p> <table border="1"> <tr> <td>1→155Mbps</td> <td>3→1.0625Gbps</td> <td>5→2.125 Gbps</td> <td>7→2.7 Gbps</td> </tr> <tr> <td>2→622Mbps</td> <td>4→1.25 Gbps</td> <td>6→2.5 Gbps</td> <td>8→3.125 Gbps</td> </tr> </table> | 1→155Mbps | 3→1.0625Gbps | 5→2.125 Gbps | 7→2.7 Gbps | 2→622Mbps | 4→1.25 Gbps | 6→2.5 Gbps | 8→3.125 Gbps | | | | | | | |
| 1→155Mbps | 3→1.0625Gbps | 5→2.125 Gbps | 7→2.7 Gbps | | | | | | | | | | | | | | |
| 2→622Mbps | 4→1.25 Gbps | 6→2.5 Gbps | 8→3.125 Gbps | | | | | | | | | | | | | | |
| | | <p>Electric connector</p> <table border="1"> <tr> <td>TR→Dual Fiber 1×9 Transceiver</td> <td>FB→Single Fiber SFF Transceiver</td> <td>EUFB→ EPON ONU SFF 2×5 BIDI Transceiver</td> </tr> <tr> <td>TB→Single Fiber 1×9 Transceiver</td> <td>PT→Dual Fiber SFP Transceiver</td> <td>ETFB→ EPON OLT SFF 2×5 BIDI Transceiver</td> </tr> <tr> <td>FT→Dual Fiber SFF Transceiver</td> <td>PB→Single Fiber SFP Transceiver</td> <td>GUFB→ GPON ONU SFF 2×5 BIDI Transceiver</td> </tr> <tr> <td>UB→Dual Bi-Direction SFP Transceiver (OM PIN Assignmet)</td> <td></td> <td>GTFB→ GPON OLT SFF 2×5 BIDI Transceiver</td> </tr> <tr> <td>UM→Dual Bi-Direction SFP Transceiver(CSFP MSA)</td> <td></td> <td>GUFM→GPON OLT SFF 2×5 BIDI Transceiver(DDMI)</td> </tr> </table> | TR→Dual Fiber 1×9 Transceiver | FB→Single Fiber SFF Transceiver | EUFB→ EPON ONU SFF 2×5 BIDI Transceiver | TB→Single Fiber 1×9 Transceiver | PT→Dual Fiber SFP Transceiver | ETFB→ EPON OLT SFF 2×5 BIDI Transceiver | FT→Dual Fiber SFF Transceiver | PB→Single Fiber SFP Transceiver | GUFB→ GPON ONU SFF 2×5 BIDI Transceiver | UB→Dual Bi-Direction SFP Transceiver (OM PIN Assignmet) | | GTFB→ GPON OLT SFF 2×5 BIDI Transceiver | UM→Dual Bi-Direction SFP Transceiver(CSFP MSA) | | GUFM→GPON OLT SFF 2×5 BIDI Transceiver(DDMI) |
| TR→Dual Fiber 1×9 Transceiver | FB→Single Fiber SFF Transceiver | EUFB→ EPON ONU SFF 2×5 BIDI Transceiver | | | | | | | | | | | | | | | |
| TB→Single Fiber 1×9 Transceiver | PT→Dual Fiber SFP Transceiver | ETFB→ EPON OLT SFF 2×5 BIDI Transceiver | | | | | | | | | | | | | | | |
| FT→Dual Fiber SFF Transceiver | PB→Single Fiber SFP Transceiver | GUFB→ GPON ONU SFF 2×5 BIDI Transceiver | | | | | | | | | | | | | | | |
| UB→Dual Bi-Direction SFP Transceiver (OM PIN Assignmet) | | GTFB→ GPON OLT SFF 2×5 BIDI Transceiver | | | | | | | | | | | | | | | |
| UM→Dual Bi-Direction SFP Transceiver(CSFP MSA) | | GUFM→GPON OLT SFF 2×5 BIDI Transceiver(DDMI) | | | | | | | | | | | | | | | |

*Please contact us for the released types.



PT1-S1-4203L

www.palconnusa.com

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---------------------|------------------------|------|------|------|------|------|
| Storage Temperature | T_S | -55 | | +95 | °C | |
| Supply Voltage | $V_{CC}T$ $V_{CC}R$ | 0 | | 5.5 | V | |
| Relative Humidity | RH | 0 | | 85 | % | |

Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|-----------------------|-------------------|------|------|------|------|------|
| Operating Temperature | T_{OP} | -40 | | +85 | °C | |
| Supply Voltage | $V_{CC}T,R$ | 3.1 | 3.3 | 3.5 | V | |
| Supply Current | $I_{TX} + I_{RX}$ | | 200 | 300 | mA | |



PT1-S1-4203L

www.palconnusa.com

Transmitter Electro-Optical Interface ($T_C = -40^{\circ}\text{C} \sim +85^{\circ}\text{C}$, $V_{CC}T, R=3.1\text{V} < V_{CC} < 3.5\text{V}$)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|--|---------------------------------|-----------------|------|----------------------|-------|------|
| Transmitter Differential Input Voltage | TD +/- | 400 | | 2000 | mVp-p | A |
| Optical Output Power | P _O | -15 | | -5 | dBm | A |
| Optical Extinction Ratio | E _R | 8.2 | | | dB | A |
| Center Wavelength | λ_C | 1260 | 1310 | 1360 | nm | A |
| Spectral Width | $\Delta\lambda$ | | | <4 | nm | A |
| Optical Rise / Fall Time | t _r / t _f | | | 3 | nsec | A,B |
| Tx_Fault - High | V _{Fault_H} | 2 | | V _{CC} | V | A |
| Tx_Fault - Low | V _{Fault_L} | V _{ee} | | V _{ee} +0.5 | V | A |
| Tx_Disable - High | V _{Disable_H} | 2 | | V _{CC} | V | A |
| Tx_Disable - Low | V _{Disable_L} | V _{ee} | | V _{ee} +0.8 | V | A |

Notes:

A. All of data is measured at 155.52Mbps, PRBS 2²³-1, NRZ.

B: 20%~80%

Receiver Electro-Optical Interface ($T_C = -40^{\circ}\text{C} \sim +85^{\circ}\text{C}$, $V_{CC}T, R=3.1\text{V} < V_{CC} < 3.5\text{V}$)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|--------------------------------------|-----------------------|------|------|------|-------------------|------|
| Receiver Differential Output Voltage | RD +/- | 600 | 800 | | mV _{p-p} | |
| Receiver Overload | P _{INMAX} | -3 | | | dBm | A,B |
| Receiver Sensitivity | P _{INMIN} | | | -32 | dBm | A,B |
| Operating Center Wavelength | λ_C | 1270 | | 1620 | nm | |
| Receiver LOS Assert Level | P _{RX_LOS A} | | | -32 | dBm | B |
| Receiver LOS Deassert Level | P _{RX_LOS D} | -45 | | | dBm | B |
| Receiver Loss of Signal Hysteresis | | 0.5 | 2 | | dB | B |

Notes:

A. With BER better than or equal to 1×10^{-12}

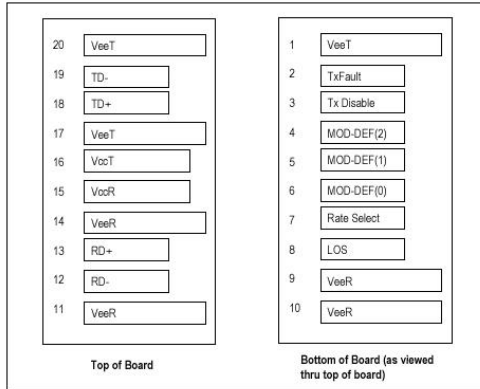
B. measured in the center of the eye opening with 2²³ -1 PRBS, NRZ



PT1-S1-4203L

www.palconnusa.com

Pin Description



SFP Transceiver Electric Pad Layout

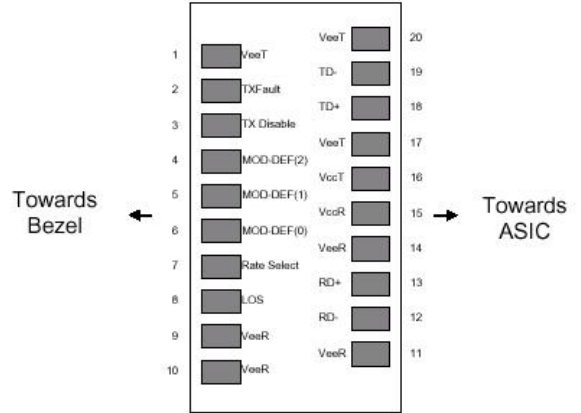


Diagram of Host Board Connector Block Pin Numbers and Names



PT1-S1-4203L

www.palconnusa.com

| Pin No. | Pin Name | Function | Plug Seq. | Notes |
|---------|-------------------|---|-----------|-------|
| 1 | V _{ee} T | Transmitter Ground | 1 | 1 |
| 2 | TX Fault | Transmitter Fault Indication | 3 | 2 |
| 3 | TX Disable | Transmitter Disable | 3 | 3 |
| 4 | MOD_DEF 2 | Module Definition 2 | 3 | 4 |
| 5 | MOD_DEF 1 | Module Definition 1 | 3 | 4 |
| 6 | MOD_DEF 0 | Module Definition 0 | 3 | 4 |
| 7 | Rate Select | Select between full or reduced receiver bandwidth | 3 | 5 |
| 8 | LOS | Loss of Signal | 3 | 6 |
| 9 | V _{ee} R | Receiver Ground | 1 | 1 |
| 10 | V _{ee} R | Receiver Ground | 1 | 1 |
| 11 | V _{ee} R | Receiver Ground | 1 | 1 |
| 12 | RD - | Inv. Receiver Data Out | 3 | |
| 13 | RD + | Receiver Data Out | 3 | |
| 14 | V _{ee} R | Receiver Ground | 1 | 1 |
| 15 | V _{cc} R | Receiver Power | 2 | |
| 16 | V _{cc} T | Transmitter Power | 2 | |
| 17 | V _{ee} T | Transmitter Ground | 1 | 1 |
| 18 | TD + | Transmitter Data In | 3 | |
| 19 | TD - | Inv. Transmitter Data In | 3 | |
| 20 | V _{ee} T | Transmitter Ground | 1 | 1 |

Note:

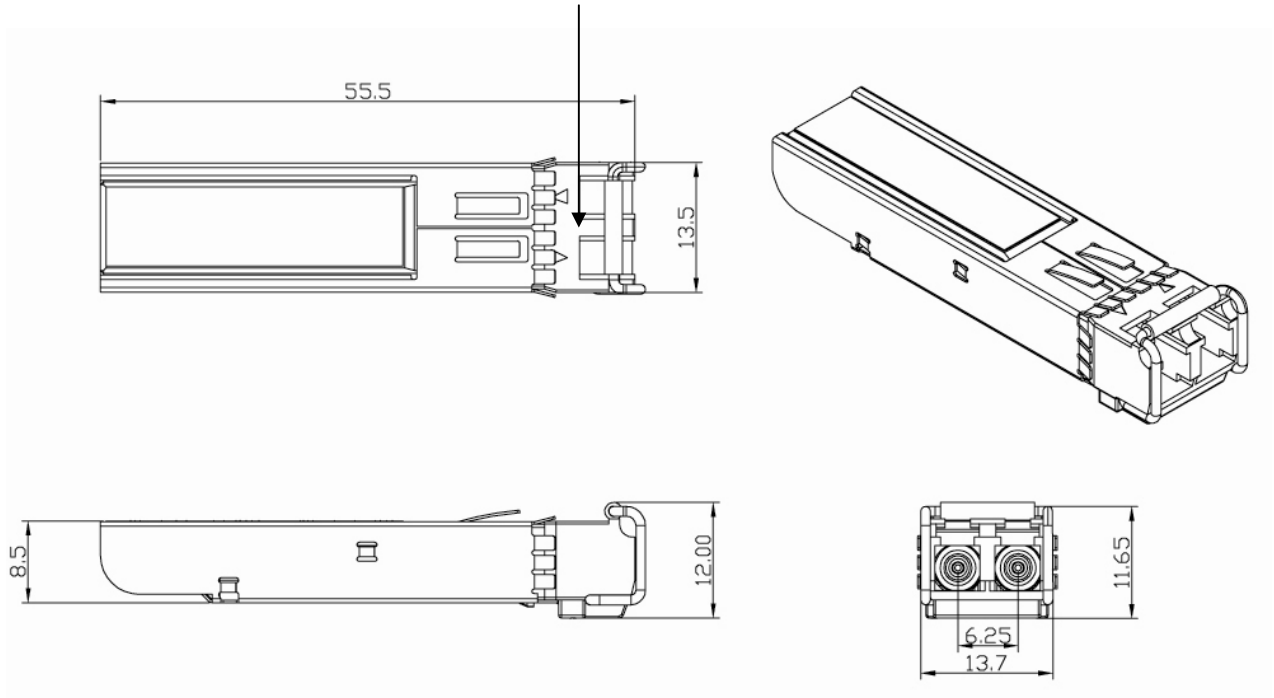
- 1, Circuit ground is internally isolated from chassis ground
- 2, Open-Collector outputs, asserted when LD and/or APC function fail.
- 3, Disable when high voltage (>2.0V or Open)
- 4, Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 5.5V.
MOD_DEF (0) pulls line low to indicate module is plugged in.
- 5, No connection required
- 6, LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 5.5V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



PT1-S1-4203L

www.palconnusa.com

Mechanical Dimensions (Units in mm) Tc measurement point



Application Circuit

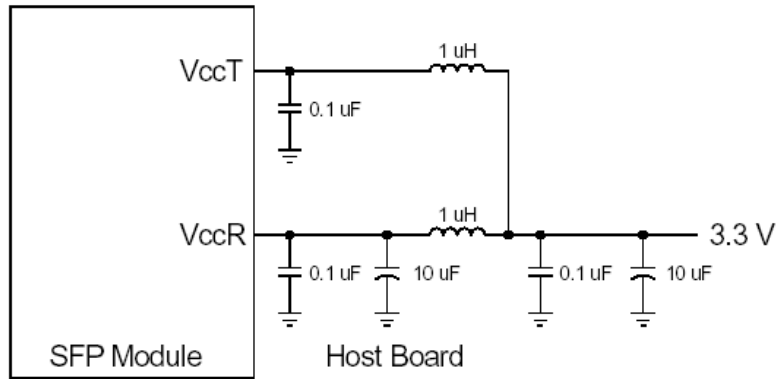


Figure 2A. Recommended Host Board Supply Filtering Network

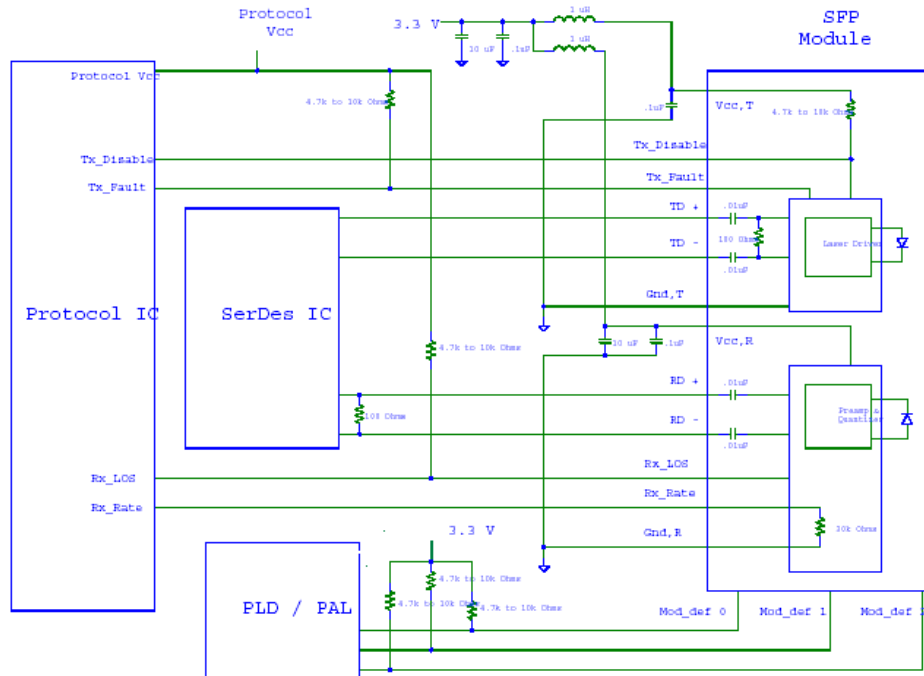


Figure 2B. Example SFP Host Board Schematic