

155Mbps ATM-Single Mode Transceiver

SFP, Duplex LC Connector, 1310nm FP LD for Single Mode Fiber, RoHS Compliant



Applications

- Fast Ethernet
- FDDI
- ATM/SONET OC-3/SDH STM-1
- Single mode fiber links
- Optical-Electrical Interface Conversion

Features

- 1310nm FP LD
- Data Rate: 155Mbps, NRZ
- Single +3.3V Power Supply
- RoHS Compliant and Lead-free
- AC/AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface (optional)
- Duplex LC Connector
- Compliance with 100Base-FX of IEEE802.3u Standard
- Compliance with FDDI PMD Standard
- Compliance with ATM Standard

Description

The AB-FE-EX-x series from ACC Systems Oy is the high performance and cost-effective module for serial optical data communication applications specified for single mode of 155 Mb/s. It operates with +3.3V power supply. The module is intended for Single-mode fiber, operates at a nominal wavelength of 1310nm and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module is integrated digital diagnostics functions via an I²C serial interface (optional).

The module is a duplex LC connector transceiver designed to provide an ATM/SONET OC-3/SDH STM-1 compliant link for 155 Mb/s long reach applications. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

EMC

Most equipment utilizing high-speed transceivers will be required to meet the following requirements:

- 1) FCC in the United States
- 2) CENELEC EN55022 (CISPR 22) in Europe

To assist the customer in managing the overall equipment EMC performance, the transceivers have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

Eye Safety

The transceivers have been designed to meet Class 1 eye safety and comply with EN 60825-1.

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Product Information

| Model Number | Operating Temperature & Monitor Function | Distance | LD Type & Wavelength | Output Power | Sensitivity |
|--------------|--|----------|----------------------|--------------|-------------|
| AB-FE-EX | 0~70 °C | 40 km | 1310 nm FP | -5 ~ 0 dBm | ≤ -34 dBm |
| AB-FE-EX-D | 0~70 °C with DOM | | | | |
| AB-FE-EX-T | -40~85 °C | | | | |
| AB-FE-EX-DT | -40~85 °C with DOM | | | | |

ABSOLUTE MAX RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---------------------|-----------------|-----|-----------------|------|------|
| Storage Temperature | T _S | -40 | 85 | °C | |
| Supply Voltage | V _{CC} | 0 | 6 | V | |
| Data Input Voltage | --- | 0 | V _{CC} | V | |

OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | NOTE |
|--------------------------|-----------------|------|------|------|------|------|
| Supply Voltage | V _{CC} | 3.1 | | 3.5 | V | |
| Data Input Voltage Swing | V _{ID} | 400 | | 1600 | mV | |

ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---|------------------|-----------------------|-----------------------|------|------|
| Transmitter | | | | | |
| Transmitter Supply Current | I _{CCR} | | 200 | mA | |
| Tx_Disable Input Voltage - Low | V _{IL} | 0 | 0.8 | V | |
| Tx_Disable Input Voltage - High | V _{IH} | 2.0 | V _{CC} | V | |
| Tx_Fault Output Voltage - Low | V _{OL} | 0 | 0.8 | V | |
| Tx_Fault Output Voltage - High | V _{OH} | 2.0 | V _{CC} | V | |
| Receiver | | | | | |
| Receiver Supply Current | I _{CCR} | | 100 | mA | |
| Receiver Data Output Differential Voltage | V _{OD} | 0.4 | 1.3 | V | |
| Rx_LOS Output Voltage - Low | V _{OL} | 0 | 0.8 | V | |
| Rx_LOS Output Voltage - High | V _{OH} | 2.0 | V _{CC} | V | |
| MOD_DEF (1) , MOD_DEF (2) - Low | V _{IL} | -0.6 | V _{CC} × 0.3 | V | |
| MOD_DEF (1) , MOD_DEF (2) - High | V _{IH} | V _{CC} × 0.7 | V _{CC} + 0.5 | V | |

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|-------------------------------|----------------|---|------|------|------|------|
| Optical Output Power | P _O | -5 | | -0 | dBm | 1 |
| Extinction Ratio | ER | 10 | | | dB | |
| Center Wavelength | λ _c | 1263 | 1310 | 1360 | nm | |
| Spectral Width (RMS) | Δλ | | | 3 | nm | |
| Optical Rise time (10%-90%) | t _r | | | 2.0 | ns | |
| Optical Fall time (10%-90%) | t _f | | | 2.0 | ns | |
| Output Eye | | Compliant with ITU recommendation G.957 | | | | |

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RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|-----------------------------|-------------|-------------|------|------|------|------|
| Maximum Input Optical Power | P_{max} | -3 | | | dBm | 2 |
| Receiver Sensitivity | P_{min} | | | -34 | dBm | 2 |
| Operating Wavelength | λ | 1100 | | 1600 | nm | |
| Loss of Signal - Asserted | P_A | -45 | | | dBm | |
| Loss of Signal - Deasserted | P_D | $P_A + 0.5$ | | -33 | dBm | |
| Loss of Signal - Hysteresis | $P_D - P_A$ | 0.5 | | 4 | dB | |

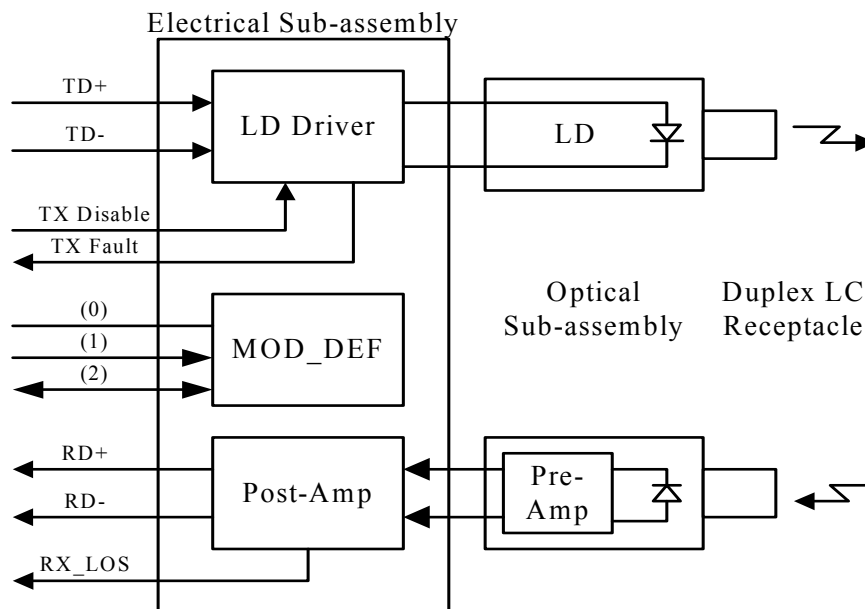
Notes:

1. Measured average power coupled into 9/125 μ m single mode fiber.
2. Measured with $2^{23}-1$ PRBS at BER < 10^{-10}

TIMING CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|---|-----------------|-----|------|-----|---------|------|
| TX_DISABLE Assert Time | t_{off} | | | 10 | μ s | |
| TX_DISABLE Negate Time | t_{on} | | | 1 | ms | |
| Time to initialize, include reset of TX_FAULT | t_{init} | | | 300 | ms | |
| TX_FAULT from fault to assertion | t_{fault} | | | 100 | μ s | |
| TX_DISABLE time to start reset | t_{reset} | 10 | | | μ s | |
| Receiver Loss of Signal Assert Time (off to on) | t_{A,RX_LOS} | | | 100 | μ s | |
| Receiver Loss of Signal Assert Time (on to off) | t_{D,RX_LOS} | | | 100 | μ s | |

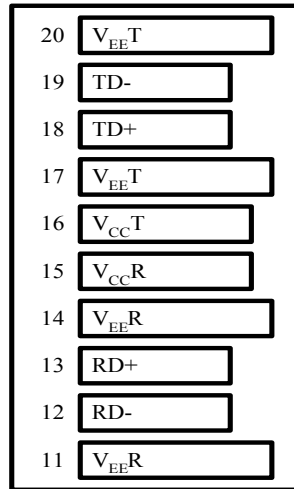
BLOCK DIAGRAM OF TRANSCEIVER



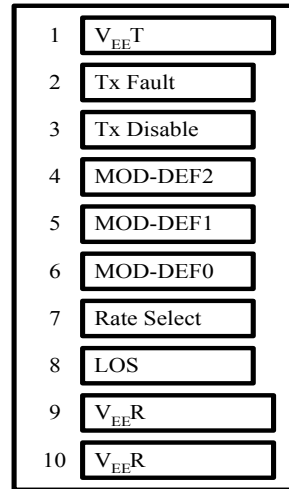
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PIN OUT DIAGRAM OF TRANSCEIVER



Top of Board



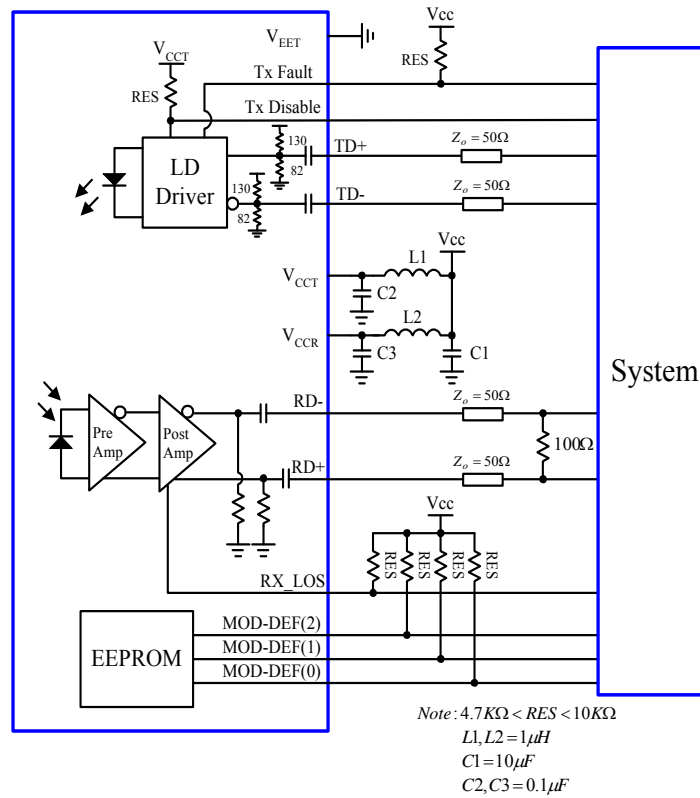
Bottom of Board (As Viewed through Top of Board)

PIN OUT TABLE

| Pin | Symbol | Functional Description |
|-----|-------------|---|
| 1 | VeeT | Transmitter Ground |
| 2 | TX Fault | Transmitter Fault Indication |
| 3 | TX Disable | Transmitter Disable – Module disables on high or open |
| 4 | MOD-DEF(2) | Module Definition 2 – Two wire serial ID interface |
| 5 | MOD-DEF(1) | Module Definition 1 – Two wire serial ID interface |
| 6 | MOD-DEF(0) | Module Definition 0 – Grounded in module |
| 7 | Rate Select | Not Connected |
| 8 | LOS | Loss of Signal |
| 9 | VeeR | Receiver Ground |
| 10 | VeeR | Receiver Ground |
| 11 | VeeR | Receiver Ground |
| 12 | RD- | Inverse Received Data Out |
| 13 | RD+ | Received Data Out |
| 14 | VeeR | Receiver Ground |
| 15 | VccR | Receiver Power |
| 16 | VccT | Transmitter Power |
| 17 | VeeT | Transmitter Ground |
| 18 | TD+ | Transmitter Data In |
| 19 | TD- | Inverse Transmitter Data In |
| 20 | VeeT | Transmitter Ground |

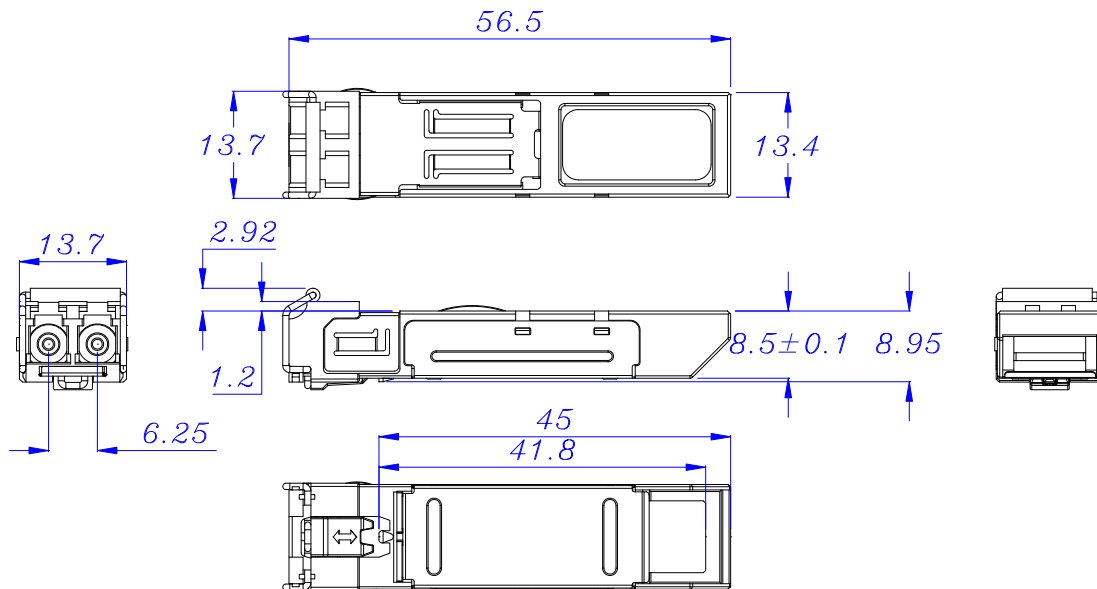
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RECOMMENDED CIRCUIT SCHEMATIC



MECHANICAL DIMENSIONS

Units in mm



All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified.

Claim:

ACC Systems Oy reserves the right to make changes in the specification described hereinafter without prior notice.