**3HE00868CB-PRO**

Alcatel-Lucent Nokia® 3HE00868CB Compatible TAA Compliant 1000Base-BX SFP Transceiver (SMF, 1490nmTx/1310nmRx, 10km, DOM, -40 to 85C, LC)

**Features**

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

**Applications:**

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

**Product Description**

This Alcatel-Lucent Nokia® 3HE00868CB compatible SFP transceiver provides 1000Base-BX throughput up to 10km 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 Alcatel-Lucent Nokia® 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.

**Rev. 031924**

## 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 | Notes |
|---|---|---|---|---|---|---|
| Maximum Supply Voltage | Vcc | -0.5 | | 4.0 | V | 1 |
| Storage Temperature | TS | -40 | | 85 | °C | 2 |
| Operating Case Temperature | Tc | -40 | | +85 | °C | |
| Operating Humidity | RH | 5 | | 85 | % | |
| Bit Error Rate | BER | | | $10^{-12}$ | | |
| Data Rate | DR | | 1.25 | | Gbps | 3 |
| | DR | | 1.062 | | Gbps | 4 |

## Notes:

1. For electrical power interface
2. Ambient temperature
3. IEEE 802.3
4. FC-PI-2 Rev7.0

## Electrical Characteristics (VCC=3.14V to 3.46V, TC=-40 °C to +85 °C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| Power Supply Voltage | Vcc | 3.14 | 3.3 | 3.46 | V | |
| Power Supply Current | Icc | | 200 | 300 | mA | 1 |
| **Transmitter** | | | | | | |
| Input differential impedance | $R_{IN}$ | | 100 | | Ω | |
| Single ended data input swing | $V_{IN\_PP}$ | 250 | | 1200 | mV | |
| Transmit disable voltage | $V_D$ | $V_{CC}$-1.3 | | $V_{CC}$ | V | |
| Transmit enable voltage | $V_{EN}$ | $V_{EE}$ | | $V_{EE}$+0.8 | V | |
| Transmit disable assert time | | | | 10 | $\mu$s | |
| **Receiver** | | | | | | |
| Single ended data output swing | $V_{OUT\_PP}$ | 300 | 400 | 800 | mV | |
| Data output rise/fall time (20%-80%) | $t_r/t_f$ | | | 300 | ps | |
| LOS Assert | $V_{LOS\_A}$ | $V_{CC}$-0.5 | | $V_{CC\_HOST}$ | V | |
| LOS De-Assert | $V_{LOS\_D}$ | $V_{EE}$ | | $V_{EE}$+0.5 | V | |

**Notes:**
1. For electrical power interface


## Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| Output Optical Power | $P_{TX}$ | -9 | | -3 | dBm | 1 |
| Optical Center Wavelength | $\lambda_c$ | 1470 | 1490 | 1510 | nm | |
| Optical Modulation Amplitude | OMA | 174 | | | $\mu$W | 2 |
| Extinction Ratio | ER | 9 | | | dB | |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | | |
| Optical Rise/Fall Time (20%-80%) | $t_r/t_f$ | | 150 | 260 | ps | |
| Relative Intensity Noise | RIN | | | -120 | dB/Hz | |
| Deterministic Jitter Contribution | DJ | | 30 | 60 | ps | |
| Total Jitter Contribution | TJ | | 60 | 120 | ps | |
| **Receiver** | | | | | | |
| Receiver Overload | $P_{OL}$ | -3 | | | dBm | |
| Optical Center Wavelength | $\lambda_c$ | 1260 | | 1360 | nm | |
| Receiver Sensitivity @ 1.063Gb/s | $R_{X\_SEN1}$ | | | -19.5 | dBm | 3 |
| Receiver Sensitivity @ 1.25Gb/s | $R_{X\_SEN2}$ | | | -19.5 | dBm | 4 |
| Optical Return Loss | ORL | 14 | | | dB | |
| Optical Isolation | ISO | 35 | | | dB | |
| LOS Assert | $LOS_A$ | -30 | | | dBm | |
| LOS De-Assert | $LOS_D$ | | | -24 | dBm | |
| LOS Hysteresis | $LOS_H$ | 0.5 | | | dB | |

**Notes:**
1. Class 1 Product
2. Equivalent extinction ratio specification for FC
3. FC-PI-2 Rev7.0 2.
4. IEEE 802.3

## Pin Descriptions

| Pin | Symbol | Name/Descriptions | Ref. |
|-----|--------|-------------------|------|
| 1 | V$_{EET}$ | Transmitter ground (common with receiver ground) | 1 |
| 2 | TX_FAULT | Transmitter Fault. Not supported | |
| 3 | TX_DISABLE | Transmitter Disable. Laser output disabled on high or open | 2 |
| 4 | MOD_DEF(2) | Module Definition 2. Data line for serial ID | 3 |
| 5 | MOD_DEF(1) | Module Definition 1. Clock line for serial ID | 3 |
| 6 | MOD_DEF(0) | Module Definition 0. Grounded within the module | 3 |
| 7 | Rate Select | No connection required | |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation | 4 |
| 9 | V$_{EER}$ | Receiver ground (common with transmitter ground) | 1 |
| 10 | V$_{EER}$ | Receiver ground (common with transmitter ground) | 1 |
| 11 | V$_{EER}$ | Receiver ground (common with transmitter ground) | 1 |
| 12 | RD- | Receiver Inverted DATA out. AC coupled | |
| 13 | RD+ | Receiver Non-inverted DATA out. AC coupled | |
| 14 | V$_{EER}$ | Receiver ground (common with transmitter ground) | 1 |
| 15 | V$_{CCR}$ | Receiver power supply | |
| 16 | V$_{CCT}$ | Transmitter power supply | |
| 17 | V$_{EET}$ | Transmitter ground (common with receiver ground) | 1 |
| 18 | TD+ | Transmitter Non-Inverted DATA in. AC coupled | |
| 19 | TD- | Transmitter Inverted DATA in. AC coupled | |
| 20 | V$_{EET}$ | Transmitter ground (common with receiver ground) | 1 |

**Notes:**

1. Circuit ground is isolated from chassis ground
2. Disabled: T$_{DIS}$>2Vor open, Enabled: T$_{DIS}$<0.8V
3. Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V
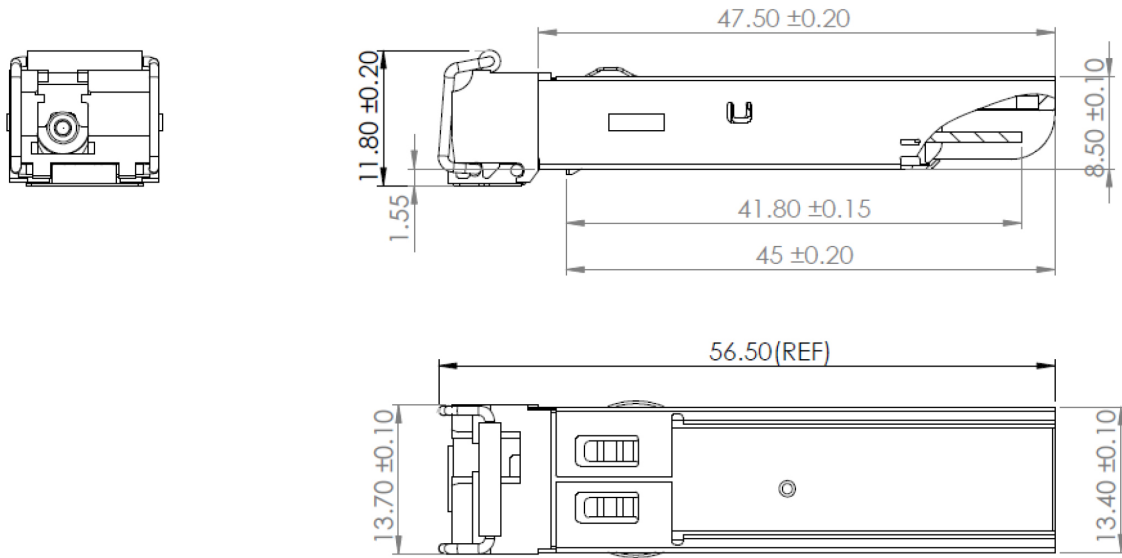4. LOS is open collector output

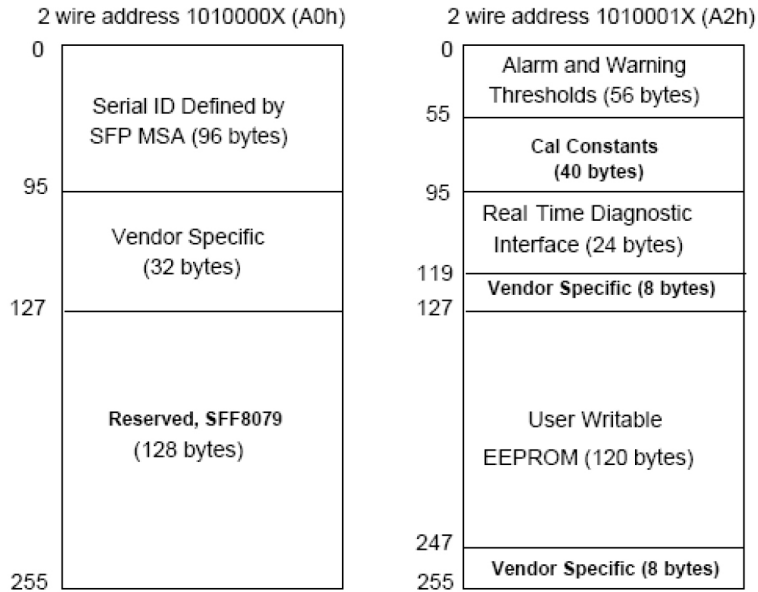Pin-out of connector Block on Host board

## Block Diagram of Transceiver
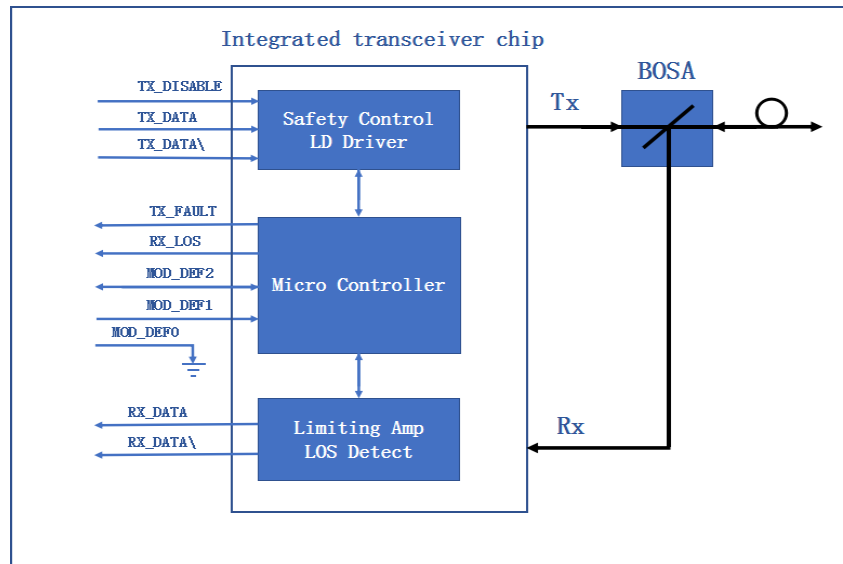
## Mechanical Specifications

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:

**Digital Diagnostic Functions**

This transceiver supports the 2-wire serial communication protocol as de- fined in SFP MSA. Digital diagnostic information is accessible over the 2-wire interface at the address 0xA2. Digital diagnostics are internally calibrated by default. The internal micro control unit accesses the device operating parameters in real time, such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. The module implements the alarm function of the SFP MSA, alerts the user when a particular operating parameter exceeds the factory-set normal range.

| Parameter | Symbol | Accuracy | Report Range | | Unit | Notes |
|---|---|---|---|---|---|---|
| Temperature | Temp | ±3 | -40 | 95 | $^\circ$C | |
| Voltage | $V_{CC}$ | ±0.1 | 2.7 | 3.9 | V | |
| Bias Current | Ibias | ±10 | 1 | 80 | mA | |
| Tx Power | $P_{TX}$ | ±3 | -12 | 2 | dBm | |
| Rx Power | $P_{RX}$ | ±3 | -30 | 0 | dBm | |

**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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