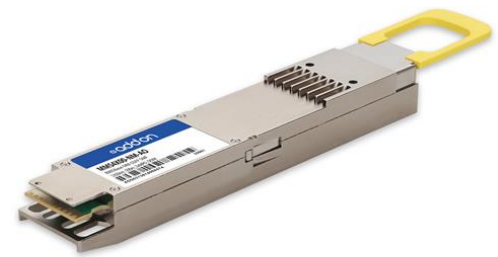


MMS4X00-NM-AO

Mellanox® MMS4X00-NM Compatible TAA 800GBase-DR8 PAM4 OSFP Transceiver (SMF, 1310nm, 500m, 2xMPO, DOM, CMIS 5.0)

Features

- OSFP MSA Compliant
- Supports 850Gbps
- 8x53.125Gb/s (PAM4) Electrical Interface
- Compliant with IEEE 802.3cu-2021: 8x100GBASE-DR optical interface
- Compliant with IEEE 802.3ck-2022: 8x100GAUI-1 C2M electrical interface
- Support both Ethernet and InfiniBand NDR
- EML transmitter and PIN PD receiver
- Commercial Temperature: 0 to 70 Celsius
- Class 1 Laser
- Dual MPO-12 Connector APC
- RoHS Compliant and Lead-Free



Applications

- 2x400GBase Ethernet
- 8x100GBase Ethernet

Product Description

This Mellanox® MMS4X00-NM compatible OSFP transceiver provides 800GBase-DR8 throughput up to 500m over single-mode fiber (SMF) using a wavelength of 1310nm via a 2xMPO connector. It is guaranteed to be 100% compatible with the equivalent Mellanox® 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.

AddOn'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."



Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|------------------------------------|------------------------------------|------|--------|----------------------|------|-------|
| Power Supply Voltage | V _{CC} | -0.5 | | 3.6 | V | |
| Storage Temperature | T _{stg} | -40 | | 85 | °C | |
| Operating Case Temperature | T _c | 0 | | 70 | °C | |
| Relative Humidity (non-condensing) | RH | 5 | | 95 | % | |
| Data Input Voltage Differential | V _{DIP} -V _{DIN} | | | 1 | V | |
| Control Input Voltage | V _I | -0.3 | | V _{CC} +0.5 | V | |
| Control Output Current | I _O | -20 | | 20 | mA | |
| Signaling Speed per Lane | DRL | | 53.125 | | GBd | |
| Operating Distance | | 2 | | 500 | m | |

Notes:

- Exceeding the Absolute Maximum Ratings table may cause permanent damage to the device. This is just an emphasized rating and does not involve the functional operation of the device that exceeds the specifications of this technical specification under these or other conditions. Long-term operation under Absolute Maximum Ratings will affect the reliability of the device.

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|---|----------------------|------|----------------------|------|-------|
| Power Supply Voltage | V _{CC} | 3.135 | 3.3 | 3.465 | V | |
| Instantaneous peak current at hot plug | I _{CC_IP} | | | 6600 | mA | |
| Sustained peak current at hot plug | I _{CC_SP} | | | 5494.5 | mA | |
| Maximum Power Dissipation | P _D | | | 16.5 | W | |
| Maximum Power Dissipation, Low Power Mode | P _{DLP} | | | 2 | W | |
| Control Input Voltage High | V _{IH} | V _{CC} *0.7 | | V _{CC} +0.3 | V | |
| Control Input Voltage Low | V _{IL} | -0.3 | | V _{CC} *0.3 | V | |
| Two Wire Serial Interface Clock Rate | | | | 400 | kHz | |
| Power Supply Noise 1 kHz - 1 MHz (p-p) | | | | 66 | mVpp | |
| High-Speed Electrical Transmitter Characteristics (TP1) | | | | | | |
| Differential Peak-Peak Input Voltage Tolerance | | 750 | | | mV | |
| Peak-to-Peak AC Common-Mode Voltage Tolerance | Low-frequency, V _{CM_LF} | | | 32 | mV | |
| | Full-band, V _{CM_FB} | | | 80 | mV | |
| Differential-mode to common-mode return loss | RL _{cd} | 802.3ck 120G-2 | | | dB | |
| Effective return loss | ERL | 8.5 | | | dB | |
| Differential termination mismatch | | | | 10 | % | |

| | | | | | | | |
|---|------------------------------|----------------|-------|--|------|----|--|
| Single-ended voltage tolerance range | | | -0.4 | | 3.3 | V | |
| DC common-mode voltage tolerance | | | -0.35 | | 2.85 | V | |
| High-Speed Electrical Receiver Characteristics (TP4) | | | | | | | |
| Peak-to-Peak AC Common-Mode Voltage | Low-frequency, $V_{CM_{LF}}$ | | | | 32 | mV | |
| | Full-band, $V_{CM_{FB}}$ | | | | 80 | mV | |
| Differential Peak-to-Peak Output Voltage | Short Mode | | | | 600 | mV | |
| | Long Mode | | | | 845 | mV | |
| Eye height | EH | 15 | | | | mV | |
| Vertical eye closure | VEC | | | | 12 | dB | |
| Common-mode to differential-mode return loss | RLDc | 802.3ck 120G-1 | | | | dB | |
| Effective return loss | ERL | 8.5 | | | | dB | |
| Differential termination mismatch | | | | | 10 | % | |
| Transition time | | 8.5 | | | | ps | |
| DC common-mode voltage tolerance | | | -0.35 | | 2.85 | V | |

Notes:

1. Compliant with IEEE802.3ck C2M.

Electrical Low Speed Control and Sense Signals Specifications

| Parameter | Symbol | Min. | Max. | Unit | Notes |
|------------------------------|--------|---------|---------|------|-------|
| Module output SCL and SDA | VOL | 0 | 0.4 | V | |
| Module Input SCL and SDA | VIL | -0.3 | VCC*0.3 | V | |
| | VIH | VCC*0.7 | VCC+0.5 | V | |
| InitMode, ResetL and ModSelL | VIL | -0.3 | 0.8 | V | |
| | VIH | 2 | VCC+0.3 | V | |
| IntL | VOL | 0 | 0.4 | V | |
| | VOH | VCC-0.5 | VCC+0.3 | V | |

Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|----------------------------------|------------|------|------------------------|-------|-------|
| Transmitter | | | | | | |
| Wavelength | λ_C | 1304.5 | 1311 | 1317.5 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Average Launch Power, each lane | AOPL | -2.9 | | 4.0 | dBm | 1 |
| Outer Optical Modulation Amplitude (OMA _{outer}), each Lane | TOMA | -0.8 | | 4.2 | dBm | |
| Launch power in OMA _{outer} Minus TDECQ, each lane | for extinction ratio ≥ 5 dB | TOMA-TDECQ | -2.2 | | dBm | |
| | for extinction ratio < 5 dB | TOMA-TDECQ | -1.9 | | dBm | |
| Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane | TDECQ | | | 3.4 | dB | |
| TDECQ – $10\log_{10}(C_{eq})$, each lane | C _{eq} | | | 3.4 | dB | |
| Average Launch Power of OFF Transmitter, each lane | TOFF | | | -15 | dBm | |
| Extinction Ratio | ER | 3.5 | | | dB | |
| Transmitter Transition Time | T _r | | | 17 | ps | |
| RIN _{15.5,OMA} | RIN | | | -136 | dB/Hz | |
| Optical Return Loss Tolerance | ORL | | | 15.5 | dB | |
| Transmitter Reflectance | T _R | | | -26 | dB | 2 |
| Receiver | | | | | | |
| Wavelength | λ_{C0} | 1304.5 | 1311 | 1317.5 | nm | |
| Damage Threshold, each Lane | AOP _D | 5 | | | dBm | |
| Average Receive Power, each Lane | AOP _R | -5.9 | | 4 | dBm | |
| Receive Power (OMA _{outer}), each Lane | OMA _R | | | 4.2 | dBm | |
| Receiver Reflectance | RR | | | -26 | dB | |
| Receiver Sensitivity (OMA _{outer}), each Lane | SOMA | | | Max (-3.9, SECQ – 5.3) | dBm | 3 |
| Stressed Receiver Sensitivity (OMA _{outer}), each Lane | SRS | | | -1.9 | dBm | 4 |
| Conditions of Stressed Receiver Sensitivity Test | | | | | | |
| Stressed Eye Closure for PAM4 (SECQ), Lane Under Test | SECQ | | 3.4 | | dB | |
| SECQ – $10\log_{10}(C_{eq})$, Lane Under Test | C _{eq} | | | 3.4 | dB | |

Notes:

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength.
2. Transmitter reflectance is defined looking into the transmitter.
3. Receiver sensitivity (OMA_{outer}), each lane (max) is informative and is defined for a transmitter with a value of SECQ up to 3.4dB.
4. Measured with conformance test signal at TP3 for the BER = 2.4×10^{-4} .

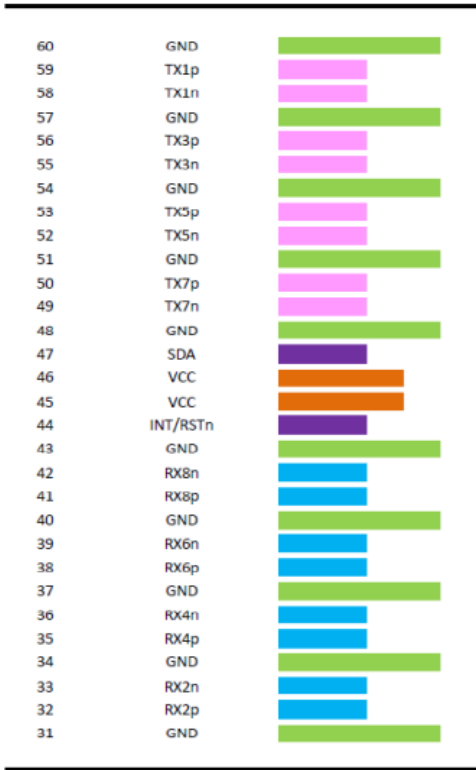
Pin Descriptions

| Pin | Logic | Symbol | Name/Description | Notes |
|-----|-------------|-----------|--------------------------------|-------|
| 1 | | GND | Module Ground. | |
| 2 | CML-I | Tx2+ | Transmitter Non-Inverted Data. | |
| 3 | CML-I | Tx2- | Transmitter Inverted Data. | |
| 4 | | GND | Module Ground. | |
| 5 | CML-I | Tx4+ | Transmitter Non-Inverted Data. | |
| 6 | CML-I | Tx4- | Transmitter Inverted Data. | |
| 7 | | GND | Module Ground. | |
| 8 | CML-I | Tx6+ | Transmitter Non-Inverted Data. | |
| 9 | CML-I | Tx6- | Transmitter Inverted Data. | |
| 10 | | GND | Module Ground. | |
| 11 | CML-I | Tx8+ | Transmitter Non-Inverted Data. | |
| 12 | CML-I | Tx8- | Transmitter Inverted Data. | |
| 13 | | GND | Module Ground. | |
| 14 | LVC MOS-I/O | SCL | 2-Wire Serial Interface Clock. | |
| 15 | | Vcc | +3.3V Power Supply. | |
| 16 | | Vcc | +3.3V Power Supply. | |
| 17 | Multi-Level | LPWn/PRSn | Low-Power Mode/Module Present. | |
| 18 | | GND | Module Ground. | |
| 19 | CML-O | Rx7- | Receiver Inverted Data. | |
| 20 | CML-O | Rx7+ | Receiver Non-Inverted Data. | |
| 21 | | GND | Module Ground. | |
| 22 | CML-O | Rx5- | Receiver Inverted Data. | |
| 23 | CML-O | Rx5+ | Receiver Non-Inverted Data. | |
| 24 | | GND | Module Ground. | |
| 25 | CML-O | Rx3- | Receiver Inverted Data. | |
| 26 | CML-O | Rx3+ | Receiver Non-Inverted Data. | |
| 27 | | GND | Module Ground. | |
| 28 | CML-O | Rx1- | Receiver Inverted Data. | |
| 29 | CML-O | Rx1+ | Receiver Non-Inverted Data. | |
| 30 | | GND | Module Ground. | |
| 31 | | GND | Module Ground. | |
| 32 | CML-O | Rx2+ | Receiver Non-Inverted Data. | |
| 33 | CML-O | Rx2- | Receiver Inverted Data. | |
| 34 | | GND | Module Ground. | |
| 35 | CML-O | Rx4+ | Receiver Non-Inverted Data. | |

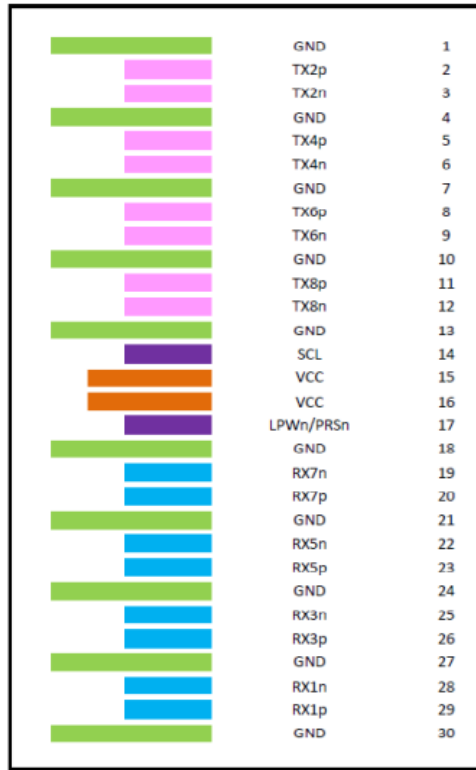
| | | | | |
|----|-------------|----------|--------------------------------|--|
| 36 | CML-O | Rx4- | Receiver Inverted Data. | |
| 37 | | GND | Module Ground. | |
| 38 | CML-O | Rx6+ | Receiver Non-Inverted Data. | |
| 39 | CML-O | Rx6- | Receiver Inverted Data. | |
| 40 | | GND | Module Ground. | |
| 41 | CML-O | Rx8+ | Receiver Non-Inverted Data. | |
| 42 | CML-O | Rx8- | Receiver Inverted Data. | |
| 43 | | GND | Module Ground. | |
| 44 | Multi-Level | INT/RSTn | Module Input/Module Reset. | |
| 45 | | Vcc | +3.3V Power Supply. | |
| 46 | | Vcc | +3.3V Power Supply. | |
| 47 | LVCNOS-I/O | SDA | 2-Wire Serial Interface Data. | |
| 48 | | GND | Module Ground. | |
| 49 | CML-I | Tx7- | Transmitter Inverted Data. | |
| 50 | CML-I | Tx7+ | Transmitter Non-Inverted Data. | |
| 51 | | GND | Module Ground. | |
| 52 | CML-I | Tx5- | Transmitter Inverted Data. | |
| 53 | CML-I | Tx5+ | Transmitter Non-Inverted Data. | |
| 54 | | GND | Module Ground. | |
| 55 | CML-I | Tx3- | Transmitter Inverted Data. | |
| 56 | CML-I | Tx3+ | Transmitter Non-Inverted Data. | |
| 57 | | GND | Module Ground. | |
| 58 | CML-I | Tx1- | Transmitter Inverted Data. | |
| 59 | CML-I | Tx1+ | Transmitter Non-Inverted Data. | |
| 60 | | GND | Module Ground. | |

Electrical Pad Layout

Top Side (viewed from top)

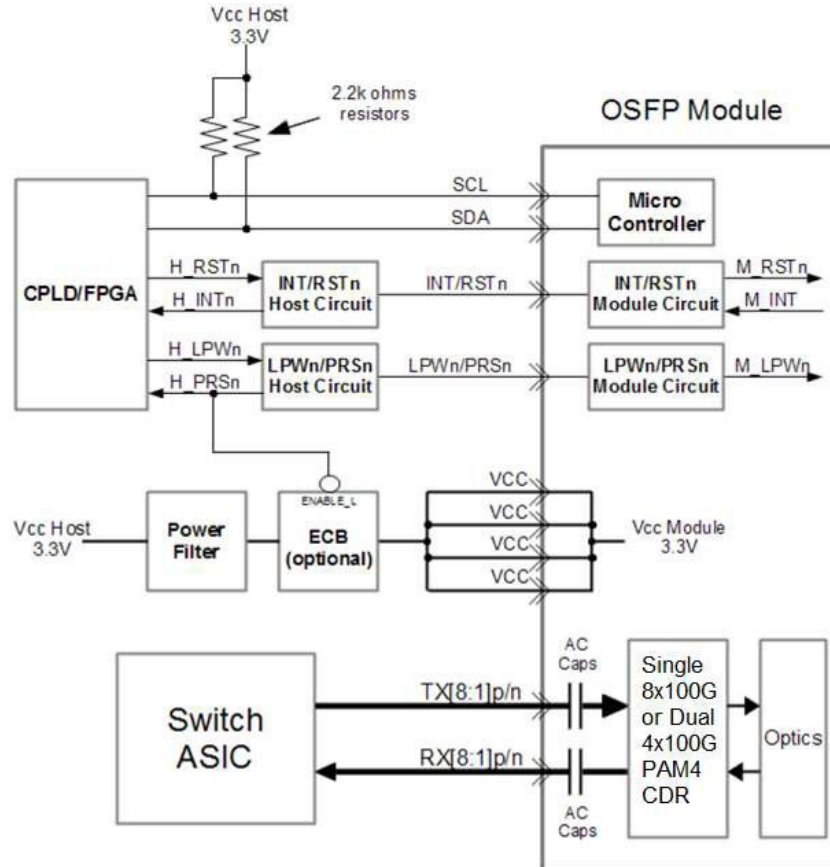


Bottom Side (viewed from bottom)

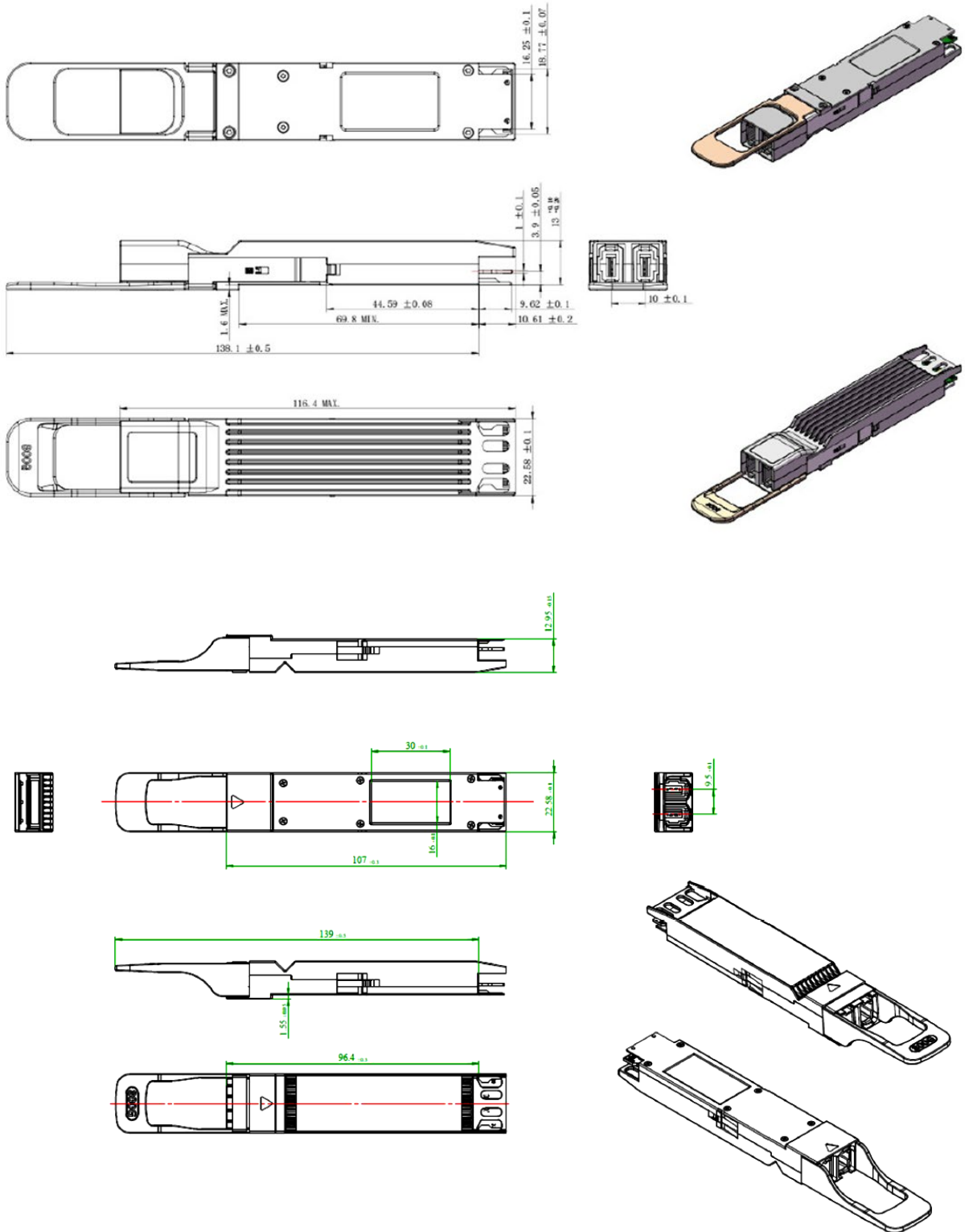


----- Module Card Edge -----

Recommended OSFP Host board Schematic



Mechanical Specifications



*Note: Both Heat Sink Exposed and Heat Sink Enclosed styles are OSFP Type 2 Compliant. Images are for Illustration purposes only. Product Labels, colors, and style may vary.

About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is engrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



U.S. Headquarters

Email: sales@addonnetworks.com

Telephone: +1 877.292.1701

Fax: 949.266.9273

Europe Headquarters

Email: salesupportemea@addonnetworks.com

Telephone: +44 1285 842070