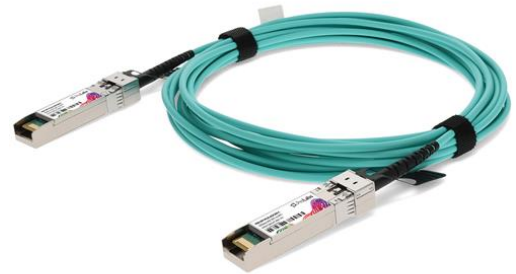


### **PAN-SFP-PLUS-AOC2M-C**

Palo Alto Networks® PAN-SFP-PLUS-AOC2M Compatible 10GBase-AOC SFP+ to SFP+ Active Optical (850nm, MMF, 2m)

#### **Features:**

- High Speed/ High Density: Supports up to 10Gbps bi-directional operation
- Compliant to SFP MSA Standards
- Reliable VCSEL and PIN photonic devices
- I2C Standard Management Interface
- Excellent High Speed Signal Interface
- Operating Temperature: 0 to 70 Celsius
- RoHS Compliant and Lead-Free



#### **Applications:**

- 10G Ethernet
- High Performance Computing, Server, and Data Storage

#### **Product Description**

This is a Palo Alto Networks® PAN-SFP-PLUS-AOC2M Compatible 10GBase-AOC SFP+ to SFP+ active optical cable that operates over active fiber with a maximum reach of 2m. It has been programmed, uniquely serialized, and data-traffic and application tested to ensure it is 100% compliant and functional. We stand behind the quality of our products and proudly offer a limited lifetime warranty. This cable is TAA (Trade Agreements Act) compliant and is built to comply with MSA (Multi-Source Agreement) standards.

ProLabs' 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 |
|------------------------|--------|------|------|------|------|-------|
| Storage Temperature    | Tstg   | -40  |      | 85   | °C   |       |
| Operating Temperature  | Tc     | 0    | 25   | 70   | °C   |       |
| Relative Humidity      | RH     | 5    |      | 85   | %    |       |
| Maximum Supply Voltage | Vcc    | 0    |      | 3.6  | V    |       |
| Data Rate              |        |      | 10.3 |      | Gbps |       |

### Electrical Characteristics

| Parameter                        | Symbol | Min.  | Typ. | Max.  | Unit | Notes |
|----------------------------------|--------|-------|------|-------|------|-------|
| Supply Voltage                   | Vcc    | 3.135 | 3.3  | 3.465 | V    |       |
| +3.3V Supply Current             | Icc    |       |      | 290   | mA   |       |
| Transmitter Fault (Tx_Fault)     | VOH    | 2.0   |      | Vcc   | V    | 1     |
| Loss of Signal (LOS)             | VOL    | 0     |      | 0.8   | V    | 1     |
| Transmitter Disable (Tx_Disable) | VIH    | 2.0   |      | Vcc   | V    | 2     |
| MOD_DEF1, MOD_DEF2               | VIL    | 0     |      | 0.8   | V    | 2     |
| Clock Rate-I2C                   |        |       |      |       |      | 3     |

#### Notes:

1. For all control input pins: Tx\_Disable.
2. For all status output pins: Rx\_LOS, Tx\_Fault.
3. For the management interface.

## Optical Characteristics

| Parameter                                     | Symbol | Min. | Typ. | Max. | Unit     | Notes |
|---|--------|------|------|------|----------|-------|
| <b>Transmitter</b>                            |        |      |      |      |          |       |
| Reference Differential Input Impedance        | ZD     |      | 100  |      | $\Omega$ | 1     |
| Signal Speed                                  |        |      | 10.3 |      | Gbps     | 2     |
| Differential Data Input Swing                 | VIN,pp | 180  |      | 700  | mV       |       |
| <b>Receiver</b>                               |        |      |      |      |          |       |
| Reference Differential Input Impedance        | ZD     |      | 100  |      | $\Omega$ | 1     |
| Signal Speed                                  |        |      | 10.3 |      | Gbps     | 2     |
| Differential Data Output Swing                |        | 150  |      | 850  | mV       |       |
| Differential Data Output Swing When Squelched |        |      |      | 50   | mV       |       |
| Rise/Fall Time (20-80%)                       |        | 24   |      |      | ps       |       |

### Notes:

1. AC coupled inside the AOC module.
2. Tested with PRBS  $2^{31}-1$  and BER: $10^{-12}$ .

## Pin Descriptions

| Pin | Symbol     | Name/Description  | Notes |
|-----|------------|---|-------|
| 1   | VeeT       | Transmitter Ground.   | 1     |
| 2   | Tx_Fault   | Transmitter Fault (LVTTL-O). "High" indicates a fault condition.          | 2     |
| 3   | Tx_Disable | Transmitter Disable (LVTTL-I). "High" or "open" disables the transmitter. | 3     |
| 4   | SDA        | 2-Wire Serial Interface Data Line. LVCMOS-I/O. MOD_DEF2.                  | 4     |
| 5   | SCL        | 2-Wire Serial Interface Clock Line. LVCMOS-I/O. MOD_DEF1.                 | 4     |
| 6   | MOD_ABS    | Module Absent (Output). Connected to the VeeT or VeeR in the module.      | 5     |
| 7   | RS0        | Rate Select 0. Not Used. Presents high input impedance.                   |       |
| 8   | Rx_LOS     | Receiver Loss of Signal. LVTTL-O.   | 2     |
| 9   | RS1        | Rate Select 1. Not Used. Presents high input impedance.                   |       |
| 10  | VeeR       | Receiver Ground.  | 1     |
| 11  | VeeR       | Receiver Ground.  | 1     |
| 12  | RD-        | Inverse Received Data Out (CML-O).  |       |
| 13  | RD+        | Received Data Out (CML-O).  |       |
| 14  | VeeR       | Receiver Ground.  |       |
| 15  | VccR       | +3.3V Receiver Power.   |       |
| 16  | VccT       | +3.3V Transmitter Power.  |       |
| 17  | VeeT       | Transmitter Ground.   | 1     |
| 18  | TD+        | Transmitter Data In (CML-I).  |       |
| 19  | TD-        | Inverse Transmitter Data In (CML-I).                                      |       |
| 20  | VeeT       | Transmitter Ground.   | 1     |

### Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that, on the host board, requires a 4.7k $\Omega$  to 10k $\Omega$  pull-up resistor to the Host\_Vcc.
3. This input is internally biased "high" with a 4.7k $\Omega$  to 10k $\Omega$  pull-up resistor to the VccT.
4. 2-Wire Serial Interface Clock and Data Lines require an external pull-up resistor dependent on the capacitance load.
5. This is a ground return that, on the host board, requires a 4.7k $\Omega$  to 10k $\Omega$  pull-up resistor to the Host\_Vcc.

## Pin-Out Connectors



## Application Interface Circuit



Mechanical Specifications



| Parameter                               | Symbol | Min. | Typ. | Max. | Unit   | Notes |
|---|--------|------|------|------|--------|-------|
| Module Retention                        |        | 90   |      | 170  | N      |       |
| Module Insertion                        |        | 0    |      | 18   | N      |       |
| Module Extraction                       |        | 0    |      | 25   | N      |       |
| Cable Pull Strength – Apply Load at 0°  |        | 25   |      |      | N      |       |
| Cable Pull Strength – Apply Load at 90° |        | 20   |      |      | N      |       |
| Cable Bending Radius                    |        | 50   |      |      | mm     |       |
| Insertion/Removal Cycles                |        | 50   |      |      | Cycles |       |

## 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.



## Contact Information

ProLabs US

Email: [sales@prolabs.com](mailto:sales@prolabs.com)

Telephone: 952-852-0252

ProLabs UK

Email: [salesupport@prolabs.com](mailto:salesupport@prolabs.com)

Telephone: +44 1285 719 600