



## PAN-QSFP-AOC-10M-SKY

Palo Alto Networks® Compatible 40GBase-AOC QSFP+ Active Optical Cable (850nm, MMF, 10m)

### Product Description

This is a Palo Alto Networks® compatible 40GBase-AOC QSFP+ to QSFP+ active optical cable that operates over multi-mode fiber with a maximum reach of 10.0m (32.8ft). At a wavelength of 850nm, it has been programmed, uniquely serialized, and data-traffic and application tested to ensure it is 100% compliant and functional. This active optical cable is built to comply with MSA (Multi-Source Agreement) standards. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

### Features:

- Support up to 4x10 Gbps bi-directional operation
- Compliant to the IEEE802.3ba
- SFF-8436 QSFP+ compliant
- Reliable VCSEL and PIN photonic devices
- I2C standard management interface
- Automatic power down while broken cable is detected to improve eye safety
- Low power consumption
- Excellent high speed signal integrity
- RoHS Compliant and Lead-Free
- Operating Case Temperature 0 to 70 Celsius



### Applications:

- 10G/40GBase Ethernet
- High performance computing, server and data storage
- Proprietary high speed, high density data

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*For your product safety, please read the following information carefully before any manipulation of the transceiver:*



#### **ESD**

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



#### **LASER SAFETY**

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

*The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.*

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### Absolute Maximum Ratings

| Parameter                  | Symbol           | Min. | Typ.   | Max. | Unit |
|----------------------------|------------------|------|--------|------|------|
| Supply Voltage             | V <sub>CC</sub>  | -0.5 |        | 3.6  | V    |
| Storage Temperature        | T <sub>stg</sub> | -40  |        | 85   | °C   |
| Operating Case Temperature | T <sub>c</sub>   | 0    | 25     | 70   | °C   |
| Relative Humidity          | RH               | 5    |        | 85   | %    |
| Data Rate Per Channel      |                  |      | 4*10.3 |      | Gbps |

### Electrical Specifications

| Parameter           | Symbol            | Min.  | Typ. | Max.  | Unit | Notes |
|---------------------|-------------------|-------|------|-------|------|-------|
| Supply Voltage      | V <sub>CC</sub>   | 3.135 | 3.3  | 3.465 | V    |       |
| Supply Current      | I <sub>CC</sub>   |       |      | 400   | mA   |       |
| Power Dissipation   | P <sub>DISS</sub> |       |      | 1500  | mW   |       |
| Clock Rate - I2C    |                   |       |      | 400   | KHz  | 1     |
| Module Turn-on time |                   |       |      | 2000  | ms   | 2     |

#### Notes:

1. For the management interface.
2. Time from module power-on/insertion/ResetL de-assert to module fully functional.

## Optical Characteristics

| Parameter                                     | Symbol  | Min. | Typ.   | Max. | Unit | Notes |
|-----------------------------------------------|---------|------|--------|------|------|-------|
| <b>Transmitter</b>                            |         |      |        |      |      |       |
| Reference Differential Input                  | Zd      |      | 100    |      | Ω    | 1     |
| Optical Return Loss Tolerance                 |         |      |        | 12   | dB   |       |
| Differential Data Input Swing                 | VIN,pp  | 180  |        | 1200 | mV   |       |
| Differential Data Input Threshold             |         |      | 50     |      | mV   | 2     |
| <b>Receiver</b>                               |         |      |        |      |      |       |
| Reference Differential Input Impedance        | Zd      |      | 100    |      | Ω    | 1     |
| Differential Data Output Swing                | VOUT,pp | 0    |        | 800  | mV   |       |
| Pre-Emphasis Pulse Amplitude Percentage       |         | 0    |        |      | %    | 4     |
|                                               |         | 10   |        |      | %    |       |
|                                               |         | 20   |        |      | %    |       |
|                                               |         | 40   |        |      | %    |       |
| Pre-Emphasis Pulse Duration                   |         |      | 30     |      | ps   |       |
| Signal Speed                                  |         |      | 4*10.3 |      | Gbps |       |
| 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. Input swing to trigger Tx-squelch.
3. User selectable. Percentage is the ratio of pre-emphasis amplitude to output swing. Users could change by writing to page 3 address 237, default value is "10."

## Pin Descriptions

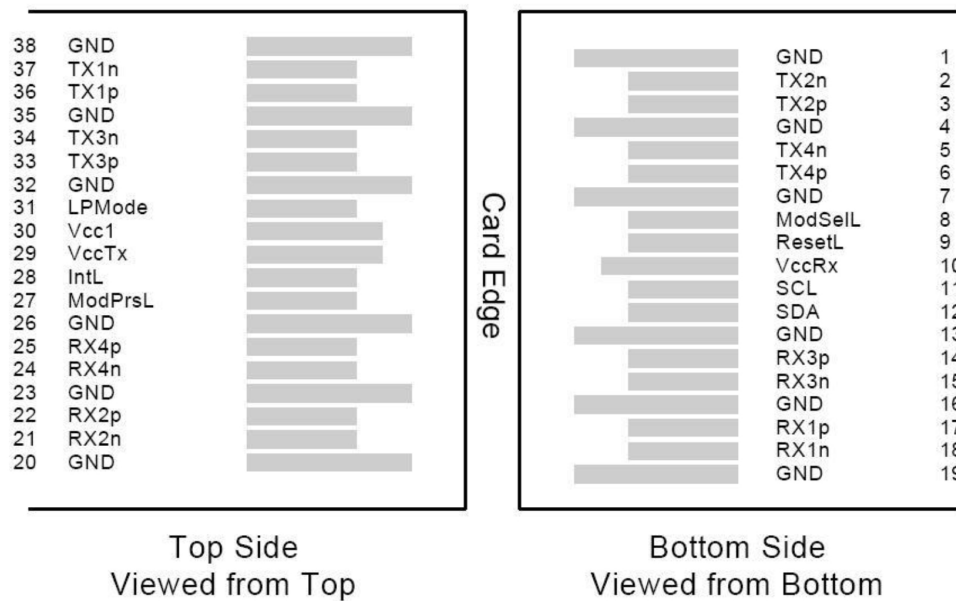
| Pin | Logic       | Symbol  | Name/Description                                        | Note |
|-----|-------------|---------|---------------------------------------------------------|------|
| 1   |             | GND     | Module Ground.                                          | 1    |
| 2   | CML-I       | Tx2-    | Transmitter Inverted Data Input.                        |      |
| 3   | CML-I       | Tx2+    | Transmitter Non-Inverted Data Input.                    |      |
| 4   |             | GND     | Module Ground.                                          | 1    |
| 5   | CML-I       | Tx4-    | Transmitter Inverted Data Input.                        |      |
| 6   | CML-I       | Tx4+    | Transmitter Non-Inverted Data Input.                    |      |
| 7   |             | GND     | Module Ground.                                          | 1    |
| 8   | LVTTL-I     | ModSelL | Module Select.                                          | 2    |
| 9   | LVTTL-I     | ResetL  | Module Reset.                                           | 2    |
| 10  |             | VccRx   | +3.3V Receiver Power Supply.                            |      |
| 11  | LVC MOS-I/O | SCL     | 2-Wire Serial Interface Clock.                          | 2    |
| 12  | LVC MOS-I/O | SDA     | 2-Wire Serial Interface Data.                           | 2    |
| 13  |             | GND     | Module Ground.                                          | 1    |
| 14  | CML-O       | Rx3+    | Receiver Non-Inverted Data Output.                      |      |
| 15  | CML-O       | Rx3-    | Receiver Inverted Data Output.                          |      |
| 16  |             | GND     | Module Ground.                                          | 1    |
| 17  | CML-O       | Rx1+    | Receiver Non-Inverted Data Output.                      |      |
| 18  | CML-O       | Rx1-    | Receiver Inverted Data Output.                          |      |
| 19  |             | GND     | Module Ground.                                          | 1    |
| 20  |             | GND     | Module Ground.                                          | 1    |
| 21  | CML-O       | Rx2-    | Receiver Inverted Data Output.                          |      |
| 22  | CML-O       | Rx2+    | Receiver Non-Inverted Data Output.                      |      |
| 23  |             | GND     | Module Ground.                                          | 1    |
| 24  | CML-O       | Rx4-    | Receiver Inverted Data Output.                          |      |
| 25  | CML-O       | Rx4+    | Receiver Non-Inverted Data Output.                      |      |
| 26  |             | GND     | Module Ground.                                          | 1    |
| 27  | LVTTL-O     | ModPrsL | Module Present. Internally pulled down to the GND.      |      |
| 28  | LVTTL-O     | IntL    | Interrupt output should be pulled up on the host board. | 2    |
| 29  |             | VccTx   | +3.3V Transmitter Power Supply.                         |      |
| 30  |             | Vcc1    | +3.3V Power Supply.                                     |      |
| 31  | LVTTL-I     | LPMode  | Low-Power Mode.                                         | 2    |
| 32  |             | GND     | Module Ground.                                          | 1    |
| 33  | CML-I       | Tx3+    | Transmitter Non-Inverted Data Input.                    |      |
| 34  | CML-I       | Tx3-    | Transmitter Inverted Data Input.                        |      |
| 35  |             | GND     | Module Ground.                                          | 1    |

|    |       |      |                                      |  |
|----|-------|------|--------------------------------------|--|
| 36 | CML-I | Tx1+ | Transmitter Non-Inverted Data Input. |  |
| 37 | CML-I | Tx1- | Transmitter Inverted Data Input.     |  |

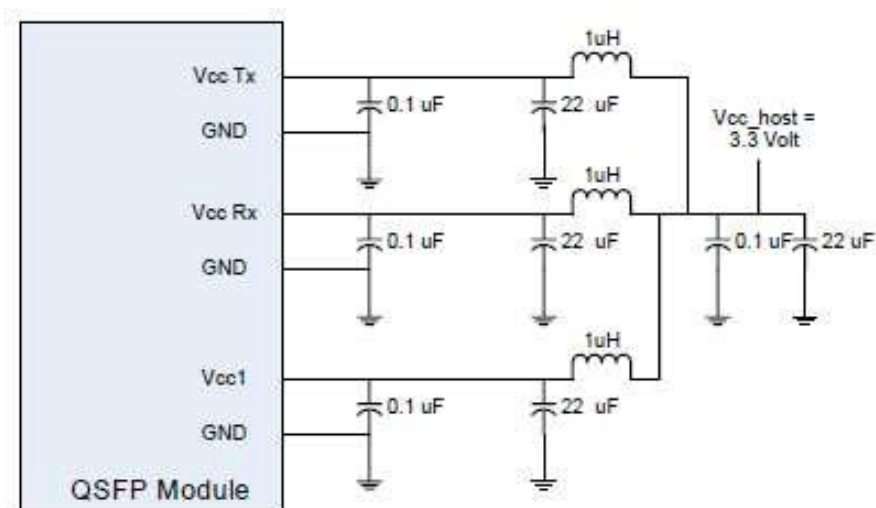
#### Notes:

1. GND is the symbol for signal and supply (power). Connect these directly to the host board signal common ground plane.
2. VccRx, Vcc1, and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. VccRx, Vcc1, and VccTx may be internally connected within the QSFP+. The connector pins are each rated for a maximum current of 500mA.

#### Pin Assignment and Pin Description

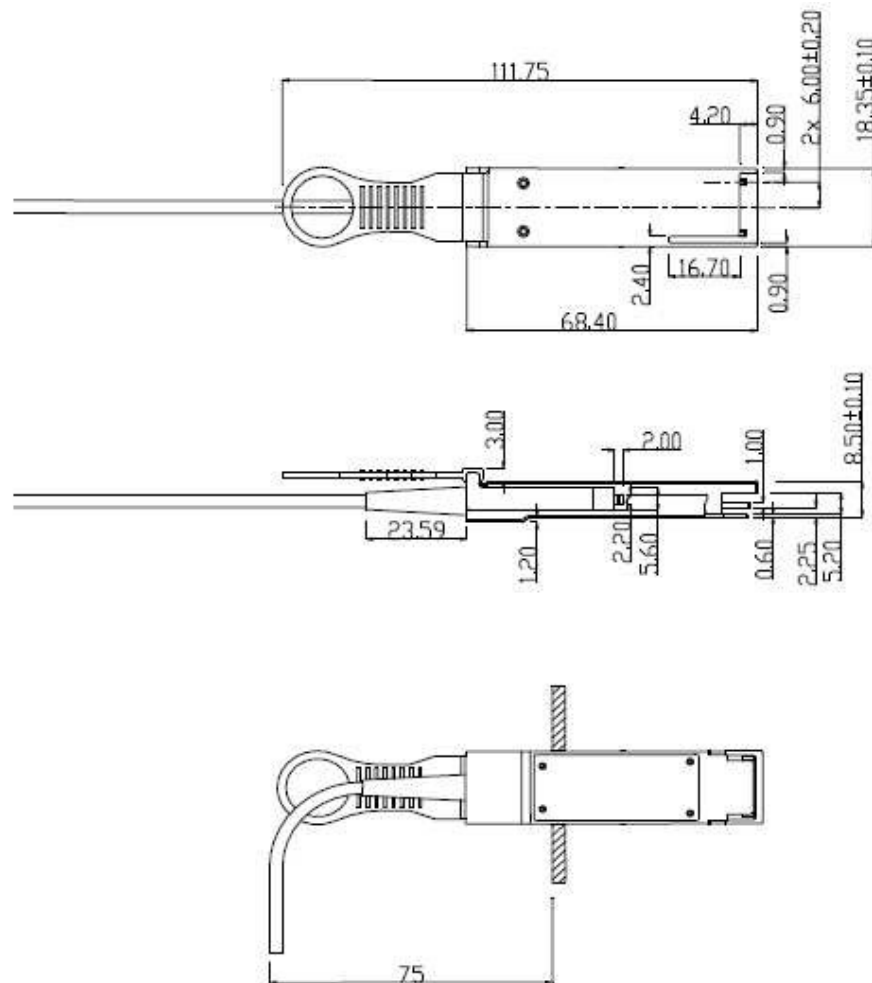


#### Recommended Application Interface Circuit



## Mechanical Specifications

| Parameter                               | Symbol | Min.   | Typ. | Max.   | Unit   | Notes |
|-----------------------------------------|--------|--------|------|--------|--------|-------|
| AOC Cable Length (L<5m)                 | L      | L-0.06 | L    | L+0.06 | M      |       |
| Module Retention                        |        | 90     |      | 170    | N      |       |
| Module Insertion                        |        | 0      |      | 18     | N      |       |
| Module Extraction                       |        | 0      |      | 25     | N      |       |
| Cable Pull Strength – Apply Load at 0°  |        | 44     |      |        | N      |       |
| Cable Pull Strength – Apply Load at 90° |        | 33     |      |        | N      |       |
| Clearance Out of IO Bezel               |        | 75     |      |        | mm     |       |
| Cable Bending Radius                    |        | 3      |      |        | cm     |       |
| Insertion/Removal Cycles                |        | 50     |      |        | Cycles |       |



Clearance 75mm Is Required.

Cable Type: Low Smoke Zero Halogen

# About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

