



### **OSFP-2QSFP56-ADAC4M-OPC**

MSA and TAA 400GBase-CU OSFP to 2xQSFP56 Direct Attach Cable Direct Attach Cable (Active Twinax, 4m)

#### **Features**

- OSFP MSA and QSFP MSA Compliant
- Infiniband HDR Compatible
- Transmission Data Rate Up to 53.125Gbps Per Channel
- Enable 400Gbps to 2x200Gbps Transmission
- Low Latency: 10ps
- Operating Temperature Range: 0 to 70 Celsius
- RoHS Compliant and Lead-Free



#### **Applications:**

- 400GBase Ethernet

#### **Product Description**

This is an MSA Compliant compatible 400GBase-CU OSFP to 2xQSFP56 direct attach cable that operates over active copper with a maximum reach of 4m. It has been programmed, uniquely serialized, and data-traffic and application tested to ensure it is 100% compliant and functional. This direct attach cable is TAA (Trade Agreements Act) compliant, and 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.

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

## Absolute Maximum Ratings

| Parameter                  | Symbol | Min. | Typ. | Max. | Unit |
|----------------------------|--------|------|------|------|------|
| Supply Voltage             | Vcc    | -0.3 | 3.3  | 3.47 | V    |
| Storage Temperature        | Tstg   | -40  |      | 85   | °C   |
| Operating Case Temperature | Tc     | 0    |      | 70   | °C   |
| Relative Humidity          | RH     | 5    |      | 85   | %    |
| Data Rate                  |        |      | 400  |      | Gbps |

## Electrical Specifications

| Parameter                                   | Symbol      | Min.                                                                                                                                                                  | Typ. | Max.                 | Unit  |
|---------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------|-------|
| Power Supply Voltage                        | Vcc         | 3.1                                                                                                                                                                   | 3.3  | 3.5                  | V     |
| Input Amplitude                             |             | 800                                                                                                                                                                   |      | 1200                 | mVp-p |
| Input Low Voltage                           | VIL         | -0.3                                                                                                                                                                  |      | 0.35*Vcc             |       |
| Input High Voltage                          | VIH         | 0.65*Vcc                                                                                                                                                              |      | Vcc+0.3              |       |
| Output Logic Low                            | VOL         |                                                                                                                                                                       |      | 0.25*Vcc             |       |
| I2C Master Mode Output Frequency            |             |                                                                                                                                                                       | 400  |                      | kHz   |
| 400G End Power Consumption                  |             |                                                                                                                                                                       | 1.2  | 1.5                  | W     |
| 200G End Power Consumption                  |             |                                                                                                                                                                       | 0.6  | 0.7                  | W     |
| Raw Cable Impedance                         | Zca         | 90                                                                                                                                                                    | 100  | 110                  | Ω     |
| Mated Connector Impedance                   | Zmated      | 85                                                                                                                                                                    | 100  | 115                  | Ω     |
| Insertion Loss @13.28GHz                    | SDD21       | 6                                                                                                                                                                     |      | 14                   | dB    |
| Return Loss                                 | SDD11/22    | $\text{Return\_loss}(f) \geq \begin{cases} 11 & 0.05 \leq f < 26.5625/7.5 \\ 6.0-9.2\lg(15f/5.5*7.5/26.5625) & 26.5625/7.5 \leq f \leq 26.5 \end{cases}$              |      |                      | dB    |
| Differential to Common-Mode Return Loss     | SCD11/22    | $\text{Return\_loss}(f) \geq \begin{cases} -25+(20/26.5625)f & 0.05 \leq f < 26.5625/2 \\ -18+(6/26.5625) & 26.5625 \leq f \leq 26.5625 \end{cases}$                  |      |                      | dB    |
| Differential to Common-Mode Conversion Loss | SCD21-SDD21 | $\text{Conversion\_loss}(f) - \text{IL}(f) \geq \begin{cases} 10 & 0.01 \leq f < 12.89 \\ 27-(29/22)f & 12.89 \leq f < 15.7 \\ 6.3 & 15.7 \leq f \leq 19 \end{cases}$ |      |                      | dB    |
| Minimum COM                                 | COM         | 3                                                                                                                                                                     |      |                      | dB    |
| BER                                         |             |                                                                                                                                                                       |      | 2.4x10 <sup>-4</sup> |       |

## Physical Characteristics

| Parameter       | Symbol | Min.                      | Typ. | Max. | Unit |
|-----------------|--------|---------------------------|------|------|------|
| Length          | L      |                           | 4    |      | M    |
| Wire Gauge      |        |                           | 30   |      | AWG  |
| Jacket Material |        | Plastic Braided Mesh, Red |      |      |      |

## Pin Descriptions (OSFP End)

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

|    |          |                                |             |   |                 |   |
|----|----------|--------------------------------|-------------|---|-----------------|---|
| 36 | Rx4-     | Receiver Data Inverted.        | CML-O       | 3 | Output to Host  |   |
| 37 | GND      | Module Ground.                 |             | 1 |                 |   |
| 38 | Rx6+     | Receiver Data Non-Inverted.    | CML-O       | 3 | Output to Host  |   |
| 39 | Rx6-     | Receiver Data Inverted.        | CML-O       | 3 | Output to Host  |   |
| 40 | GND      | Module Ground.                 |             | 1 |                 |   |
| 41 | Rx8+     | Receiver Data Non-Inverted.    | CML-O       | 3 | Output to Host  |   |
| 42 | Rx8-     | Receiver Data Inverted.        | CML-O       | 3 | Output to Host  |   |
| 43 | GND      | Module Ground.                 |             | 1 |                 |   |
| 44 | INT/RSTn | Module Interrupt/Module Reset. | Multi-Level | 3 | Bi-Directional  | 2 |
| 45 | Vcc      | +3.3V Power.                   |             | 2 | Power from Host |   |
| 46 | Vcc      | +3.3V Power.                   |             | 2 | Power from Host |   |
| 47 | SDA      | 2-Wire Serial Interface Data.  | LVC MOS-I/O | 3 | Bi-Directional  | 1 |
| 48 | GND      | Module Ground.                 |             | 1 |                 |   |
| 49 | Tx7-     | Transmitter Data Inverted.     | CML-I       | 3 | Input from Host |   |
| 50 | Tx7+     | Transmitter Data Non-Inverted. | CML-I       | 3 | Input from Host |   |
| 51 | GND      | Module Ground.                 |             | 1 |                 |   |
| 52 | Tx5-     | Transmitter Data Inverted.     | CML-I       | 3 | Input from Host |   |
| 53 | Tx5+     | Transmitter Data Non-Inverted. | CML-I       | 3 | Input from Host |   |
| 54 | GND      | Module Ground.                 |             | 1 |                 |   |
| 55 | Tx3-     | Transmitter Data Inverted.     | CML-I       | 3 | Input from Host |   |
| 56 | Tx3+     | Transmitter Data Non-Inverted. | CML-I       | 3 | Input from Host |   |
| 57 | GND      | Module Ground.                 |             | 1 |                 |   |
| 58 | Tx1-     | Transmitter Data Inverted.     | CML-I       | 3 | Input from Host |   |
| 59 | Tx1+     | Transmitter Data Non-Inverted. | CML-I       | 3 | Input from Host |   |
| 60 | GND      | Module Ground.                 |             | 1 |                 |   |

**Notes:**

1. Open-drain with pull-up resistor on the host.
2. See pin assignments below for the required circuit.

Electrical Pin-Out Details - OSFP

Top Side (viewed from top)

|    |          |  |
|----|----------|--|
| 60 | GND      |  |
| 59 | TX1p     |  |
| 58 | TX1n     |  |
| 57 | GND      |  |
| 56 | TX3p     |  |
| 55 | TX3n     |  |
| 54 | GND      |  |
| 53 | TX5p     |  |
| 52 | TX5n     |  |
| 51 | GND      |  |
| 50 | TX7p     |  |
| 49 | TX7n     |  |
| 48 | GND      |  |
| 47 | SDA      |  |
| 46 | VCC      |  |
| 45 | VCC      |  |
| 44 | INT/RSTn |  |
| 43 | GND      |  |
| 42 | RX8n     |  |
| 41 | RX8p     |  |
| 40 | GND      |  |
| 39 | RX6n     |  |
| 38 | RX6p     |  |
| 37 | GND      |  |
| 36 | RX4n     |  |
| 35 | RX4p     |  |
| 34 | GND      |  |
| 33 | RX2n     |  |
| 32 | RX2p     |  |
| 31 | GND      |  |

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Module Card Edge  
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Bottom Side (viewed from bottom)

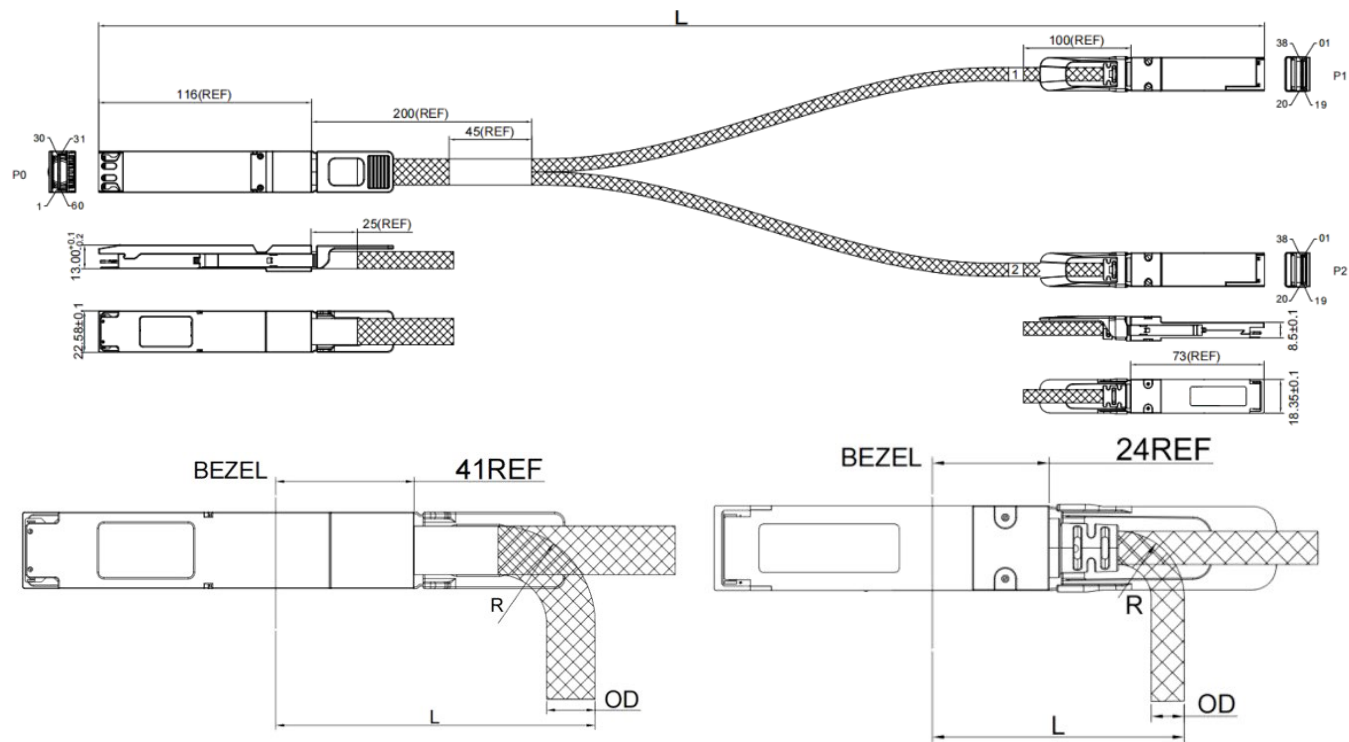
|  |           |    |
|--|-----------|----|
|  | GND       | 1  |
|  | TX2p      | 2  |
|  | TX2n      | 3  |
|  | GND       | 4  |
|  | TX4p      | 5  |
|  | TX4n      | 6  |
|  | GND       | 7  |
|  | TX6p      | 8  |
|  | TX6n      | 9  |
|  | GND       | 10 |
|  | TX8p      | 11 |
|  | TX8n      | 12 |
|  | GND       | 13 |
|  | SCL       | 14 |
|  | VCC       | 15 |
|  | VCC       | 16 |
|  | LPWn/PRSn | 17 |
|  | GND       | 18 |
|  | RX7n      | 19 |
|  | RX7p      | 20 |
|  | GND       | 21 |
|  | RX5n      | 22 |
|  | RX5p      | 23 |
|  | GND       | 24 |
|  | RX3n      | 25 |
|  | RX3p      | 26 |
|  | GND       | 27 |
|  | RX1n      | 28 |
|  | RX1p      | 29 |
|  | GND       | 30 |

## Pin Descriptions (QSFP End)

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



Mechanical Specifications



| OSFP  |       |                 |                      | QSFP  |       |                 |                      |
|-------|-------|-----------------|----------------------|-------|-------|-----------------|----------------------|
| Gauge | OD    | Bend Radius "R" | Min. Bend Radius "L" | Gauge | OD    | Bend Radius "R" | Min. Bend Radius "L" |
| 30AWG | 9.5MM | 18MM            | 60MM                 | 30AWG | 5.7MM | 12MM            | 46MM                 |



## **OptioConnect**

### **Innovation for the Future of High-Speed Networking**

#### **Who We Are**

OptioConnect is reshaping the landscape of communication and high-speed networking through intelligent technology. With a core focus on cutting edge technology, we deliver smarter fiber optic solutions for enterprise networks, data centers, and next-gen telecom infrastructures.

#### **What We Do**

At OptioConnect, we fuse advanced engineering with intelligent automation to drive the future of networking. Our AI-integrated solutions are designed to optimize performance and streamline operations with:

- Superior Performance
- Network and traffic optimization
- Intelligent energy management
- Seamless OEM compatibility
- Scalable cost-efficiency

#### **Smarter Networks by Design**

Innovation isn't just a goal—it's our process. We embed AI and machine learning across our R&D and product lines, enabling adaptive performance, automated tuning, and faster deployment cycles. The result? Networks that don't just work—they learn, evolve, and outperform.

#### **Our Team**

Our engineers, data scientists, and network architects bring decades of experience and a future-focused mindset. We provide hands-on support with intelligent insights that turn complex challenges into simple solutions.

#### **Our Mission**

To deliver AI-enhanced connectivity that reduces cost, increases speed, and maximizes efficiency—empowering our partners to operate at the forefront of a rapidly evolving digital world.

#### **Let's Connect**

Discover how OptioConnect's intelligent infrastructure solutions can power your network's next leap forward.

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