

100G QSFP28 Immersion Cooling Extender

FSQE-PC101-DXX

Features

- Compliant QSFP MSA
- Typical insertion loss less 5dB@12.89GHz
- 100ohm differential impedance system
- 3.3V power supply
- I2C R/W function
- Status indicators with LED
- Low EMI radiation and crosstalk
- RoHS 6 compliant(lead free)



Applications

- Extend 100G/40G transceiver/AOC for liquid immersion link environment
- Protect device QSFP SMT connector
- provide I2C R/W and some status indicators with LED

Description

FIBERSTAMP can offer rich experience of immersion solution, that includes different form and speed transceivers/AOC product. FIBERSTAMP 100G QSFP28 immersion cooling extender (FSQE-PC101-DXX) is an important part of liquid immersion solution, normal QSFP form transceiver/AOC can be used for immersion environment with this product. This product include extender cage, cable, QSFP housing three parts, the cable length can be customized no more than 0.5m for extension, that can avoid the optical lens/engine/interface exposure to the liquid indirectly.

In addition, this product can provide I2C read/write, also can show the status indicators with LED for low speed electrical hardware pins. When insertion and removal frequently, this product can effectively protect the QSFP SMT connector of switch/NIC.

Liquid cooling Advantage

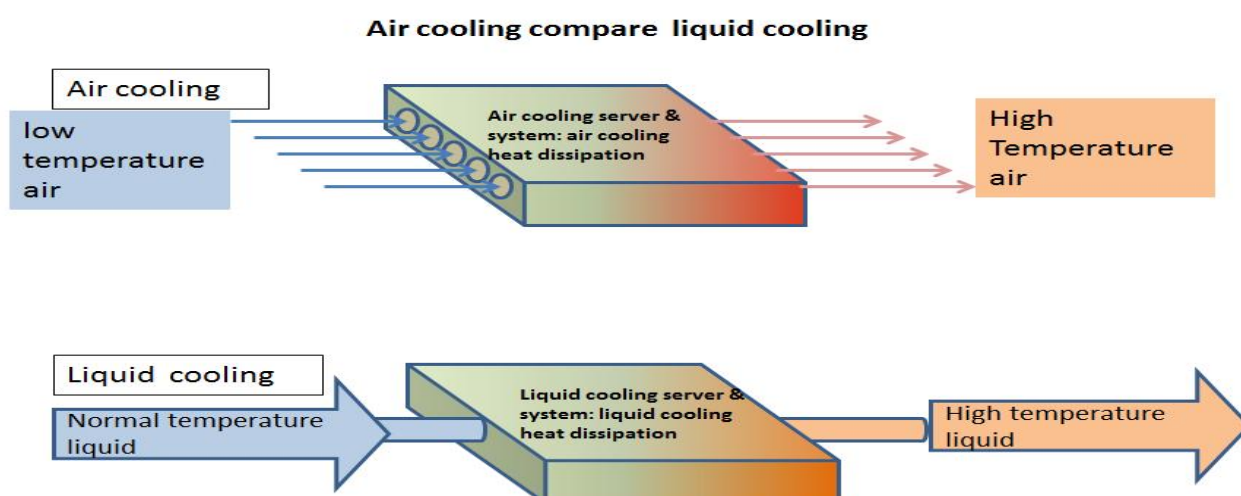


Figure 1. Liquid cooling advantage



As the requirement of data traffic keeping growth and the heat flux emitted by data center internal chips increases constantly, traditional air cooling methods are under pressure. Liquid cooling technologies removes the heat more efficiently with dielectric fluids that have high heat capacity to improve the efficiency of energy in data center.

FIBERSTAMP solved the lack of optical transceivers which perform reliability in immersion even liquid immersion depth up to 10m, the Liquid cooling optical series transceiver is suitable for liquid cooling server & system, this series product are compatible with fluorinated liquid and mineral oils well.

Immersion cooling extender can also be a important role in liquid immersion solution, existing normal QSFP form transceiver/AOC can be adapted for immersion indirectly.

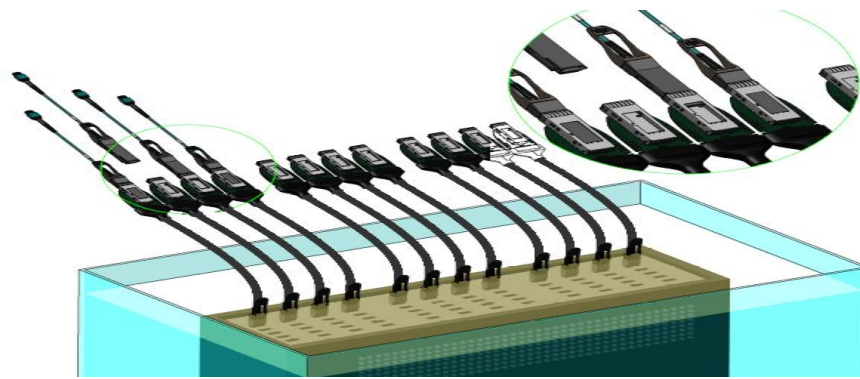


Figure 2.QSFP28 immersion cooling extender under liquid

Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Unit |
|----------------------------|----------------|-----|-----|------|
| Storage Temperature | T _s | -20 | 85 | °C |
| Case Operating Temperature | T _c | 0 | 70 | °C |
| Humidity (non-condensing) | Rh | 5 | 95 | % |

Recommended Operating Conditions

| Parameter | Symbol | Min | Typical | Max | Unit |
|----------------------------|----------------|-----|---------|-----|---------|
| Operating Case Temperature | T _c | -20 | | 70 | °C |
| Baud Rate per Lane | fd | | 25.78 | | GBaud/s |
| Humidity | Rh | 5 | | 85 | % |

Main Part assembly

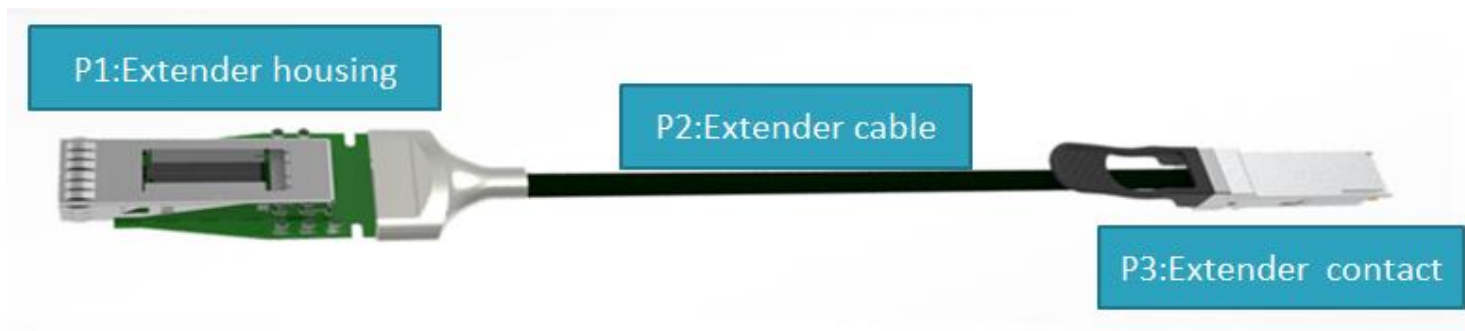


Figure 3.QSFP28 extender main part assembly



Extender contact Pin Description

| Pin | Logic | Symbol | Name/Description |
|-----|------------|---------|--|
| 1 | | GND | Module Ground ^{Note5} |
| 2 | CML-I | Tx2- | Transmitter inverted data input |
| 3 | CML-I | Tx2+ | Transmitter non-inverted data input |
| 4 | | GND | Module Ground ^{Note5} |
| 5 | CML-I | Tx4- | Transmitter inverted data input |
| 6 | CML-I | Tx4+ | Transmitter non-inverted data input |
| 7 | | GND | Module Ground ^{Note5} |
| 8 | LVTTTL-I | MODSEIL | Module Select ^{Note6} |
| 9 | LVTTTL-I | ResetL | Module Reset ^{Note6} |
| 10 | | VCCRx | +3.3V Power Supply |
| 11 | LVCNOS-I | SCL | 2-wire Serial interface clock ^{Note6} |
| 12 | LVCNOS-I/O | SDA | 2-wire Serial interface data ^{Note6} |
| 13 | | GND | Module Ground ^{Note5} |
| 14 | CML-O | RX3+ | Receiver non-inverted data output |
| 15 | CML-O | RX3- | Receiver inverted data output |
| 16 | | GND | Module Ground ^{Note5} |
| 17 | CML-O | RX1+ | Receiver non-inverted data output |
| 18 | CML-O | RX1- | Receiver inverted data output |
| 19 | | GND | Module Ground ^{Note5} |
| 20 | | GND | Module Ground ^{Note5} |
| 21 | CML-O | RX2- | Receiver inverted data output |
| 22 | CML-O | RX2+ | Receiver non-inverted data output |
| 23 | | GND | Module Ground ^{Note5} |
| 24 | CML-O | RX4- | Receiver inverted data output |
| 25 | CML-O | RX4+ | Receiver non-inverted data output |
| 26 | | GND | Module Ground ^{Note5} |
| 27 | LVTTTL-O | ModPrsL | Module Present, internal pulled down to GND |
| 28 | LVTTTL-O | IntL | Interrupt output, should be pulled up on host board ² |
| 29 | | VCCTx | +3.3V Transmitter Power Supply |
| 30 | | VCC1 | +3.3V Power Supply |
| 31 | LVTTTL-I | LPMODE | Low Power Mode ^{Note6} |
| 32 | | GND | Module Ground ^{Note5} |
| 33 | CML-I | Tx3+ | Transmitter non-inverted data input |
| 34 | CML-I | Tx3- | Transmitter inverted data input |
| 35 | | GND | Module Ground ^{Note5} |



| Pin | Logic | Symbol | Name/Description |
|-----|-------|--------|-------------------------------------|
| 36 | CML-I | Tx1+ | Transmitter non-inverted data input |
| 37 | CML-I | Tx1- | Transmitter inverted data input |
| 38 | | GND | Module Ground ^{Note5} |

Note:

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector should be pulled up with 4.7K to 10K ohms on host board to a voltage between 3.15V and 3.6V.

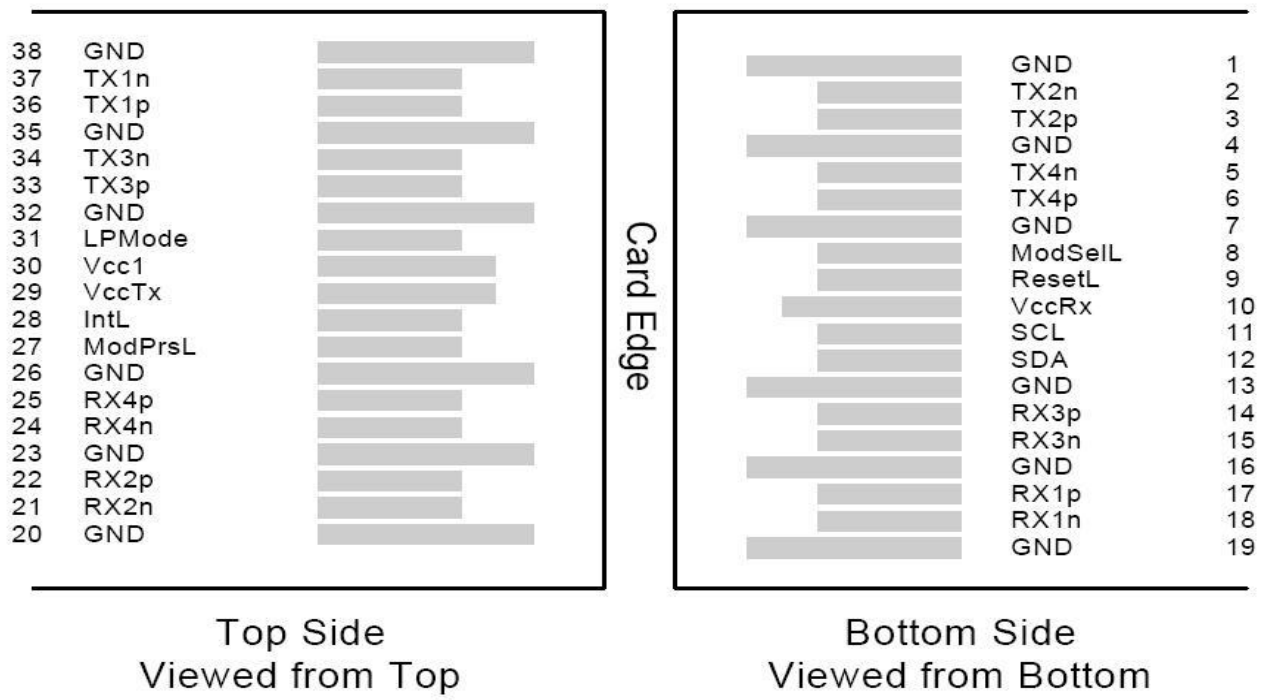


Figure 4. Extender housing QSFP SMT connector pin

Mechanical Dimensions

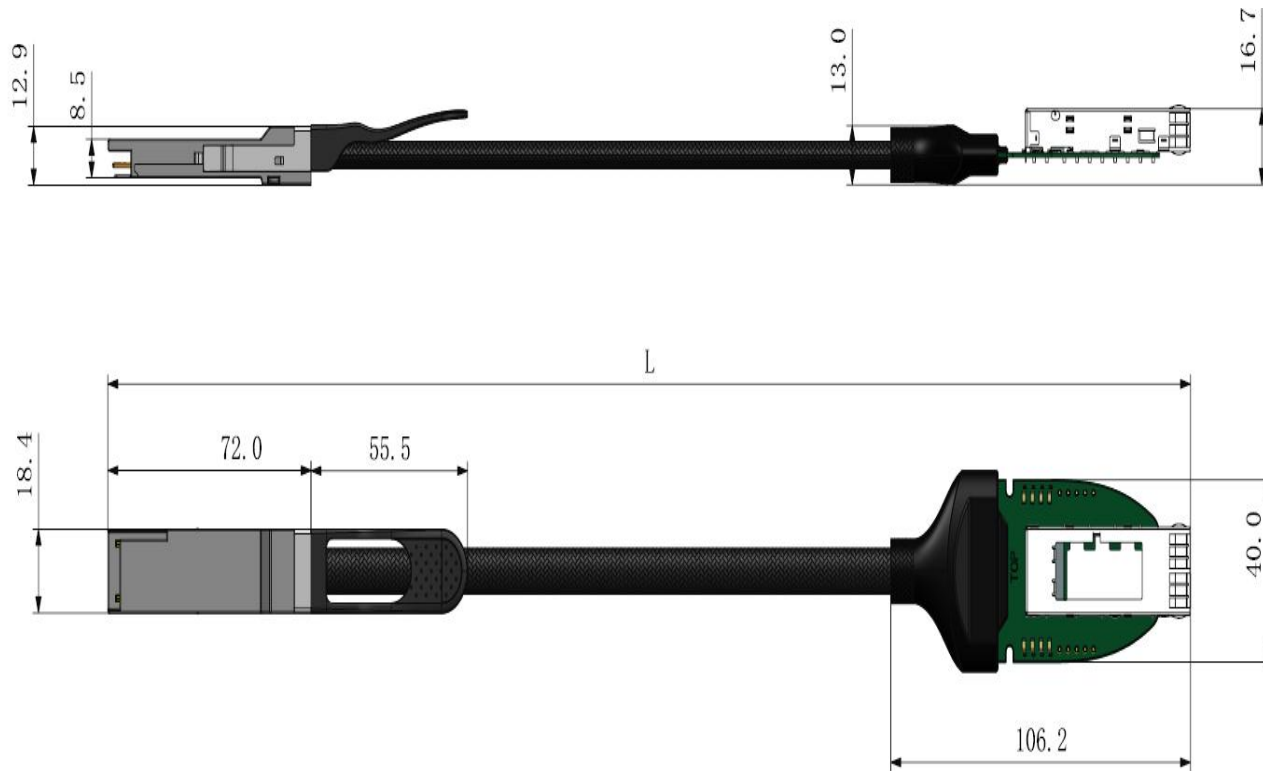


Figure 5. Mechanical Specifications



Wiring Patterns and connection diagram

| WIRING TABLE | | | | | |
|----------------------|---------|---|----------------------|---------|-----------|
| P1(Extender contact) | | | P1(Extender housing) | | |
| 01 | GND | ↔ | 01 | GND | |
| 02 | TX2n | ↔ | 02 | TX2n | |
| 03 | TX2p | ↔ | 03 | TX2p | |
| 04 | GND | ↔ | 04 | GND | |
| 05 | TX4n | ↔ | 05 | TX4n | |
| 06 | TX4p | ↔ | 06 | TX4p | |
| 07 | GND | ↔ | 07 | GND | |
| 08 | ModseIL | ↔ | 08 | ModseIL | 4# LED |
| 09 | ResetL | ↔ | 09 | ResetL | 5# LED |
| 11 | SCL | ↔ | 11 | SCL | |
| 12 | SDA | ↔ | 12 | SDA | |
| 13 | GND | ↔ | 13 | GND | |
| 14 | RX3p | ↔ | 14 | RX3p | |
| 15 | RX3n | ↔ | 15 | RX3n | |
| 16 | GND | ↔ | 16 | GND | |
| 17 | RX1p | ↔ | 17 | RX1p | |
| 18 | RX1n | ↔ | 18 | RX1n | |
| 19 | GND | ↔ | 19 | GND | |
| 20 | GND | ↔ | 20 | GND | |
| 21 | RX2n | ↔ | 21 | RX2n | |
| 22 | RX2p | ↔ | 22 | RX2p | |
| 23 | GND | ↔ | 23 | GND | |
| 24 | RX2n | ↔ | 24 | RX2n | |
| 25 | RX2p | ↔ | 25 | RX2p | |
| 26 | GND | ↔ | 26 | GND | |
| 27 | ModPrsL | ↔ | 27 | ModPrsL | 3# LED |
| 28 | IntL | ↔ | 28 | IntL | 4# LED |
| 29 | VccTx | ↔ | 29 | VccTx | 1# 2# LED |
| 30 | Vcc1 | | 30 | Vcc1 | |
| 10 | VccRx | | 10 | VccRx | |
| 31 | LPMode | ↔ | 31 | LPMode | 8# LED |
| 32 | GND | ↔ | 32 | GND | |
| 33 | TX3p | ↔ | 33 | TX3p | |
| 34 | TX3n | ↔ | 34 | TX3n | |
| 35 | GND | ↔ | 35 | GND | |
| 36 | TX1p | ↔ | 36 | TX1p | |
| 37 | TX1n | ↔ | 37 | TX1n | |
| 38 | GND | ↔ | 38 | GND | |

Figure 6. Wiring Patterns

Extender housing pin and parts

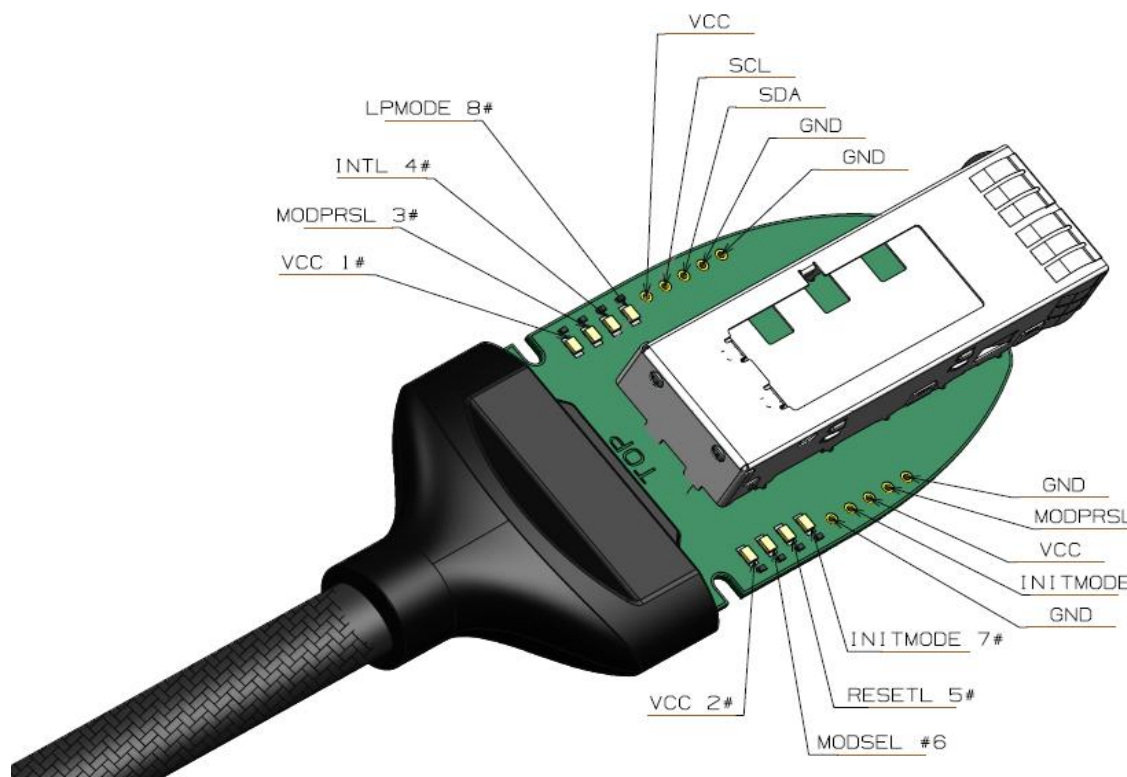


Figure 7. Extender housing pin and parts

Regulatory Compliance

FIBERSTAMP's 100GE immersion cooling extender meet the requirements of the following standards:

| Feature | Standard |
|--------------------------|--|
| Electrical Safety | EN 62368-1: 2014 IEC 62368-1:2014 UL 62368-1:2014 |
| Environmental protection | Directive 2011/65/EU with amendment(EU)2015/863 |
| CE EMC | EN55032: 2015 EN55035: 2017 EN61000-3-2:2014 EN61000-3-3:2013 |
| FCC | FCC Part 15, Subpart B; ANSI C63.4-2014 |

Ordering information

| Part Number | Length | Description |
|----------------|--------|---|
| FSQE-PC101-D01 | 10cm | 100G QSFP28 extender with high speed cable, with nylon jacket, 0.1meter length with connector and cage. |
| FSQE-PC101-D05 | 50cm | 100G QSFP28 extender with high speed cable, with nylon jacket, 0.5meter length with connector and cage. |

The length(meter) of FSQE-PC101-DXX is decimal and can be customizable.

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