



OPEN

Compute Project

100G QSFP28 SR4

OCP Optical Transceiver

Specification V0.1

Product Specification

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Author: Eric Chen, FormericaOE

Compliance with OCP Tenants

Openness

By migrating the Immersion Active Optical Cable & Pigtail Specifications to the Open Compute foundation, they become open to all to review and implement. In addition, the broad membership of the OCP is able to contribute to the future development of the specification.

Efficiency

The purpose of the Immersion Active Optical Cable Specification is to drive commonality in implementations of iAOCs/iAOPs in order to reduce friction in adoption users. This directly reduces opex in the form of qualifications and firmware work to adapt to different iAOC/iAOP implementations.

Impact

Immersion Active Optical Cables or Pigtails have proven to be essential components of hyperscale and service provider networks in order to enable high speed, low cost, low power and highly reliable networks. Migrating this specification to OCP drives commonality in these implementations and a broader membership base to widen impact.

Scale

Multiple hyperscalers have deployed or are planning to deploy Active Optical Cables. Soon they shall be deployed in immersion cooling.

Similarly to optical connectors in Air/DLC, the CMIS/DDMI monitoring functions ensure the Data Center Fabric is performing at its optimal.

Sustainability

Active Optical Cables & Pigtails ease fabric connection complexity. Immersion Active Optical Cables & Pigtails allows the fabric to function in immersion cooling, which lowers PUE of data centers for AI/ML/HPC.

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Scope and Overview

1.1 Scope

This document defines the technical specifications for the 100G QSFP28 SR4 OCP optical transceivers used in large-scale data center applications.

1.2 Overview

- Supports 103.1Gb/s data rate links of 70m/100m via OM3/OM4, respectively
- Low power consumption <2W
- Hot pluggable electrical interface
- Single 3.3V power supply
- Using standard 12 or 8 lane optical fiber with MPO pluggable optical connector
- 4x25Gb/s 850nm VCSEL-based transmitter
- RoHS Compliant
- Compliant with 100G Ethernet IEEE 802.3 bm 100GBASE-SR4

2 Common Terms

The following terms are used in this document

2.1 Parameter related

AOP - Average Optical Power

OMA - Optical Modulation Amplitude

TDECQ - Transmitter Dispersion Eye Closure Quaternary

ER - Extinction Ratio

SMSR - Side Mode Suppression Ratio

BER - Bit Error Rate

FEC - Forward Error Correction

PAM4 - 4-level Pulse Amplitude Modulation

Gbps - Gigabit per second

GBd - Gigabaud

2.2 Product related

iAOP - Immersion Active Optical Pigtail

iAOC - Immersion Active Optical Cable

AOC - Active Optical Cable

CT - Commercial Temperature

IT - Industrial Temperature

LPMode - Low Power Mode

I2C - Inter-Integrated Circuit

SR - Short reach

LR - Long reach

2.3 Fiber

MMF - Multi-Mode Fiber

SMF - Single-Mode Fiber

OM3 - Optical Multimode 3

PC - Physical Contact

APC - Angled Physical Contact

MPO - Multiple-Fiber Push-On

2.4 Standard

CWDM - Coarse Wavelength Division Multiplex

IEEE - Institute for Electrical and Electronics Engineers

MSA - Multi-Source Agreement

SFF - Small Form Factor

QSFP - Quad Small Form Factor Pluggable

QSFP112 - Quad Small Form Factor Pluggable Module 112

QSFP-DD - QSFP–Double Density

OSFP - Octal Small Form Factor Pluggable Module

OSFP-RHS - OSFP-Riding Heat Sink

CMIS - Common Management Interface Specification

3 Operating Conditions

Recommended Operating Conditions		
Parameters	Value	Unit
Case Operating Temperature	0 ~ 70	°C
Power Supply Voltage (Typical)	3.3	V
Power Consumption (Max)	2	W
Data Rate per Channel (Typical)	25.78125 +/- 100ppm	Gb/s

Note1, RT value depends on dew point of the Fluid

4 Specifications

4.1 Electrical Transmitter Characteristic

Electrical Transmitter Characteristics		
Parameters	Value	Unit
Differential Data Input Voltage Peak to Peak Swing	900	mV
Differential Input Impedance	90 ~ 110	ohm
Common Mode Noise RMS (max)	17.5	mV
Transition Time, 20 to 80% (min)	10	ps
Common Mode Voltage	-0.3 ~ 2.8	V

4.2 Electrical Receiver Characteristic

Electrical Receiver Characteristics		
Parameters	Value	Unit
Differential Data Output Voltage Peak to Peak Swing	300 ~ 900	mV
Differential output impedance	90 ~ 110	ohm
Common Mode Voltage	-0.35 ~ 2.85	V
Common Mode Noise RMS (max)	17.5	mV

4.3 Optical Transmitter Characteristic

Optical Transmitter Characteristics		
Parameters	Value	Unit
Center Wavelength (range)	840 ~ 860	nm
Average Launch Optical Power, each lane	-8.4 ~ +2.4	dBm
OMA, each lane	-6.4 ~ +3.0	dBm
ER (min)	2	dB

4.4 Optical Receiver Characteristics

Optical Receiver Characteristics		
Parameters	Value	Unit
Center Wavelength (range)	840 ~ 860	nm
Average receive power each lane (max)	2.4	dBm
Average receive power each lane (min)	-10.3	dBm
Receive power, each lane (OMA) (max)	3	dBm
Stressed receiver sensitivity (OMA), each lane (max)	-5.2	dBm

4.5 Optical Fiber Link Model

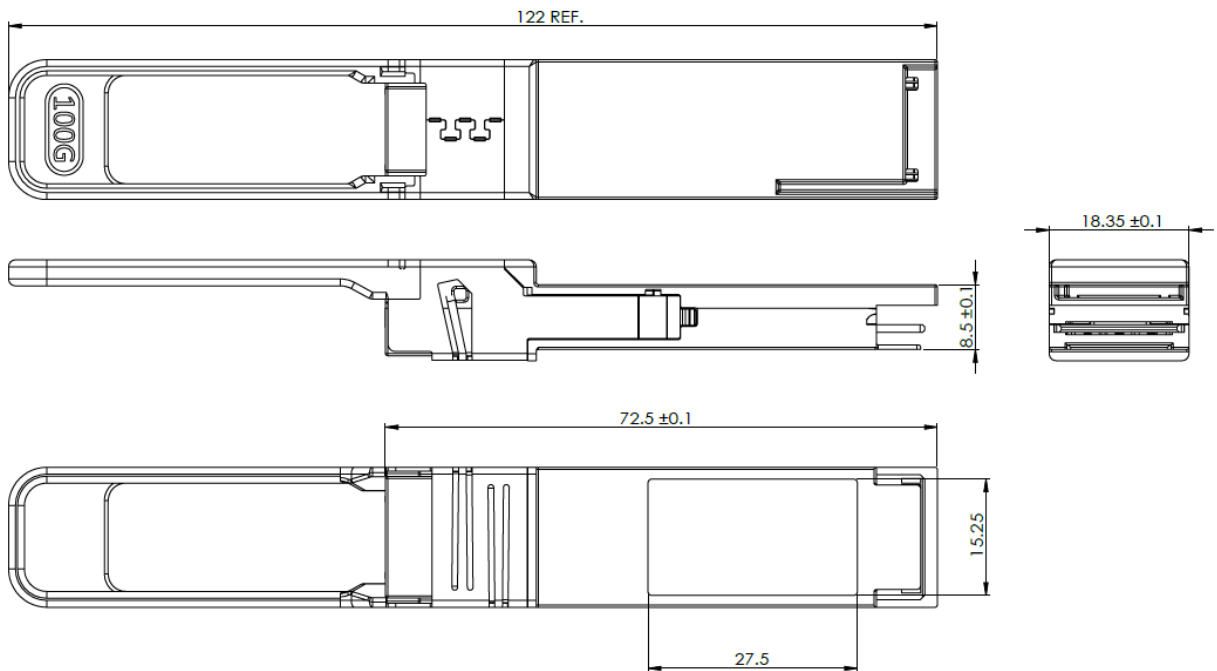
The reference optical fiber link model is based on MMF fiber. The distance. Refer to IEEE 802.3
bm.

Optical Fiber Link Model	
100GBase-SR4	0.5m to 70m for OM3
	0.5m to 100m for OM4

5 From Factor

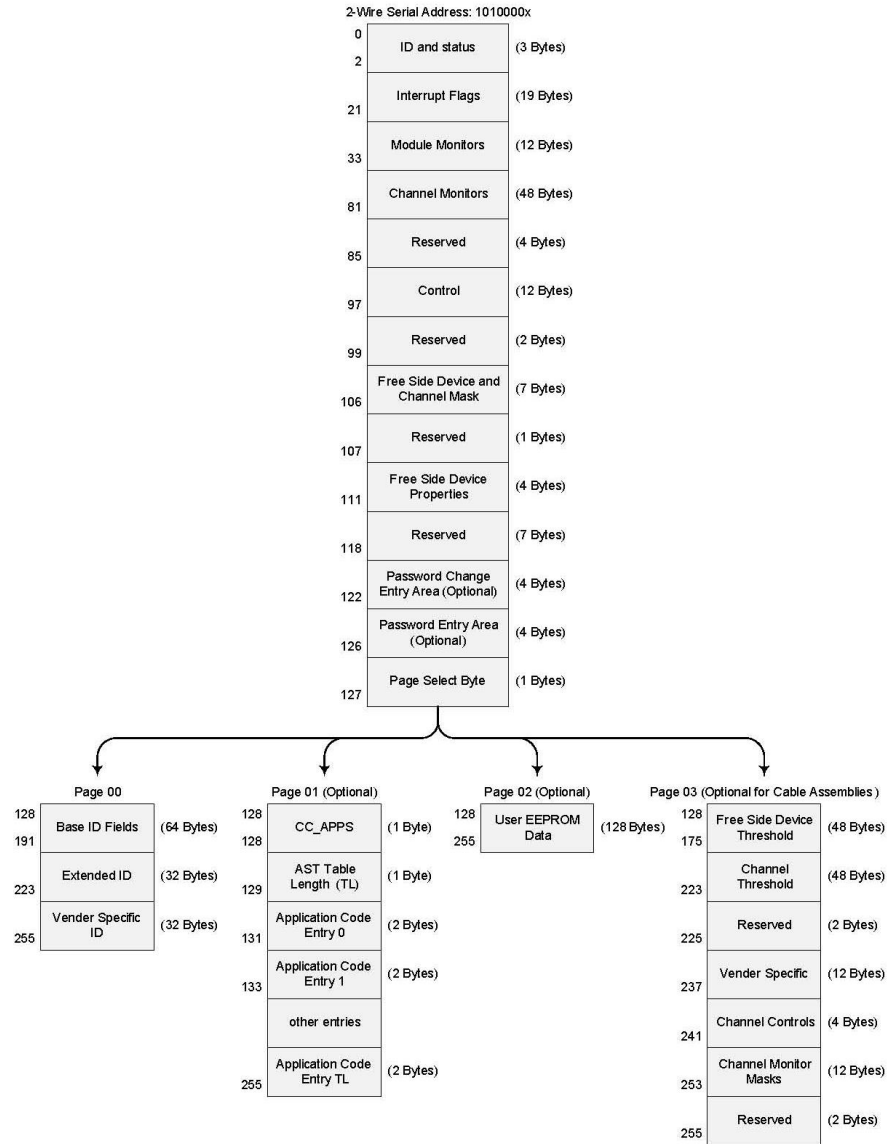
The QSFP28 form factor described in SFF-8665 shall be used. This form factor is commonly referred to as QSFP28 for 100G applications.

5.1 Mechanical Drawing



6 Management Interface

The module is compliant to SFF-8636.



7 Reference

The following documents are referenced in this specification:

- IEEE 802.3 bm
- SFF-8636
- SFF-8665
- SFF-8661
- SFF-8662
- SFF-8679

8 Revisions

Rev	Date	Description
0.1	July 15 th , 2025	Initial Release