
Higher Speed Copper Ethernet

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Objective

- **Overview of selected existing and developing physical layer higher speed copper specifications for considerations of applicability for higher speed copper Ethernet.**

Summary: Infiniband and PCIe express lane widths

InfiniBand Protocol	Signaling (Gbd) single data rate (SDR)	Signaling (Gbd) dual data rate (DDR)	Signaling (Gbd) quad data rate (QDR)
serial	1 x 2.5	1 x 5	1 x 10
parallel	4 x 2.5	4 x 5	4 x 10
parallel	8 x 2.5	8 x 5	8 x 10
parallel	12 x 2.5	12 x 5	12 x 10

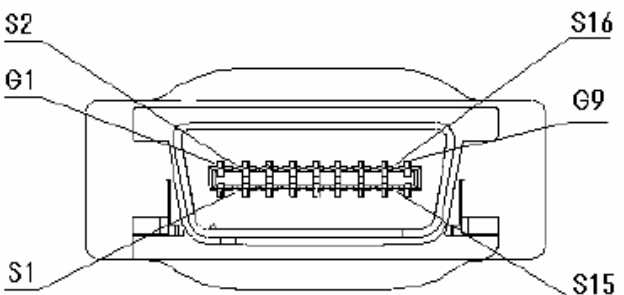
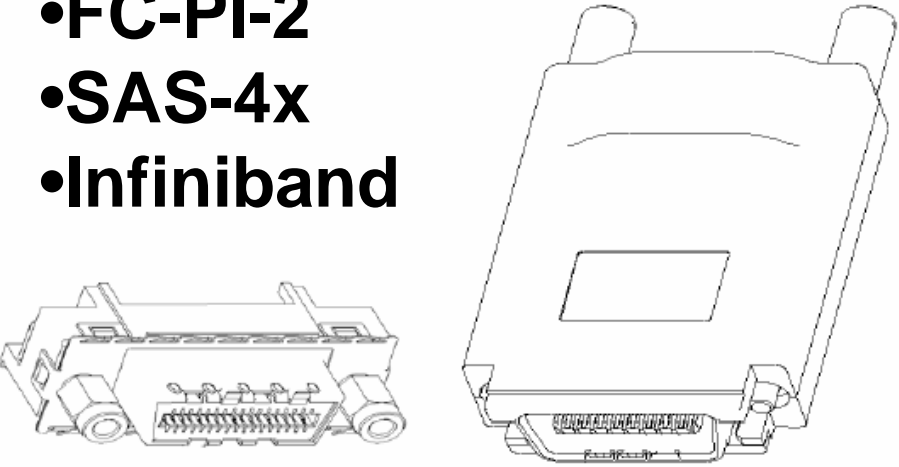
PCI Express	Signaling (Gbd) 2.5	Signaling (Gbd) 5
serial	1 x 2.5	1 x 5
parallel	4 x 2.5	4 x 5
parallel	8 x 2.5	8 x 5
Parallel	16 x 2.5	16 x 5

Small form factor (SFF)- 8470 – multilane shielded connector

4x Connector Type and Application Usages

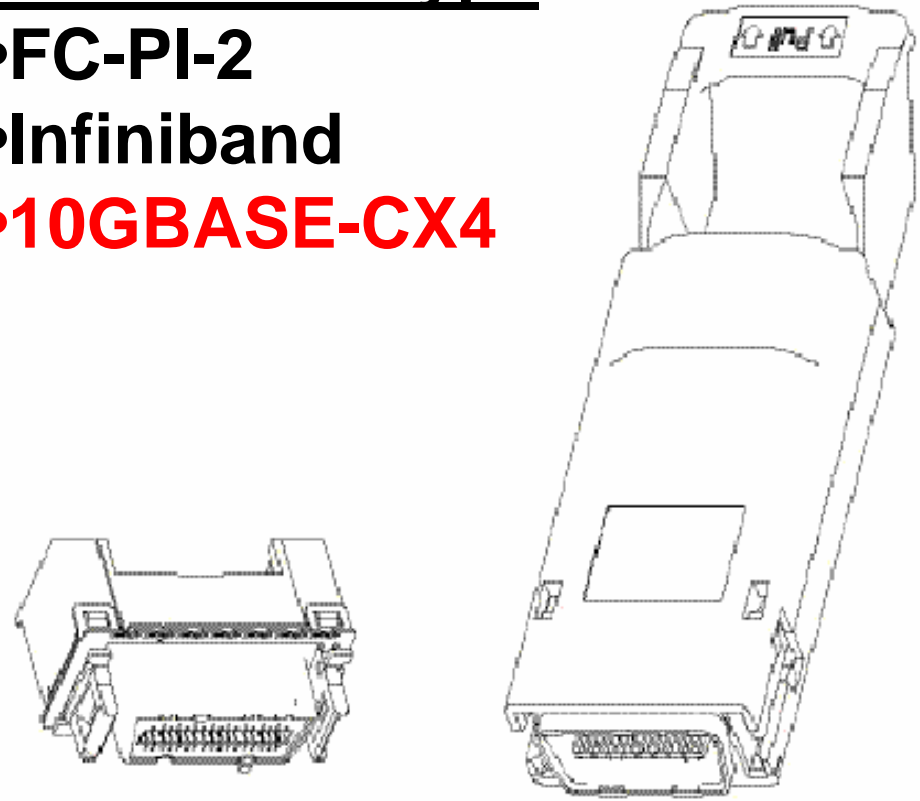
Screw Type

- FC-PI-2
- SAS-4x
- Infiniband



Latch Lock Type

- FC-PI-2
- Infiniband
- 10GBASE-CX4**

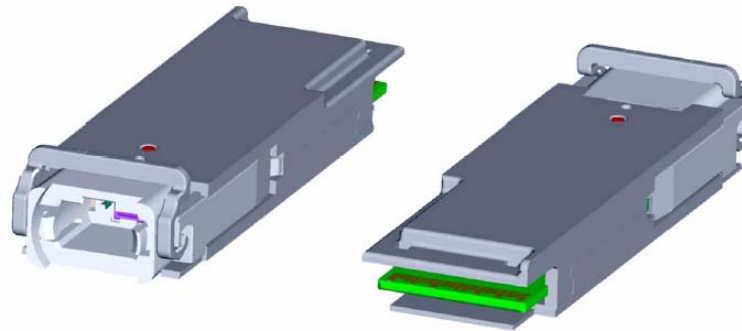


10GBASE-CX4 - IEC 61076-3-113 connector

Infiniband Copper - Cable Board Connector – 38 ckt

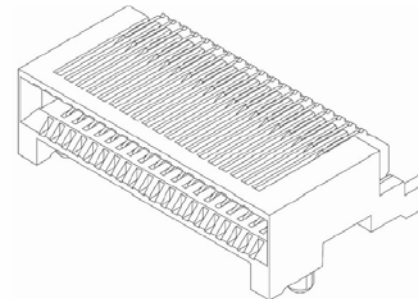
- Annex A5: Pluggable Interfaces: CATx, Copper and Optical
- Pluggable QSFP FOR 4x, 8x and 12x
 - Multiple 4x QSFP pluggables used for 8x or 12x links

QSFP Module



SFF-8436

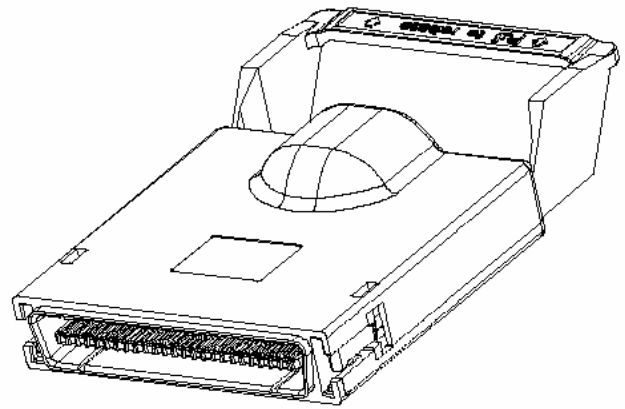
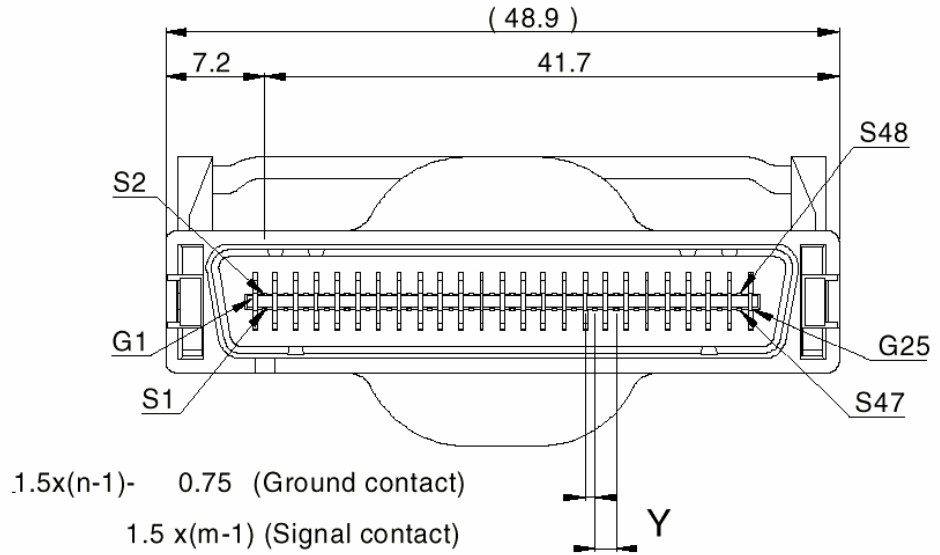
QSFP Connector: 38-contact,
right angle surface mount connector



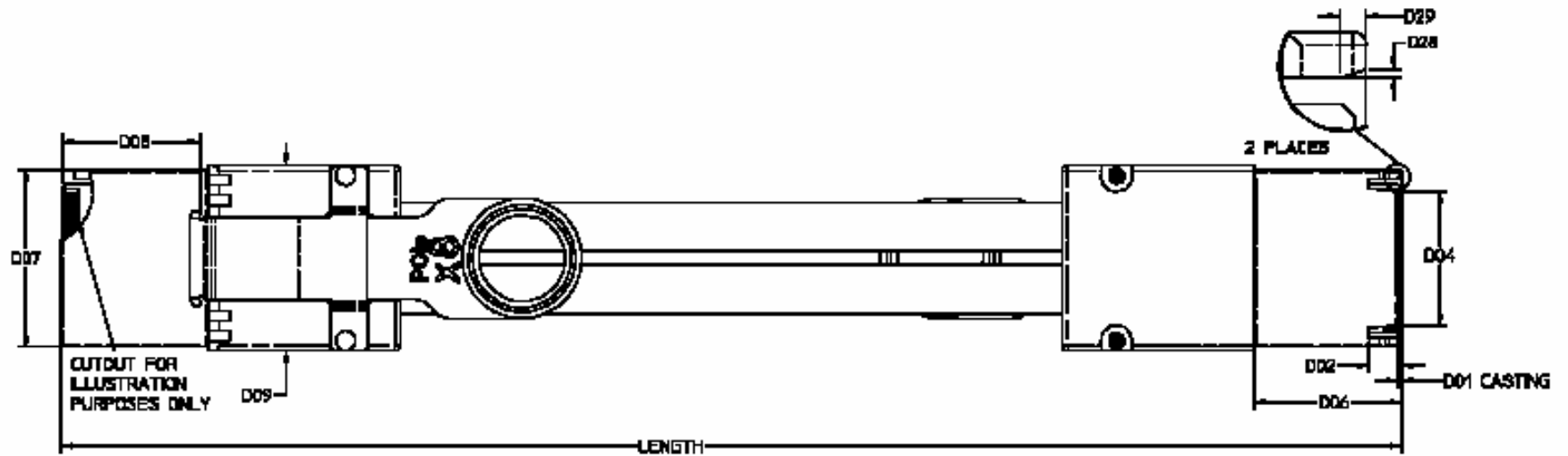
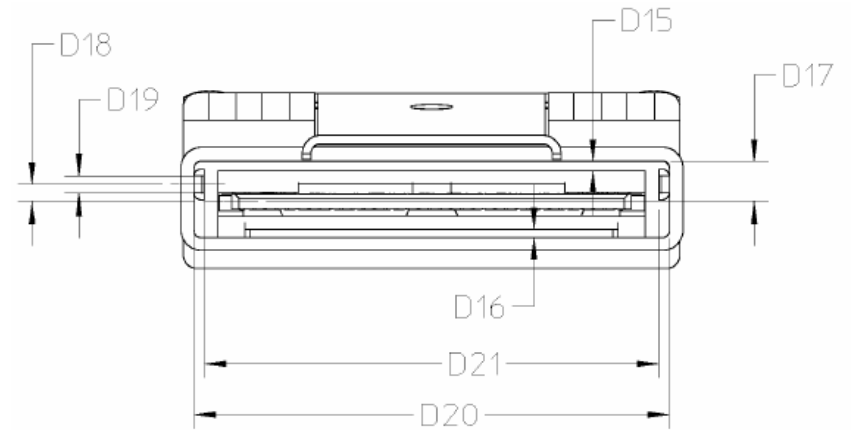
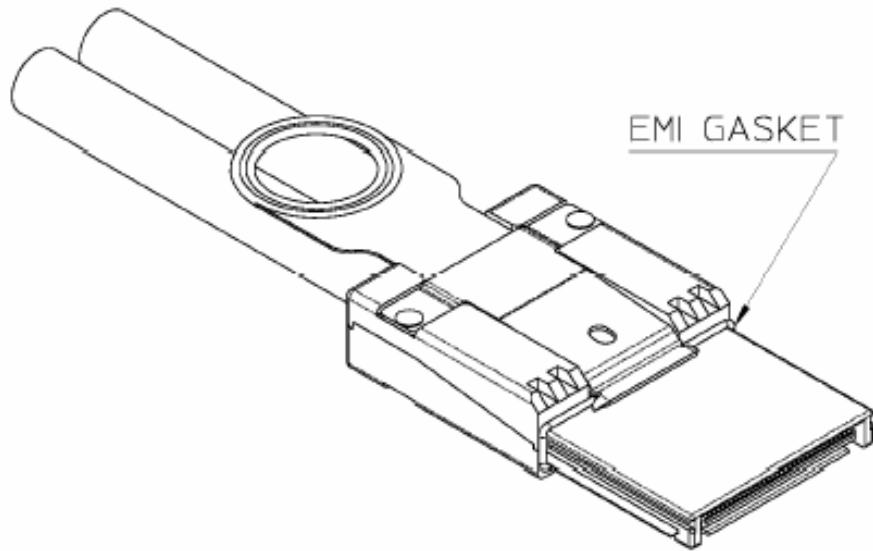
Small form factor (SFF)- 8470 – multilane shielded connector

- 12x (24 differential pair)

- Infiniband copper

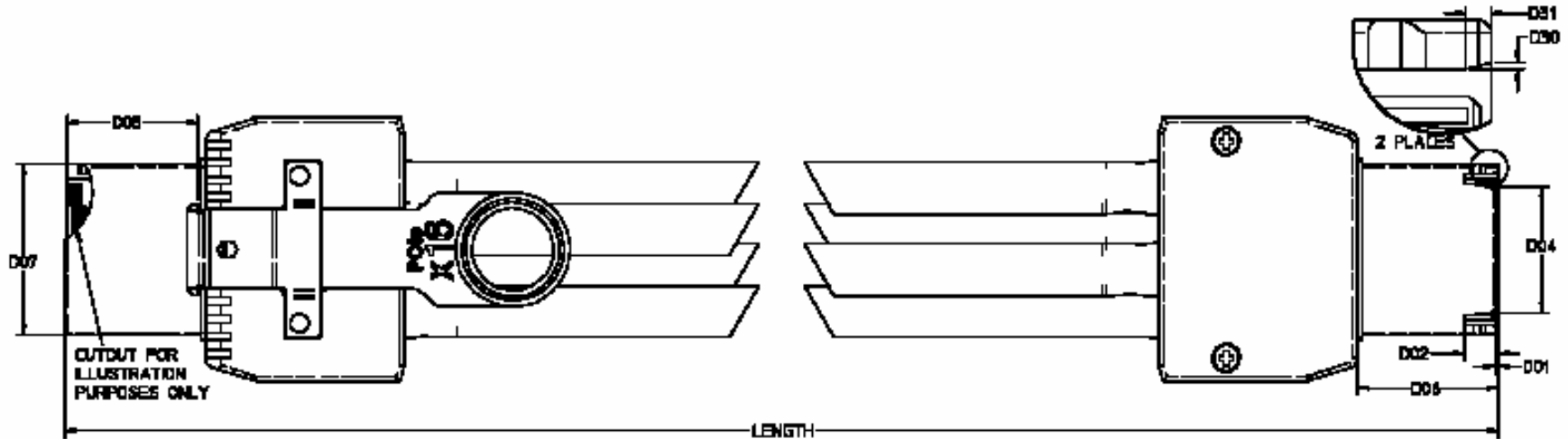
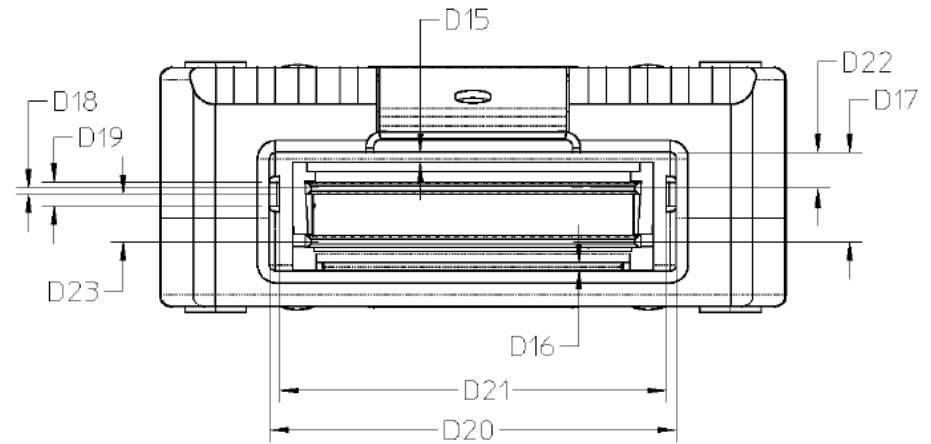
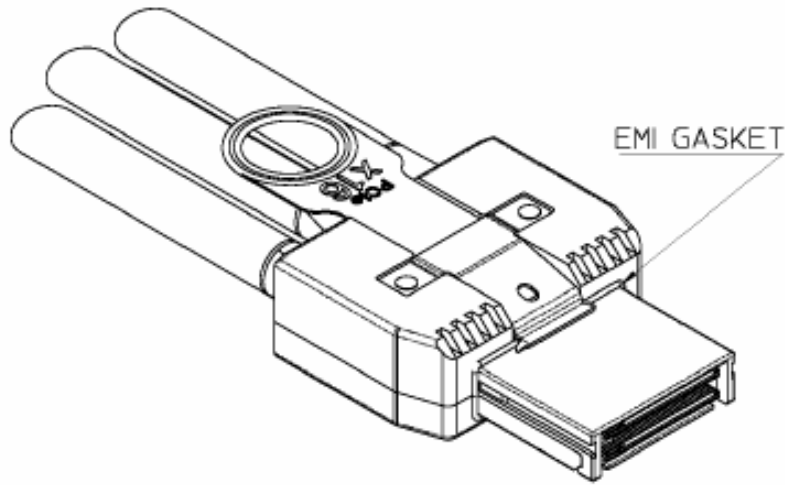


PCI express 8x Cable Assembly



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PCI express 16x Cable Assembly

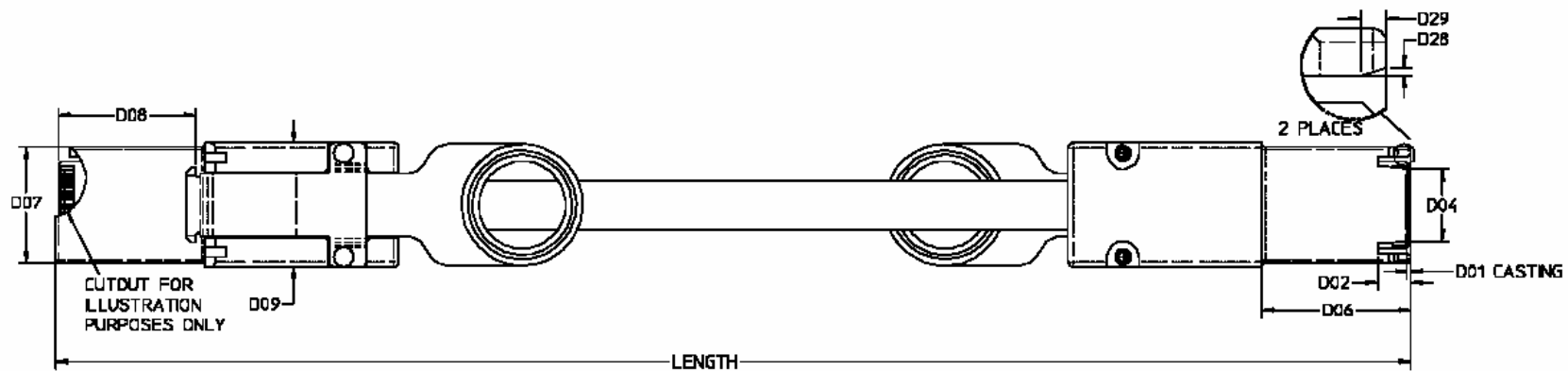
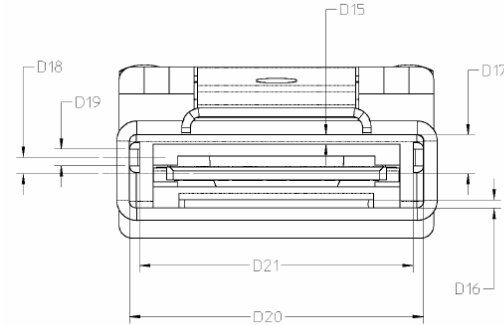
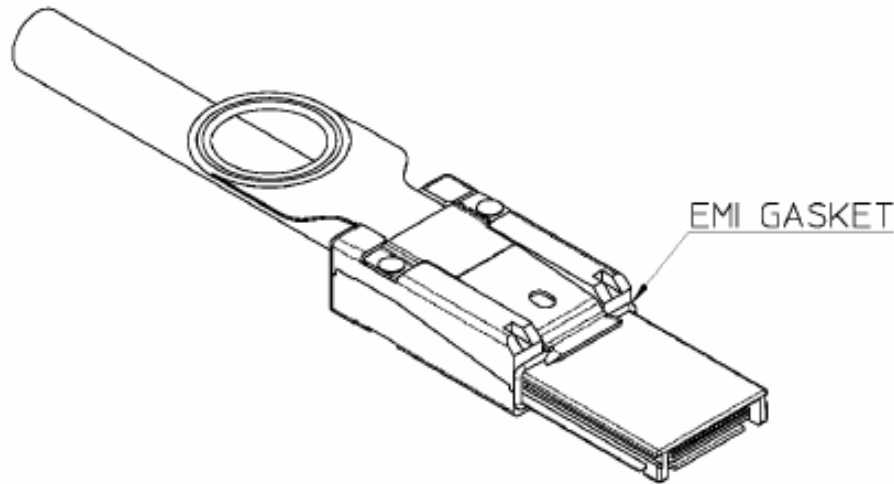


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SFF-8088 - Mini Multilane Series: Shielded – 28 ckt

4x Connector Type and Application Usages

- Mini SAS 4x
- PCI express 4x – specified in PCIe External Cable Specification – 38 ckt



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Conclusions

- **There are a number of existing and developing physical layers copper specifications that should be considered for higher speed copper Ethernet.**