Distance Requirements for XLAUI/CAUI and PMD Service Interface

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• This presentation investigates the minimum distance requirements for both XLUAI/CAUI and PMD service electrical interfaces.

• The analysis considers the impact of both single and multi-port MAC/PHY devices, and also first generation (CFP based) and future generation optical modules.
Results

CFP sized optical modules (likely 1st gen)

- 1 port MAC/PHY chip: 1.5” - 3”
- 4 port MAC/PHY chip: 3” - 8”

XFP/QSFP/POD sized optical modules

- 1 port MAC/PHY chip: 1.5”
- 4 port MAC/PHY chip: 2” - 4”
- 8 port MAC/PHY chip: 3” - 8”
CFP: Single Port Host

CFP-sized Module

Module support circuitry (hot swap, etc.)

1.5”-3.0”

Single port PHY/serdes
CFP: Four Port Host

4 x CFP-sized Module

3.0”-8.0”

System 6.0”-8.0”

MAC with integrated PHY/serdes

Backplane Connector
XFP: Single Port Host

XFP-sized Module

Module support circuitry (hot swap, etc.)

single port PHY/serdes

1.5”
XFP: Four Port Host

4 x XFP-sized Module

2.0”-4.0”

quad PHY/serdes
XFP: Eight/Ten Port Host

- 10 x XFP-sized Module
- MAC with integrated PHY/serdes
- Backplane Connector
- System 6.0”-8.0”
- 3.0”-8.0”
Recommendation

• **Target PMD service interface at 4”**
  
  This supports direct attach from a single host chip to either a single port CFP sized module, or to up to four XFP/QSFP sized modules.

• **Target XLUI/CAUI interface at 8”**
  
  This supports direct attached from a single host chip to up to four CFP sized optical modules or up to eight/ten XFP/QSP sized optical modules.
Interfaces: Implementation options

- **PMD Service Interface**
  - PMD
  - MAC/PHY
  - Optics
  - 4"

- **Optics**
  - (with CDR)

- **Notes**
  - 1 CFP
  - 1,4 “XFP”

- **XLAUI/CAUI**
  - MAC/PHY
  - Optics (with CDR)
  - 8"

- **Notes**
  - 1,4 CFP
  - 1,4,8 “XFP”

- **XLAUI/CAUI**
  - MAC/PHY
  - CDR*
  - Optics
  - 8”

- **Notes**
  - 1,4 CFP
  - 1,4,8 “XFP”

* Note may require multiple CDR chips
Summary

• We analyzed the distance requirements for both the PMD service interface and XLAUI/CAUI assuming both CFP and XFP/QSFP sized optical modules

• We recommend targeting the PMD service interface at a distance of 4” and XLAUI/CAUI at a distance of 8”