CORNING

Proposal to include optical fiber objective in Multi-gig Automotive Ethernet

Mike Yadlowsky
Alex Umnov
Steve Swanson
Mark Bradley
Sergey Ten

Corning Optical Communications

Supporters

- We will be seeking supporters for the Feb 21/22 meeting

Summary

Propose to include an optical fiber PHY objective in Multi-Gig Ethernet to support emerging high bandwidth, long length & weight reduction use cases

Broad market potential

- Automotive networking is evolving rapidly with multiple use cases for bandwidth ≥ 1 Gb/s
- Related applications requiring link lengths ≥ 15m
- Glass fiber media option would complement twisted pair in emerging applications

Benefits

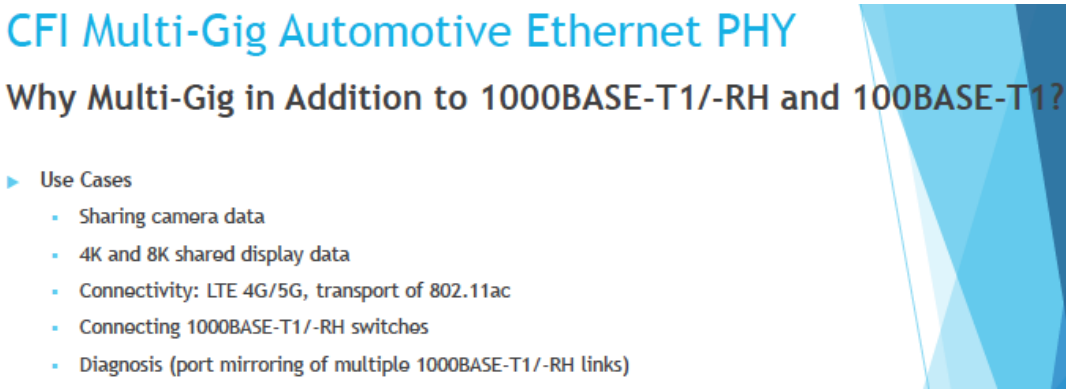
- Optical fiber complements copper interconnect by providing exceptional bandwidth, light weight, electromagnetic immunity and harsh environment resistance

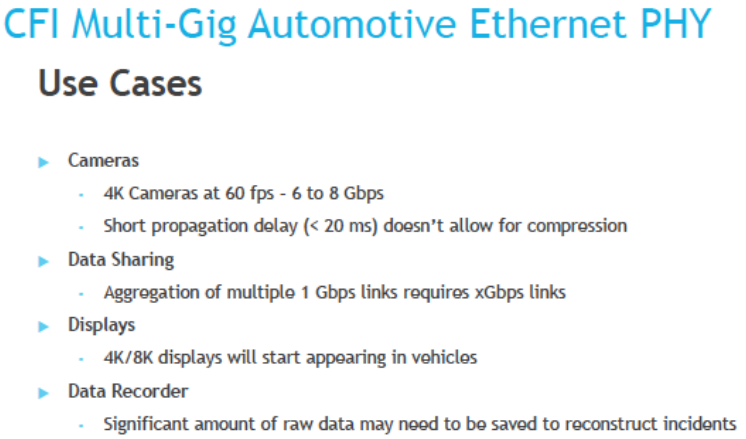
Technical Feasibility

- Optical fiber technologies are mature and widely used in other applications where they have achieved low cost have proven reliability. 10GBASE-SR technology can be used for an automotive PHY

Automotive use cases could benefit from an optical fiber option

- Use cases From CFI Multi-Gig Automotive Ethernet PHY CFI_01_1116.pdf





- Uncompressed camera/video data rates reach and exceed 10 Gb/s, e.g. zinner_NGAUTO_01a_0217.pdf
- Commercial vehicle applications may require lengths up to 40 m: matheus_buntz_10SPE_01_0916.pdf (10 Mbps Single Pair Ethernet SG)

	Mandatory	Additional/optional
Physical Medium	Unshielded, unjacketed TP cabling	If possible, CAN cable (i.e. PVC insulation)
Max. link length	15 m for passenger vehicles	40 m for commercial vehicles

- OEM survey indicated that 50% of respondents expressed interest in 10 Gb/s and 50% said they would consider optical cable Wienckowski_3NGAUTO_01a_0117.pdf

Benefits of optical fiber

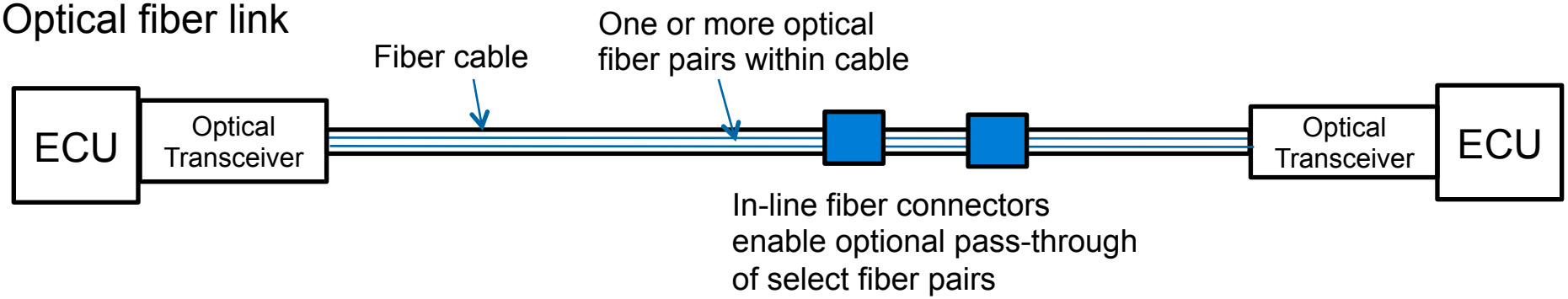
- Optical fiber links provide compelling features that complement copper interconnects

- High capacity - 10 Gb/s to 100 m (OM4)
- Light weight
- Thinner cross-section
- Electromagnetic immunity
- Harsh environment compatibility

Reference: whelan_3NGAUTO_01b_0117.pdf

Technical feasibility

Optical fiber link



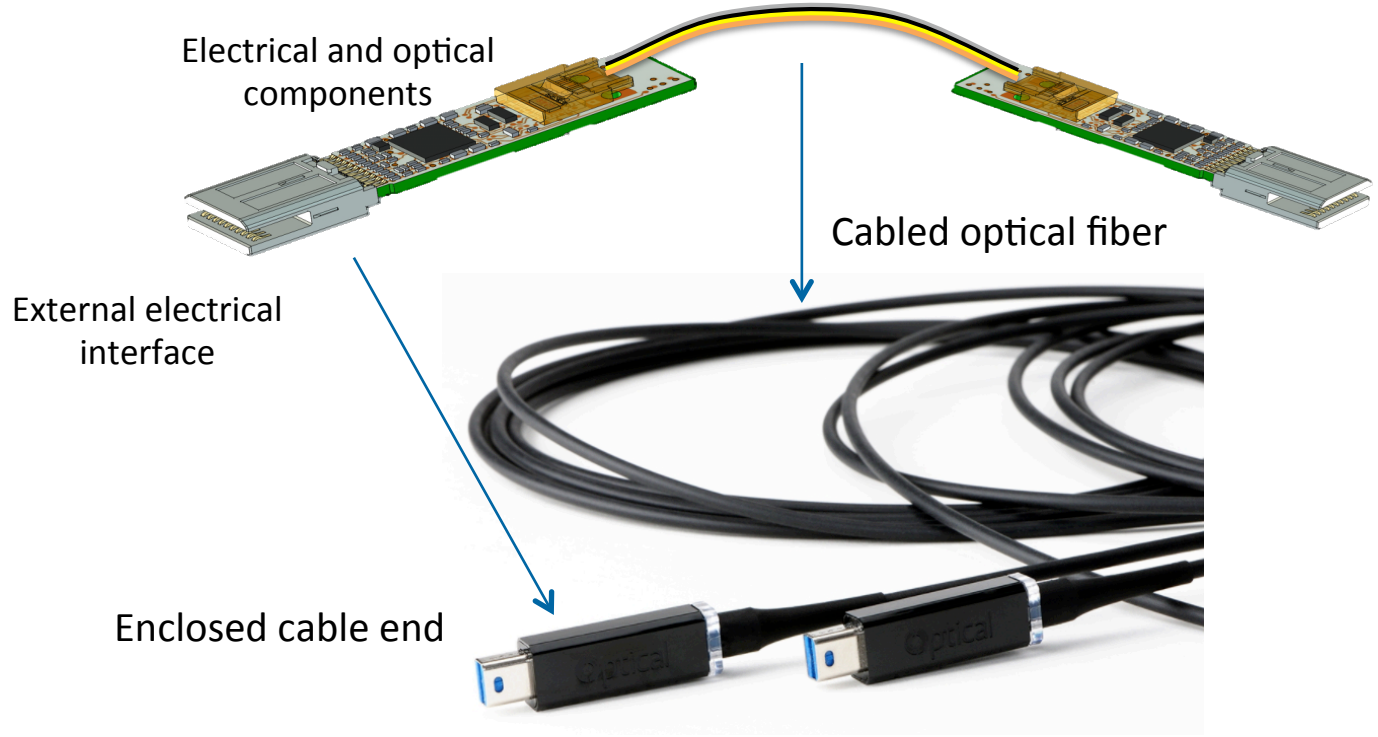
Component	Status	Technology	Examples
Optical transceiver	Available	VCSEL	10GBASE-SR
Fiber	Available	Multimode fiber	OM2, OM3, OM4
Cable	Available	Environmentally hardened	Fiber drop cable, Aerospace cable
Connector	Available	Environmentally hardened	Please see next slide for example

Environmentally-hardened optical fiber connector - example

Hardened fiber connector

Active optical cable configuration encapsulates optical links

- Transceiver is permanently fixed to fiber cable
  - Compatible with proven transceiver technologies
- Active cable provides electrical interface to external devices
- Optical and electronic components can be environmentally isolated in sealed environment



Objective proposal

- Add the following multi-gig objective

"Define the performance characteristics of a link segment and a PHY to support 10 Gb/s operation over this link segment with a single pair supporting up to four inline connectors using

  - copper cabling with lengths up to at least 15m
  - optical fiber cabling with lengths up to at least 40m"


CORNING
Thank You!