CORNING

Optical PHY proposal for NGAUTO

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An optical PHY objective is proposed

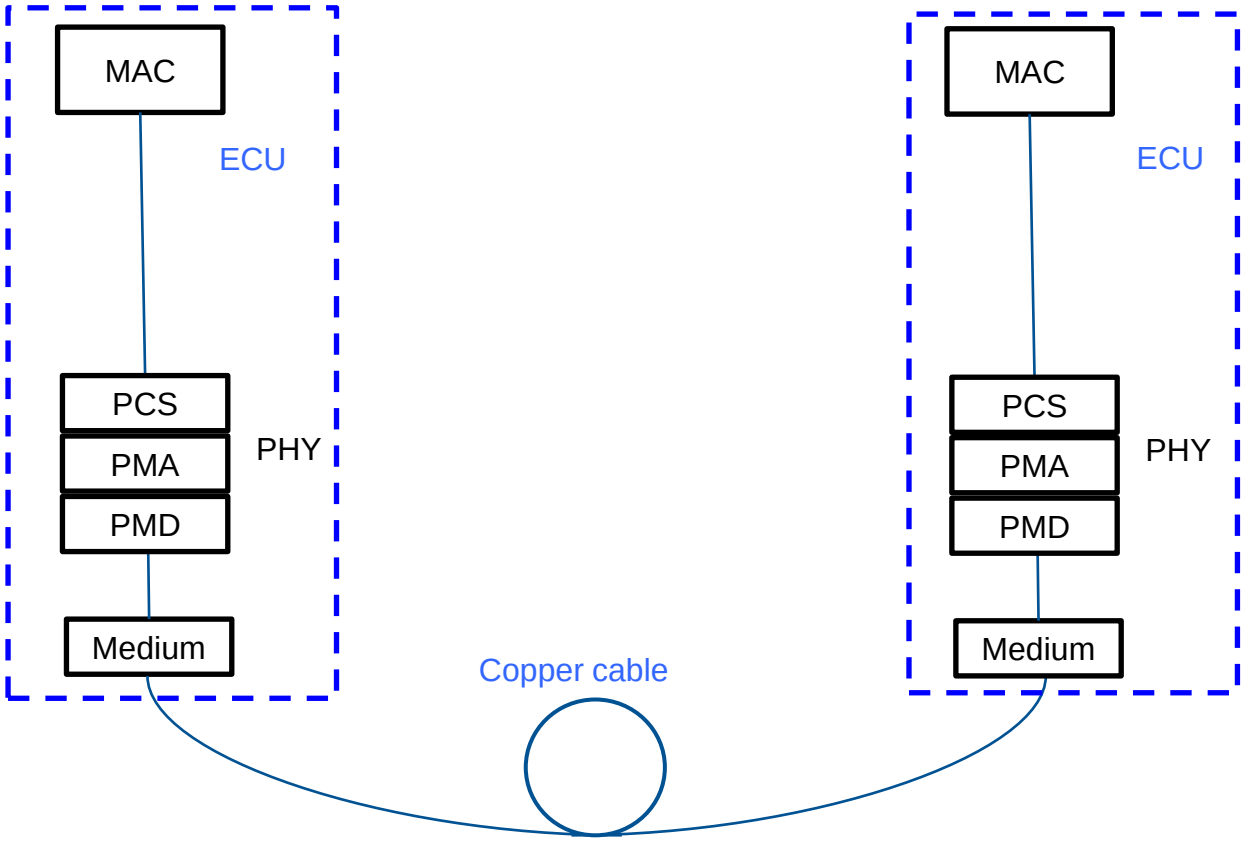
- To address emerging use cases
- A single Optical PHY would allow multiple physical implementations
- Similar wording to copper PHYs

"Define the performance characteristics of an automotive link segment and an optical PHY to support 10 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors and up to at least 15m on automotive cabling"

Addressing the CSDs

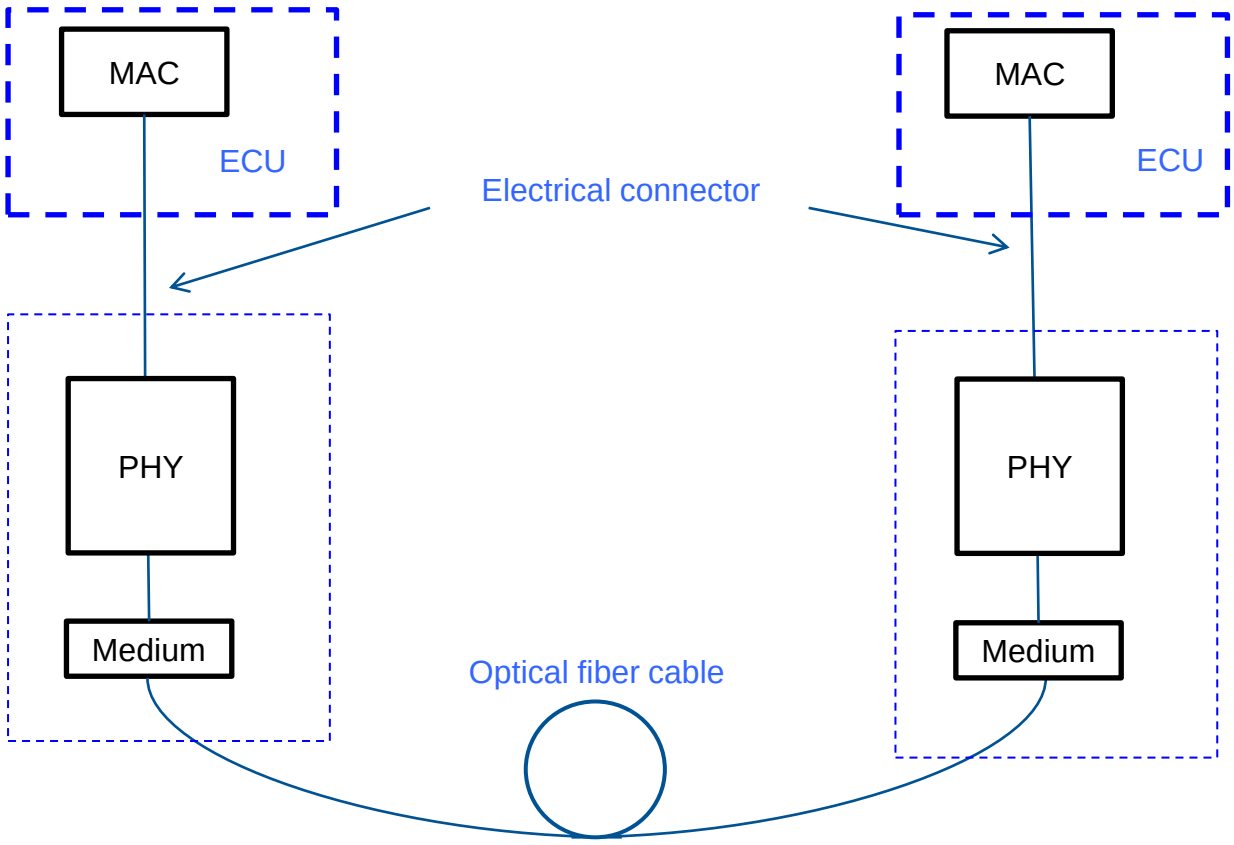
- Broad market potential
  - Automotive networking is evolving rapidly with multiple use cases for bandwidth ≥ 1 Gb/s
  - Glass fiber media option would complement copper media in automotive applications by providing high bandwidth, light weight, low power consumption, electromagnetic immunity, and harsh environment resistance
- Technical feasibility
  - Optical fiber technologies are mature with proven reliability and are widely used in harsh environments
- Distinct from 10GBASE-SR
  - Due to short link length, significant trade-offs are possible for all link components that will reduce complexity
  - Wavelengths other than 850nm with broader spectral widths could be considered
  - EEE and standby power will be addressed
  - Startup requirements will be addressed

Electrical implementation



Multiple optical implementations are possible

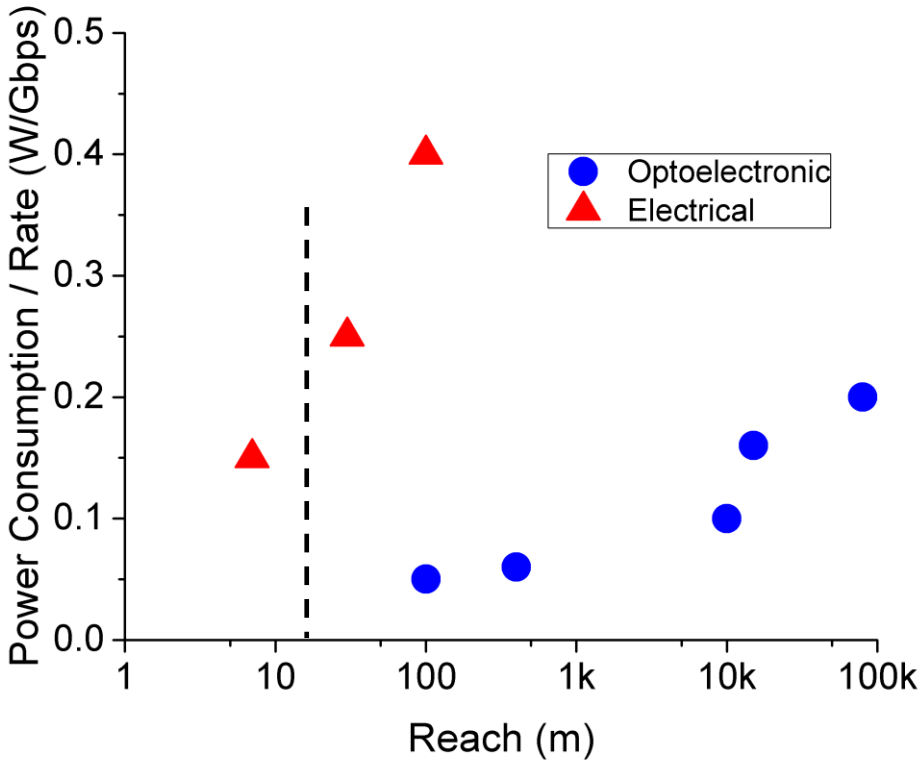
- Electrical interface on ECU to optical transceivers with fiber cable connecting ends in diagram



Implementation Example: 10m Cable

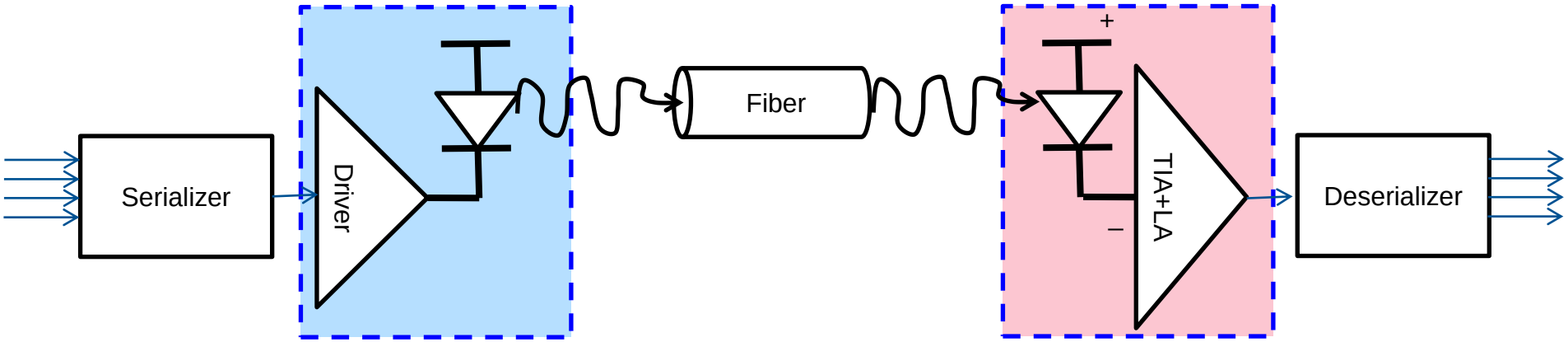
Automotive power requirements will be addressed

- EEE focus to date has been on reducing power consumption of copper PHYs
  - Optical 10G operating at 15m will consume ~ 0.4W or less



- Power up requirements
  - 10GBASE-SR transceivers datasheet specifies 300ms
  - Optics powering can support ≤ 100ms

10G Short Reach Transceiver Power Consumption Demystified



	Voltage (V)	Typ Current (mA)	Power (W)
VCSEL Driver Dis=Hi (VCSEL Driver Dis=low)	3.3	75 (35)	0.25 (0.12)
VCSEL	1.8	12	0.02
TIA	3.3	28	0.09
LA	3.3	40	0.13
RX @ -12dBm	3.3	25	0.08

Power reduction suspect: 8% of power used to drive VCSEL, 50% used to power up 2-wire interface

- Total Power is 0.57W at TX_Dis = High

Reducing Startup Time to <100ms

- Time to initialize specification in 10GBase-SR transceiver is based on SFF-8431, section 2.7

Time to initialize 2-wire interface	t_2w_start_up		300	ms	From power on or hot plug after the supply meeting Table 8.
Time to initialize	t_start_up		300	ms	From power supplies meeting Table 8 or hot plug or Tx disable negated during power up, or Tx_Fault recovery, until non-cooled power level I part (or non-cooled power level II part already enabled at power level II for Tx_Fault recovery) is fully operational.

- It includes complex cases. As example, there is a transient effect when optical power falls, followed by TX_Dis and TX_Fault, but then optical power is on again. TX_Dis deasserts while TX_Fault is still active. Then t_start_up may be 300ms
- Optics recovery time is <2ms in all cases
- Working with automotive suppliers on all complex cases will ensure that this parameter is <100ms for every fault that may occur in the car

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- Similar wording to copper PHYs
- Optical fiber complements copper interconnect by providing exceptional bandwidth, light weight, low power consumption, electromagnetic immunity, and harsh environment resistance

"Define the performance characteristics of an automotive link segment and an optical PHY to support 10 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors and up to at least 15m on automotive cabling"

Straw poll

A) I can support the adoption of the objective defined in swanson_NGAUTO_01a_0317.pdf

B) I cannot support the adoption of the objective defined in swanson_NGAUTO_01a_0317.pdf

C) I need more information

(pick one)

A: , B: , C:

"Define the performance characteristics of an automotive link segment and an optical PHY to support 10 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors and up to at least 15m on automotive cabling"


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