

Laning for a Multi-Speed Standard

IEEE 802.3cy – Beyond 10G Electrical
Automotive Ethernet PHY TF

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Managing complexity – A proposal

- 3 PHY speeds, multiple use cases could be a complex project
- Borrow where we can, extend naturally:
 - 802.3ch – our highest automotive speed
 - Not too far off in speed/reach for 25 Gbps
 - Very far off for 100 Gbps
 - Other 802.3 clauses use laning of at least PMAs at high speeds
- Recommend adopting a ‘conceptual baseline’ to guide our work
 - (see slide 6) Move that: 802.3cy specify a 25 Gbps PMA and link segment, which are reused as 2x or 4x for the 50Gbps and 100 Gbps objectives, leaving issues of how to lane and all other parameters of the laned 25 Gbps PMA open for future proposals

“How to lane”?

- Several choices:
 - Lane PMA only as a unit? (combine at FEC) (like CI 55)
 - Similar to BASE-T model, although FEC isn't separate sublayer
 - Lane PMA & FEC as a unit? (combine at PCS) (like CI 91 & 94)
 - Allows integration and repetition of a PMA/FEC with independent BER
 - Lane PMA/FEC/PCS as a unit? (combine at RS) (CI 143)
 - Allows independent PHY units to be bonded
 - PCS & FEC can still be internally laned if needed, independent of PMA
- See https://www.ieee802.org/3/cy/public/jul20/zimmerman_3cy_01_0720.pdf for more information

Some decisions left open for future proposals

Multi-lane specifications

- Adapt the signal from other sublayers to the appropriate number of physical lanes based on the rate.
- Provide bit-level multiplexing to PMA lanes, if needed.
- Tolerate Skew Variation between the PMA lanes.
- Coupling parameters between lanes on the link segment (i.e., crosstalk)

Per-lane specifications

- Provide signal drivers/output levels
- Requirements for line encoding and decoding, equalization, etc
- Requirements for per-input-lane clock and data recovery
- Requirements for clock generation per lane
- Optional local loopback to/from the PMA service interface
- Optional remote loopback to/from the PMD service interface
- Optional test-pattern generation and checking
- Link segment (per-lane) transmission and EMC parameters

Advantages of focus

- Focuses link segment analysis on a single target link segment
- Focuses PHY modulation, line coding, receiver performance specifications on a single target transmitter/receiver
- Minimizes possible bleeding edge high-frequency work (especially at 100G)
- Allows design reuse of 25 Gbps PMA on early, less-common higher speed links

Motion to consider

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THANK YOU!

Consensus
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