

Path to Baselines

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

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Outline

- Where we are
- Getting the Pump Primed
 - Setting up small decisions
 - What we've got
 - Managing complexity
- Recommended first steps

Where we are

- We have a project, generally:
 - Specify an Automotive PHY > 10 Gb/s
 - Now we need to write a draft
- We can now make technical decisions
 - We need to fulfill our objectives
 - Note, the PAR limits the scope, not the objectives
 - Objectives give important parameters
 - Speeds of 25, 50, 100 Gbps
 - Lengths of 11m on automotive media
- Now the fun starts....

Getting the Pump Primed!

- PHY designers design to a media spec
- Cabling designers design to an application's requirements
 - In the objectives: 11m, 2 inliners
- Start with the simple stuff:
 - Start with media parameters
 - What construction of media is NOT something we directly decide
 - We know 11m, 2 inliners,

Setting up the small decisions

- We don't specify constructions, but they influence what PHY designers need:
 - Automotive suitability (temperature, vibration, size, weight)
 - Transmission parameters which govern the PHY:
 - Specified bandwidth (over which we can have predictable performance)
 - Approximate loss vs. frequency
 - How many lanes
- Focusing on, and downselecting options here will aid the PHY work

Fortunately, we've been here before...

- We have data on link segments (802.3ch & SG)
 - We can add new data
- We have a template for measurements
 - We can add new ones as needed
- See 802.3ch website

Choices

- Number of paths in the medium: 1 or more than 1?
 - If more than 1: bidirectional lanes or unidirectional?
 - Cost of echo-cancelling – PHY complexity

- Possible Cabling types:

- Questions in:
 - [matheus kaindl 3NGauto_01a_0217.pdf](#)
 - [buntz NGAUTO_01c_0217.pdf](#)

Cable types

	UTP	STP	SPP*	Coax	POF/GOF
One „pair“					
Two „pairs“					

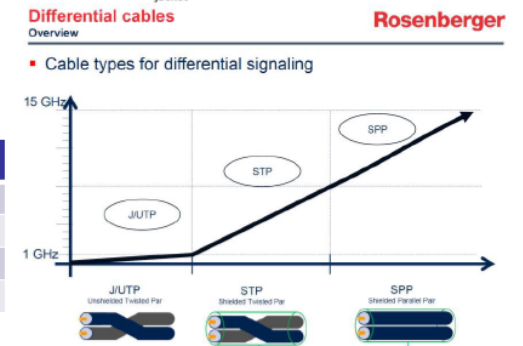
With/without jacket

- Possibilities given in:

- [mueller NGAuto_1a_0217.pdf](#)
- Various automotive types reviewed

Bandwidth	UTP	STQ	STP/SPP	Coax
<1 GHz	Likely	Likely	Likely	Likely
<3 GHz	Unlikely	Likely	Likely	Likely
<5 GHz	Unlikely	Unlikely	Likely	Likely
>6 GHz	Unlikely	Unlikely	Possible	Likely

Table above represents this presenter's impression from mueller



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Managing complexity

- 3 PHY speeds, multiple use cases could be a complex project
- Again, we've done this before...suggestions to manage
 - Stage decisions:
 - Media basics, PHY approach, Media details, PHY details
 - Borrow where we can, extend naturally:
 - 802.3ch – Not too far off in speed/reach & has automotive applications
 - Other 802.3 clauses (optical and other multi-lane schemes)
 - One 802.3cy speed to another
 - Innovate where it makes sense
 - If new media specs are anticipated, get those out early, with media basics
 - If PHY specs different from 802.3ch are needed, get those out with PHY approach discussion

Recommended First steps

- Bring automotive media recommendations first (input from OEM's, Tier 1's)
 - Mechanicals, relative cost, environmental stability
- Converge on a strawman link segment spec for each speed
 - Bandwidth, IL, RL, any additional specifications?
- Discuss how speeds may relate
 - Relates to media and sets stage for PHY discussions
 - Multi lane? Speed scaling? Different PHYs?

THANK YOU!

Consensus
WE BUILD IT.

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