

# Objectives ideas

IEEE 802.3 Multi-Gig Automotive Ethernet PHY Study Group  
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# Introduction

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- Short status review
- More possible applications for Multi-Gig Single Pair Ethernet (SPE)
- First ideas to set up this link segment

# What do we have now or under discussion using 1 pair transmission (SPE)?

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- 802.3cg 10Mbit/s task force
  - Automotive short reach
  - Industrial long reach (~1 km)
- 802.3bw 100 Mbit/s published
  - Short reach with power, (published)
- 802.3bp 1000Mbit/s, published
  - 15 m automotive short link
  - 40 m longer link with 3 environmental classes
  - Both with power derivable via PoDL (published)

# From Approved CFI

## CFI Multi-Gig Automotive Ethernet PHY

### Target Markets

#### ▶ Automotive networking

- The dominant driving market for this CFI
- Increasing bandwidth and interconnecting requirements for in-vehicle control systems
- Large market volume (i. e., port count)
- This presentation will focus on this segment

#### A Multi-Gigabit PHY could be leveraged across other segments including:

#### ▶ Avionics networking

- ▶ The need for weight savings for the cabling infrastructure is even more dominant than in the automotive industry

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- Automotive networking had been discussed in details with the different use cases
  - Let's talk about other application segments presented in the CFI and ad hoc meetings

# Possible applications for MultiGig SPE

## Industrial Automation

- Why MultiGig SPE?
  - High data rates needed for: Vision sensors and cameras, 3D laser scanners and other measurements equipment
- advantage of SPE Industrial Automation are:
  - Cabling must follow the mega trend of the miniaturization of the sensors
  - easier installation and maintenance

# Possible applications for MultiGig SPE

## Robotics

- Why MultiGig SPE?
  - High data rates needed for: The equipment installed at the robots like Vision sensors and cameras, 3D laser scanners and other measurements equipment
- advantage of Single Pair Ethernet for robots are:
  - the lower weight of the cables help to increase the movable work load at the robots (important for the growing number of small industrial robots)
  - easier installation and maintenance
  - longer life time for the strong used cables (bending and torsion)

# Possible applications for MultiGig SPE

## Transportation: Avionics, Railway, Light trains and busses

- Why MultiGig SPE?
  - High data rates needed for: WiFi, surveillance Cameras, passenger information systems and entertainment (similar like inside cars)
- advantage of SPE for railway are:
  - significant weight reduction
    - *save energy during the use*
  - easier installation and maintenance





# Possible applications for MultiGig SPE

## Agriculture vehicles and machines

- Why MultiGig SPE?
  - High data rates needed for: The equipment installed at the tractors, harvesters and other equipment like GPS and Vision sensors and cameras, 3D laser scanners and other measurements equipment and of course self driving machines
- advantage of SPE for this applications are:
  - easier installation and maintenance
  - plug and work functionality for the often changed equipment at the tractors
  - SPE support the trend to use Hybrid (Diesel/Electric) systems



# Possible applications for MultiGig SPE

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Beside the mainly at the CFI already addressed automotive use cases are other applications for 10GBASE-T1 possible like:

- Avionics
  - Robotics
  - Industrial automation with vision control sensors, cameras, 3D laser scanners and so on
  - Public transportation inside railway, light trains, and busses
  - Agriculture vehicles and machines
- MultiGig Single Pair Ethernet should be not only focused on automotive. Like all other Ethernet standards user will use it also for other applications if it is available in the market
- We should add this other use cases to the objectives

# NGAUTO (non automotive)

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- From the expected network size a longer link length is needed for this applications
- From the sequence presented, a link length around 30 m to 40 m with a transmission speed much greater than 1Gbit/s would fit.
- Is there anything we could take from?  
→ YES

# First ideas to set up this link segment

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- 802.3bq: 4-pair 25Gbit/s and 40Gbit/s over 30 m
  - Link supported by cabling standards ISO/IEC and TIA
- This means that 1 pair transmits 6.25bit/s or 10Gbit/s. Of course it does not mean that I can slice the PHY and link by 4 but the experience is there, it is not a complete new approach.
- As the noise in a 4-pair channel is different and probably higher than in one pair channels a longer reach than 30 m could be considered.

# THANKS FOR YOUR ATTENTION



*Thank you!*