Multi-Gig Ethernet for Automotive

WHAT DO WE NEED/WANT FOR AUTOMOTIVE?

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Surveys

In August, 2016 I sent out surveys regarding Multi-Gig Ethernet for Automotive.

- Audience:
  - OEMs
  - Tier 1's
  - PHY Vendors
  - Cable/Connector/Harness Suppliers
- Purpose:
  - Make people aware of the CFI for Multi-Gig Ethernet
  - Get people thinking about what they need and what is possible
  - Jump start work on proposals due to short time frame (end of year holidays)

Surveys – Background

Many Automotive OEMs are interested in Multi-Gig Ethernet but are not able or willing to attend the IEEE Meetings, in many cases due to the travel required. We collect information on what they would like to share with the group to ensure that what is developed will have broad acceptance and does not just reflect the needs of the few OEMs that participate directly.

Disclaimer included in survey email:

- Please note: These answers are for informational and planning purposes only and are not binding in any way.

Surveys – OEM Responses - Speed

Please indicate the usefulness (importance) of each of the four indicated Multi Gig Ethernet speeds (2.5 Gbps, 4 Gbps, 5 Gbps, 10 Gbps) by giving them a value from 1 (most useful / important) to 10 (not at all useful / important). If you do not plan to use Multi Gig Ethernet, please keep all values at 10.

4 Gbps was seen as being of very little value by most respondents so it is not included.

2.5 Gbps – 6.25 average – 5.45 w/o yellow

5 Gbps – 6.33 average – 5.8 w/o yellow

10 Gbps – 3.56 average – 1.64 w/o yellow

2.5 Gbps	5 Gbps	10 Gbps
10	1	5
10	5	1
2	10	1
10	5	5
10	10	1
10	10	1
5	10	4
1	10	5
3	6	1
5	1	1
5	7	10
10	5	10
10	10	10
3	2	1
6	3	1

Surveys – OEM Responses

Cable Types – Should different speeds use the same cable or is it okay if they're different?

- 68.75% of respondents said it is okay to use different cables for different speeds

Is it okay to use optical cable?

- 50% of respondents said they would consider using optical cable

Maximum operating temperature

- 62.5% need 105 C for most or all speeds
- 18.75% need more than 105 C for some or all speeds
- 18.75% say 85 C is sufficient for all speeds

Minimum operating temperature

- 100% agree that -40 C is sufficient
- -55 C is required for storage

Surveys – Tier 1 Responses

3 Tier 1's responded.

Their responses are not consistent with each other.

This variation may be due to the differing OEMs they have spoken with or may be due to the particular subsystems they generally supply.

Survey – PHY Vendors

PHYs that incorporate a single speed are less expensive than PHYs that can do multiple speeds.

Higher speeds generally require more power.

8 PHY vendors responded. 6 are typically copper providers, 1 is typically an optical provider and 1 provides both.

87.5% think that each speed should have its own cable type based on what would work best and should not try to keep the same cable type, potentially with more conductors.

25% think that optical fiber should be considered for multi-Gig Ethernet.

Thoughts on maximum speed for the following cables types:

- 1 UTP 0.1, 1, 1, 2.5, 2.5, 2.5, 4 Gbps
- 1 STP 1, 2.5, 5, 10, 10, 25 Gbps
- 1 coax 1, 10, 10+ 12, 12, 12 Gbps

PHY Vendors Presentation Requests

1. What is the maximum number of voltage levels you expect to be able to have in a single twisted pair and meet Automotive EMC requirements?
2. What is the relative cost of the PHY based on cable option (twisted pair, shielded twisted pair, shielded 2 twisted pairs, coax, POF) and speed (2.5 Gbps, 4 Gbps, 5 Gbps, 10 Gbps)?
3. Do you think an Optical Fiber solution can be competitive for 10 Gbps assuming you can't use Plastic Optical Fiber? What type of Optical Fiber would be required?
4. What is the maximum speed that can be transmitted on 1 UTP?
5. What is the maximum speed that can be transmitted on 1 STP?
6. What is the maximum speed that can be transmitted on 1 coax?

Survey – Harness Vendors

Thoughts on maximum speed for the following cables types:

- 1 UTP 1, 1, 1, 1 Gbps
- 1 STP 2.5, 5, 10, 15 Gbps
- 1 coax 5, 6, 10-15, 12 Gbps

Harness Vendors Presentation Requests

1. What is the maximum number of voltage levels you expect to be able to have in a single twisted pair and meet Automotive EMC requirements?
2. Do you think an Optical Fiber solution can be competitive for 10 Gbps assuming you can't use Plastic Optical Fiber? What type of Optical Fiber would be required?
3. What is the maximum speed that can be transmitted on 1 UTP?
4. What is the maximum speed that can be transmitted on 1 STP?
5. What is the maximum speed that can be transmitted on 1 coax?