Draft Objectives for Discussion

IEEE 802.3 Study Group
10Mb/s Single Twisted Pair Ethernet (10SPE)

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Basic PHY project objectives formulae

PHY projects typically have objectives of the form:

- Preserve the 802.3 / Ethernet frame format utilizing the 802.3 MAC
- Support a data rate of 10Mbps at the MAC/PLS service interface
- Preserve minimum and maximum Frame Size of current 802.3 standard
- Support full duplex operation (or half duplex in this case)
- Support a BER better than or equal to 10-x at the MAC/PLS service interface
- Support (optional single pair) Auto-Negotiation
- Define (optional) Energy Efficient Ethernet
- Support point-to-point (and/or point to multipoint) topologies
- Define or describe any link segments to be used
- Define a PHY (or PHYs) capable of operation over (various link segments)
- Do not preclude meeting FCC and CISPR EMC requirements
- Support optional PoE/PoDL
- Operate in any application environments/features necessary
  - E.g., Automotive, Industrial EMC, Intrinsic safety, fast startup

Noncontroversial

- – Preserve the 802.3 / Ethernet frame format utilizing the 802.3 MAC

- – Support a data rate of 10Mbps at the MAC/PLS service interface

- – Do not preclude meeting FCC and CISPR EMC requirements

  - (note – this does not limit additional EMC objectives)

Usual, but need some discussion, choices and justification

- Preserve minimum and maximum Frame Size of current 802.3 standard

  - (hard change to justify in a PHY project)

- Support full duplex operation

  - (any case for half duplex?)

- Support a BER better than or equal to 10^{-9} at the MAC/PLS service interface

  - (needs support, 10^{-9} consistent w/10/100)

- Support for optional single-pair Auto-Negotiation

  - (should fit in with BASE-T1 family of PHYs)

- Define optional Energy Efficient Ethernet

  - Low power when no packets to be sent

- Support 10 Mbps operation in automotive & industrial environments

  - Is this necessary with the next slide?

Hard stuff that define our PHYs

- Define the performance characteristics of link segments and one or more PHYs to support point-to-point operation over this link segment with single twisted pair supporting up to four inline connectors using balanced cabling

- Define one or more PHYs to support the following options, where at least one must be present:
  - up to at least 1200 m reach with full-duplex operation
  - up to at least 40 m reach (with half-duplex operation?)
  - up to at least 15 m reach (with half-duplex operation?)

- Support the ability to meet EMC standards and regulations in industrial automation, building automation, and automotive
  - How we state this may matter

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<u>Special industrial requirements</u>

- Support point-to-point operation over a subset of single twisted pair cables commonly used for long reach, including IEC 61158 Type A

- Do not preclude working within an Intrinsically Safe device and system as defined in IEC 60079

- Point to multipoint operation?, Which link segments?

<u>Special automotive requirements</u>

- Support point-to-point operation over an automotive link segment with a single twisted pair supporting up to four inline connectors using balanced copper cabling for at least 15m.

- Define optional startup procedure which enables the time from power_on=FALSE to valid data to be less than 100ms

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<u>Powering Objectives for 10 Mb/s Ethernet</u>

- Specify an optional power distribution technique for use over the 10 Mb/s single twisted pair link segment in conjunction with a 10Mbps single-pair PHY

- Allow for operation if a PHY is not present

- Do not preclude compliance with standards used in industrial automation, building automation, automotive, and transportation industries when applicable

- Do not preclude working within an Intrinsically Safe device and system as defined in IEC 60079

Big things to Consider

- Each of these can make its own separate set of PHY objectives:

  - Is half duplex acceptable or required?

  - Is point-to-multipoint required?

- Is a 15m automotive PHY also a 15m industrial PHY?

- Any other special features/modes that are 'MUST HAVE'

- Any special features that are NOT 'MUST HAVE' can be dropped

Smaller things to do

- Get analysis for:
  - Market potential vs Link segments
  - BERs required
- Get strawmen for:
  - Link segments vs market potential
  - PHY feasibility vs link segments
  - Powering in this environment

THANK YOU!