Draft Objectives for Discussion - update

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

George Zimmerman
CME Consulting, Inc.

Noncontroversial – Ready to Accept

– 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

Usual, May be ready to accept

- THESE SEEM READY TO ACCEPT:
  - Preserve minimum and maximum Frame Size of current 802.3 standard
    - Supported by brandt_082216_10SPE_02_adhoc , reflector comments (Buntz)
  - Support a BER better than or equal to 10-9 at the MAC/PLS service interface
    - Supported by brandt_082216_10SPE_01_adhoc
- THESE DON'T SEEM TO BE CONTROVERSIAL, BUT DO THEY NEED SUPPORTING PRESENTATIONS? (SUGGEST WE ACCEPT):
  - Support for optional single-pair Auto-Negotiation
    - Consistent with broad market potential & compatibility w/existing BASE-T1 PHYs (brandt_082216_10SPE_03_adhoc.pdf
  - Define optional Energy Efficient Ethernet
    - Consistent with broad market potential & compatibility w/existing BASE-T1 PHYs
    - Might be nice to have a presentation on...
  - Support 10 Mbps operation in automotive & industrial environments
    - May not be necessary as a separate objective, but is supported by the CFI market potential

- NEEDS SOME DISCUSSION: FULL DUPLEX SUPPORT
  - DO ALL PHYS HAVE TO SUPPORT FULL DUPLEX OPERATION?
  - Note that this is with regards to the 802.3 MAC meaning of full/half-duplex (collisions on the medium, not whether the PHY is echo-cancelled, TDD, FDD,...)

Hard stuff that define our PHYs
Things that seem close but need work

- 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 <u>including automotive and industrial environments</u>
  - <u>SUGGEST WE ACCEPT:</u> (Discuss, Any alternative wording?)

- Support the ability to meet EMC standards and regulations in industrial automation, building automation, and automotive
  - <u>SUGGEST WE DROP:</u> This seems redundant with the earlier environment objectives, and previous automotive or LAN PHYs didn't have an additional objective

Special Application Requirements
Things that seem close

- Support point-to-point operation over a subset of single twisted pair cables commonly used for long reach, including IEC 61158 Type A
  - <u>SUGGEST WE DROP:</u> Do we need this specificity? As long as Feasibility includes common cabling, maybe not

- Do not preclude working within an Intrinsically Safe device and system as defined in IEC 60079
  - <u>SUGGEST WE ACCEPT:</u> We seem to have consensus, but may need a defining presentation & a check to make sure feasibility points are consistent. Note, this does NOT make IEC 60079 a requirement on all systems.

- 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.
  - <u>SUGGEST WE ACCEPT:</u> **STILL NEEDS FEASIBILITY PRESENTATIONS**

- Define optional startup procedure which enables the time from power_on=FALSE to valid data to be less than 100ms
  - <u>SUGGEST WE ACCEPT:</u> FEASIBILITY IS REFERENCE 802.3BP/BW

Special Issues to Resolve

- Is support for full duplex required in all cases?
  - See earlier for Ethernet meaning...

- Do we need point-to-multipoint link segments to meet Market or Economics?
  - If so, for which use cases/link segments?
  - Links may be shared media, so this could be tied to not always supporting full-duplex
    - **Will need 802.3 WG socialization & presentations**

Powering Objectives:

- Specify an optional power distribution technique for use over the 10 Mb/s single twisted pair link segments in conjunction with 10Mbps single-pair PHYs
  - SUGGEST WE HAVE CONSENSUS ON THIS, STILL NEEDS FEASIBILITY PRESENTATIONS
    - Maybe an overview of 802.3bu and possible modifications?
    - Do we need powering levels vs. links? (PoDL didn't have these)

- These all seem noncontroversial:
  - 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

The Big Ticket Item:
Reaches and PHY Use Cases

- Define one or more PHYs to support the following options, where at least one must be present:
  - up to at least 1200 m reach on an industrial or link segment
  - up to at least 40 m reach on an industrial or transportation link segment
  - up to at least 15 m reach on an industrial and automotive link segment
    - (Automotive feasibility of this one is HIGHLY sensitive to economics in both environments)
- Need Technical Feasibility/Economic Feasibility presentations
  - 15m/automotive: Need presentations
  - 40m:CFI (slide 41 is >40m), could use more backup: is 40m the right tradeoff?
  - 1.2km: Need presentations
- Broad market potential presentations to support individual reaches:
  - CFI, brandt_082216_10SPE_03_adhoc.pdf, ...

Next steps

- SURFACE ANY ADDITIONAL ISSUES EARLY
  - the later we start, the later we finish
- BRING YOUR PRESENTATIONS
  - I'm only highlighting the issues, we are contribution driven
  - We need supporting material for several of these
- HELP TO FOCUS DISCUSSION
  - Let us know which points you are attempting to support or resolve by telling us.
  - Let us know what questions you think we need to answer first

THANK YOU!