Chair's Thoughts

IEEE 802.3

10 Mbps Single Pair Ethernet Study Group

George Zimmerman (Chair)

CME Consulting, Inc.

Ad Hoc 10/10/16

Adopted Objectives (Sept Interim)

1. Preserve the IEEE 802.3/Ethernet frame format at the MAC client service interface.
2. Preserve minimum and maximum frame size of the current IEEE 802.3 standard.
3. Support a speed of 10 Mb/s at the MAC/PLS service interface.
4. Do not preclude meeting FCC and CISPR EMC requirements
5. Support for optional single-pair Auto-Negotiation
6. Support optional Energy Efficient Ethernet
7. Support 10 Mb/s operation in automotive environments (e.g. EMC, temperature) over single balanced twisted-pair cabling.
8. Support 10 Mb/s operation in industrial environments (e.g. EMC, temperature) over single balanced twisted-pair cabling.

Objectives for consideration – compilation from Brandt, Tazebay & Winkel

- Define the performance characteristics of a link segment and at least one PHY to support point-to-point operation over this link segment with single twisted pair supporting up to four inline connectors using balanced cabling for at least 15 m reach.
- Define the performance characteristics of a link segment and a PHY to support point-to-point operation over this link segment with single twisted pair supporting up to 10 inline connectors using balanced cabling for at least 1 km reach
- Maintain a bit error ratio (BER) of less than or equal to 10^-9/10^-10 at the MAC/PLS service interface. (Winkel: Support < 10^-9 for up to 1000m and < 10^-10 for up to 100m cable length)
- Do not preclude working within an Intrinsically Safe device and system as defined in IEC 60079
- Do not preclude the ability to survive automotive and industrial fault conditions (e.g. shorts, over voltage, EMC, ISO16750).
- Support fast-startup operation using predetermined configurations which enables the time from power_on**=FALSE to a state capable of transmitting and receiving valid data to be less than 100ms.
- Support optional operation with run-time configuration, that specifies a maximum allowable time from power_on **=FALSE to a state capable of transmitting and receiving valid data.
- 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 (Yseboodt: compatible with 802.3bu)
- Support voltage and current levels for the automotive, transportation, and industrial control industries.

Other Possibilities Raised (not objectives yet)

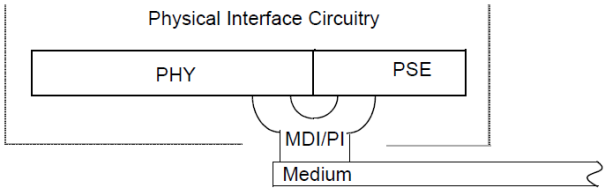
- Link Quality diagnostics?
  - Is this big enough that it needs to be an objective?
- PHY/MAC interface?
  - Do we need an objective to define a reduced-complexity interface?
- Link loss recovery? a ‘fast recovery’ objecitive, and if so, how long?
  - Be careful, this could essentially be specifying that it is OK to lose the link for a certain time period

Multi-Drop/DC-bus Objectives

- Support optional bus topology for applications up to 15m.
- Support optional power delivery over 10BASE-T1 links, using a method that allows the PD to act as a DC bus
- Multidrop PHY objectives... Support:
  - CSMA/CD multidrop links
    - [Discussion mentioned maybe PON is better]
  - CSMA/CD multidrop or full duplex links (with autonegotiation)
    - [“Autonegotiation” may be the wrong word here, discussion was around “plug and play” and existing 1-pair autoneg is designed for pt-to-pt]
- These need more work: for example (not complete):
  - Multi-access method (CSMA/CD, PON, other?)
  - How do we describe the “define a link segment”, e.g., Node count, other limits?
  - What is meant by autonegotiation
  - What is this required to plug-and-play with? Anything?
- Need to consider whether this impacts our existing CSDs

Multi drop issues

- Technical Feasibility is an issue
  - Very little uncertainty on PHY communication
  - MAC protocols
  - Powering technology for hot-installation
  - Failure analysis/fault isolation needs to be proven
  - May be dependent on getting progress on a pt-to-pt link
- Multi-drop vs. Single-drop may be a good line to separate the project along
- Is Multi-drop power really all that is needed?
  - Standards vs. product features



MDI = Medium Dependent Interface
PHY = Physical Layer Device
PI = Power Interface
PSE = Power Sourcing Equipment