Baseline proposal for chip-to-module attachment unit interface (AUI-C2M) at 200 Gb/s per lane

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Preface

- AUI-C2M is a high priority electrical specification in P802.3dj
  - Likely the first one that the market will widely adopt
- A lot of work has been done in this area
- Not all details are in consensus at this time
  - But there are general assumptions on the technology and components of the solution
- We can start forming a baseline proposal
  - A baseline and initial drafts can include TBDs

Outline

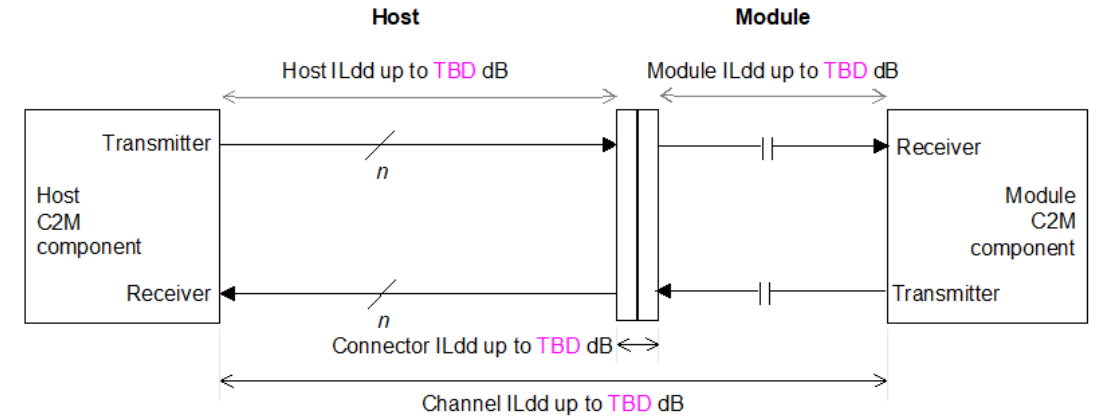
- AUI-C2M will be specified in an annex that multiple PHY/PMD clauses can refer to.
  - Not having a number yet, it is referred to in this presentation as Annex 999X.
- The structure of this annex is expected to be based on existing AUI-C2M annexes, such as 120G, with some modifications.
- The major subclauses are:
  1. Overview, including a general error rate specification (BER or other)
  2. Channel model (including recommended insertion loss)
  3. Compliance point definitions
  4. Electrical characteristics: host/module, output/input
  5. Measurement methodology
  6. PICS
- Details on each subclause are included in the following slides.

999X.1 Overview

- General introductory text
- Architectural diagram (as in Figure 120G-1), including usage within a PHY and within an xGMII Extender
- Composition of a C2M link, with a pointer to 999X.2 (channel model subclause)
- Nominal signaling rate 106.25 GBd, PAM4 modulation
- Adjustable output equalization and differential swing, with method TBD
  - AKA “Link Training”, expected to be defined in another annex
- Error rate specifications
  - Based on a BER allocation assuming uncorrelated errors (see ran_3dj_01_230817)
    - For AUI-C2M within a PHY: TBD (options: 1e-5 / 2e-5 / conditional on having a C2C in the PHY)
    - For AUI-C2M within an xGMII Extender: TBD (options: 1.29e-4 / 2.58e-4 / conditional on having a C2C in the Extender)
  - Allowance of additional errors from other segments for each case
  - Measurement method and limits TBD (may refer to a general Annex that would explain BER allocation).

999X.2 Channel model

- Channel model figure with all losses TBD
  - Text stating that host and module losses in the figure include packages



NOTE—The number of lanes *n* is equal to 1 for 200GAUI-1, 2 for 400GAUI-2, 4 for 800GAUI-4, and 8 for 1.6TAUI-8.
ILdd values are at 53.125 GHz.

Figure 999X–99—Channel model for AUI-C2M

- Channel insertion loss (recommended)
  - Text, equation and figure based on 120G.4
- COM reference model (new) TBD
  - Includes reference transmitter and receiver for assumed capabilities
  - Same as those used for normative input/output requirements that include reference Tx/Rx

999X.3 Compliance point definitions

- Similar to 120G.2
- Reference to channel model in 999X.5
- HCB/MCB characteristics (similar to 120G.5.4)
  - Previously another annex with detailed HCB/MCB/MTF specifications was pointed to (e.g., Annex 162B)
  - Baseline for that annex should be adopted separately (and independently of a possible CR clause)

999X.4 Electrical characteristics: host/module, output/input

- Host and Module output:
  - All existing specifications in 120G, with the following exceptions:
    - Signaling rate value 106.25 GBd ±50 ppm (for 400GAUI-2 and 200GAUI-1, applies only for a PMA in the same package as the PCS)
    - Transition time (min) value TBD
    - Steady-state voltage (max) defined with equalization off, value TBD
    - VEC and EH replaced by output parameters TBD (see “Measurement methodology”)
    - Limits based on error allocation
    - ERL TBD
  - Details, equations, figures
- Host and Module input:
  - All existing specifications in 120G, with the following exceptions:
    - Signaling rate value 106.25 GBd
      - ±100 ppm for 400GAUI-2 and 200GAUI-1, ±50 ppm otherwise
    - Stressed input tolerance
      - Setup diagrams, jitter profile are similar to 120G
      - Calibration procedure and parameters TBD due to adjustable equalization
    - Limits based on error allocation
    - ERL TBD
  - Details, equations, figures

999X.4 Measurement methodology

- To be decided
- Likely alternatives for output specifications:
  A. Based on 120G: EH and VEC
  B. Based on 120F: Output waveform, SNDR, R_{LM}, SNR_{ISI}, Output jitter
- For input specifications, method of calibrating stressed signal will be based on the output specification

Summary

- A proposed structure and content of an AUI-C2M annex was presented.
- Significant areas to be decided are
  - Error allocation
  - Adjustable output equalization/swing method (aka link training)
  - Methodology, with consideration of adjustable output
  - Some parameter values
- These gaps could be filled after D1.0 is generated.

That’s all

Questions? Discussion?