Unconfirmed Meeting Minutes: IEEE P802.3bp 1000BASE-T1 Task Force

March 18-20, 2014
Beijing, China

Prepared by George Zimmerman

IEEE P802.3bp 1000BASE-T1 Task Force meeting convened at 09:14 AM, Tuesday, March 18, 2014 by John D'Ambrosia, Acting as 802.3bp Task Force Chair for the meeting. Mr. D'Ambrosia had been appointed acting Chair for the meeting by Steve Carlson, prior to the meeting via email to the 802.3bp reflector. 802.3 Working Group Chair David Law confirmed the appointment during the opening plenary meeting on March 17.

Attendance is listed in Appendix A

ADMINISTRATIVE MATTERS
Presentation: agenda_3bp_0314.pdf
Presenter: John D'Ambrosia, Acting Chair.

The Chair called for introductions and affiliations.

The Chair reviewed the agenda. Mr. D'Ambrosia turned to presentation agenda_3bp_01_0314.pdf and reviewed the schedule of presentations for the meeting.

Motion #1: Approve the agenda as modified from agenda_3bp_01_0314.pdf

M: Alex Tan S: William Lo
Approved by voice vote without opposition (Procedural > 50%)

Motion #2: Approve the minutes from the January meeting (http://www.ieee802.org/3/bp/public/jan14/minutesu_3bp_0114.pdf)

M: Richard Mei S: Chris Mash
Approved by voice vote without opposition (Procedural > 50%)

The Chair then resumed the review of presentation agenda_3bp_01_0314.pdf:
- Mr. D'Ambrosia asked if anyone was attending from the press including those who would run a public blog on this meeting.
- Mr. D'Ambrosia noted that there should be no recording or photography without permission.

The Chair disclosed that under his role in the Ethernet Alliance he did write blogs sometimes related to standards activities, but would not write "blow-by-blow" descriptions of actions in meetings. There were no other responses indicating they published a public report or blog.

Mr. D'Ambrosia reviewed the goals for the meeting, access to the reflector and website, and ground rules.

Attendance, Mr. D'Ambrosia advised the group of the IEEE meeting attendance tool and procedures, including both the attendance book and the web attendance tracking tool.

IEEE Patent Policy, at 9:27 am, Mr. D'Ambrosia showed slides 0 through 4 patent policy from agenda_3bp_0314.pdf. Mr. D'Ambrosia read aloud slides 0 through 4. Mr. D'Ambrosia made the call for potentially essential patents at 9:31 am, and none responded. Mr. D'Ambrosia then completed the reading of slide #4.

Mr. D'Ambrosia then continued review of the presentation, including overview of the IEEE standards organization and the standards development process.

LIAISONS

The Chair moved to liaisons, and asked Mr. Dave Dwelley to present the liaison report from the PoDL / 1000BASE-T Liaison report. (dwelley_3bp_01_0314.pdf) He discussed the noise added by the PoDL powering system and described the coupling network. Starting limits for PoDL noise were taken from Clause 33 (Table 33-11 and 33.2.7.3) describing noise from 100 kHz to 1MHz, and technical notes on the nature of the noise specification.

Mr. Dwelley requested that the 1000BASE-T1 Task Force provide information to the PoDL Task Force as to the desired noise level at frequencies above 1 MHz.

The Chair delegated formulating a response to this request to the EMC Ad Hoc led by Mr. Tazebay.

The PoDL Task Force will use this information to calculate the values needed for a coupling network, and provide feedback to the 802.3bp Task Force.

Following Mr. Dwelley's presentation, the Chair completed review of the presentation noting the rules for presentations, project objectives which were unchanged from the prior meeting, and since the group has been in Task Force.

BREAK AT 10:02AM TO RECONVENE AT 10:25 AM

PRESENTATIONS

The Chair then moved to the presentations for the meeting. (Secretary's note – where significant group discussion occurred, particularly involving future actions, a summary of any follow-on points is provided. Summaries are given as a guide to the presentation material.

Title: Channel Definitions Ad Hoc Report (diminico_3bp_01_0314.pdf)

Summary: Report of activities of the 802.3bp channel definitions ad hoc since the January Interim meeting. The channel modeling ad hoc held 5 conference calls since the January interim. Channel Definitions ad hoc meetings are held weekly on Thursdays at 8AM PST. The presentation reviewed the contributions and progress made. The main areas of activity have been: optional link segment specification, link segment balance test specifications, test fixture specification, and alien crosstalk topologies and test procedures. The report concluded requesting a face-to-face ad hoc meeting to be held Wednesday.

Presenter: Chris Diminico, MC Communications, Co-chair 802.3bp channel definitions ad hoc

Co-author: Mehmet Tazebay, Broadcom, Co-chair 802.3bp channel definitions ad hoc

Title: EMC Ad Hoc Report – 802.3bp 1000BASE-T1 EMC & Noise Ad Hoc Report (EMCnoise_ad_hoc_3bp_01_0314.pdf)

Summary: The presenter described progress in the EMC ad hoc since the prior meeting, and outlined work for a face-to-face ad hoc meeting to be held on Wednesday. One contribution had been received (see below) to be heard in the ad hoc.

Presenter: Mehmet Tazebay, Broadcom, Co-chair 802.3bp EMC ad hoc

Co-author: Ahmad Chini, Broadcom, Co-chair 802.3bp EMC ad hoc

The following presentation was posted on the web site, but was heard in the EMC Ad hoc rather than in the Task Force meeting.

Title: Slow Transient Noise Analysis based on ISO 7637-3 (chini_3bp_01_0314.pdf)

Summary: Slow transient noise analysis test was set up according ISO 7637-3 and 3-port transfer function (S3P) was captured using the VNA. A 3-port ADS model was generated in order to compute the differential noise at the PHY input. The DM noise at the PHY input is expected to be less than 10mV for slow transient noise. Slow transient noise estimated based on ISO 7637-3 is not expected to be a significant noise source for 1000BASE-T1.

Presenter: Mehmet Tazebay, Broadcom, Co-chair 802.3bp EMC ad hoc

Co-author: Ahmad Chini, Broadcom, Co-chair 802.3bp EMC ad hoc

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Title: Worst Case Alien-Near-End-Crosstalk Measurements and Analysis for IEEE 802.3bp (meurer_3bp_01 0314.pdf)

Summary: This contribution shows measurements of alien near end crosstalk and shows that for several cables, greater than the requested 6dB relaxation of alien crosstalk is required.

Presenter: Martin Meurer, MD Elektronik GmbH

Discussion: Discussion in the group clarified that what the presenter described as 'preferred' cable for 1000BASE-T1 was not necessarily the 'preferred' cable by all, and that other participants in the group were working with the presenter to improve the cable. Other members emphasized that there were better performing cables which met the existing limits for Alien Crosstalk. In further discussion, members of the group discussed that the configuration measured in the presentation was different (less stringent) than the working topology in the channel definitions ad hoc. The presenter indicated he would bring his presentation to the ad hoc for further discussion.

The Chair indicated that, with the groups consent, a late presentation would be heard next on the same subject. There was no dissent.

Title: IEEE 1000BASE-T1 Alien crosstalk measurements (mueller_01_3bp_0314.pdf)

Summary: This contribution discussed alien crosstalk measurements, and improvements, comparing to measurements given in Indian Wells (mueller_01a_0114.pdf). The presenter proposed a change to the alien near-end crosstalk specification, relaxing it by 6 dB independent of frequency.

Presenter: Thomas Müller, Rosenberger

Discussion: The group focused on the topology for the alien crosstalk measurements themselves and how they related to realistic worst-case automotive harness measurements and previous measurements seen by the group. The presenter showed additional data

Title: Effects of New NEXT Limit on Performance (xiaofeng_3bp_01_0314.pdf)

Summary: This contribution analyzes the impact of the proposed 6dB relaxation of PSANEXT on PHY SNR margin. The analysis concludes there is minimal degradation of the margins due to the additional proposed PSANEXT.

Presenter: Xiaofeng Wang, Qualcomm

Discussion: No discussion was offered.

Title: PAM-3 Line Coding/Mapping for 1000BASE-T1 (xiaofeng_3bp_02_0314.pdf)

Summary: This contribution proposes a ternary line code for PAM-3, and analyzes the performance. Particular attention is spent on DFE error propagation protection. A 10:7 ternary line code is specifically recommended.

Presenter: Xiaofeng Wang, Qualcomm

Discussion: There was significant discussion regarding the error propagation and its importance in the presence of transient noise. Others were concerned whether the insertion of PAM-2 symbols would be sufficient to terminate error propagation.

BREAK FOR LUNCH AT 12:00, AND RECONVENED AT 1:20PM.

Title: PAM3 Mapping for 802.3bp (liu_3bp_01a_0314.pdf)
Summary: This contribution proposes high efficiency (<1% rate loss) mappings of FEC-encoded bits to PAM-3 constellations, based on either 11 bit or 19 bit groupings into 7 or 12 PAM-3 symbols, respectively. The mappings are shown to minimize run lengths. Mapping diagrams and tables are provided, as well as the impact of the mapping on the transmit spectrum.
Presenter: Zhenyu Liu, Marvell Semiconductor

Discussion: No discussion followed the presentation.

Title: 1000BASE-T1 Line Baud Rate Selection (Lo_3bp_01_0314.pdf)
Summary: This contribution justifies and proposes using baud rates that are a multiple (or simple rational relation) of 25MHz in order to lower system cost and minimize PHY complexity and maximize relation to existing Ethernet rates.
Presenter: William Lo, Marvell Semiconductor

Discussion: No discussion.

Title: 1000BASE-T1 PHY Encoder Proposal For Gigabit MAC Compatibility (Lo_3bp_02_0314.pdf)
Summary: This contribution points out that the 64/65b PCS rate encoding used for PHY rate analysis based on 10G applications would restrict control symbols to 4-byte boundaries, whereas 1G and lower rate Ethernet allow control symbols at any byte boundary, creating an incompatibility with existing Gigabit MACs. The contribution proposes a solution, encoding a pointer in the PCS encoding at 64/65b and further proposes extensions to 8N/(8N+1) encoding, which could be matched to whatever FEC is used. The contribution further proposes using Clause 55 scrambling.
Presenter: William Lo, Marvell Semiconductor

Discussion: There was no discussion offered by the group.

Title: Fast Synchronization Mechanism for 1000BASE-T1 (Lo_3bp_03_0314.pdf)

Summary: This contribution addresses synchronization of startup and proposes using Clause 73 (backplane autonegotiation) instead of Clause 28 (BASE-T autonegotiation) as a basis for developing 1000BASE-T1 startup, because Clause 73 would be able to meet the fast startup times required for the application. The presenter proposes an ad hoc investigate adapting Clause 73 for startup synchronization.
Presenter: William Lo, Marvell Semiconductor

Discussion: Discussion indicated some support for elements of the proposal – particularly and the possibility of folding the discussion into the PHY ad hoc rather than starting a new ad hoc.

Title: IEEE 802.3bp 1000BASE-T1: 1. Stream FEC Proposal 2. Latency Model Proposal (Brown_3bp_01_0314.pdf)
Summary: The presenter reviewed the benefits of applying the FEC on the PCS encoded bit stream, similar to 802.3ba and EPON standards. Additionally, the presenter proposed a layered model for a latency budget, specifying a MAC to MAC 1-way latency model and suggesting some partitions into sublayers.
Presenter: Mandeep Chadha presenting for Tom Brown, Vitesse
Discussion: No discussion. (most of the material for this presentation had been previously heard in the PHY proposal ad hoc).

Title: FEC Considerations for 802.3bp 1000BASE-T1 (shen_3bp_01_0314.pdf)
Summary: This contribution discusses various considerations for FEC in 1000BASE-T1, including latency, interleaving, soft-decision decoding and burst error protection in the presence of a 0.2usec impulse. LDPC codes and Reed-Solomon codes are compared in these discussions. Decoder complexity and code rates are also mentioned. The contribution concludes that soft-decision decoding in LDPC codes can provide up to 2.5dB better performance in narrow-band interference.
Presenter: BZ Shen, Broadcom
Discussion: There was some discussion on the error propagation performance of LDPC codes. Additionally there was discussion of simulation work needed to combine the FEC with the bit mapping to a PAM-3 constellation.

BREAK AT 3:15PM TO RECONVENE AT 3:45 PM

DISCUSSION, MOTIONS & STRAW POLLS

Having concluded the presentations for the meeting, the Chair then moved to discussion, motions and (additional) straw polls.

The Chair entertained Mehmet Tazebay presenting tazebay_01a_3bp_0314.pdf, showing multi-vendor consensus on PAM3 as the modulation scheme, which resulted in Motion 3 below.

MOTIONS:

Motion 3: Move that the IEEE P802.3bp Task Force adopts PAM3 as the modulation scheme for 1000BASE-T1 PHY.
M: Mehmet Tazebay S: William Lo
Y:33 N:0 A: 5
MOTION PASSES (Technical >= 75%)

Motion 4: Move that 802.3bp adopt the "Proposed baseline" Alien NEXT specification on slide 8 of mueller_01a_3bp_0314.pdf
M: Thomas Müller S: Chris Mash
Y: 29 N:0 A: 9
MOTION PASSES (Technical >= 75%)

Having concluded the technical presentations and the motions offered, the chair recessed the meeting to allow scheduled ad hoc meetings on Wednesday March 19, to reconvene on Thursday, March 20 at 9AM to hear ad hoc reports and any further business (e.g., motions).
Meeting Recessed at 4:14PM, to allow for ad hoc meetings on Wednesday, March 19, to reconvene at 9AM Thursday, March 20.

Meeting Reconvened at 0900 AM Thursday, March 20, 2014.

The Acting Chair, Mr. D'Ambrosia called the meeting to order. At 9:02AM he showed slides 1-4 detailing the IEEE patent policy, and repeated the call for essential patents from the prior day. There were no responses.

The Chair then moved to take reports from the ad hocs.

Ad Hoc Reports, Straw Polls, Discussion and Motions
Mr. Diminico reported on the meeting of the Channel Definitions ad hoc from the prior day, reporting that the action items on diminico_3bp_01_0314.pdf, slide 3 where progressed, and that he expects to begin discussing draft text for the test fixtures, alien crosstalk, and balance measurements in the ad hoc soon, and is anticipating a baseline draft at the next Task Force meeting. The next ad hoc meeting will be held April 3, from 8-10am PST.

The Chair then entertained Mr. Dwelley, Chair of the Power over Data Lines (PoDL) group, to take a straw poll on attendance and joint participation in 1000BASE-T1 and PoDL.

Straw Poll:

Do you plan on spending time in PoDL during the Interim Meeting in Norfolk, VA in May 2014?

Y: 9 Maybe: 6

Will you be generating a PoDL presentation for the Norfolk Interim Meeting?

Y: 0 Maybe: 0

The Chair then moved to take the remaining ad hoc reports, and Mr. Tazebay presented on the EMC ad hoc held 3/20/2014 during the recess.

Title: 802.3bp 1000BASE-T1 EMC & Noise Ad Hoc Report (tazebay_3bp_03a_0314.pdf)

Summary: The presenter described progress in the EMC ad hoc the previous day. The request from the PoDL ad hoc will be analyzed and presented before the May interim. The group discussed a contribution on transient noise analysis presented by Mr. Tazebay, which showed it is not a dominant factor. The group decided that the EMC ad hoc will not meet regularly, but will call its next meeting as needed.

Presenter: Mehmet Tazebay, Broadcom, Co-chair 802.3bp EMC ad hoc

Mr. Tazebay then presented on the PHY ad hoc meeting held 3/20/2014 during the recess.

Title: 802.3bp 1000BASE-T1 PHY Ad Hoc Progress Report (tazebay_3bp_02a_0314.pdf)

Summary: The presenter described progress in the PHY ad hoc the previous day. The group reviewed William Lo's presentations and prepared motions for the Task Force. Mr. Tazebay presented the ad hoc's prioritized action plan for agreeing on completing the details of a baseline PHY proposal. The PHY ad hoc anticipates to complete a transmit PSD mask and analysis of the PoDL noise impact by the May Task Force meeting.

Presenter: Mehmet Tazebay, Broadcom, Chair 802.3bp PHY ad hoc

William Lo then presented the following contribution, presented the prior day at the PHY ad hoc.

Title: Modified Clause 73 Auto-Negotiation Detailed Proposal (Lo_3bp_04_0314.pdf)

Summary: This contribution provides more detail on synchronization of startup and using Clause 73 (backplane auto negotiation) instead of Clause 28 (BASE-T auto negotiation) as a basis for developing 1000BASE-T1 startup, The contribution includes detailed description of state machines, electrical signaling (to be based on whatever transmitter is used for normal data), and describes the state variables necessary to implement the proposal.

Presenter: William Lo, Marvell Semiconductor

Discussion: The presenter clarified that the intent is to use the content of Clause 73 as a baseline and shows the differences from what is already in Clause 73. He was not proposing that 802.3bp create amendments to Clause 73 itself. The presenter clarified that he was using Clause 73 auto negotiation as a model not so much for auto negotiation but to aid PHY synchronization. There was discussion that the group should think carefully about how true auto negotiation might be implemented and what legacy devices might be considered. *The Chair noted that we are a contribution driven organization and that contributions on subjects such as how auto negotiation might relate to other 802.3 projects should be brought to the PHY ad hoc.*

This concluded the ad hoc reports.

BREAK AT 10:07 AND RECONVENED AT 10:36

MOTIONS

The Chair then entertained motions that were outputs from the PHY ad hoc (see motions_3bp_01_0314.pdf)

Motion #5: Move that 1000BASE-T1 PHY proposals use a line baud rate of 25N/M MHz where N and M are integers, M <= 5 and ideally M = 1.

M: William Lo S: Mehmet Tazebay
Y:24 N: 0 A: 7
MOTION PASSES (Technical >=75%)

Motion #6: Move that 1000BASE-T1 PHY encoder use the 8N/(8N+1) block as described in Lo_3bp_02_0314.pdf slide 18 (Formal Encoder Definition) and the Clause 55 scrambler (as shown on slide 15 of same). The final integer value of N ranging from 1 to 16 inclusive will be decided by the 802.3bp task force at a later date.

M: William Lo S: Mehmet Tazebay
Y: 30 N: 0 A: 3
MOTION PASSES (Technical >=75%)

No further motions were offered.

OTHER ADMINISTRATIVE BUSINESS

The Chair then discussed future meetings.

Future Meetings Straw Poll
Straw Poll:
Will you attend the May 2014 interim meeting in Norfolk, VA

YES! - 20
Maybe – 6
May not - 6
NO! - 2

Adjournment
<u>Motion #7:</u> To adjourn the meeting.
M: Mehmet Tazebay S: Mandeep
MOTION PASSES by voice without opposition
The Meeting was adjourned at 10:52 AM, Thursday, March 20, 2014.

Appendix A: Attendees at the IEEE P802.3bp 1000BASE-T1 Task Force Meeting, March 18-20, 2014

P802.3bp Task Force Sign-In Sheet March 18-21, 2004

Name	Company	Affiliation	Email (optional)	T	W	Th
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P802.3bp Task Force Sign-In Sheet _____

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MM