Approved Minutes
IEEE P802.3bj 100 Gb/s Backplane and Copper Cable Task Force
Plenary Meeting
March 13-14, 2012
Waikoloa, Hawaii, USA

Prepared by David Chalupsky

IEEE P802.3bj plenary meeting convened at 9:05am, Tuesday, March 13, 2012 by John D'Ambrosia, 802.3bj Chair. Aloha!

Agenda & General Information
By – John D'Ambrosia
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/agenda_01a_0312.pdf

Chair outlined the agenda for the meeting.

- Introductions – Everyone introduced themselves and stated their affiliation.
- Chair reviewed the agenda.

Motion #1: Motion to approve the agenda

- Moved by Kent Lusted
- Second by Mike Dudek
- Approved by voice vote without opposition.

Motion #2: Motion to approve the January 2012 minutes.

- Moved by Kent Lusted
- Second by Brian Misek
- Approved by voice vote without opposition.

Chair continued with his introductory presentation

- Chair asked if there were any reporters in the room. No one responded.
- Chair reminded everyone that photographs or recordings are not allowed without permission.
- Goals for the meeting: hear technical presentations and adopt baseline proposals.
- Ground Rules
- IEEE Structure, Bylaws & Rules
    - Chair read the Guidelines for IEEE-SA meetings

IEEE Patent Policy: Chair reads aloud the patent policy text contained in the agenda.
Chair calls for potentially essential patents. No response.

- Chair gives overview of the 802.3 Standards Process. Reviews the project objectives and adopted timeline.
- Chair gives instructions for recording attendance

Presentation #1
Title – Two Backplane Markets, Two Backplane Channels, Two Signaling Schemes, Two PHYs
By – Pravin Patel
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/patel_01_0312.pdf
Discussion – None. Chair thanked the presenter for leading consensus building activity.

Chair notes that Mark Bugg would like to update his presentation with new material and asked if there is any objection. No objection in the room.

Presentation #2
Title – Baseline Proposal for 100G Backplane Specification Using PAM2
By – Mike Dudek
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/dudek_01a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. Presenter notes that loss plot on page 10 (as projected in the room) should be smooth; unknown source of the roughness. Discussion on use of FEC, test points (at BGA), linear fit, impairments. Informative vs. normative channel: proposed baseline could apply for either.

Break at 10:10 until 10:30am.

Presentation #3
Title – 100G backplane PAM4 PHY encoding (revised)
By – Matt Brown
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/brown_01a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. Speaker notes that main technical change from last meeting was transcoding mechanism. New proposal allows NRZ & PAM4 to share same transcoding. Informative vs. normative channel: presenter states that proposal would apply to either.

Presentation #4
Title – Specifying receiver and transmitter for 100GCu
By – Charles Moore
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/moore_02a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. Intent is to propose as a baseline. Would be conflict between this and Dudek baseline. Chair advises harmonizing with the two backplane proposals.

Break for lunch at 11:55am to resume at 1:30pm.

Presentation #5
Title – Baseline Proposal for 802.3bj Auto-Negotiation
By – Kent Lusted for Arthur Marris
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/marris_01_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. Discussion about naming conventions if a channel objective change results in two backplane PHYs

Presentation #6
Title – Backplane NRZ FEC Baseline Proposal
By – Mark Gustlin
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/gustlin_01_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Presentation #7
Title – 256b/257b Transcoding for 100 Gb/s Backplane and Copper Cable
By – Roy Cideciyan
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/cideciyan_01a_0312.pdf
Discussion – None.

Presentation #8
Title – Use of FEC in PAM2 Backplane and Copper
By – Mike Dudek
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/dudek_02a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Break at 2:55pm, resume at 3:15.

Presentation #9
Title – Should the FEC be Optional for the NRZ PHY?
By – Mounir Meghelli
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/meghelli_01a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. (updated presentation posted.)

Presentation #10
Title – Detailed baseline for EEE in 100G
By – Hugh Barrass
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/barrass_01_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Scheduled presentations for the day are completed. Chair discusses strategy for consensus building between PHY & test proposals, need to resolve this week. Also mandatory/optional FEC; should be resolved next meeting.

Straw Poll #1:
Do you support mandatory FEC with the ability to turn it off?

- Copper Cable (CR4)
- Y: 37 N: 1
- Backplane
- Y: 28 N: 8

Proceeding into tomorrow's schedule to make room for additional consensus presentations on Wednesday.

Presentation #11
Title – Update of DkDf Algebraic Model
By – Beth Kochuparambil
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/kochuparambil_01a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. Discussion on the relationship of single-ended model vs. differential measurements. Chair asks if there is any objection to uploading the latest tool revision to the TF tools page. No objection.

Presentation #12
Title – Backplane Test Points and Fixtures
By – Pavel Zivny
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/zivny_01_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. Questions on location of AC coupling capacitor.

Chair notes that TF is running ahead of schedule and that work may complete on Wednesday, including motions.
Break for the day at 5:05pm, to resume at 9am.

Wednesday, March 14, 2012

802.3bj interim meeting reconvened at 9:05am by John D'Ambrosia, IEEE P802.3bj Chair.

Agenda & General Information
By – John D'Ambrosia
See – – http://grouper.ieee.org/groups/802/3/bj/public/mar12/agenda_01a_0312.pdf

- **IEEE Patent Policy**: Chair displayed the patent policy text contained in the agenda. No one responded.
- Chair reviews attendance recording procedures, agenda, and plan for the day.

Presentation #13
Title – Defining Test Points in a Copper Back Plane / Mid Plane Implementation
By – Joel Goergen
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/goergen_01_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. Normative vs. informative channel, and how to account for the AC capacitor with respect to test points and total loss budget. ACTION ITEM: Presenter volunteers to lead, and Chair encourages, off line consensus building on the topic.

Presentation #14
Title – Host Budget Consensus Building
By – Ryan Latchman
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/latchman_01_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Presentation #15
Title – PAM-N Tutorial Material
By – Vasudevan Parthasarathy for Chris Cole
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/cole_01a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Break at 10:03 to 10:25am

Presentation #16
Title – Improvements to the dibit gain--SN method presented in moore_01_0311
By – Charles Moore
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/moore_01_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. Presenter volunteers to make tool available. Chair asks if there is any objection; none. ACTION ITEM: Provide tool.

Chair asks of there is any objection to him taking a photograph of the room. No objection.

Presentation #17
Title – Use of Advance Scope for Measurement of TP2/TP4 and Calibration of TP4 Stressor
By – Ali Ghiasi
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/ghiasi_01_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Presentation #18
Title – A Time/Frequency Domain Statistical Channel Compliance/Specification Method
By – Mike Li
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/li_01a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. Presenter requests a straw poll. Chair asks permission of the room to hold a straw poll at this time. No objection.

Straw Poll #2:
Do you support further efforts on developing time/frequency domain statistical channel compliance method as outlined in li_01a_0312.pdf?

- Yes 32
- No 1
- Abstain 18

Break for lunch at 11:55, resume at 1:00pm.
Chair notes that we should be done with presentations & moving to motions ~4pm.

Presentation #19
Title – IEEE 802.3bj: 100GBASE-CR4 Test Points and Parameters
By – Chris DiMinico
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/diminico_01a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material. ACTION ITEM: Send updated presentation. DONE

Presentation #20
Title – 100 Gbps Copper Cable Channels
By – Mark Bugg
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/bugg_01a_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Presentation #21
Title – 802.3bj MDI Baseline Proposal
By – Nathan Tracy
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/tracy_01_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Scheduled, pre-submitted presentations are complete at 2:20pm. Proceeding to updates.

Presentation #22
Title – Amendment and Supplement to brown_01_0312
By – Matt Brown
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/brown_02_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Presentation #23
Title – Baseline Proposal for 100G Backplane Specification Using PAM2
By – Mike Dudek
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/dudek_03_0312.pdf
Discussion – Clarifying questions were discussed regarding the material.

Break from 2:55 to 3:18pm

MOTIONS & STRAW POLLs

Motion #3
Replace the existing backplane PHY objective:

Define a 4-lane 100 Gb/s backplane PHY for operation over links consistent with copper traces on "improved FR-4" (as defined by IEEE P802.3ap or better materials to be defined by the Task Force) with lengths up to at least 1m.

With the following two objectives:

• Define a 4 lane PHY for operation over a printed circuit board backplane with a total channel insertion loss of <= 35 dB at 12.9 GHz

• Define a 4 lane PHY for operation over a printed circuit board backplane with a total channel insertion loss of <= 33 dB at 7.0 GHz

Moved by: Pravin Patel Seconded by: Joel Goergen
(technical, >=75%)
All: Yes: 52; No: 0; Abstain 3
802.3 voters: Yes: 42; No: 0; Abstain 1

Motion #4
Move that the following be adopted as baseline proposals:
- dudek_03_0312.pdf for the 12.9GHz-related objective
- brown_01a_0312.pdf (excluding slides 4 and 26) and brown_02_0312.pdf for the 7.0GHz-related objective

Moved by Matt Brown, 2nd by Mike Dudek
(technical, >=75%)
Yes 52 No 0 Abstain 2

Motion #5
Adopt the proposed auto-negotiation changes outlined in slides 4-5, 7-15 of marris_01_0312.pdf.
Moved: Kent Lusted, 2nd: Andre Szczepanek
(technical, >=75%)
Results: Yes: 54 No: 0 Abstain: 2

Motion #6

Move to adopt gustlin_01_0312 pages 5-19, and cideciyan_01a_0312 pages 8-19 as the baseline FEC proposal for PAM-2 modulation over copper cables and backplanes.

- Moved by: Mark Gustlin
- Seconded: Zhongfeng Wang
  - (technical, >=75%)

Yes: 55 No: 0 Abstain: 3

Motion #7

Move that QSFP28, per tracy_01_0312.pdf, be adopted as a baseline proposal for a type of MDI for 100GBASE-CR4.

- Moved by: Nathan Tracy
- Seconded: Joel Goergen
  - (technical, >=75%)

Yes: 55 No: 0 Abstain: 2

Motion #8

Move that the 802.3bj Task Force adopt barrass_01_0312.pdf as a baseline for optional Energy-Efficient Ethernet operation for 100G Backplane and Twinaxial cable PHYs.

- Moved by: Mark Gustlin
- Seconded by: Matt Brown
  - (technical, >=75%)

Yes: 54 No: 0 Abstain: 3

Motion #9

Motion to accept as the baseline the test points TP0 and TP5 as per zivny_01_0312, page 3

- Moved by: Pavel Zivny
- Seconded: Charles Moore
  - (technical, >=75%)

Discussion: further consensus building is needed.

Motion #9 is withdrawn

Motion #10

Move to adopt the 100GBASE-CR4 channel baseline proposal described in slides 7-8 and 12-17 of diminico_01a_0312.pdf

- Moved by: Chris Di Minico
- Seconded by: Rick Rabinovich
- Technical >=75%

Yes: 54 No: 0 Abstain: 2

Future Attendance Straw Poll

Straw Poll #3

How many of you will attend the **May 14 – 18, 2012** Interim in Minneapolis, MN, USA?

Yes: 37

Probably yes: 13

Probably no: 5

No: 1

Straw Poll #4
Would you prefer to see Tx/Rx normative specs in the backplane application (per zivny_01_0312.pdf) of:
– (vote for one)
A) TP0/TP5 = 6
B) TP0a/TP5a = 19
C) need more data = 20

Straw Poll #5
For the backplane spec, do you prefer the DC blocking cap to be allocated in:
– (vote for one)
A) Receiver = 15
B) Channel = 8
C) no preference = 5
D) Need more data = 16

Presentation #24
Title – Editor's report
By – Adam Healey
See – http://grouper.ieee.org/groups/802/3/bj/public/mar12/healey_01_0312.pdf
Discussion – None.

Chair discusses future work plan and future meeting schedule.
Time for a group photo.

Motion to adjourn by Hugh Barrass, second by Adee Ran. Approved by voice without opposition
Meeting adjourned at 4:37pm March 14th.

Action Items:

Volunteer	**Action**	**Date Assigned**	**Status**
New Action Items, November 2011			
John D'Ambrosia	Reach out to test & measurement vendors for contributions on measurement techniques	11/7/2011	Done
John D'Ambrosia	Post updated version of dambrosia_02_1111.pdf	11/8/2011	Done
Mounir Meghelli	Provide update/correction to PAM 4 crosstalk in beukema_01_1111.pdf.	11/9/2011	Done Mar'12
Mounir Meghelli	Post channel data used in beukema_01_1111.pdf	11/9/2011	Done Mar'12
Roy Cideciyan	Send updated version of cediciyan_01a_1111.pdf	11/9/2011	Done Jan'12
Beth Kochuparambil	Provide updated tool with surface roughness, provide recommendation for benchmark loss/unit length metric based upon the adopted definition of improved FR-4; hold conference call	11/10/2011	DONE
New Action Items January 2012		Date	**Status**

		Assigned	
Chris Di Minico	Provide updated slides as presented	1/26/2012	Done
Joe Beers	Add credit reference to page 3 (content from Kochuparambil) and provide updated presentation	1/26/2012	Done
Mike Dudek	Provide graph for insertion loss (in addition to the equation) for dudek_01 prior to motion for baseline adoption.	1/26/2012	Done- sent CEI-25G-LR IL plot
Dariush Dabiri	Add labels to x axis of graphs (dB of what?) and send updated file.	1/26/2012	Done
Adee Ran	Provide updated slides as presented	1/26/2012	Done
Adee Ran	Correlate results with Patel/IBM reference, work with NRZ contributors to close the gaps.	1/26/2012	In process
Howard Frazier	Provide updated slides as presented	1/26/2012	Done
Mark Nowell	Provide updated slides as presented	1/26/2012	Done
Oren Sela	Provide updated slides as presented	1/27/2012	Done
Pete Anslow	Send updated slides with your name included	1/27/2012	Done
Hugh Barrass	Send updated slides with typo corrected	1/27/2012	Done
Charles Moore	Provide updated slides as presented	1/27/2012	Done
New Action Items March'12		**Date Assigned**	**Status**
Charles Moore	Provide tool discussed in moore_01_312.pdf	3/15/2012	
Joel Goergen	Lead consensus building activity on backplane test points	3/15/2012	

Attendee List

IEEE 802.3bj 100Gb/s Cu & BP TF, March 2012 Plenary			**3/13/2012**	**3/14/2012**
Last Name	**First Name**	**Affiliation**	**Tuesday**	**Weds**
Amleshi	Peerouz	Molex	x	x
Baldwin	Thananya	Ixia	x	
Barnett	Barry	IBM	x	x
Barrass	Hugh	Cisco	x	
Beaudoin	Denis	Texas Instruments	x	x
Bennett	Mike	LBNL	x	x
Bliss	Will	Broadcom	x	x
Brown	Matt	Applied Micro	x	x
Bugg	Mark	Molex	x	x
Chalupsky	David	Intel	x	x
Chen	Chung-Jue	Broadcom	x	x
Cideciyan	Roy	IBM	x	x
Dalmia	Kamal	Aquantia	x	
D'Ambrosia	John	Dell	x	x
DiMinico	Christopher	MC Communications/Leoni	x	x

Donahue	Curtis	UNH - IOL	x	x
Dudek	Mike	QLogic	x	x
Farhoodfar	Arash	Cortina Systems	x	x
Goergen	Joel	Cisco	x	x
Gundubogula	Sudhakar	Marvell	x	x
Gustlin	Mark	Xilinx	x	x
Hammond	Bernard	TE Connectivity	x	
Healey	Adam	LSI	x	x
Hidaka	Yasuo	Fujitsu Lab of America	x	x
Hu	Kerry	Huawei	x	x
Huang	Xi	Huawei	x	x
Irwin	Scott	MoSys Inc.	x	x
Jiang	Hongtao	Broadcom	x	x
Katz	Walter	Signal Integrity Software	x	x
Kawatsu	Yasuaki	Hitachi-Cable	x	x
Kimmitt	Myles	Emulex	x	x
Kochuparambil	Elizabeth	Cisco Systems	x	x
Kono	Masashi	Hitachi	x	
Kosanivich	Keith	Leviton Network Solutions	x	x
Kvist	Bengt	Ericsson	x	x
Lackner	Hans	QoSCom	x	
Langhammer	Martin	Altera	x	x
Latchman	Ryan	Mindspeed		x
LeCheminant	Greg	Agilent Technologies		x
Li	Mike	Altera	x	x
Lusted	Kent	Intel	x	x
Meghelli	Mounir	IBM	x	x
Mei	Richard	Commscope		x
Meier	Wolfgang	Emerson Network Power EC	x	x
Mellitz	Richard	Intel	x	x
Misek	Brian	Avago Technologies	x	x
Moore	Charles	Avago Technologies	x	x
Ofelt	David	Juniper Networks	x	x
Parthasarathy	Vasudevan	Broadcom	x	x
Patel	Pravin	IBM	x	x
Pepper	Gerald	Ixia	x	
Rabinovich	Rick	Alcatel-Lucent	x	x
Ran	Adee	Intel		x
Ravid	Ran	Mellanox Technologies	x	x
Riani	Jamal	Marvell	x	x
Savi	Olindo	Hitachi Cable	x	x
Searles	Shawn	Advanced Micro Devices	x	x
Shanbhag	Megha	TE Connectivity	x	x
Shariff	Masood	Commscope		x
Sharma	Atul	Volex	x	x
Sparrowhawk	Bryan	Leviton	x	x

St. Peter	Matthew	Radisys	x	x
Tracy	Nathan	Tyco Electronics		x
Umnov	Alexander	Huawei Technoligies	x	x
Vaden	Sterling	Optical Cable Corp.	x	x
Valle	Stefano	ST Microelectronics	x	x
Wagner	Bob	Panduit Corp.	x	x
Wang	Zhongfeng	Broadcom	x	x
White	Martin	Marvell	x	x
Woodruff	Bill	Broadcom	x	
Zambell	Andrew	FCI	x	x
Zhang	James	Qualcomm	x	x
Zivny	Pavel	Tektronix	x	x