Approved Minutes
IEEE P802.3bj 100 Gb/s Backplane and Copper Cable Task Force
Interim Meeting
September 13-14, 2011
Chicago, Illinois

Prepared by: David Chalupsky

Meeting convened at 9:00am, Tuesday, September 13, 2011 by David Law, 802.3 Chair.
David Chalupsky appointed secretary for meeting

Appointment of 802.3bj Task Force Chair:
Motion #1: Motion to appoint John D'Ambrosia as Task Force chair
Moved by Joel Goergen. Second by Mike Bennett.
(Technical, 75%)
Vote: Yes=61, No=0, Abstain=2
John D'Ambrosia confirmed as Chair of Task Force.

Agenda & General Information
By – John D'Ambrosia
See – http://www.ieee802.org/3/bj/public/sep11/agenda_01b_0911.pdf
Chair outlined the agenda for the meeting.

- D. Chalupsky appointed Task Force secretary.
- Introductions – Everyone introduced themselves and stated their affiliation.
- Chair reminded everyone that photographs or recordings are not allowed without permission. Chair asks audience if anyone objected that he photograph the roomful of attendees. No objection.
- Chair asked if there were any reporters in the room. No one responded

Motion #2: Motion to approve the agenda

- Moved by Ed Sayre
- Second by Brad Booth
- Approved by voice vote without objection.

Motion #3: Motion to approve the July 2011 minutes.

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

Chair continued with his introductory presentation

- Goals for the week
  - Task Force Formation
  - Hear Technical Presentations
  - Adopt project schedule.

- Chair notes that the proposed project schedule in the agenda has formatting problems and will be updated.

- 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 essential patents. No one responded.

Chair reviews the liaison letter to OIF (dambrosia_02_0911.pdf) and requests the audience to review it prior to an approval motion on Wednesday.

Chair reviews the agenda and notes several updated and late submissions. No objections to accepting the updated/late material.

Presentation #1
Title – Simulation parameters and results template with example
By – Adam Healey
See – http://www.ieee802.org/3/bj/public/sep11/healey_01_0911.xls
Discussion – Clarifying questions were asked regarding the use of the template. ACTION ITEM: Based upon suggestions and discussion, presenter will update spreadsheet to add name & affiliation, FEC parameters, and simulation tool used. Also update example reference.

Presentation #2
Title – 512B/513B Transcoding and FEC for 100 Gb/s Backplane and Copper Links
By – Roy Cideciyan
See – http://www.ieee802.org/3/bj/public/sep11/cideciyan_01a_0911.pdf
Discussion – Clarifying questions were discussed regarding the material. Noted that Hamming distance is reduced, which makes FEC more compelling; discussion of whether correction is required or detection is sufficient. Discussion of clocking affects and lane count/type usage.

Break at 10:40am. Resumed at 11:05am

Presentation #3
Title – Measurements and Simulation Results in Support of IEEE 802.3bj Objective
By – Jitendra Mohan
See – http://www.ieee802.org/3/bj/public/sep11/mohan_01a_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Noted that PHY device used in measurements was SiGe not CMOS.

Presentation #4
Title – PAM-2 on a 1 Meter Backplane Channel
By – Pravin Patel
See – http://www.ieee802.org/3/bj/public/sep11/patel_01b_0911.pdf

Discussion - Clarifying questions were discussed regarding the material. Speaker noted that 1m Megtron-6 channel was intended as a feasibility demonstration for 1m, and that shorter channels may be constructed with lower cost materials.

Break for lunch at 11:50am. Return at 1:15pm.

Presentation #5
Title – PAM-2 on a simulated 1 Meter Backplane Channel including manufacturing tolerance
By – Mike Dudek
See – http://www.ieee802.org/3/bj/public/sep11/dudek_01a_0911.pdf
Discussion - Clarifying questions were discussed regarding the material.

Presentation #6
Title – Characteristics of Installed Backplane Channels
By – Howard Frazier
See – http://www.ieee802.org/3/bj/public/sep11/frazier_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material.

Presentation #7
Title – Line Signaling and FEC Performance Comparison for 25Gb/s 100GbE
By – Mounir Meghelli
See – http://www.ieee802.org/3/bj/public/sep11/beukema_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Suggestion to look at difference in coding gain on PAM4 vs. NRZ; not assume same.

Presentation #8
Title –SI Analysis of 25Gb/s Transmission over Backplane and Copper Cables Links
By – Mounir Meghelli
See – http://www.ieee802.org/3/bj/public/sep11/meghelli_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material.

Break at 3:06pm, resume at 3:30pm.

Presentation #9
Title –100G backplane PHY: NRZ and PAM4
By – Matt Brown
See – http://www.ieee802.org/3/bj/public/sep11/brown_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Discussion about the merits of supporting two solutions.

Presentation #10
Title – A Preliminary Proposal for PAM-4 TX Specification
By – Kent Lusted
See – http://www.ieee802.org/3/bj/public/sep11/bliss_01a_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Action Item: send updated presentation (done).

Presentation #11

Title – Precoding proposal for PAM-4 Modulation
By – Chung Chen
See – http://www.ieee802.org/3/bj/public/sep11/parthasarathy_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material.

Presentation #12
Title – Enabling Improved DSP Based Receivers for 100G Backplane
By – Dariush Dabiri
See – http://www.ieee802.org/3/bj/public/sep11/dabiri_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material.

5:00pm: Scheduled presentations for the day are complete.
Chair asks if there are any straw polls, motions or discussions.
Proceeding into late presentation submissions.

Presentation #13
Title – Defining a Minimum Channel Floor from Material Constraints
By – Joel Goergen
See – http://www.ieee802.org/3/bj/public/sep11/goergen_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Action Item: provide tool to group. Speaker volunteers to provide a channel template as well.

Presentations concluded for the day. Chair discusses plans for tomorrow.
Break for the day at 6:00pm.

Meeting Reconvened Wednesday, September 14, 2011 at 9:00am.

Agenda & General Information

- Chair reviews the agenda for the day in "agenda_01a_0911.pdf" and attendance recording procedures.
- Chair notes that late and updated presentations have been submitted. No objection in the room to accepting the new material as time allows.
- Chair displays the IEEE patent policy.
- Chair notes that combined session between 802.3bj and the new Next Generation 100Gb/s Optical Ethernet Study Group will take place tonight at 5pm.

Presentation #14
Title – Energy-Efficient Ethernet for 100 Gb/s Backplane and Copper
By – Mike Bennett
See – http://www.ieee802.org/3/bj/public/sep11/bennett_01a_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Discussion on the benefits of including EEE in the initial 802.3bj work rather than deferring it to a retrofit as 802.3az was.

Presentation #15
Title – 100 Gb/s Ethernet and EEE
By – Mark Gustlin
See – http://www.ieee802.org/3/bj/public/sep11/gustlin_01_0911.pdf

Discussion - Clarifying questions were discussed regarding the material. Noted that alignment marker proposal for 100G would apply easily to 40G as well. Request for others to investigate impact to 100GBASE-CR10.

Presentation #16
Title – FEC striping options for 100 Gb/s Backplane and Copper Task Force
By – Mark Gustlin
See – http://www.ieee802.org/3/bj/public/sep11/gustlin_02_0911.pdf
Discussion - Clarifying questions were discussed regarding the material.

Presentation #17
Title – FEC proposal for 100G-KR
By – Sudeep Bhoja
See – http://www.ieee802.org/3/bj/public/sep11/bhoja_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Request to analyze the differential encoder impact to DFEs >1.

Break at 10:17am; resume at 10:45am

Presentation #18
Title – 100G-Cu FEC and PCS Encoding Thoughts
By – Charles Moore
See – http://www.ieee802.org/3/bj/public/sep11/slavick_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Request for author (Jeff) to work offline with others FEC presenters on consensus. Discussion of perceived need for FEC to achieve BER objective.

Presentation #19
Title – Evaluation of Various channels Using a Method proposed by Healey and Moore
By – Charles Moore
See – http://www.ieee802.org/3/bj/public/sep11/moore_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. ACTION ITEM: Ed Sayre to provide channel data for legacy backplanes with new line card.

Presentation #20
Title – Method of Modeling a Full Channel
By – Mark Bugg
See – http://www.ieee802.org/3/bj/public/sep11/bugg_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Discussion of measured vs. simulated channels. Suggestion that we need to move from overall budget for CR to a budget for hosts vs. cable. Suggestion for Mark to work with Di Minico & other cable champions on CR channel consensus.

Break for lunch at 12:05pm; resume at 1:23pm

Presentation #21
Title – MDI option for 4x25G copper
By – Tom Palkert
See – http://www.ieee802.org/3/bj/public/sep11/palkert_01a_0911.pdf

Discussion - Clarifying questions were discussed regarding the material. Noted that the 25G QSFP mechanical specs are already in progress in the SFF committee but not the electrical spec.

Presentation #22
Title – Jitter and Noise Measurements in Presence of Crosstalk and 802.3bj
By – Pavel Zivny
See – http://www.ieee802.org/3/bj/public/sep11/zivny_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material.

Presentation #23
Title – cPPI-4 Channel and Compliance Boards
By – Ali Ghiasi
See – http://www.ieee802.org/3/bj/public/sep11/ghiasi_01a_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. ACTION ITEM: Ali to send update presentation correcting proposed HCB trace loss (page 3) DONE.

Presentation #24
Title – System Requirements for 100GbE 4x25G Backplane Channels
By – Ziad Hatab
See – http://www.ieee802.org/3/bj/public/sep11/hatab_01_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Discussion on the merits of one backplane solution vs. two solutions.

Task Force presentations are complete.

Motion #4: Move for confirmation of appointment:
- Adam Healey as Chief Editor, IEEE 802.3bj Task Force
- Moved: Mike Bennett
- Second: Charles Moore
- (Procedural, 50%)
- Approved by voice without objection.

Chair displays the OIF liaison document (dambrosia_02_0911.pdf) for review. One minor edit is accepted.

Motion #5: Move that Task Force approve the text in http://www.ieee802.org/3/bj/public/sep11/dambrosia_02a_0911.pdf with editorial license granted to the Chair (or his appointed agent) as an informal communication by the Chair to the OIF.
- Moved: Pavel Zivny
- Second: Phil Northcott
- (Technical, >75%)
- Results: Approved by voice vote without objection.

Straw Poll #1: Do you support doing the work to specify EEE for 100G Cu and Backplane IEEE P802.3bj interfaces?
Results: Yes: 43; No: 0; Unsure: 12

Straw Poll #2: I would work on the specification of EEE 100G Cu and Backplane IEEE P802.3bj interfaces.
Results: Yes: 20; No: 8; Unsure: 29

Break at 3:00pm. Resume at 3:30pm

Straw Poll #3: Do you support doing the work to specify EEE for 40G Cu and Backplane IEEE P802.3ba interfaces in addition to the 100G Cu and Backplane IEEE P802.3bj interfaces?
Results: Yes: 14; No: 0; Unsure: 24

Straw Poll #4: I would work on the specification of EEE for 40G Cu and Backplane IEEE P802.3ba interfaces in addition to the 100G Cu and Backplane IEEE P802.3bj interfaces.
Results: Yes: 8; No: 9; Unsure: 23

Presentation #25
Title – Channel Loss Characteristics Summary
By – Joel Goergen
See – http://www.ieee802.org/3/bj/public/sep11/goergen_02_0911.pdf
Discussion - Clarifying questions were discussed regarding the material. Presentation used as the background information for straw poll #5.

Straw Poll #5: Do you support a channel model of at least _____
(Chicago Rules)
a) -20dB@7GHz?
b) -25dB@7GHz?
c) -30dB@7GHz?
d) -30dB@12.9GHz?
e) -35dB@12.9GHz?
f) -40dB@12.9GHz?
Results
a) 13
b) 10
c) 17
d) 31
e) 27
f) 7

Straw Poll #6: Do you support the use of FEC to meet the project backplane 10^-12 or better BER objective at 1m?
(Chicago Rules)
Results: Yes: 49; No: 1; Abstain: 3

Straw Poll #7: Do you support the use of _____ to meet the project backplane 10^-12 or better BER objective for channels up to 1m?
(Chicago rules)
a) NRZ
b) PAM-4
c) Both NRZ and PAM-4
Results: a) 43 b) 7 c) 18

Motion #6: Adopt the proposed timeline in –
http://www.ieee802.org/3/bj/public/sep11/agenda_01b_0911.pdf

- (procedural, 50%)
- Moved by Charles Moore
- Second: Brad Booth
- Results: Yes: 45 No: 0 Abstain: 3

Chair reviews future meeting schedule.
Chair announces intent to have a co-located meeting with optical Study Group prior to November meeting; likely Monday morning of the meeting week.

Chair reminds task force of common meeting with 100GNGOPTX Study Group at 5pm today. For minutes of that session, see the IEEE 802.3 Next Generation Optical Study Group meeting minutes, which may be found at http://www.ieee802.org/3/100GNGOPTX/public/sept11/index.html.

Secretary reviews Action Items recorded during the meeting.

Volunteer	Action	Date Assigned	Status
Adam Healey	Update spreadsheet to add name & affiliation, FEC parameters, and simulation tool used. Also update example reference.	9/13/2011	
Joel Goergen	Provide loss calculator spreadsheet to group	9/13/2011	
Ed Sayre	Provide channel data for legacy backplanes with updated line cards.	9/14/2011	
Ali Ghiasi	Ali to send update presentation correcting proposed HCB trace loss (page 3)	9/14/2011	Done
Joel Goergen	Provide relative cost analysis of board technologies/materials based on Goergen_02_0911.pdf	9/14/2011	
Joel Goergen	Provide topology definition/relative frequencies of interest spreadsheet	9/14/2011	
Joel Goergen	Provide update of surface roughness calculation in Goergen_02_0911	9/14/2011	
Chris Cole	Present CFP4 MSA update to 802.3bj at November meeting. (Note 1)	9/14/2011	

Note 1: Action item taken during 802.3bj / 100GNGOPTX joint session

Motion to adjourn by Joel Goergen, 2nd by Kent Lusted
Meeting adjourned at 4:55pm

Attendee List

IEEE 802.3bj 100Gb/s Cu & BP TF Attendees - September 2011			9/13/2011	9/14/2011
Last Name	**First Name**	**Affiliation**	**Tues**	**Weds**
Abbas	Ghani	Ericsson, UK	X	
Alie	Stephen	Cortina Systems	X	X
Amleshi	Peerouz	Molex	X	X
Anstey	Mike	Altera	X	X
Balasubramanian	Vittal	FCI	X	X
Baldwin	Thananya	Ixia	X	X
Barnett	Barry	IBM	X	X
Belopolsky	Yakov	Bel Stewart	X	X
Ben-Artsi	Liav	Marvell	X	X
Bennett	Mike	LBNL	X	X
Bhatt	Vipul	Lightwire	X	
Bhoja	Sudeep	Broadcom	X	X
Bliss	Will	Broadcom	X	
Braun	Ralf-Peter	Deutsche Telekom, T-Systems	X	
Brown	Matt	Applied Micro	X	X
Bugg	Mark	Molex	X	X
Chalupsky	David	Intel	X	X
Chang	Frank	Vitesse	X	X
Chen	Chung-Jue	Broadcom	X	X
Cheng	Wheling	Juniper Networks	X	
Cideciyan	Roy	IBM	X	X
Cole	Chris	Finisar	X	
Cui	Kai	Huawei	X	
Dabiri	Dariush	Applied Micro	X	
D'Ambrosia	John	Dell	X	X
Dawe	Piers	IPtronics	X	
DiMinico	Christopher	MC Communications/LEONI	X	X
Dinh	Thuyen	Pulse Electronics	X	
Dove	Dan	HP	X	
Dudek	Mike	QLogic	X	X
Ewen	John	IBM	X	X
Flatman	Alan	LAN Technologies	X	
Frazier	Howard	Broadcom	X	
Ghazisaidi	Navid	Ericsson, Inc.	X	
Ghiasi	Ali	Broadcom	X	
Goergen	Joel	Cisco	X	X
Gundubogula	Sudhakar	Marvell	X	X
Gustlin	Mark	Cisco	X	X
Hamano	Hiroshi	Fujitsu Labs	X	
Harel	Ziv	Marvell	X	X

Hatab	Ziad	Vitesse	X	X
Healey	Adam	LSI	X	X
Hidaka	Yasuo	Fujitsu Lab of America	X	X
Hu	Kerry	Huawei	X	X
Huang	Xi	Huawei	X	X
Iwadate	Hirotake	Sumitomo Electric	X	
Jiang	Hongtao	Broadcom	X	X
Kasturia	Sanjay	PLX / Inphi	X	X
Katz	Walter	Signal Integrity Software	X	
Kimmitt	Myles	Emulex	X	X
Kipp	Scott	Brocade	X	
Kodama	Satoshi	NTT	X	
Kono	Masashi	Hitachi	X	
Kvist	Bengt	Ericsson	X	X
Latchman	Ryan	Mindspeed	X	
Laubach	Mark	Broadcom	X	
Lawson	Matthew Todd	Cisco	X	X
LeCheminant	Greg	Agilent Technologies	X	
Li	Mike	Altera	X	X
Lu	Adam	Surtec	X	X
Lusted	Kent	Intel	X	X
Malkman	Yonaton	Mellanox	X	X
Marris	Arthur	Cadence	X	X
McDonough	John	NEC America	X	
Meghelli	Mounir	IBM	X	X
Meier	Wolfgang	Emerson Network Power EC	X	X
Moeller	Merrick	Amphenol		X
Mohan	Jitendra	National Semi	X	X
Moore	Charles	Avago Technologies	X	X
Nagapudi	Venkatesh	Applied Micro	X	X
Nordin	Ron	Panduit Corp.	X	X
Northcott	Phil	PMC-Sierra	X	
Nowell	Mark	Cisco	X	
Ofelt	David	Juniper Networks	X	X
Oomori	Hirotaka	Sumitomo	X	
Palkert	Tom	Xilinx, Luxtera, Molex	X	
Pannell	Don	Marvell	X	X
Parthasarathay	Vasudevan	Broadcom	X	X
Patel	Pravin	IBM	X	X
Pearson	Karen	Leviton	X	X
Pepper	Gerald	Ixia	X	X
Petrilla	John	Avago Technologies	X	
Pickles	Tim	Surtec America	X	X

Pimpinella	Rick	Panduit Corp.	X	
Rabinovich	Rick	Alcatel-Lucent	X	
Rategh	Hamid	Inphi	X	X
Regev	Eran	Marvell	X	X
Riani	Jamal	Marvell	X	X
Sambasivan	Sam	AT&T	X	
Sayre	Edward	NESA	X	X
Sela	Oren	Mellanox	X	X
Shanbhag	Megha	TE Connectivity	X	X
Shrikhande	Kapil	Dell	X	
Sparrowhawk	Bryan	Leviton	X	X
Sprague	Ted	Infinera	X	
Straka	Frank	Panduit Corp.	X	X
Szczepanek	Andre	Inphi	X	
Tracy	Nathan	Tyco Electronics	X	
Tremblay	Francois	Gennum	X	
Trowbridge	Steve	Alcatel-Lucent	X	
Vaden	Sterling	Optical Cable Corp.	X	
Vanderlaan	Paul	Nexans	X	
Vareljian	Albert	Altera Corp.	X	X
Wagner	Bob	Panduit Corp.	X	
Wang	Zhongfeng	Broadcom	X	X
Wang	Xiaofeng	PMC Sierra	X	X
Warland	Tim	Applied Micro	X	
Wu	Wendy	Netlogic	X	
Yan	Hang	Huawei Technology	X	X
Zhao	Wenyu	CATR China	X	
Zivny	Pavel	Tektronix	X	X