

Approved Minutes  
IEEE 802.3 100 Gb/s Backplane and Copper Cable Study Group

Interim Meeting  
January 12 - 13, 2011  
Ft. Lauderdale, FL USA

Prepared by: David Chalupsky

Meeting convened at 9:00 am, Wednesday, Jan 12, 2011.

David Chalupsky appointed secretary for meeting  
David Law discussed Study Group

Appointment of Study Group Secretary:

**Motion #1:** Motion to appoint John D'Ambrosia as study group chair

- Moved by Tom Palkert
- Second by Alan Flatman
- Technical (=>75%)
- Results – Yes=61, N=0, Abstain=0

John D'Ambrosia unanimously confirmed as Chair of the Study Group by show of hands

**Agenda & General Information**

By – John D'Ambrosia

See – agenda\_01\_0111.pdf

- Introductions – Everyone introduced themselves and stated their affiliation.
- Chair outlined the agenda for the week.

**Motion #2:** Motion to approve the agenda

- Moved by Mark Nowell
- Second by Mike Bennett
- Results - Meeting agenda was approved by voice vote without objection.
  
- 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.
- Chair went through his introduction presentation “agenda\_01\_0111.pdf”
- Goals for the week
  - Hear presentations related to objectives and 5 Criteria
  - Start developing consensus on objectives
  - Lay groundwork for next meeting
- Ground Rules
- IEEE Structure, Bylaws & Rules

- Meeting attendance
  - During the Interim Meeting, must use the IEEE-SA Meeting Attendance Tool as it will be the basis of the official attendance record for this meeting.
- Chair recognizes & thanks the Cat6A Consortium for sponsoring the meeting.

Chair suggests that the study group draft a liaison letter to the OIF, indicating that 802.3 started this study group. Chair appoints Tom Palkert to draft the letter.

#### Presentation #1

Title – Process and Problems

By – John D’Ambrosia

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/dambrosia\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/dambrosia_01_0111.pdf)

*Discussion* - none

Break at 9:52am

Reconvened at 10:27am

#### Presentation #2

Title – OIF CEI-25G-LR Overview

By – Tom Palkert

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/palkert\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/palkert_01_0111.pdf)

*Discussion* – questions were asked & discussed followed on the terminology, and relative merits of different signaling schemes (NRZ, PR2, duobinary) and equalization. OIF selected NRZ.

Presenter notes that little work was done on PAM4 in the OIF project.

Will Bliss offered to provide a presentation on signaling terminology.

Discussion in the room noted that some of the material is out of date. Speaker agrees to seek an updated liaison from OIF.

#### Presentation #3

Title – Process Overview Tutorial

By – Wael Diab

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/diab\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/diab_01_0111.pdf)

*Discussion* – none

#### Presentation #4

Title – 100GE for Telecom

By – Bengt Kvist

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/kvist\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/kvist_01_0111.pdf)

*Discussion* – Discussion on BER target and history of how they were set for prior projects. Chair requests that Brad Booth draft the BER objective proposal for the next meeting.

Break for lunch at 11:45am.

Reconvened at 1:15pm

### Presentation #5

Title – Feasibility Study for: IEEE 802.3 100GbE Electrical Backplane / Copper Cabling Study Group

By – Vittal Balasubramanian

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/balasubramanian\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/balasubramanian_01_0111.pdf)

*Discussion* – presenter volunteers to post channel data for the study group.

Chair asks what file format is preferred for channels models. .s4p format is consensus.

Discussion on higher frequency range and other format questions.

**Channel Submissions:** Chair calls for channels submissions from the Study Group.

Format preferences: .s4p format, 50MHz to 40GHz is preferred. Bundle through channel with aggressors for a given case. Still looking for a recommendation on step size.

Assume input ports are 1:3, outputs are 2:4. Provide details in file header. Chair will repeat the call for channel information via the email reflector.

### Presentation #6

Title – IEEE 802.3 Electrical Backplane/Twinax Cu Cable SG Objectives

By – Chris Di Minico

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/diminico\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/diminico_01_0111.pdf)

*Discussion* – Network physical topology and its impact to cable reach requirements. Source of electrical parameters and request to provide channel data.

### Presentation #7

Title – Review of the 5 Criteria

By – Howard Frazier

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/frazier\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/frazier_01_0111.pdf)

*Discussion* – The Chair reinforces that is an important phase in the project and contributes to the success of 802.3.

Break at 2:52pm

Reconvened at 3:25pm

The Chair reminds the group to use the attendance tool.

Presentations continue.

### Presentation #8

Title – 25Gb/s VSR Link Data

By – Megha Shanbhag

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/shanbhag\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/shanbhag_01_0111.pdf)

*Discussion* – Presenter agrees to provide the channel data that was presented. Presentation references ICN limits from an OIF presentation which is not publicly available. The Chair requests that the specific information be added to the presentation file if possible.

### Presentation #9

Title – Technical Feasibility of Twinax Copper Cable for 4X25Gbps Data

By – Mark Bugg

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/bugg\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/bugg_01_0111.pdf)

*Discussion* – Question on compatibility of the new connector. The host connector is a different surface mount land pattern, but the MDI is QSFP+ compatible. Additional questions and discussion of cable construction and electrical impact. Presenter will make channel data available in .s4p format.

#### Presentation #10 (late request)

Title – Materials Issues for Low Skew Close Phase Matching in 25Gbps Differential System Designs

By – Ed Sayre

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/sayre\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/sayre_01_0111.pdf)

*Discussion* – Presentation file contains a copyright notice on page 1, which was not intentional on the part of the presenter. Chair requests that it be removed and the file resent. Question on the impact to Objectives: Dk distribution and intra-pair skew could impact the reach of the channel. Discussion on how intra-pair skew can be reflected in the specifications

At 4:40pm the scheduled presentations for the day are concluded.

The Chair leads the group in a discussion of the name of the project. Current name is unwieldy. Several suggestions are proposed.

#### **Straw Poll #1:** (Chicago Rules)

Potential new name for this study group -

- 100 Gb/s Backplane and Copper Cable Study Group
- 100 Gb/s Backplane and Twin-ax Study Group
- 100 Gb/s Copper Study Group
- 100 Gb/s Backplane and Cables Study Group
- No change

Results

- a) 45
- b) 28
- c) 24
- d) 5
- e) 4

Break for day at 4:55pm

Meeting reconvened at 9:05 am, Thursday, Jan 13, 2011.

The Chair reviews the agenda for the day, and attendance procedures.

#### Presentation #11

Title – Study of 100 Gb/s on 40GBASE-KR4 Channel

By – Howard Frazier and Vasu Parthasarathy

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/bliss\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/bliss_01_0111.pdf)

*Discussion* – Questions on the materials & design practices of channel database. In response to a question Presenters agree to look at the quality of channels vs. time to see if it has improved. Discussion that x4 interface has been predominant.

Break at 9:53am  
Reconvened at 10:20am

#### Presentation #12

Title – Suggested Practices for Reporting Simulation Results

By – Adam Healey

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/healey\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/healey_01_0111.pdf)

*Discussion* – Discussion about package models. The Chair will make a call for package models. Presenter has base set of parameters, but suggests it could be improved by the March meeting and will host an interim call to begin work. Discussion of whether we should have a signaling ad-hoc. Discussion needs to start with the parameter set, not the values.

#### Presentation #13

Title – 25Gbps Communication over 10GBASE-KR Channels

By – Will Bliss

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/bliss\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/bliss_01_0111.pdf)

*Discussion* – questions on assumptions; discussion on channel vs. signaling, equalization and FEC.

#### Presentation #14

Title – Technical Feasibility of Serial 25 Gb/s Signaling over Backplanes: Channel and System Analysis

By – Ziad Hatab

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/hatab\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/hatab_01_0111.pdf)

*Discussion* – Is there interest in sharing a Matlab script for impulse response to s-parameters conversion for consistency? A good reflector discussion. Question on lower bound of VNA frequency range, and accuracy of measurement at the low end. Capability of measurement equipment will impact the channel .s4p conventions discussed yesterday.

Break for lunch at 11:55am.  
Reconvened at 1:35pm

#### Presentation #14

Title – Elements for 100Gb/s FEC

By – Sudeep Bhoja

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/bhoja\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/bhoja_01_0111.pdf)

*Discussion* – Discussion on impact of DFE tap value; MTTFPA; latency. Procedural next-steps. Discussion that we need to start considering BER targets as it affect this analysis. Also discussed need to address latency; should it be in the objectives? Will Bliss agrees to lead the latency proposal.

#### Presentation #15

Title – FEC Options for 100G-KR

By – Zhongfeng Wang

See – [http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/wang\\_01\\_0111.pdf](http://grouper.ieee.org/groups/802/3/100GCU/public/jan11/wang_01_0111.pdf)

*Discussion* –

2:45pm: presentations are completed.

### Future Meetings:

The Chair discussed the meeting schedule. March meeting in Singapore. Location for May interim has not been selected.

Future Meeting information at:

- <http://ieee802.org/3/interims/index.html>

March 2011 IEEE 802.3 Interim

- March 14 - 17
- Marina Bay Sands Hotel, Singapore

The Chair requests input on attendance at future meetings.

### **Straw Poll #2:**

For the March 2011 802 Plenary Study Group meeting

- a) Will attend
- b) May attend
- c) Will not attend

Results : a) 30; b) 21; c) 17

### **Straw Poll #3**

For future meetings:

- a) Plan to attend
- b) May attend
- c) Will not attend

Results: a) 55; b) 21; c) 0

OIF Liaison: The Chair displays OIF liaison letter drafted by Mr. Palkert (palkert\_02\_0111.pdf). Some discussion and editing follow.

### **Motion #3:**

Move that Study Group approve the text in palkert\_02a\_0110.pdf, with editorial license granted to the Chair (or his appointed agent) as an informal communication by the Chair to the OIF.

- Moved: John McDonough
- Second: Mike Dudek
- (Procedural, 50%)
- Results: passed by voice without objection

Chair review list of presentations needed for next meeting.

Summary of Actions items:

<b>Volunteer</b>	<b>Action</b>	<b>Date Assigned</b>	<b>Status</b>
Tom Palkert	Draft a liaison letter to the OIF, indicating that 802.3 started this study group.	Jan-12-11	Done
Tom Palkert	Request updated liaison from OIF	Jan-12-11	Done
Will Bliss	Presentation on signaling terminology	Jan-12-11	
Brad Booth	BER objective proposal	Jan-12-11	
Will Bliss	Latency proposal (Objective?)	Jan-12-11	
Vittal Balasubramanian	Provide channel data related to presentation	Jan-12-11	
John D'Ambrosia	Issue call for channel data to reflector. Indicate preferred format.	Jan-12-11	Done
Chris Di Minico	Provide channel data related to presentation	Jan-12-11	
Megha Shanbhag	Provide channel data related to presentation. Provide ICN limits referenced from OIF.	Jan-12-11	
Mark Bugg	Provide channel data related to presentation	Jan-12-11	
Ed Sayre	Update presentation to remove copyright	Jan-12-11	
Howard Frazier Vasu Parthasarathy	Data mining of channel database: has quality improved over time? (Will entertain other requests related to the database via the reflector.)	Jan-13-11	
John D'Ambrosia	Issue call for package models.	Jan-13-11	
Adam Healey	Lead discussion (reflector or ad hoc) to establish practices for reporting simulation results by March meeting.	Jan-13-11	
Greg LeCheminant	Recommend lower frequency bound for VNA measurements and .s4p files (started as a proposal by Di Minico to provide Matlab script for .s4p to impulse response. )	Jan-13-11	

Motion to adjourn moved by Mike Dudek and seconded by John McDonough;  
Motion passes by voice vote without opposition.

Meeting adjourned at 3:33 PM on Jan 13, 2011.

## Attendee List

<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>	<b>1/12/2011</b>	<b>1/13/2011</b>
Abbas	Ghani	Ericsson, UK	X	X
Abunasrah	Ebrahim	Molex	X	X
Alie	Stephen	Cortina Systems	X	X
Anderson	Jon	Opnext		X
Anslow	Pete	Ciena Corporation	X	X
Balasubramanian	Vittal	FCI	X	X
Barrass	Hugh	Cisco	X	X
Belopolsky	Yakov	Bel Stewart	X	
Bennett	Mike	LBNL	X	
Bhoja	Sudeep	Broadcom	X	X
Bliss	Will	Broadcom	X	X
Booth	Brad	Applied Micro	X	X
Brown	Matt	Applied Micro	X	X
Bugg	Mark	Molex	X	X
Carroll	Martin	Verizon	X	X
Chalupsky	David	Intel	X	X
Chen	Chung-Jue	Broadcom	X	X
Chou	Joseph	Realtek	X	X
Coenen	Robert	Reflex Photonics	X	X
Cui	Kai	Huawei	X	X
D'Ambrosia	John	Force 10 Networks	X	X
Dawe	Piers	IPTronics	X	X
Diab	Wael	Broadcom	X	X
Diamond	Pat	Semtech	X	X
DiMinico	Christopher	MC Communications/LEONI	X	X
Dove	Dan	HP	X	X
Dudek	Mike	QLogic	X	X
Dupuis	Mark	Madison Cable	X	X
Dwellely	David	Linear Tech	X	X
Edwards	Gareth	Xilinx	X	X
Flatman	Alan	LAN Technologies	X	X
Forbes	Harry	Nexans	X	X
Frazier	Howard	Broadcom	X	X
Ghiasi	Ali	Broadcom		X
Giannakopoulos	Dimitris	Applied Micro	X	X
Goergen	Joel	Cisco	X	X
Gustlin	Mark	Cisco	X	X
Hamano	Hiroshi	Fujitsu Labs	X	X
Hatab	Ziad	Vitesse	X	X



Last Name	First Name	Affiliation	1/12/2011	1/13/2011
Healey	Adam	LSI	X	X
Hess	Dave	Nexans	X	X
Huang	Xi	Huawei	X	X
Ishida	Osamu	NTT	X	X
Katsuria	San Jay	PLX	X	
Kimmitt	Myles	Emulex	X	X
Kipp	Scott	Brocade	X	X
Koben	Benny	Mellanox	X	X
Kono	Masashi	Hitachi	X	X
Kvist	Bengt	Ericsson	X	X
Law	David	HP	X	X
LeCheminant	Greg	Agilent Technologies	X	X
Lehman	John	Amphenol	X	
Lewis	Dave	JDSU	X	
Li	Mike	Altera	X	X
Maguire	Valerie	Seimon, TIA	X	X
Malkman	Yonaton	Mellanox	X	X
McDonough	John	NEC America	X	X
Moore	Charles	Avago Technologies	X	X
Muller	Shimon	Oracle	X	X
Neslusan	Neal	Multiphy	X	X
Noh	George	Vitesse Semiconductors	X	X
Nordin	Ron	Panduit Corp.	X	X
Nowell	Mark	Cisco	X	X
Ofelt	David	Juniper Networks	X	X
Okuyama	Takeshi	Fujitsu Components	X	X
Olisar	Ron	Maxim Integrated Products	X	X
Palkert	Tom	Xilinx, Luxtera	X	X
Parthasarathay	Vasudevan	Broadcom	X	X
Pearson	Karen	Leviton		X
Ran	Adee	Intel	X	X
Robertson	Iain	Texas Instruments	X	X
Sambasivan	Sam	AT&T	X	X
Sayre	Edward	NESA	X	X
Shanbhag	Megha	Tyco Electronics	X	X
Shang	Song	Semtech	X	X
Shrikhande	Kapil	Force 10 Networks		X
Sommers	Scott	Molex	X	X
Sparrowhawk	Bryan	Leviton	X	X
Sprague	Ted	Infinera	X	X
Swanson	Steve	Corning	X	X
Thompson	Don	Yamaichi Electronics	X	X

<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>	<b>1/12/2011</b>	<b>1/13/2011</b>
Thornton	Bob	Fujitsu Component America	X	X
Timmins	Ian	Optical Cable Corp.	X	X
Tracy	Nathan	Tyco Electronics	X	X
Tremblay	Francois	Genum	X	
Trowbridge	Steve	Alcatel-Lucent	X	X
Vaden	Sterling	Optical Cable Corp.	X	X
Vanderlaan	Paul	Nexans	X	X
Walker	Bill	Fujitsu	X	X
Wang	Zhongfeng	Broadcom	X	X
Warland	Tim	Applied Micro	X	X
Zivny	Pavel	Tektronix	X	X