

# **IEEE 1 Twisted Pair 100 Mb/s Ethernet Study Group**

**May 12-13, 2014**

**Norfolk, VA, USA**

## **Minutes**

**Chair: Thomas Hogenmueller**

Recording Secretary: Peter J. Scruton

All times local to Virginia, USA

Began approximately 8:35 Monday morning

David Law began with the appointing of a Chair for the IEEE 1 Twisted Pair 100 Mb/s Ethernet Study Group.

Motion: Confirm Thomas Hogenmueller as the IEEE 802.3 1 Twisted Pair 100 Mb/s Ethernet Study Group Chair.

Move: Steve Carlson

Second: Dave Dwelley

Yes: 38

No: 0

Motion passes.

Introductions / Affiliations

Reviewed Agenda

Reviewed Decorum

Reviewed Email reflector

Reviewed Ground rules

Chair read from Guidelines for IEEE-SA Meetings slide (from presentation)

Reviewed the location for bylaws and rules

Peter Anslow reviewed IEEE structure

The intended timeline was reviewed and the fastest anticipation of completion was August 2015.

Thomas Reviewed the CFI presentation

<http://www.ieee802.org/3/1TPCESG/public/cfiMaterial.html>

Reviewed Purpose of the Study Group

- (draft PAR, Objectives and Criteria of Standards Development) among other things

Purpose of Criteria for Standards Development (CSD, Formerly known as 5 Criteria)

Reviewed each of the 5 criteria

Marek Hajduczenia reviewed Objectives.

Criteria for Standards CSD (old 5 criteria + Managed Objects), Objectives Drafting Process

Color code

Green (unconfirmed text w/o major discussion)

Red (unconfirmed text w/ major discussion)

Black (confirmed)

Presentation William Lo (Marvell)

- Autonegotiation ( [http://www.ieee802.org/3/1TPCESG/public/Lo\\_02\\_0514.pdf](http://www.ieee802.org/3/1TPCESG/public/Lo_02_0514.pdf) )
  - Presentation recommended adding Auto-Negotiation to 1TPCE Objectives.
- Questions:
  - Discussion regarding not currently a 1000BASE-T1 Auto-Negotiation objective
  - Discussion about effects of PoDL timing
  - Discussion on timing requirements - RJ-45 compatibility -1 Pair
  - Discussion - Do ones that have Auto-Negotiation enabled and disabled work together... or make it mandatory?
  - Discussion regarding a substitute recommendation that Auto-Negotiation is not included.
  - Discussion: 1PPoDL... 1TPCE Auto-Negotiation optional
  - Discussion: Application/Use cases first before discussing Auto-Negotiation

Break: 10:50 am

---

Reconvened just after 11:05 am

Presentation Brad Booth:

- Overview Auto-Negotiation  
([http://www.ieee802.org/3/1TPCESG/public/booth\\_03\\_0514\\_1TPCE.pptx](http://www.ieee802.org/3/1TPCESG/public/booth_03_0514_1TPCE.pptx))
  - Discussion

Geoff Thompson noted that one of the contributions posted on the website was marked copyrighted Broadcom which is unusual.

In response David Law displayed a copyright permission letter from Broadcom. David noted that the letter did not contained permission to modify, however he had received an e-mail from Broadcom stating that should a PAR result from this study group they would provide an updated permission letter, including permission to modify.

Broke for lunch 11:38 am

---

Reconvened at 1:18pm

Presentation Mehmet Tazebay (Broadcom), Thomas Suermann (NXP) presented by Mehmet

- Presentation: Deployed 100Mb/s One Pair OABR PHY  
([http://www.ieee802.org/3/1TPCESG/public/tazebay\\_01\\_0512.pdf](http://www.ieee802.org/3/1TPCESG/public/tazebay_01_0512.pdf))
  - Discussion occurred
- Mehmet Tazebay (Broadcom) Displayed and discussed the listed supporting material:  
[http://www.ieee802.org/3/1TPCESG/public/BroadR\\_Reach\\_Automotive\\_Spec\\_V3.0.pdf](http://www.ieee802.org/3/1TPCESG/public/BroadR_Reach_Automotive_Spec_V3.0.pdf)
  - No further discussion occurred

There was an additional mention regarding recording attendance on IEEE Attendance Tool ( this is currently located here: <https://imat.ieee.org/my-site/home> ) and then also regarding signing the physical sheet.

Geoff Thompson presented on Managed Objects:

([http://www.ieee802.org/3/1TPCESG/public/20140508\\_ManagedObjects.pdf](http://www.ieee802.org/3/1TPCESG/public/20140508_ManagedObjects.pdf) )

Proposal: Accept Managed Objects Text from presentation

Moved: Yong Kim:

Seconded: Mehmet Tazebay

Discussion occurred.

Proposal:

Geoff Thompson moved a subsidiary motion to postpone until after the Scope is approved.

Seconded by Thomas Hogenmueller

For 28, Opposed 0, Abstain 10

Thomas Hogenmueller presented Broad Market Potential Presentation:

([http://www.ieee802.org/3/1TPCESG/public/20140508\\_BroadMarketPotential.pdf](http://www.ieee802.org/3/1TPCESG/public/20140508_BroadMarketPotential.pdf) )

Discussion occurred. Wording of second bullet modified under “Other Applications Include”

Discussion occurred. Wording of third item under “Broad Set of Applications” was modified.

Took break about 3:04 pm

- - -

Reconvened at 3:29 pm

Continued on to the second page of Broad Market Potential slide

Wording changes were discussed. Text was modified.

Straw Poll:

Should we remove the last bullet regarding “Internet of Things”?

General consensus was to remove.

Geoff Thompson discussed Title and Scope.

<http://www.ieee802.org/3/1TPCESG/public/PAR%20Substance%201TPE.ppt>

Yong Kim discussed Compatibility for CSD... wording changes were made.

Stefan Buntz discussed Distinct Identity. Slight wording change.

Yong Kim discussed Technical Feasibility... wording changes were made.

Thomas Hogenmueller discussed Economic Feasibility... wording changes were made.

Yong Kim also discussed Economic Feasibility.... Wording changes were made to Economic Feasibility.

Took brief break and returned

Thomas Hogenmueller discussed Objectives... wording changes were made.

Motion to adjourn: Gary Yurko

Second: Doug Oliver

Motion carried.

Adjourned for the day (May 12, 2014) at 6:12 pm

=====

Reconvened May 13, 2014 at 8:35 am

Thomas Hogenmueller reminded people to sign up on Physical Sign-up sheet and in IMAT.

Thomas Hogenmueller indicated that the votes will be this afternoon in order to allow people to attend PoDL (starting 9 am and likely finishing approximately 12PM).

The group then continued to discuss the Objectives and edit them. Added a bullet regarding maintaining interoperability with existing conformant OABR PHYs.

Straw Poll:

Option 1: Provide electrical interoperability with existing 100Mb/s client interface (ref here. OABR\* PHY)

Option 2: Maintain interoperability with deployed PHYs in compliance with OABR TC1 requirements specification.

Votes for Option 1: 20

Votes for Option 2: 8

Took break approximately 9:27 am

---

Reconvened at 9:47 am

Continued discussing Objectives.

Straw Poll:

Option 1: The resulting standard will not preclude single pair Auto-Negotiation.

Option 2: The resulting standard will not preclude single pair auto-negotiation.

Option 3: The resulting standard will not preclude single pair speed discovery.

Votes for Option 1: 1

Votes for Option 2: 26

Votes for Option 3: 2

A Straw Poll regarding inclusion of clock specification in Objectives was conducted.

- Overwhelming majority in favor of not including Clock specification in objectives, only 1 in support of inclusion.

A discussion on Reach Objective occurred.

Break at 10:29

- - -

Reconvened at 10:46

Objective for reach is:

Define the performance characteristics of a link segment and a PHY to support point-to-point operation over this link segment with single twisted pair supporting up to four inline connectors using balanced cabling for at least 15 m reach.

Discussed and modified various objectives.

Broke up the “fast startup time” objective and the “run time configuration” objective into separate objectives.

Reviewed Distinct Identity, modified slightly

Reviewed Economic Feasibility

Geoff Thompson discussed the online PAR form and presented a document containing information to be submitted in the online PAR form. We reviewed the information that is to be submitted for the online PAR. It appears that this is going to be 802.3bw.

We reviewed and modified the information to be submitted.

Adjourning until 2:00 pm

Adjourn at 11:54 am

---

Reconvened at: 2:04 pm

Discussion regarding power\_off = FALSE as used in the Objectives.

2:28 pm took a brief break

---

Reconvened approximately 2:36 pm

Motion to adopt the CSD “Managed Objects” as written in “20140513\_V2\_ManagedObjects.pdf”.

<http://www.ieee802.org/3/1TPCESG/public/PAR%20Substance%20TPCE.ppt>

M: Jeff Heath

S: Mehmet Tazebay

Yes: 35

No: 0

Abstain: 1

Motion to adopt the CSD “Broad Market Potential” as written in

“20140513\_V2\_BroadMarketPotential.pdf”.

[http://www.ieee802.org/3/1TPCESG/public/20140513\\_V2\\_BroadMarketPotential.pdf](http://www.ieee802.org/3/1TPCESG/public/20140513_V2_BroadMarketPotential.pdf)

M: Dave Dwelley

S: Stefan Buntz

Yes: 36

No: 0

Abstain: 1

Motion to adopt the CSD “Compatibility” as written in “20140513\_V2\_Compatibility.pdf”.

[http://www.ieee802.org/3/1TPCESG/public/20140513\\_V2\\_Compatibility.pdf](http://www.ieee802.org/3/1TPCESG/public/20140513_V2_Compatibility.pdf)

M: Yong Kim

S: Todd Herman

Yes: 36

No: 0

Abstain: 1

Motion to adopt the CSD "Distinct Identity" as written in "20140513\_V2\_DistinctIdentity.pdf".

[http://www.ieee802.org/3/1TPCESG/public/20140513\\_V2\\_DistinctIdentity.pdf](http://www.ieee802.org/3/1TPCESG/public/20140513_V2_DistinctIdentity.pdf)

M: Stefan Buntz

S: Mehmet Tazebay

Yes: 35

No: 0

Abstain: 1

Motion to adopt the CSD "Technical Feasibility" as written in "20140513\_V2\_TechnicalFeasibility.pdf".

[http://www.ieee802.org/3/1TPCESG/public/20140513\\_V2\\_TechnicalFeasibility.pdf](http://www.ieee802.org/3/1TPCESG/public/20140513_V2_TechnicalFeasibility.pdf)

M: Vijay Ceekala

S: Thomas Mueller

Yes: 36

No: 0

Abstain: 1

Motion to adopt the CSD "Economic Feasibility" as written in "20140513\_V2\_EconomicFeasibility.pdf".

[http://www.ieee802.org/3/1TPCESG/public/20140513\\_V2\\_EconomicFeasibility.pdf](http://www.ieee802.org/3/1TPCESG/public/20140513_V2_EconomicFeasibility.pdf)

M: Olaf Krieger

S: Thomas Suermann

Yes: 36

No: 0

Abstain: 1

Thomas explained that anyone can request a separate vote on any line item in the Objectives.

Dave Dwelley wanted to vote on first seven.

M: Dave Dwelley

S: Mehmet Tazebay

Motion to adopt the first seven objectives as written:

- ➔ Support 100 Mb/s operation in automotive environments (e.g. EMC, temperature) over a single balanced twisted pair.
- ➔ Provide electrical interoperability with existing single balanced twisted pair 100 Mb/s client interface (OABR\* PHY).



- ➔ Preserve the IEEE 802.3/Ethernet frame format at the MAC client service interface.
- ➔ Preserve minimum and maximum frame size of the current IEEE 802.3 standard.
- ➔ Support full duplex operation only.
- ➔ Support a speed of 100 Mbit/s at the MAC/PLS service interface.
- ➔ Maintain a bit error ratio (BER) of less than or equal to  $10^{-10}$  at the MAC/PLS service interface.

Vote:

Yes: 39

No: 0

Abstain: 1

Motion to additionally adopt the following Objective:

- ➔ Do not preclude the ability to survive automotive fault conditions (e.g. shorts, over voltage, EMC, ISO16750)

M: Yong Kim

S: Tom Brown

Yes: 35

No: 1

Abstain: 2

Motion to additionally adopt the following two Objectives:

- ➔ Support fast-startup operation using predetermined configurations which enables the time from power\_on\*\*=FALSE to a state capable of transmitting and receiving valid data to be less than 100ms.
- ➔ Support optional operation with run-time configuration; by allowing time from power\_on\*\*=FALSE to a state capable of transmitting and receiving valid data to be up to TBD.

M: Geoff Thompson

S: Douglas Oliver

Yes: 39

No: 0

Abstain: 2

Motion to additionally adopt the following Objective:

- ➔ The resulting standard will not preclude single pair auto-negotiation.

M: Dave Dwelley  
S: Shaoan Dai  
Yes: 40  
No: 0  
Abstain: 2

Motion to additionally adopt the following Objective:

- ➔ Define the performance characteristics of a link segment and a PHY to support point-to-point operation over this link segment with single twisted pair supporting up to four inline connectors using balanced cabling for at least 15 m reach.

M: Natalie Wienckowski  
S: Olaf Krieger  
Yes: 37  
No: 0  
Abstain: 4

Motion: The items on “Draft PAR 100BASE-T1.doc” in Red to be entered into the online PAR system by the WG Chair with appropriate editorial discretion as needed to complete the submission.

<http://www.ieee802.org/3/1TPCESG/public/Draft%20PAR%20100BASE-T1.doc>

M: Geoff Thompson  
S: Mehmet Tazebay  
Yes: 39  
No: 0  
Abstain: 3

Thomas Hogenmueller asked if there are planned contribution or discussion items for the planned interim meeting in June in Germany.

No indication of any contribution.

Thomas Hogenmueller asked whether there should be an interim meeting that is already scheduled (June 5-6, 2014) in Germany prior to the July Plenary.

Move to cancel interim meeting June 5-6 in Germany.

M: Thomas Hogenmueller

S: Dale Amason

Yes: 34

No: 0

Abstain: 2

Yong Kim made a request for consideration that the smiley face on Thomas PC wallpaper be changed from time to time.

Geoff Thompson requests the Study Group Chair e-mail the cancellation of the interim meeting very soon.

Motion to Adjourn

M: Geoff Thompson

S: Mehmet Tazebay

Motion passed by voice without opposition at 3:23pm.

Adjourned at 3:23 pm on May 13, 2014.

Tuesday  
Initial

1 of 3

Sign in for 802.3 Twisted Pair 1000 Mbit/s Ethernet Study Group, May 12, 2014

|      | Attendee Name     | Affiliation       | email address                            |
|------|-------------------|-------------------|--|
|      | PIETER ANSLOW     | CIENA             | panslow@ciena.com                        |
|      | MAREK HAJDUCZENIA | BHX               | MAREK.HAJDUCZENIA@MYBRIGHTHE             |
| OK   | Aboubacar Diarra  | Bosch             | aboubacar.diarra@de.bosch.com            |
|      | Olaf Krüger       | Volkswagen AG     | Olaf.Krueger@volkswagen.com              |
| HZ   | Helge Zinner      | Continental AG    | Helge.Zinner@continental-corporation.com |
| MM   | Martin Heinebrodt | Bosch             | martin.heinebrodt@de.bosch.com           |
| JK   | Shaoan Dai        | Marvell           | sdai@marvell.com                         |
| aw   | Peter Wu          | Marvell           | Xingwu@marvell.com                       |
| AA   | Andreas Arlt      | Bosch             | andreas.arlt@de.bosch.com                |
| MM   | Michael Mehnert   | Bosch             | michael.mehnert@de.bosch.com             |
| DA   | Dale Amason       | Freescale         | dale.amason@freescale.com                |
| CKD  | Curtis Donahue    | UNH-IOL           | cdonahue@iol.unh.edu                     |
| J    | Peter Scruton     | UNH-IOL           | pjs@iol.unh.edu                          |
|      | STERLING VANDEN   | VANDEN ENT.       | STERLINGV@charter.net                    |
| WZ   | William Lee       | Amphenol Adronics | wlee@adronics.com                        |
| MM   | Martin Mewer      | MD Elektronik     | Martin.Mewer@md-elektronik.com           |
|      | Thomas Müller     | Rosenberger       | thomas.mueller@rosenberger.de            |
| #    | Allen Houck       | NXP               | allen.houck@nxp.com                      |
| \$   | Sujan Pandey      | NXP               | sujan.pandey@nxp.com                     |
| S    | Thomas Suermann   | NXP               | thomas.suermann@nxp.com                  |
|      | BRAD BOOTH        | MICROSOFT         | brbooth@microsoft.com                    |
|      | James Malkenus    | General Cable     | jmalkenus@generalcable.com               |
| AT   | ALBERT TRETTER    | SIEMENS AG        | albert.tretter@siemens.com               |
| A.C. | Ahmad Chini       | Broadcom          | achini@broadcom.com                      |

Tuesday  
Initial

2 of 3

100

Sign in for 802.3 Twisted Pair 1000 Mbit/s Ethernet Study Group, May 12, 2014

| Attendee Name                 | Affiliation       | email address                     |
|-------------------------------|-------------------|-----------------------------------|
| <u>DAO</u> Doug Oliver        | Ford Motor        | doliver@ford.com                  |
| RALPH MASON                   | MICROCHIP         | <del>AM</del> ralph.mason@microch |
| PAUL KISH                     | BELDEN            | paul.kish@belden.co               |
| JEFF HEATH                    | Linear            | jheath@linear.com                 |
| <u>DMD</u> DALE DWELLEY       | LTC               | ddwelle@linear.com                |
| ALON REGEV                    | IXIA              | AREGEV@IXIACOM.COM                |
| EFSTATHIOS LARIOS             | JAGUAR LAND ROVER | elarios1@jaguarlandrover          |
| <u>AW</u> Natalie Wienckowski | GM                | natalie.a.wienckowski             |
| Sasha Babenko                 | Molex             | sasha.babenko@molex               |
| LARRY MATOLA                  | DELPHI            | LAURENCE.MATOLA@DELPHI            |
| <u>SPM</u> ARTHUR MARRIS      | CADENCE           | ARTHURM@CADENCE.CO                |
| <u>SB</u> Stefan Buntz        | Daimler           | stefan.buntz@daimler              |
| <u>Ymy</u> Garoid Yuriko      | TE                | gyuriko@TE.COM                    |
| <u>TM</u> Thomas Miller       | Rosenbergn        |                                   |
| <u>MS</u> MIKE GARDNER        | Molex             | MIKE.gardner@molex                |
| Mehmet Tazebay                | Broadcom          | mtazebay@broadcom                 |
| ALON REGEV                    | IXIA              | AREGEV@IXIACOM.C                  |
| <u>EL</u> EFSTATHIOS LARIOS   | JAGUAR LAND ROVER | elarios1@jaguarlandrover          |
| <u>Ca</u> VIJAYA CEKALA       | TEXAS INSTRUMENTS | Vijaya.Cekala@ti                  |

Tuesday  
Initial

30 of 3

Sign in for 802.3 Twisted Pair 1000 Mbit/s Ethernet Study Group, May 12, 2014

|     | Attendee Name    | Affiliation                | email address                |
|-----|------------------|----------------------------|------------------------------|
|     | Dave Estes       | Spirent Communications     | david.estes@spirent.com      |
| ZH  | TODD HERMAN      | CommScope                  | therman@commscope.com        |
|     | DAVE HESS        | CORD DATA                  | davecarlhess@outlook.com     |
|     | WAYNE LARSEN     | COMMSCOPE                  | WLARSEN@COMMSCOPE.CO         |
| YKC | Yongbum Kim      | Broadcom                   | ybkim@broadcom.com           |
|     | Bernd Hormmeyer  | Phoenix Contact            | bhormmeyer@phoenixcontact.co |
| ST  | GEOFF THOMPSON   | Bosch (contract)           | thompson@ieee.org            |
|     | DAVID LAW        | HP                         | dlaw@hp.com                  |
| MR  | Michael Rucks    | Delphi                     | michael.rucks@delphi.com     |
|     | Phillip Braumlee | Coilcraft                  | PBrowmlee@coilcraft.com      |
| BH  | Benson Huang     | Realtek                    | benison_lw@realtek.com       |
| WJ  | WILLIAM LO       | MARVELL                    | williaml@marvell.com         |
|     | Victor Berglund  | Vitesse                    | berglund@vitesse.com         |
|     | Thomas Brown     | Vitesse                    | tkbrown@vitesse.com          |
| KW  | KARL WEBER       | BECKHOFF                   | karl.weber@beckhoff.com      |
| XTW | XIAO FENG WANG   | Qualcomm                   | wangxiao@qti.qualcomm.com    |
| PT  | Pat Thaler       | Broadcom                   | pthaler@broadcom.com         |
|     | Steve Carlson    | Marvell / Intel<br>+ Value |                              |