POWER OVER DATA LINES

Call For Interest

IEEE 802.3 Ethernet Working Group
16 July 2013

Dave Dwelley
Linear Technology Corporation

Panel

- Thomas Hogenmueller, Bosch
- Wael Diab, Broadcom
- Steve Carlson, High Speed Design/P802.3bp chair
- Kirsten Matheus, BMW

Supporters

Francois Crepin	Akros		Karl Barker	Jaguar Land Rover
Rick Rabinovich	Alcatel-Lucent		John Leslie	Jaguar Land Rover
Dan Dove	Applied Micro		Alan Flatmann	LAN Technology
Raul Lozano	Aruba Networks		Mike Bennett	Lawrence Berkeley Labs
Bill Delveaux	Avaya		Jeff Heath	Linear Tech
Yakov Belopolsky	Bel Stewart		Chris DiMinico	MC Communications
Oliver Kleineberg	Belden		Yair Darshan	Microsemi
Kirsten Matheus	BMW		Pavlick Rimbiom	Microsemi
Thomas Hogenmueller	Bosch		Martin Rossbach	Nexans
Wael Diab	Broadcom		Paul Vanderlaan	Nexans
Ismail Jorio	Broadcom		Thomas Suermann	NXP
Martin McNarney	Broadcom		Sterling Vaden	OCC
Mehmet Tazebay	Broadcom		Ron Nordin	Panduit
Scott Kipp	Brocade		Doarte Goncalves	PSA Peugeot Citroën
Kousi Balasubramanian	Cisco		Ahmed Harrar	PSA Peugeot Citroën
Hugh Barass	Cisco		Joseph Chou	Realtek
Chad Jones	Cisco		Albert Kuo	Realtek
George Zimmerman	CME Consulting		Stephane Korzin	Renault
Phil Brownlee	Coilcraft		Jose Villanueva	Renault
Richard Mei	Commscope		Fred Schindler	Seen Simply
Masood Sharif	Commscope		Ludwig Winkel	Siemens
Dave Hess	Cord Data		Valerie Maguire	Siemon
Helmut Leier	Daimler		Peter Johnson	Sifos
John D'Ambrosia	Dell		David Lucia	Sifos
Theodore Brillhart	Fluke Networks		Christian Beia	ST
Jim Lawlis	Ford		Stefano Valle	ST
Markus Jochim	GM		David Abramson	TI
Natalie Wienckowski	GM		Michael McCormack	Unemployed
Steve Carlson	High Speed Design		Curtis Donahue	UNH
David Tremblay	HP		Dave Estes	UNH
Xin Chang	Huawei		Mandeep Chadha	Vitesse
Dongok Kim	Hyundai		Olaf Krieger	Volkswagen AG
Dave Chalupsky	Intel		Hans Alminger	Volvo
			Marek Hajdeczunia	ZTE

Objective for This Meeting

- Gauge interest in forming a Study Group to develop a 1-Pair Power over Data Lines (PoDL) standard
  - For use where Clause 33 PoE is not applicable

- This meeting will not:
  - Fully explore the problem
  - Debate strengths and weaknesses of any solution
  - Choose a solution
  - Create a PAR or 5 Criteria
  - Create a standard or specification

Background

- Automotive industry requested a faster, lower wire count Ethernet
  - RTPGE CFI formed in Hawaii March 2012
- Interest has increased since that time
  - Volume estimates are increasing
  - Significant automotive attendance in P802.3bp WG
- Power is required over many automotive links
  - New power standard is needed to fit automotive links beyond existing IEEE 802.3 PoE

Target Markets

Markets
Automotive Networking
Cars, Trucks, Buses Cameras, Sensors, Infotainment Converged Ethernet Backbone
Industrial Networking
Factory Automation Replace Legacy Powered non-Ethernet Protocols
Railroad/Aircraft
High Speed Rail Airframe Communications (Especially Weight Sensitive)

Automotive Networking Applications

Diagram by Bosch

- Cruise control sensors (shown)
- Front-facing cameras
- Front proximity sensors
- Side-view cameras
- Lane departure warning sensors
- Rear facing cameras
- Backup sensors

Automotive Market: Unique Aspects

- 100M Automotive Ethernet ports/year by 2017, 25% powered
  - Data from RTPGE CFI presentation, supplied by Bosch
  - Newer data suggests these numbers are conservative
- Weight and connector requirements dictate minimum pair count
  - No dynamic configuration – network topology is static
  - No structured cabling or specified connector
- 12V supply vs. 50V for IEEE 802.3 PoE
  - Wire size can vary with current requirements
- Additional automotive-specific conformance requirements
- Cost efficiency
  - Overall costs must be lower than dedicated power lines
- Possible alternate use cases
  - PoDL used as a turn-on signal

Power Coupling Architecture

- Phantom power injection
  - Requires (at least) 2 pairs
  - Used by Clause 33 PoE
  - Not applicable to single pair
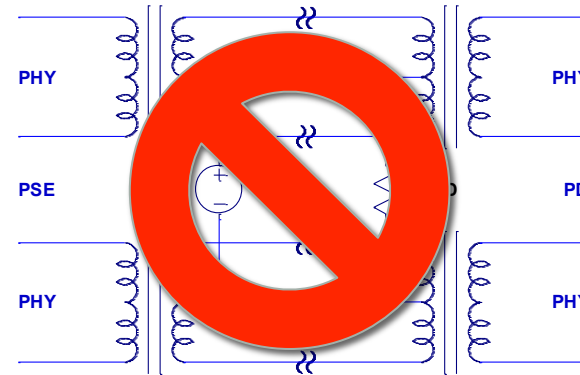
- New coupling scheme required to work with single pair
- Several legacy single-pair powering schemes exist
  - We'll attempt not to re-invent the wheel
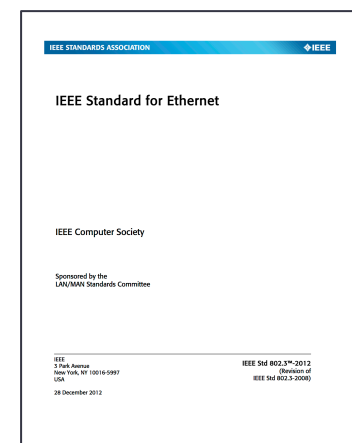
Why Do This in 802.3?

- Same market as Automotive Ethernet
  - Will require close cooperation with 802.3bp PHY project
  - PoDL will affect magnetics, cabling decisions
- 1PPoDL will help broaden the market for P802.3bp
- Automotive industry wants it now
- Same group of power experts as 4PPoE

March 2012 → 802.3bp (RTPGE) →

July 2013 → 1PPoDL →

IEEE STANDARDS ASSOCIATION   ◆IEEE

IEEE Standard for Ethernet

IEEE Computer Society

Sponsored by the
LAN/MAN Standards Committee

IEEE
3 Park Avenue
New York, NY 10016-5997
USA

IEEE Std 802.3™-2012
(Revision of
IEEE Std 802.3-2008)

28 December 2012

Why Not Do This in P802.3bp?

- P802.3bp is a data PHY spec
  - CFI, PAR cover data only

- Power and data groups are traditionally kept separate
  - P802.3af PoE 1999-2003
  - P802.3at PoE+ 2005-2009
  - 4PPoE Study Group 2013+

- Different expertise required for data and power
  - Different people in the room

Q & A

CFI Question

- Should a study group be formed for
  1-Pair Power over Data Lines (1PPoDL)

    People in the room: Y:_48_ N:_0_ A:_1_

    802.3 Voters only: Y:_33_ N:_0_ A:_0_

Straw Polls

_49_ Number of people in the room

_26_ Individuals who would attend and contribute to a
1-Pair Power over Data Lines Study Group

_26_ Companies that support the formation of a
1-Pair Power over Data Lines Study Group

THANK YOU