



POWER OVER DATA LINES

Call For Interest

IEEE 802.3 Ethernet Working Group
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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
Raul Lozano	Aruba Networks	Alan Flatmann	LAN Technology
Bill Delveaux	Avaya	Mike Bennett	Lawrence Berkeley Labs
Yakov Belopolsky	Bel Stewart	Jeff Heath	Linear Tech
Oliver Kleineberg	Belden	Chris DiMinico	MC Communications
Kirsten Matheus	BMW	Yair Darshan	Microsemi
Thomas Hogenmueller	Bosch	Pavlick Rimbiom	Microsemi
Wael Diab	Broadcom	Martin Rossbach	Nexans
Ismail Jorio	Broadcom	Paul Vanderlaan	Nexans
Martin McNarney	Broadcom	Thomas Suermann	NXP
Mehmet Tazebay	Broadcom	Sterling Vaden	OCC
Scott Kipp	Brocade	Ron Nordin	Panduit
Kousi		Doarte Goncalves	PSA Peugeot Citroën
Balasubramanian	Cisco	Ahmed Harrar	PSA Peugeot Citroën
Hugh Barass	Cisco	Joseph Chou	Realtek
Chad Jones	Cisco	Stephane Korzin	Renault
George Zimmerman	CME Consulting	Jose Villanueva	Renault
Phil Brownlee	Coilcraft	Fred Schindler	Seen Simply
Richard Mei	Commscope	Ludwig Winkel	Siemens
Masood Sharif	Commscope	Valerie Maguire	Siemon
Dave Hess	Cord Data	Peter Johnson	Sifos
Helmut Leier	Daimler	David Lucia	Sifos
John D'Ambrosia	Dell	Christian Beia	ST
Theodore Brillhart	Fluke Networks	Stefano Valle	ST
Markus Jochim	GM	David Abramson	TI
Natalie Wienckowski	GM	Dave Estes	UNH
Steve Carlson	High Speed Design	Mandeep Chadha	Vitesse
David Tremblay	HP	Olaf Krieger	Volkswagen AG
Xin Chang	Huawei	Hans Alminger	Volvo
Dongok Kim	Hyundai	Marek Hajdeczunia	ZTE
Dave Chalupsky	Intel		



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

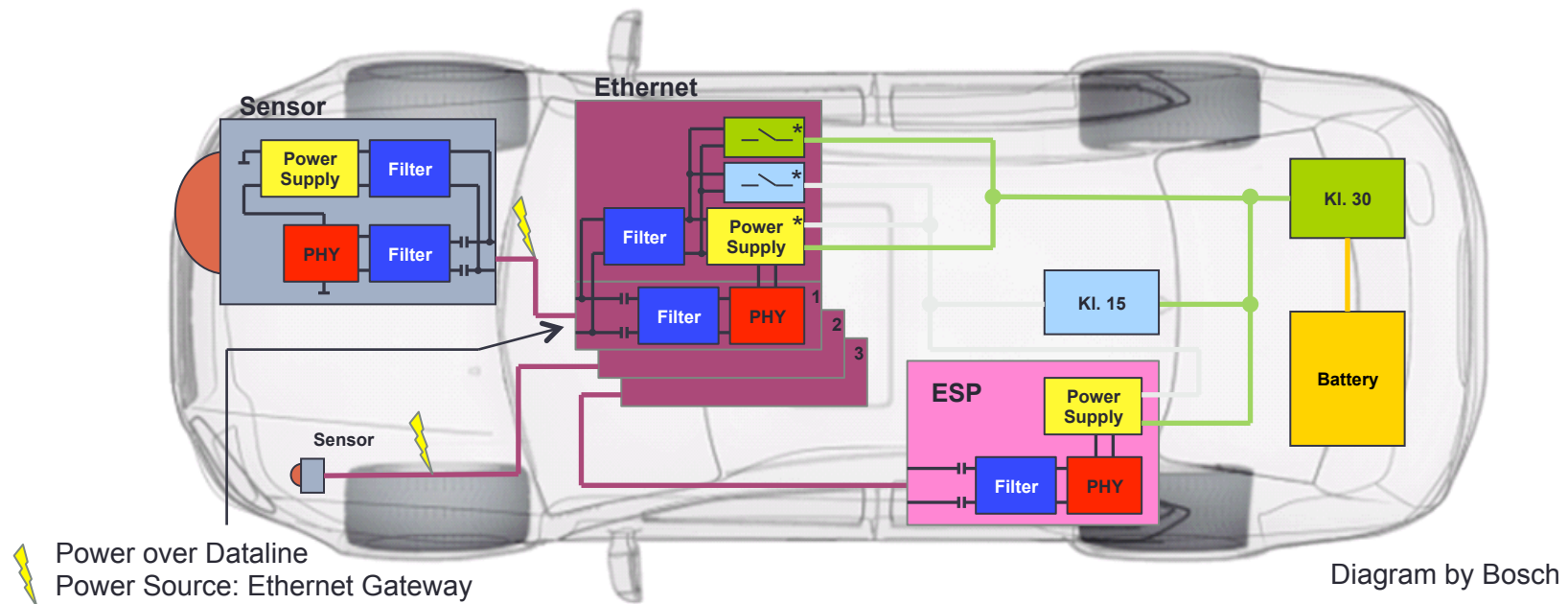
Industrial Networking

Factory Automation
Replace Legacy Powered non-Ethernet Protocols

Railroad/Aircraft

High Speed Rail
Airframe Communications (Especially Weight Sensitive)

Automotive Networking Applications



- 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

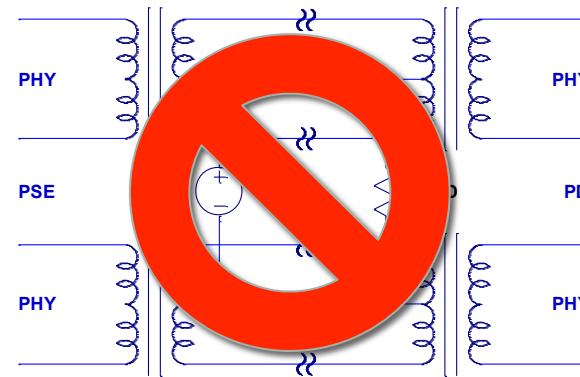
- 100M Automotive Ethernet ports/year by 2017, 25% powered
 - Data from RTPGE CFI presentation, supplied by Bosch
 - Newer data suggests these numbers are conservative
- Weight and connector requirements dictate minimum pair count
 - No dynamic configuration – network topology is static
 - No structured 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?

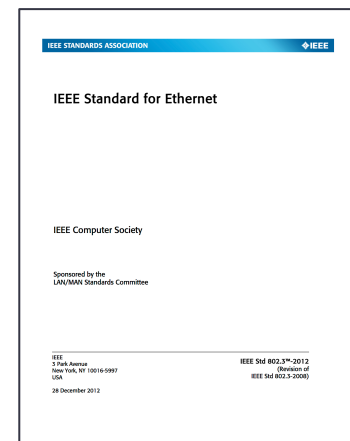
- Same market as Automotive Ethernet
 - Will require close cooperation with 802.3bp PHY project
 - PoDL will affect magnetics, cabling decisions
- 1PPoDL will help broaden the market for P802.3bp
- Automotive industry wants it now
- Same group of power experts as 4PPoE

March 2012

802.3bp (RTPGE)

July 2013

1PPoDL





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:___ N:___ A:___

802.3 Voters only: Y:___ N:___ A:___



Straw Polls

- ___ Number of people in the room
- ___ Individuals who would attend and contribute to a
1-Pair Power over Data Lines Study Group
- ___ Companies that support the formation of a
1-Pair Power over Data Lines Study Group



THANK YOU
