Reduced Twisted Pair Gigabit Ethernet SG Channel Definitions Ad Hoc Report

Phoenix, Arizona
January 2013

Ad hoc – co-chairs
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MC Communications
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Broadcom

Channel Definitions Ad Hoc

- Ad Hoc charted to develop channel definitions
- Initial meeting IEEE Interim May 2012
- Communications via RTPGE reflector
- Follow-on conference calls
  - June 14, November 1, December 13, January 10

Minutes - Channel definitions ad hoc minutes

Minutes– December 13, 2012

Attendees were asked to review the patent policy slides at http://www.ieee802.org/3/patent.html.

>>Reviewed document [121123_AutomotiveCablingSurvey.pdf] - Automotive Cabling Survey responses presented by Dr.-Ing. Stefan Buntz, Daimler AG..

>>Stefan followed-up with attachment summary of typical automotive bus systems and cabling extracted from the survey.

>>Request to Commscope to provide s-parameter measurements of proposed SMA-IDC test fixture including balance parameters (see Automotive Cabling survey parameters).

Minutes– January 10, 2013

Attendees were asked to review the patent policy slides at http://www.ieee802.org/3/patent.html.

January 10 Agenda

>>>Reviewed document [automotiveelectrical-delphi.pdf]- Automotive Electrical Overview – presented by Larry Matola, Lead Architect Delphi Corporation.

>>Larry has agreed to provide summary slide chart.

Minutes - Channel definitions ad hoc minutes

Minutes– January 10, 2013

>>>Reviewed document [mueller_01_0112.pdf] - IEEE RTPGE Automotive Datalinks over Twisted Quad Cabling T. Müller, G. Armbrecht, S. Kunz

>>Thomas followed-up with attachment summary of typical automotive bus systems and cabling extracted from the survey.

Stefan Buntz, Daimler AG summary of typical automotive bus systems and cabling extracted from the survey.

Overview over typical automotive bus systems, their voltage levels and cables and connectors

system	LIN	CAN (500 kbit/s*)	FlexRay	USB (HiSpeed)	HSVL („LVDS“)	RF-signals
Data rate	20 kbit/s	500 kbit/s	10 Mbit/s	480 Mbit/s	200…3000 Mbit/s	Antenna signals (AM, FM, ISM, WLAN, Bluetooth, …)
amplitude	12 V	2V	0,6V	0,4V	0,25…0,45V	different
differential?	single-ended	differential	differential	differential	differential	single-ended
typical cabling	Single wire, e.g. 0,35mm²	UTP 2x0,35mm² (future: UTP 2x0,17mm²)	UTP 2x0,35mm² (e.g. FLR9Y 2x0,35 mm²-SN) (future: UTP 2x0,17mm²)	STQ 4x0,5mm² (e.g. Leoni Dacar566)	STQ 4x0,14mm² (e.g. Leoni Dacar535-2)	Coax (e.g. Leoni Dacar302)
DC resistance max. values	125 mΩ/m	55 mΩ/m (for 0,35mm²)	55 mΩ/m (for 0,35mm²)	35 mΩ/m	125 mΩ/m	e.g. 50 mΩ/m (Leoni Dacar 302)
Differential Cable impedance (Z_{diff} Ω)	-	120 (±12)	100 (±10)	90 (±15)	100 (±15)	50 (±3)
Shield?	no	no	no	yes (braid + foil)	yes (braid + foil)	yes (braid + foil)
conductor	stranded (e.g. 7)	Stranded (e.g. 7)	stranded (e.g. 7x0,26)	stranded (e.g. 19x0,182)	stranded (e.g. 7x0,16)	stranded (e.g. 7x0,27)
Jacketed?	-	no	no	yes	yes	yes
typical connector	different multi pin connectors (e.g. Tyco MQS)	different multi pin connectors (e.g. Tyco MQS)	different multi pin connectors (e.g. Tyco MQS)	Rosenberger HSD	Rosenberger HSD	FAKRA

*) different data rates are possible for CAN, typically are 125kbit/s or 500kbit/s, possible are 667kbit/s or up to 1Mbit/s

Protocols and applications - Connectors and Cables (Rosenberger)

System	Ethernet (BroadR-Reach)	Ethernet (100Base-TX)	Firewire	APIX	APIX 2	MHL	HSVL (LVDS)
data rate	100 Mbit/s	100 Mbit/s	800 Mbit/s	1 Gbit/s	3 Gbit/s	3 Bit/s	200…3000 Mbit /s
amplitude							
mode	differential	differential	differential	differential	differential	differential	differential
typical cabling	U/STQ 4x0.14mm^2	STQ 4x0.14mm^2	STQ 4x0.14mm^2	STQ 4x0.14mm^2	STQ 4x0.14mm^2	STQ 4x0.14mm^2	
DC resistance							
max. values	125 m?/m	125 m?/m	125 m?/m	125 m?/m	125 m?/m	125 m?/m	125 m?/m
Diff. Cable							
impedance	100 (±10) ?	100 (±10) ?	100 (±10) ?	100 (±10) ?	100 (±10) ?	100 (±10) ?	100 (±10) ?
Shielded	yes / no	yes	yes	yes	yes	yes	yes
conductor							
Jacketed	yes	yes	yes	yes	yes	yes	yes
typical connector	HSDe (unshielded) HSD	HSD	HSD	HSD	HSD	HSD	HSD

Summary: Protocols and applications over connectors and cables Rosenberger Hochfrequenztechnik GmbH & Co. KG, Provided by T. Müller, G. Armbrecht, S. Kunz

Summary status

- **RTPGE channel definitions ad hoc;**
  - **-collecting specifications and automotive cabling components to be tested at UNH-IOL.**
  - **-coordinate with RTPGE EMC ad hoc to finalize link segment definitions.**