
Reduced Twisted Pair Gigabit Ethernet SG Link segments

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Purpose

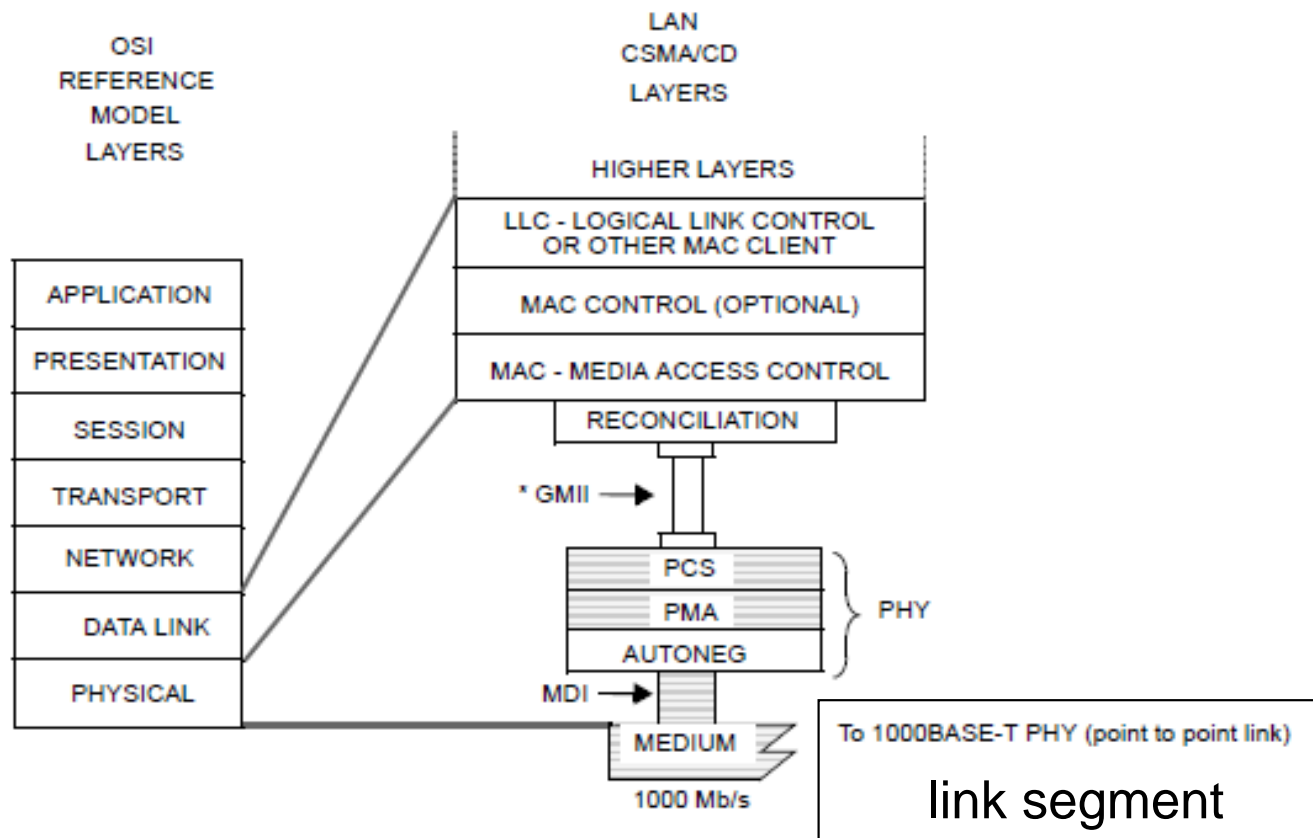
- **Scope**

- **Initiate discussion on Reduced Twisted Pair Gigabit Ethernet link segment characteristics**

- **Rationale**

- **Link segment characteristics enables considerations for PHY (e.g., signaling, number of differential pairs, etc)**

Gigabit Ethernet link segment



MDI = MEDIUM DEPENDENT INTERFACE

GMII = GIGABIT MEDIA INDEPENDENT INTERFACE

PCS = PHYSICAL CODING SUBLAYER

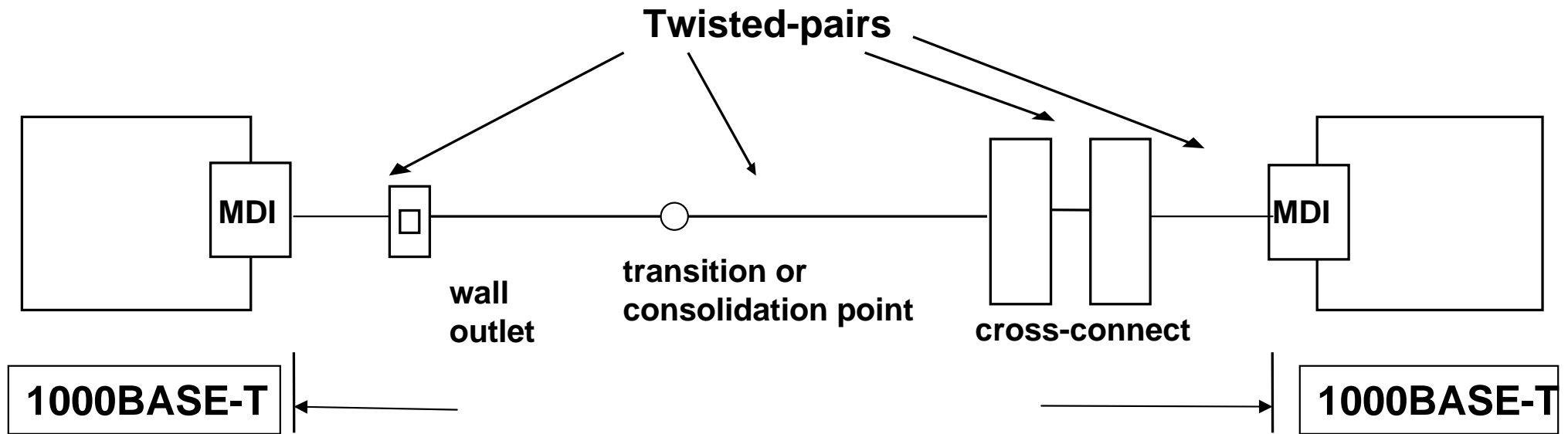
PMA = PHYSICAL MEDIUM ATTACHMENT

PHY = PHYSICAL LAYER DEVICE

*GMII is optional.

Figure 40-1—Type 1000BASE-T PHY relationship to the ISO Open Systems Interconnection (OSI) Reference Model and the IEEE 802.3 CSMA/CD LAN Model

Twisted Pair Link Segment



Structured cabling ISO/IEC, TR42

1000BASE-T Link transmission and coupling parameters

- Insertion loss, Return loss
- NEXT, FEXT, Multiple Disturber Crosstalk

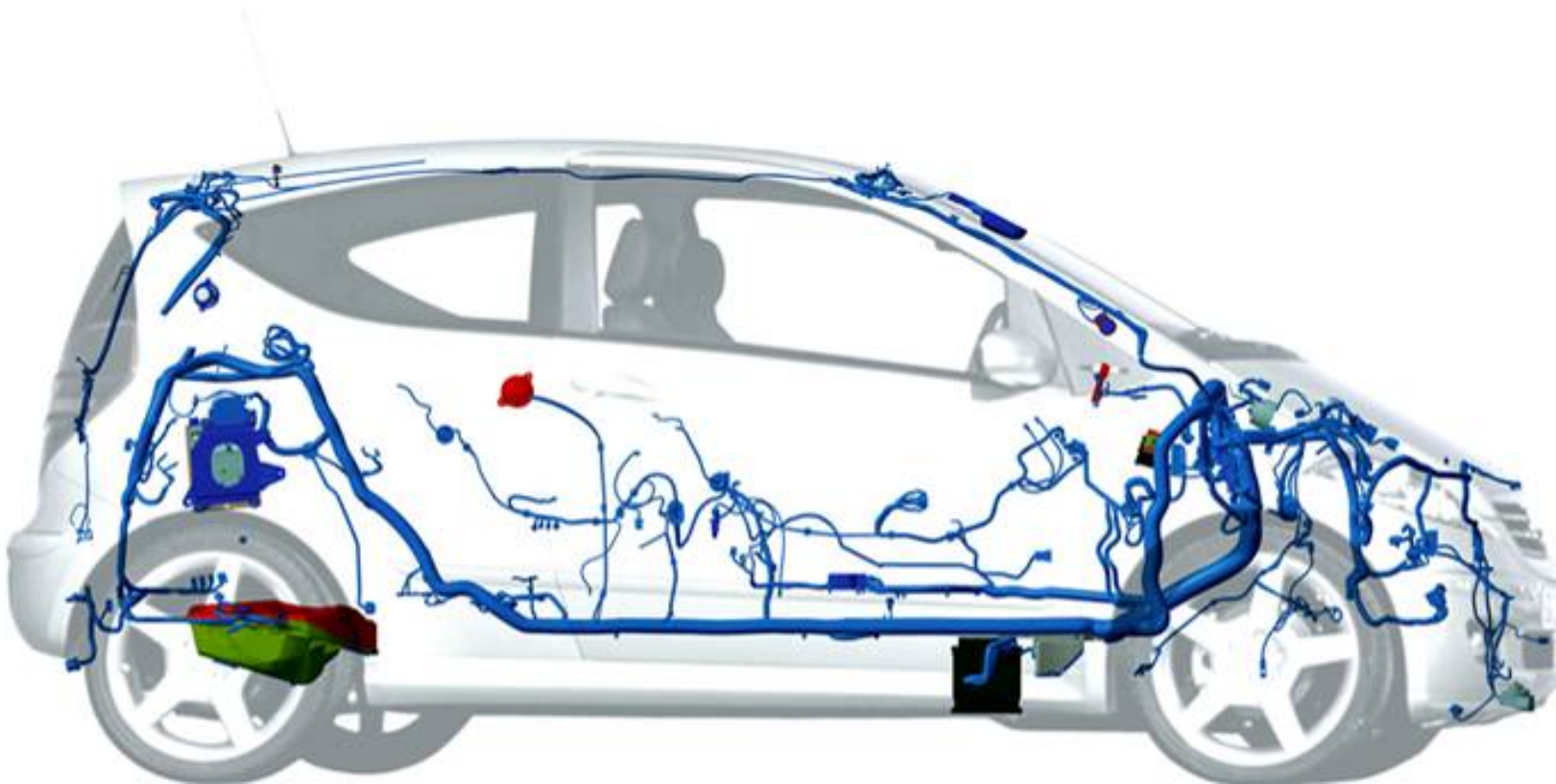
Automotive wiring system

Automotive wiring system example

- Length of cable: more than 3 km
- Number of single cables : up to 1,500
- Number of contacts: up to 3,000
- Weight: up to 50 kg

Automotive versus LAN cabling

- Topology (identification of link segment)
- Temperature ratings (engine compartments)
- Jacketing and insulation materials (resistant to oil, gasoline, hydraulic fluids etc.)
- Mechanical properties



Link segment characteristics – starting point

High Level Summary

- **Ethernet is being deployed in vehicles at an ever-increasing rate**
- **The automotive industry estimates the number of worldwide Ethernet ports in vehicles at ~270 million ports/year ~2019**
- **Ethernet is poised to become the network backbone in vehicles over the next decade**
- **A new Gigabit Ethernet PHY that meets these qualifications is needed**
 - Operates on fewer than 4-pairs of UTP cabling
 - Operates over the channel model developed in conjunction with the automotive/industrial networking industries
 - Meets automotive EMC & susceptibility requirements
 - Meets automotive environmental requirements

http://www.ieee802.org/3/RTPGE/public/mar12/CFI_01_0312.pdf

Summary

- **Discussion of link segment characteristics for “Reduced Twisted Pair Gigabit Ethernet”**
- **Differentiating LAN cabling from automotive cabling; topology and cabling characteristics.**