
MDI Comments Application Perspective

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Scope

- **802.3 D3p3 MDI comments application perspective**

802.3cg Environments and Link Segments

802.3cg Objectives

7. Support 10 Mb/s single-pair Ethernet operation in automotive environments (e.g. EMC, temperature).
8. Support 10 Mb/s single-pair Ethernet operation in industrial environments (e.g. EMC, temperature).
9. Do not preclude the ability to survive automotive and industrial fault conditions (e.g. shorts, over voltage, EMC, ISO16750)
10. Do not preclude working within an Intrinsically Safe device and system as defined in IEC 60079
11. Define performance characteristics of the following:
 - a. A link segment with a single balanced pair of conductors supporting up to 4 inline connectors for up to at least 15 m reach
 - b. A mixing segment with a single balanced pair of conductors supporting up to at least 8 nodes, for up to at least 25 m reach
 - c. A link segment with a single balanced pair of conductors supporting up to 10 inline connectors for up to at least 1 km reach
12. Define a PHY:
 - a. Supporting point-to-point half-duplex operation over the 15 m link segment
 - b. Optionally supporting full-duplex operation over the 15 m link segment
 - c. Optionally supporting half-duplex multi-drop operation over the 25 m mixing segment
13. Define a PHY:
 - a. Supporting point-to-point full-duplex operation over the 1 km link segment

Automotive
-engineered system

Industrial/Process/
Factory Automation

- cabling reuse/engineered system
- greenfield

Building Automation

- HVAC
- Security/Access
- Fire
- Lighting Control Systems
- Residential

Intelligent Buildings

Commercial Buildings

Two wire
point-to-point or
multidrop

Two wire sensors
(IoT)

Source: http://www.ieee802.org/3/cg/objectives_3cg_0318.pdf

802.3cg Link Segments

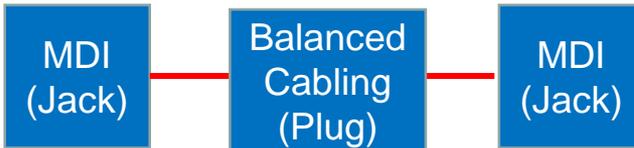
- **Automotive link segments – Closed system not plug-and-play**
- **industrial/process automation link segments – end-point terminals possibly equipment specific not generally plug-and-play**
- **Plug-and-play link segments – Installed separate from equipment that will use it.**
 - **MDI reference for compatibility with balanced cabling.**

802.3cg In-building Applications – plug-and-play



How and when will ecosystem evolve?

- **Balanced cabling**
- **Field testing**
- **Installation procedures**
- **Etc..**
- **End user will have to implement:**
 - **Compatibility at the Physical Medium interface (that is, the physical cable interface).**



How and when will ecosystem evolve?

- **TIA/ISO balanced cabling and field test specifications**
- **Draft specifications available**

No MDI (jack/plug) references

- **No referenced mechanical interface to the balanced cabling (jack)**
- **No referenced balanced cabling (plug)**
- **No referenced compatibility**

MDI (jack/plug) references

- **Referenced (jack)**
- **Referenced (plug) has translated into TIA/ISO balanced cabling and field test specifications**
- **Compatibility**
- **Investments in ecosystem developments (EMC)**

Draft standard 3p2

146.8.1 MDI connectors

The mechanical interface to the balanced cabling is a 3-pin connector (BI_DA+, BI_DA-, and optional SHIELD) or alternatively a 2-pin connector with an optional additional mechanical shield connection which conforms to the link segment specification defined in 146.7.

Specific systems or applications can use connectors or terminals that support the link segment specification defined in 146.7.

The assignment of PMA signals to connector contacts for PHYs are given in Table 146-8.



Draft standard 3p3

146.8.1 MDI connectors

The mechanical interface to the balanced cabling is a 3-pin connector (BI_DA+, BI_DA-, and optional SHIELD) or alternatively a 2-pin connector with an optional additional mechanical shield connection which conforms to the link segment specification defined in 146.7.

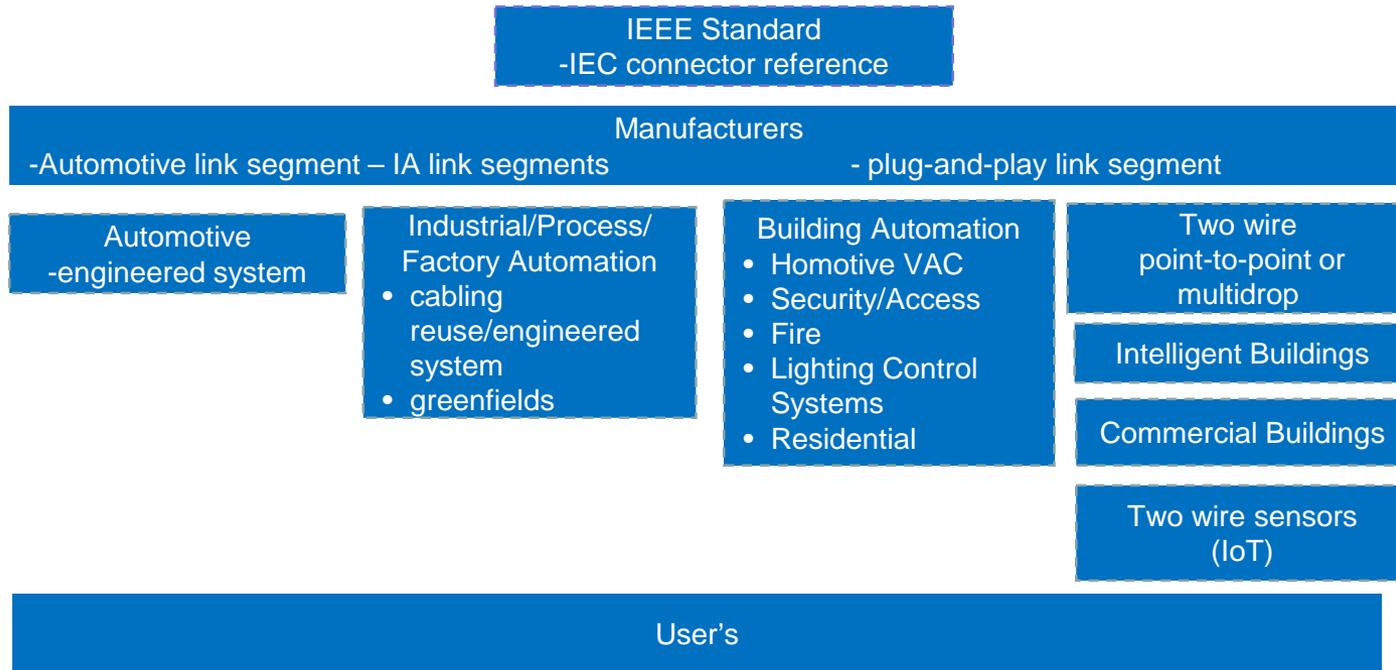
Specific systems or applications can use connectors or terminals, in addition to those listed below, that support the link segment specification defined in 146.7.

Connectors meeting the requirements of IEC 63171-1 or IEC 61076-3-125 may be used as the mechanical interface to the balanced cabling. The plug connector is used on the balanced cabling and the MDI jack connector on the PHY. The IEC 63171-1 plug and jack are depicted (for informational use only) in Figure 146-26 and Figure 146-27 respectively, and the mating interface is depicted in Figure 146-28. The IEC 61076-3-125 plug and jack are depicted (for informational use only) in Figure 146-29 and Figure 146-30 respectively and the mating interface is depicted in Figure 146-31. The assignment of PMA signals to connector contacts for PHYs are given in Table 146-8. These two connectors may be used, with adaptations if needed, for electromagnetic classifications for the link segment given in Table 146-7. These connectors should support link segment DCR characteristics for 1.02 mm (18 AWG) to 0.40 mm (26 AWG) in Table 146B-1.

MDI Considerations

- **Single MDI reference not sufficient to address objectives for in-building environments and link segments.**
 - **Cannot preclude industrial/process/factory automation cabling reuse (terminals)**
- **MDI reference options consistent with other IEEE PHYs.**
 - **e.g., 39.5.1, 85.11, 92.12, or 96.8.1, Annex 136C.**
- **Not providing MDI references will require users to implement compatibility and slow if not circumvent plug compatible ecosystem.**
- **Adopting MDI (jack) reference aligned with ISO/IEC SC25 WG3 and TIA TR42 balanced cabling (plug) will;**
 - **accelerate SPE ecosystem developments; cabling, remote powering, installation and field testing.**

Market confusion – IEC Connector



- User market consists of manufacturer's products. Manufacturer's drive user choices.
 - Automotive link segments – Closed system not plug-and-play – no confusion IEC connector reference
 - industrial/process automation link segments – end-point terminals possibly equipment specific not generally plug-and-play - no confusion IEC connector reference
 - Plug-and-play link segments – Installed separate from equipment that will use it.
 - IEC references will minimize manufacturer's confusion as evident in alignment with ISO/IEC SC25 WG3 and TIA TR42 balanced cabling (plug).
 - User market "connectivity" specified by TIA/ISO minimizes confusion.