

MDI Connector interface Considerations for IEEE 802.3cg

IEEE 802.3cg Task Force
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Related to draft 2.1 MDI ballot comments in clause 146

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Supporters

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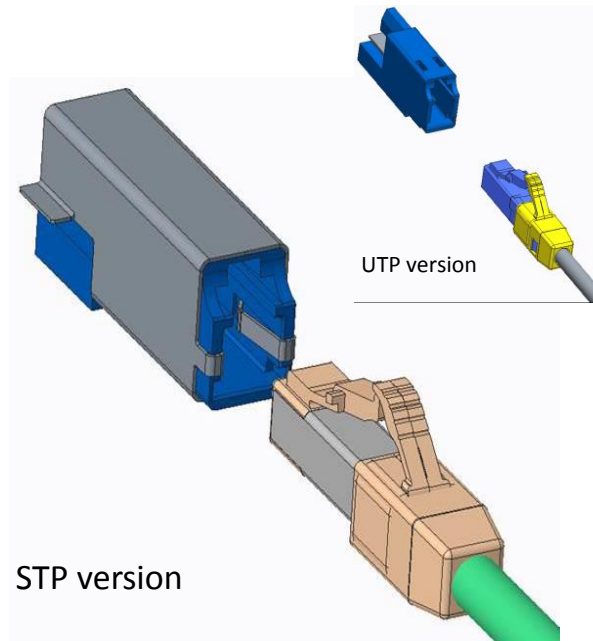
Background

- ISO/IEC/JTC 1/SC 25/WG 3 received liaison letter from IEEE 802.3 in February 2018 requesting input on MDI Connector selection
- ISO/IEC/JTC 1/SC 25/WG 3 responded by creating expected requirements and selection process using a country ballot that concluded in the IEC 63171-1 being selected for **$M_1I_1C_1E_1$** and IEC 61076-3-125 for **$M_2I_2C_2E_2$ and $M_3I_3C_3E_3$**
- This information was communicated to IEEE 802.3 in August 2018
- ISO/IEC/JTC 1/SC 25/WG 3 adopted these two interfaces as normative references in the draft ISO 11801-1 Amendment 1 for generic single pair cabling
- TIA TR42 independently selected the same two connectors as ISO/IEC/JTC 1/SC 25/WG 3 and has communicated this result to IEEE 802.3

The two connectors selected by ISO and TIA

- IEC 63171-1

LC style for $M_1I_1C_1E_1$ environments . e.g.
office buildings and data centers



- IEC 61076-3-125

Industrial style for $M_2I_2C_2E_2$ and $M_3I_3C_3E_3$
environments e.g. industrial spaces and harsh
conditions



What does cabling interface connector mean ?

- Applies only at the two ends of the link segment
- Does not apply to any other connectors in the link segment
- Interface connectors need larger number of mating cycles (> 750)
- Interface connectors can be subject to mating and un-mating under load (2 A per contact)
- Need to have repeatable and consistent electrical & mechanical plug and jack interoperability from multiple suppliers

A closer look at ISO 11801-1 interface connectors

This is an MDI connection
and is part of the equipment
(IEEE 802.3)

This is a cabling interface
connection and is part of the
cabling (ISO/IEC WG33)

Having harmonized
connections for the MDI
and the cabling interface
will result in a equipment
cord that has the same
plugs on both ends, i.e.,
no need for adapter cords

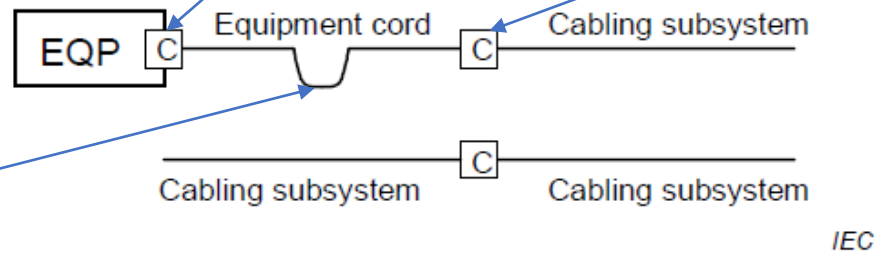


Figure 3 – Interconnect models

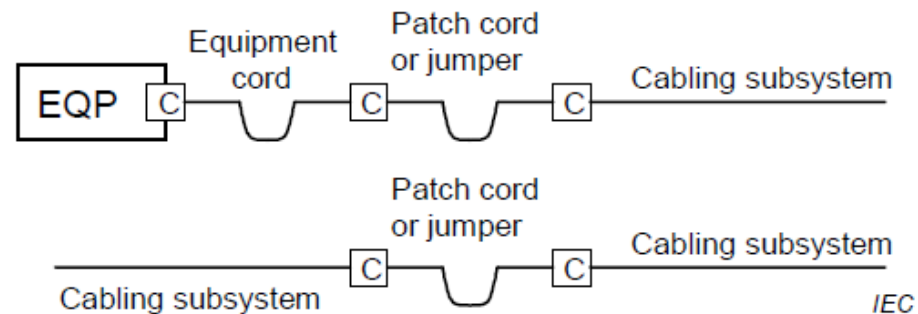


Figure 4 – Cross-connect models

NOTES:

Other inline connections within
the link are not specified as
mechanical interface
connections, only electrical
performance is specified

The connection at the opposite
end of the link is the user
interface connection and is
specified for both mechanical
dimensions and electrical
performance. It is a second
cabling interface connection

Advantages of using the same interface for cabling and MDI

- Connector specifications are developed by IEC SC48B experts with considerable expertise in mechanical specifications, electrical specifications, reliability specifications, testing and EMC specifications
 - IEC SC48B is the expert committee for detailed connector specifications
- Do not need multiple adapter cords for connection to equipment from the installed cabling
- Improves the volume economics of both MDI and cable interface connectors
- Shared knowledge and technology will improve both cabling interfaces and equipment interfaces leading to positive benefits for both

Usability considerations and advantages

- Cord can be plugged in without concern for end orientation making it easier to administer.
- Avoids mix ups, where one is choosing a cord by looking at the plugs. With the same plug on both ends, a look at either end means it is the same on the other end.
- Reduces the number of plug combinations (experience with the USB cord variants with USB on one end and different equipment connectors at the other end).
- Advantage of plug designed for the “cabling interface” application at the outlet, will also be capable of repeated “mating” at the equipment.

Observations and Recommendations

- IEC 63171-1 may be used for 10BASE-T1S and 10BASE-T1L MDI for $M_1I_1C_1E_1$ environments
- IEC 61076-3-125 may be used for 10BASE-T1S and 10BASE-T1L MDI for $M_2I_2C_2E_2$ and $M_3I_3C_3E_3$ environments
- This will allow a single equipment cord type to be used for $M_1I_1C_1E_1$ improving usability, interoperability, and mobility of single pair equipment and devices
- Similarly a single equipment cord type can be used for $M_2I_2C_2E_2$ and $M_3I_3C_3E_3$ to improve usability, interoperability, and mobility of single pair equipment and devices