IEEE 802.3cg MDI connectors

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Background

- 802.3cg D3p1 clauses 147.9.1 (146.8.1 has similar language) specifies

  "Connectors meeting the requirements of IEC 63171-1 may be used as the mechanical interface to the balanced cabling in environments meeting the E1 and E2 electromagnetic classifications specified in Table 146–7. Connectors meeting the requirements of IEC 63171-6 may be used as the mechanical inter-face to the balanced cabling in environments meeting the E3 electromagnetic classification specified in Table 146–7. The plug connector is used on the balanced cabling and the MDI jack connector on the PHY."

Related Comments

Comment	CommenterName	Clau	Subclaus	Pa	Li	CommentType	Comment	SuggestedRemedy	Response	CommentStatu	ResponseStatu
54	Anslow, Peter	1	1.3	29	31	T	The new editor's notes related to IEC 63171-1 and IEC 63171-6 say ; "If IEC 63171-x is not referenceable by final circulation, then the entry for IEC 63171-x, this Editor's Note, and references to IEC 63171-x in this draft will be removed." In 146.8.1 and 147.9.1, however, there are text figures and tables that depend on these references that would not make sense if just the references were removed.	In the two editor's notes, change: "... this Editor's Note, and references to IEC 63171-x in this draft will be removed." to: "... this Editor's Note, references to IEC 63171-x and any text, figures and tables dependent on these references in this draft will be removed."	PROPOSED ACCEPT IN PRINCIPLE. IEC 63171-1 and IEC 63171-6 are informative references and there are no text, figures, and tables dependent on them. This comment is accomodated by comment #r01-158. The resolution to comment #r01-158 is: Add Bibliography to the amendment. Move references to IEC 63171-1 and IEC 637171-6 to the bibliography, along with the associated editor's notes.	D	W
55	Bains, Amrik	146	146.8.1	170	1	T	Change from 802.3cg_D3p0 (page 153, line 12) to 802.3cg_D3p1 (page 170, lin1) does not improve improve the specification requirements for the connector selection. New text is very restrictive on uses case that will be developed. I prefer to go back to the text as per 802.3cg_D3p0	FROM: "Connectors meeting the requirements of IEC 63171-1 or IEC 63171-6 may be used as the mechanical interface to the balanced cabling in environments meeting the E1 and E2 electromagnetic classifications specified in Table 146-7. Connectors meeting the requirements of IEC 63171-6 may be used as the mechanical interface to the balanced cabling in environments meeting the E3 electromagnetic classification specified in Table 146-7" TO "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	PROPOSED ACCEPT IN PRINCIPLE. Resolve with Comment r01-155, r01-87, and r01-88. TFTD Note - if comment r01-88 deletes the connector references, the text changed by this comment is deleted. Also, comment r01-155 changes the text commented on, correcting an editorial error. PROPOSED REJECT. The CRG disagrees with the commenter. Motion #7, slide 8, of http://www.ieee802.org/3/cg/public/May2019/motions_3cg_01a_0519.pdf, established the text (as would be corrected by comment r01-155) for this subclause. Simply reverting the paragraph would undo a change which flipped a disapprove ballot (exchanging one disapprove for another) so discussion should focus on whether there is a way to satisfy both commenters without flipping another.	D	W

Related Comments (cont.)

Comment	CommenterName	Clause	Subclause	Page	Line	CommentType	Comment	SuggestedRemedy	Response	CommentStatus	ResponseStatus
88	Jones, Peter	146	146.8.1	169	51	TR	The changes made in the resolution of D3.0 comment #196 linked the optional connector choice to the E1/E2/E3 environments. We clearly state that any connector/terminal that matches requirements can be used: "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." Also, according to the notes in the normative references, both IEC 63171-1 or 63171-6 are still in development, and unless they are referenceable by final circulation, references to them will have to be removed from the draft. In addition, we have seen contributions describing issues with selected connectors (http://www.ieee802.org/3/cg/public/Jan2019/bains_3cg_01e_0119.pdf) I think that we should revert to the D3.0 text or implement the D3.0 comment #196 suggested remedy and remove discussion of specific connectors. This would be equivalent to D2.1 comment #407 (see http://www.ieee802.org/3/cg/public/Nov2018/jones_3cg_02c_1118.pdf).	Implement D3.0 comment #196 suggested remedy On page 169 line 51: Replace, "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." with, "Specific systems or applications can use connectors or terminals that support the link segment specification defined in 146.7. Delete 146.8.1 paragraph 3 (starts on page 200, line 53). In 146.8.1, delete figures 146-29, 146-30, 146-31, 146-32, 146-33, 146-34, and table 146-3. Remove IEC 63171-1 and 63171-6 from the normative references list.	PROPOSED ACCEPT IN PRINCIPLE. Resolve with Comment r01-55, r01-87, and r01-155. Discuss also with Comment 89 on clause 147 TFTD: Issue to be discussed is whether to delete paragraph 3, the connector figures and references from the draft. If the group decides to delete: Then ACCEPT IN PRINCIPLE this comment (implementing 196 is not necessary, as the text is deleted, and the reference to the pinout polarity needs to be retained for powering) On page 169 line 51: Replace, "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." with, "Specific systems or applications can use connectors or terminals that support the link segment specification defined in 146.7. Replace 146.8.1 paragraph 3 (starts on page 200, line 53) with: The assignment of PMA signals to connector contacts for PHYs are given in Table 146-8. In 146.8.1, delete figures 146-29, 146-30, 146-31, 146-32, 146-33, 146-34. Remove IEC 63171-1 and 63171-6 from the normative references list. (only if both clauses 146 and 147 choose to remove the references)	D	W
89	Jones, Peter	147	147.9.1	218	50	TR	The changes made in the resolution of D3.0 comment #197 linked the optional connector choice to the E1/E2/E3 environments. We clearly state that any connector/terminal that matches requirements can be used: "Specific systems or applications can use connectors or terminals, in addition to those listed below, that support the link segment specification defined in 147.7 or the mixing segment specification defined in 147.8." Also, according to the notes in the normative references, both IEC 63171-1 or 63171-6 are still in development, and unless they are referenceable by final circulation, references to them will have to be removed from the draft. In addition, we have seen contributions describing issues with selected connectors (http://www.ieee802.org/3/cg/public/Jan2019/bains_3cg_01e_0119.pdf) I think that we should revert to the D3.0 text or implement the D3.0 comment #197 suggested remedy and remove discussion of specific connectors. This would be equivalent to D2.1 comment #407 (see http://www.ieee802.org/3/cg/public/Nov2018/jones_3cg_02c_1118.pdf)	Implement D3.0 comment #197 suggested remedy On page 218, line 50: Replace, " Specific systems or applications can use connectors or terminals, in addition to those listed below, that support the link segment specification defined in 147.7 or the mixing segment specification defined in 147.8 " with, "Specific systems or applications can use connectors or terminals that support the link segment specification defined in 147.7 or the mixing segment specification defined in 147.8" Delete 147.9.1 paragraph 3 (starts on page 170, line 1). In 147.9.1, delete figures 147-21, 147-22, 147-23, 147-24, 147-25, 147-26, and table 147-3. Remove IEC 63171-1 and 63171-6 from the normative references list.	PROPOSED ACCEPT IN PRINCIPLE. Discuss with Comment r01-088, which is the same issue, but in clause 146. TFTD: Issue to be discussed is whether to delete paragraph 3, the connector figures and references from the draft. If the group decides to delete the references in clause 147, then: ACCEPT IN PRINCIPLE this comment (implementing 196 is not necessary, as the text is deleted, and the reference to the pinout polarity needs to be retained for powering) Implement D3.0 comment #197 suggested remedy On page 218, line 50: Replace, " Specific systems or applications can use connectors or terminals, in addition to those listed below, that support the link segment specification defined in 147.7 or the mixing segment specification defined in 147.8 " with, "Specific systems or applications can use connectors or terminals that support the link segment specification defined in 147.7 or the mixing segment specification defined in 147.8" Delete 147.9.1 paragraph 3 (starts on page 170, line 1). In 147.9.1, delete figures 147-21, 147-22, 147-23, 147-24, 147-25, 147-26, and table	D	W

Problems

- IEC 63171-1 and IEC 63171-6 specifications are NOT finalized or approved (comment #54/88/89)
- No agreement between various system, connector, cabling manufactures and connector standard bodies on common connector specification (comment r01-88/89)
- IEC 63171-1 does not support E3 – Current products using RJ45 support E3 (comment r0-55)
- IEC 63171-1/63171-6 are specified to be through-hole mounting only – this is not appropriate for most switches and end devices. Need surface-mount connector option
- No PHYSICAL interoperability (mating surface and pin pitch are different) between IEC 63171-1 and IEC 63171-6

SPE connector requires E3 support

- IEC/EN/EN61000-4-2 (Electro Static Discharge), 8kV air/6kV contact
- IEC/EN 61000-4-3 (Radiated Immunity, 10 V/m 80-2000MHz, 3V/m 2000-2700MHz)
- IEC/EN 61000-4-4 (Fast Transients - 2kV DC power, 2kV data line, 4kv earth)
- IEC/EN 61000-4-5 (Surge 2 kV/1 kV DC power, 2 kV shielded and unshielded data line)
- IEC/EN 61000-4-6 (Conducted Immunity, 10 V/emf 0.15-80MHz)
- IEC/EN 61000-4-8 (Power Frequency Magnetic Field Immunity 30A/m 60 sec, 300A/m 3 sec)
- IEC/EN 61000-4-9 (Pulse Magnetic Field Immunity 300A/m)
- IEC/EN 61000-4-29 (Voltage Dips Immunity)

No Industry Consensus on SPE connector

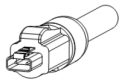
Single Pair Ethernet: HARTING cooperates with TE Connectivity

on 03.04.2019 at 11:01

TE Connectivity (TE), a world leader in connectivity and sensors, is cooperating with fellow connector producer HARTING to set Single Pair Ethernet as the de facto infrastructure solution to enable the Industrial Internet of Things, IIoT. The two companies will together drive solutions which will define the infrastructure for SPE.

There are several SPE standards in IEEE 802.3 covering wired Ethernet technology for LANs and WANs. The latest, 802.3cg 10Base-T1, for distances up to 1 km, will be released in 2019. SPE allows for a single open, scalable Ethernet-based network within the automation system. This significantly reduces complexity, costs and enables to go beyond existing borders.

TE and HARTING are inviting companies to partner up to drive Single Pair Ethernet as the infrastructure solution for the fast growing IIoT market. “Single Pair Ethernet is the technology on which we will build the road to the future success of the IIoT,” says Eric Leijtens, Global Product Manager Industrial Communication, TE Connectivity. “With the new interconnection standard IEC 63171-6, we have an outstanding opportunity to reap the full potential of the Industrial Internet of Things,” says Frank Welzel, Director Product Management, HARTING Electronics.

Style	Description
2P-L-L	PLUG - Free 2-way IP20 connector with male contacts, latch locking 
2J-L-L	JACK - Fixed 2-way IP20 connector with female contacts, latch locking, intended for PCB mounting 

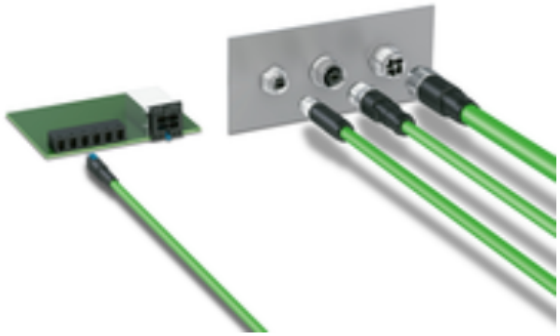
https://www.harting.com/PT/en-gb/news/company/single-pair-ethernet-harting-cooperates-te-connectivity

No Industry Consensus on SPE connector

New standards for Single Pair Ethernet

09.04.2019

Phoenix Contact, Weidmüller, Reichle & De-Massari, Belden, and Fluke Networks are developing mutually compatible components for Single Pair Ethernet.



The companies Phoenix Contact, Weidmüller, Reichle & Massari (R&M), Belden, and Fluke Networks announced a technology partnership for Single Pair Ethernet (SPE) at the Hannover Messe. These companies are developing and supporting the pin connector patterns collectively added to the IEC 63171-2 (office environment) and IEC 63171-5 (industrial environment) standards. These standards define IP20 and IP65/67 pin connector patterns for single and four-pair data transmission in Single Pair Ethernet applications. The companies in this partnership are pooling their technological expertise in order to ensure a standardized infrastructure for devices, connectors, cables, and measurement technology.

https://www.phoenixcontact.com/online/portal/pc?1dmy&urile=wcm%3Apath%3A/pcen/web/corporate/press/press_information/99fad08e-c95f-408e-9c01-6c7faee6dc37

Updated proposed resolutions

- Two alternate resolutions are offered.
  - Resolution 1: Remove both IEC 63171-1 and IEC 63171-6 from the draft
  - Resolution 2: Retain IEC 63171-1 and remove IEC 63171-6
- Why Resolution 1?
  - We don't know the right answer yet
  - Allow the broader industry to build consensus as this market develops
- Why Resolution 2?
  - Single mating interface
  - Better support for:
    - Surface Mount
    - 1x1, 2x1 ….2x6 ganged connectors (similar to RJ45)

Comment #88 proposed changes: Resolution 1

Remove all content after 1st paragraph of “147.8.1 MDI connectors” until “Table 147–3—Assignment of PMA signals to MDI contacts”.

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 63171-6 may be used as the mechanical inter-face to the balanced cabling in environments meeting the E1 and E2 electromagnetic classifications specified in Table 146–7.~~

……

~~**Figure 146–34—IEC 63171-6 Mating Face**~~

Comment #89 proposed changes: Resolution 1

Remove all content from 2nd paragraph of “147.9.1 MDI connectors” until “Table 147–3—Assignment of PMA signals to MDI contacts.”

147.9.1 MDI connectors

In its minimum configuration, 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 147.7 or to the mixing segment specification defined in 147.8.

~~Specific systems or applications can use connectors or terminals, in addition to those listed below, that sup-port the link segment specification defined in 147.7 or the mixing segment specification defined in 147.8.~~

~~Connectors meeting the requirements of IEC 63171-1 may be used as the mechanical interface to the bal-anced cabling in environments meeting the E1 and E2 electromagnetic classifications specified~~

……

~~**Figure 147–26—IEC 63171-6 Mating Face**~~

Comment #88 proposed changes: Resolution 2

Change the 3rd paragraph of “146.8.1 MDI connectors” starting on page 170/line 1 as follows

Connectors meeting the requirements of IEC 63171-1~~ or IEC 63171-6~~ may be used as the mechanical inter-face to the balanced cabling ~~in environments meeting the E1 and E2 electromagnetic classifications specified in Table 146–7. Connectors meeting the requirements of IEC 63171-6 may be used as the mechanical interface to the balanced cabling in environments meeting the E3 electromagnetic classification specified in Table 146–7.~~ 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 146–29 and Figure 146– 30 respectively, and the mating interface is depicted in Figure 146–31. ~~The IEC 63171-6 plug and jack are depicted (for informational use only) in Figure 146–32 and Figure 146–33 respectively and the mating inter-face is depicted in Figure 146–34.~~ The assignment of PMA signals to connector contacts for PHYs are given in Table 146–8. ~~These two connectors~~ ***This connector may be used***, with adaptations if needed, for electromagnetic classifications for the link segment given in Table 146–7. ~~These connectors~~ ***This connector*** should support link segment DCR characteristics for 1.02 mm (18 AWG) to 0.40 mm (26 AWG) in Table 146B–1.

Remove Figure 146–32 and Figure 146–33.
Remove IEC 63171-6 from 1.3 Normative references

Comment #89 proposed changes: Resolution 2

Change the 3rd paragraph of “147.9.1 MDI connectors” starting on page 218/line 53 as follow

Connectors meeting the requirements of IEC 63171-1 may be used as the mechanical interface to the balanced cabling ~~in environments meeting the E1 and E2 electromagnetic classifications specified in Table 146–7. Connectors meeting the requirements of IEC 63171-6 may be used as the mechanical interface to the balanced cabling in environments meeting the E3 electromagnetic classifications specified in Table 146–7.~~ 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 147–21 and Figure 147–22 respectively and the mating interface is depicted in Figure 147–23. ~~The IEC 63171-6 plug and jack are depicted (for informational use only) in Figure 147–24 and Figure 147–25 respectively and the mating interface is depicted in Figure 147–26.~~ The assignment of PMA signals to connector contacts for PHYs are given in Table 147–3. . ~~These connectors~~ ***This connector*** should support link segment DCR characteristics for 1.02 mm (18 AWG) to 0.40 mm (26 AWG) in Table 146B–1.

Remove Figure 147–25 and Figure 147–25
Remove IEC 63171-6 from 1.3 Normative references

Summary

- IEEE 802.3cg D3p2 clauses 146.8.1 and 147.9.1 MDI connectors not lining up with industry directions
- If 802.3cg text doesn't match industry consensus, this increases market confusion and delays adoption.
- "Accept in Principle" #88 and #89 choosing one of
  - Alternative 1 - Remove text regarding IEC 63171-1 & IEC 63171-6
    - 146.8.1 MDI connectors
    - 147.9.1 MDI connectors
    - 1.3 Normative references
  - Alternative 2 - Retain IEC 63171-1 and remove IEC 63171-6
    - 146.8.1 MDI connectors
    - 147.9.1 MDI connectors
    - 1.3 Normative references

Thank you.