Copper MDI connector guidance

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Supporters

Background

Cl **179C** *SC* **179C.1** *P* **921** *L* **3** # 86

Ran, Adee — Cisco Systems

Comment Type **T** *Comment Status* **R** *MDI connectors (CG)*

"When an MDI connector is not fully utilized the lower PMD numbers in Table 179C–2 should be used"

The MDI is part of the PHY so "not fully utilized" means the host does not have transmit and receiver functions for all lanes of the MDI. This is an unlikely situation, and even if it happens, following the recommendation does not guarantee interoperability, since in most cases the link partner needs to be configured accordingly.

Instead, it would be helpful for readers to know that in some cases, such as breakout cables, the combination of PMDs types on both sides of the cable can require management to create matching configurations

SuggestedRemedy

Delete the quoted sentence.
Add the following informative note:
NOTE—The PMD types on both sides of the cable assembly need to match. When the MDI is used for multiple PMDs or for PMDs with lower number of lanes than the MDI supports, appropriate configuration is required. The means for selecting the appropriate configuration are beyond the scope of this standard.

Response *Response Status* **C**

REJECT.

This comment does not apply to the substantive changes between IEEE P802.3dj D2.2 and D2.3 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/26_01/ran_3dj_03a_2601.pdf

There was some agreement that changes to the wording in 179C would improve the quality of the draft. However, there was no agreement on specific changes. Further work on this topic is required.

There was no consensus to make any of the proposed changes at this time.

Cl **179C** *SC* **179C.1** *P* **921** *L* **4** # 107

Dudek, Mike — Marvell

Comment Type **TR** *Comment Status* **R** *MDI connectors (CG)*

Annex 180A provides normative requirements for which fibers should be used when connectors are not fully utilized. Whereas for the equivalent situation for CR there is just a "recommendation" with the use of "should"

SuggestedRemedy

Change "When an MDI connector is not fully utilized the lower PMD numbers in Table 179C–2 should be used." to "When an MDI connector is not fully utilized the lower PMD numbers in Table 179C–2 shall be used". Or "When all the lanes of an MDI connector do not have signals connected the lower PMD numbers in Table 179C–2 shall be used.e.g. if a QSFP224 connector is used for a single 400GBASE-CR2 connection then PMD 0 and 1 are used."

Response *Response Status* **C**

REJECT.

This comment does not apply to the substantive changes between IEEE P802.3dj D2.2 and D2.3 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.

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There was no consensus to make any of the proposed changes at this time.

- Following comments #86 and #107 against D2.3 and related presentation ran_3dj_03a_2601:
  - Note about the need for configuration.
  - Wording of signal assignments for partially-used connectors.
- A consensus building group met on Feb 17th, 2026 to discuss these topics and propose changes for D3.1.
- See also ran_3dj_04a_2603, the related proposal for optical MDIs.

Why a note is needed

- An MDI connector can be used as one or more MDIs.
- Implementations can use an MDI connector for one or more MDIs with corresponding PHYs. An implementation can have several abilities (combinations of PHYs that use the MDI connector).
- If more than one ability (combination of PHYs using the same connector) is supported, interoperability with a link partner requires correct configuration.
- Example:
  - Host A uses an OSFP connector, with PMA/PCS/MAC support for 8×200GBASE-CR1, 4×400GBASE-CR2, 2×800GBASE-CR4, and 1×1.6TBASE-CR8.
  - Host B also uses an OSFP connector but with only 8×200GBASE-CR1 ability (that is, no 400GBASE-CR2/800GBASE-CR4/1.6TBASE-R support).
  - For interoperability with host B, host A must be configured as 8×200GBASE-CR1.

Doesn’t AN handle that?

- AN is specified to operate only on lane 0 of a multi-lane PHY…

73.5.1 DME electrical specifications

Change the second paragraph of 73.5.1 (as amended by IEEE Std 802.3ck-2022) as follows:

For any multi-lane PHY, DME pages shall be transmitted only on lane 0. The transmitters on other lanes should be disabled as specified in 71.6.7, 84.7.7, 85.7.7, 92.7.7, 93.7.7, 94.3.6.7, 136.8.7, 137.8.7, 162.8.7, ~~or~~ 163.8.7, 178.8.7, or 179.8.7.

- In practice, AN is often (if not always) used with a single advertised ability, matching a preconfigured combination of PHY sublayers (from PCS to PMD) and possibly MAC and upper layers.
  - Reconfiguration is complicated, and AN has strict timing requirements.

Partially populated MDI connectors

- A host may use an MDI connector but implement MDIs (and PHYs) only on some of the connector signals.
- If different hosts have different choices of connector signals, they cannot interoperate.
- Example:
  - Host A uses a QSFP connector, but has only 1×200GBASE-CR1 ability. It uses one of the four lanes, with signals SL0n/p and DL0n/p.
  - Host B uses the same connector and has the same ability but uses signals SL1n/p and DL1n/p.
  - The two hosts cannot interoperate (unless a non-standard cable assembly is used).
- The choice of connector signals in such cases needs to be normative.

Recommendations

- In 179.12 “MDI specifications”, add the following informative note

  NOTE—The PHY types on both sides of the cable assembly need to match. Hosts can have one or more PHY types utilizing the same MDI connector, as described in Annex 179C. If a host supports multiple combinations of PHY types, it needs to be configured appropriately for interoperability with the connected link partners. Selecting the appropriate configuration of a host can require knowledge of the abilities of the link partners.

- In 179C.1, change the last sentence in the paragraph preceding Table 179C-2 as follows:

  When not all connector signals in an MDI connector ~~is not fully utilized~~ are physically connected to PMD signals, the connector signals corresponding to lower PMD numbers in Table 179C–2 ~~should~~ shall be used.

Alternative wording for 179.12 NOTE

(to align with the proposed NOTEs for Annex 180A)

Annex 180A proposed NOTE

NOTE—Implementations that support multiple combinations of PHY types on the same MDI must be configured appropriately for interoperability with the connected link partners. Selecting the appropriate configuration requires knowledge of the fiber plant and the link partners.

179.12 proposed NOTE

NOTE—Implementations that support multiple combinations of PHY types on the same MDI connector, as described in Annex 179C, must be configured appropriately for interoperability with the connected link partners. Selecting the appropriate configuration requires knowledge of the link partners.

That’s all!

Questions?