

IEEE 802.3 Ethernet Working Group
DRAFT Liaison Communication

Source: IEEE 802.3 Working Group¹

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From: David Law Chair, IEEE 802.3 Ethernet Working Group
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Subject: Liaison reply to "MOPA addressing the contribution of Optical Pluggable Transceivers to time synchronisation error in PTP networks, concerns over "segmented" FEC.", 2 November 2023

Approval: Agreed at IEEE 802.3 interim meeting, St. Petersburg, FL, USA, 25 January 2024

Dear Mr Dahlfort and members of MOPA,

Thank you for your liaison raising your concern about "segmented" FEC schemes, and their potential impact on time variation and possible impact on the class of a module.

IEEE 802.3 is aware of the importance of time synchronization accuracy in PTP networks, which is one of many different types of networks that leverage the IEEE 802.3 Ethernet

¹ This document solely represents the views of the IEEE 802.3 Working Group and does not necessarily represent a position of the IEEE, the IEEE Standards Association, or IEEE 802.

standard. To that end, the standard is written in a flexible manner to enable as many different types of implementation choices as possible.

For example, an MII extender may serve different architectural purposes. The XGMII Extender, as noted in Clause 47.1, extends “the physical separation between MAC and PHY components in a 10 Gigabit Ethernet system distributed across a circuit board.” Another potential use of an MII extender is to enable port flexibility, by providing a mechanism for a MAC component to communicate with PHY components, via an Attachment Unit Interface (AUI), that leverage different FEC codes. The FEC code of the MII extender used to enable communication between the MAC and PHY components is terminated, and the new FEC code is applied in the Physical Coding Sublayer (PCS) of the PHY. This is the essence of the noted proposal for 800GBASE-ER1 (see [nicholl_3dj_02a_2307.pdf](#)).

It should be pointed out that the underlying problem in this instance is that idles, alignment markers, and codeword markers may be inserted / removed in both the extender sub-layers (XS) of an MII Extender and the PCS of the PHY. However, IEEE Std 802.3cx™-2023 subclause 90.7.2 includes the following note –

When TX_NUM_BIT_CHANGE and RX_NUM_BIT_CHANGE are not available (e.g., over physical interfaces such as instantiated xMII or AUI), it is recommended to avoid insertion and removal of idles, alignment markers, and codeword markers in the sublayers below the xMII/AUI, when possible, to reduce timestamping accuracy impairments (see Annex 90A).

After considering your liaison and the noted underlying problem, it is thought that many PHYs can address the note above via implementation choice. The noted proposal for 800GBASE-ER1 (see [nicholl_3dj_02a_2307.pdf](#)) is addressing an objective of the IEEE P802.3dj project. It should be noted that this proposal has not been adopted at this time. However, there has also been task force discussion suggesting interest in the 800GBASE-ER1 PHY sharing a common logical architecture with 800GBASE-LR1, which utilizes a concatenated FEC approach.

As the development of the 800GBASE-ER1 PHY continues, we will inform you of any additional information that may be relevant to your concern. In the meantime, we will be reviewing the noted technical paper (https://mopa-alliance.org/wp-content/uploads/2023/10/MOPA_Technical_Paper-v2.2-Final.pdf) in your liaison and may have follow-up question at a later date.

Information regarding future IEEE P802.3dj meetings may be found at <https://www.ieee802.org/3/dj/public/index.html>. We would encourage individuals from MOPA interested in contributing to participate.

Please note that we have copied members of the Optical Internetworking Forum (OIF), as they have sent liaisons to IEEE 802.3 indicating that their organization is working on an Implementation Agreement specifying 800ZR and 800LR Coherent Interfaces.

We look forward to the continued interaction of our two groups to ensure that Ethernet will service the requirements of the time synchronization application space.

Sincerely,
David Law
Chair, IEEE 802.3 Ethernet Working Group