Active cables and Project Scope

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IEEE P802.3dv Task Force
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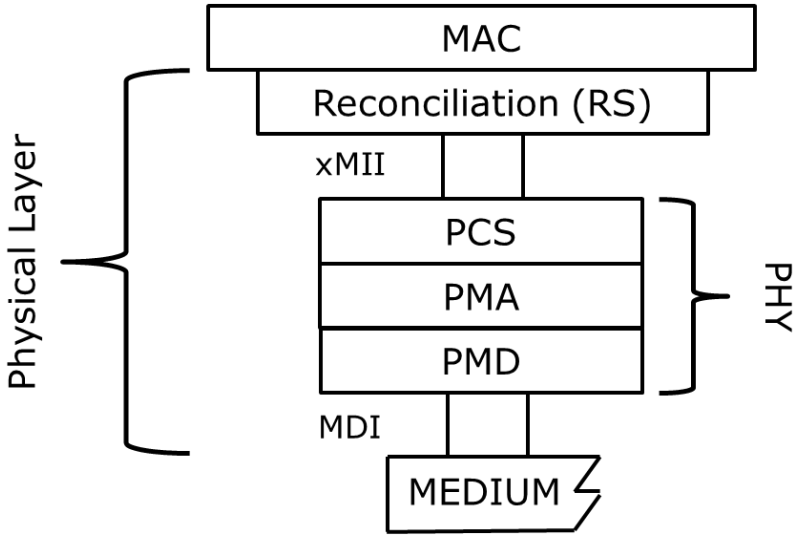
Introduction

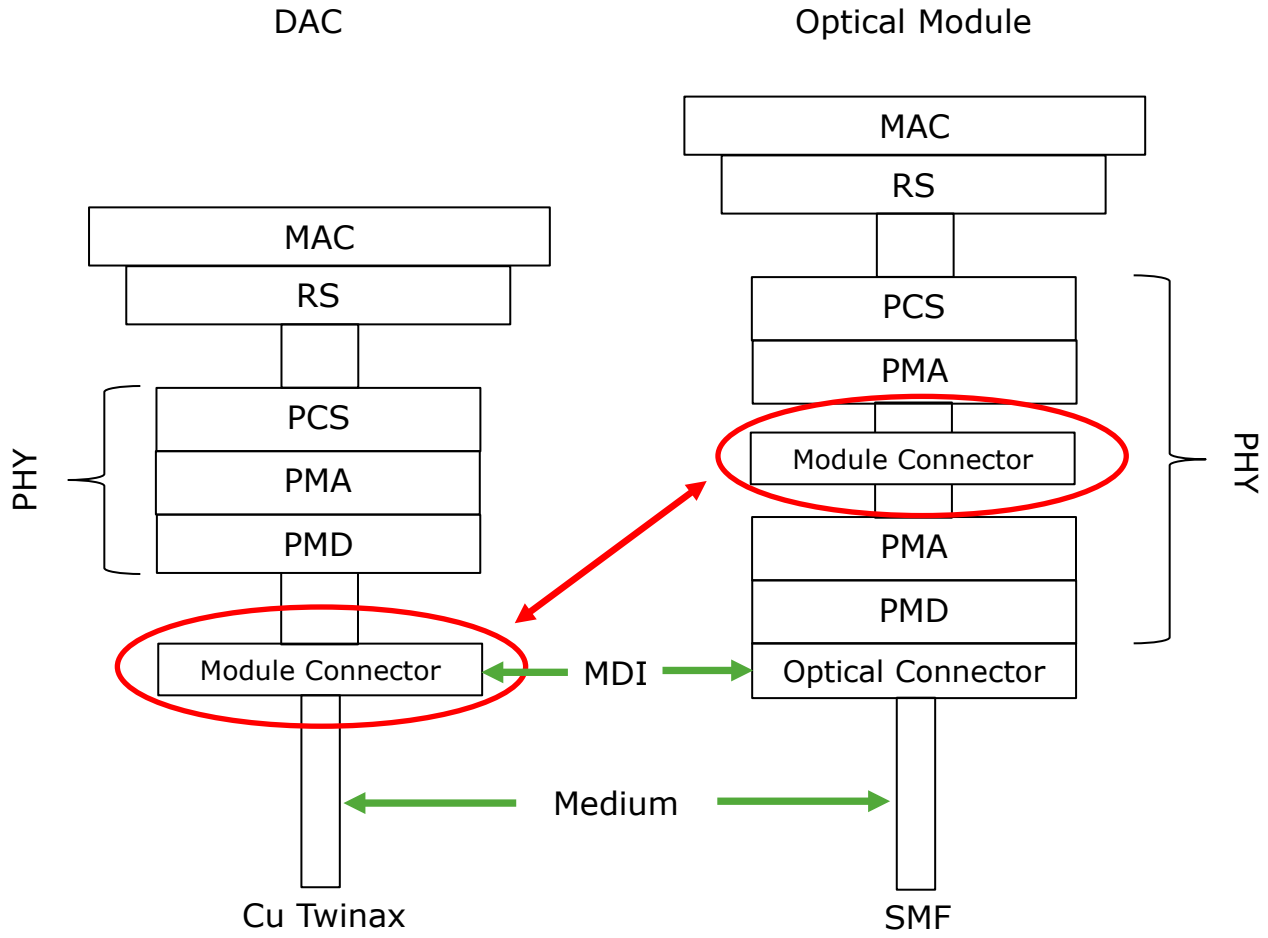
- Active cables are being discussed
  - Multiple concepts
- Important to understand how the concept applies to IEEE 802.3 physical layer / PHY / MDI / architecture
  - IEEE 802.3 scope implications
  - IEEE P802.3dv scope implications
  - What can be done?
- Where is the “channel”?

Relevant Scopes

- **802.3 - This standard defines Ethernet local area, access and metropolitan area networks. Ethernet is specified at selected speeds of operation; and uses a common media access control (MAC) specification and management information base (MIB). The Carrier Sense Multiple Access with Collision Detection (CSMA/CD) MAC protocol specifies shared medium (half duplex) operation, as well as full duplex operation. Speed specific Media Independent Interfaces (MIIs) provide an architectural and optional implementation interface to selected Physical Layer entities (PHY). The Physical Layer encodes frames for transmission and decodes received frames with the modulation specified for the speed of operation, transmission medium and supported link length. Other specified capabilities include control and management protocols, and the provision of power over selected twisted pair PHY types.**
- **802.3dv – The scope of the project is to specify modifications of IEEE Std 802.3 to add Physical Layer specifications and Management Parameters for 400 Gb/s, 800 Gb/s and 1.6 Tb/s using 400 Gb/s/lane signaling for electrical interconnects and single-mode fiber optical interconnects with reaches up to 500 meters.**
- **Both 802.3 and 802.3dv contain the scope to within the Physical Layer.**

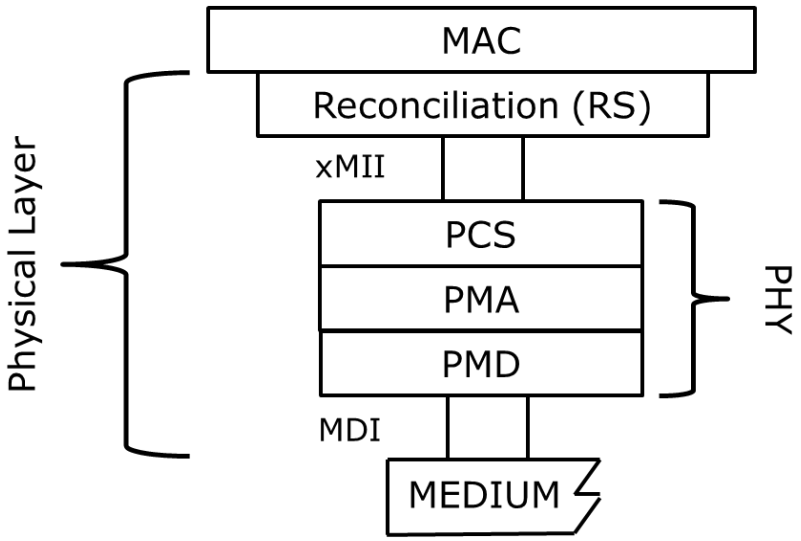
Understanding the MDI

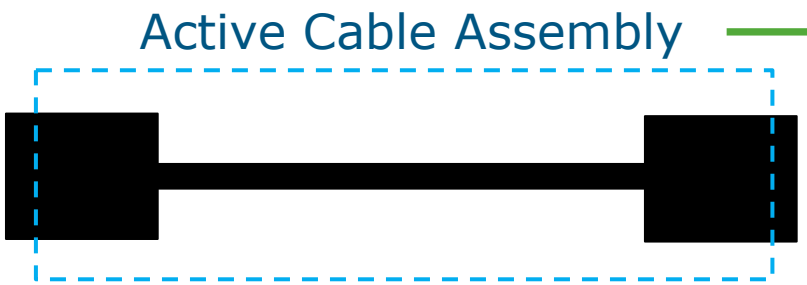


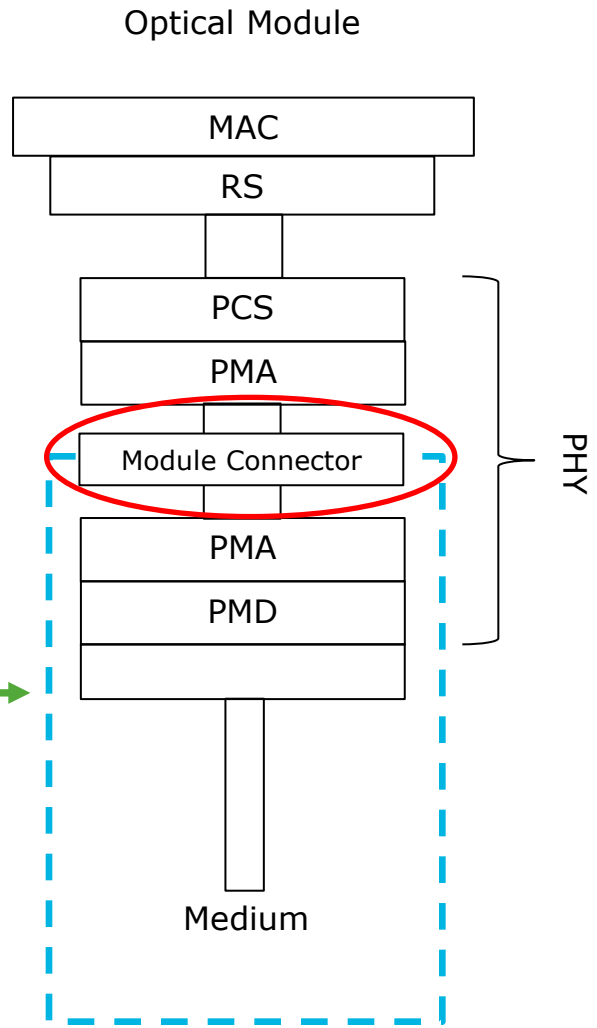


A "connector" is not necessarily an MDI

Scope Boundaries







- Different concepts for “active cables” have been discussed
- Active cable could include part of the PHY as well as the “medium”
- Exposed interface?
- Could be anything in cable itself – Cu, SMF, MMF – we don’t know
- Specific design details of active cable “medium” not in scope to specify

Connector Consideration

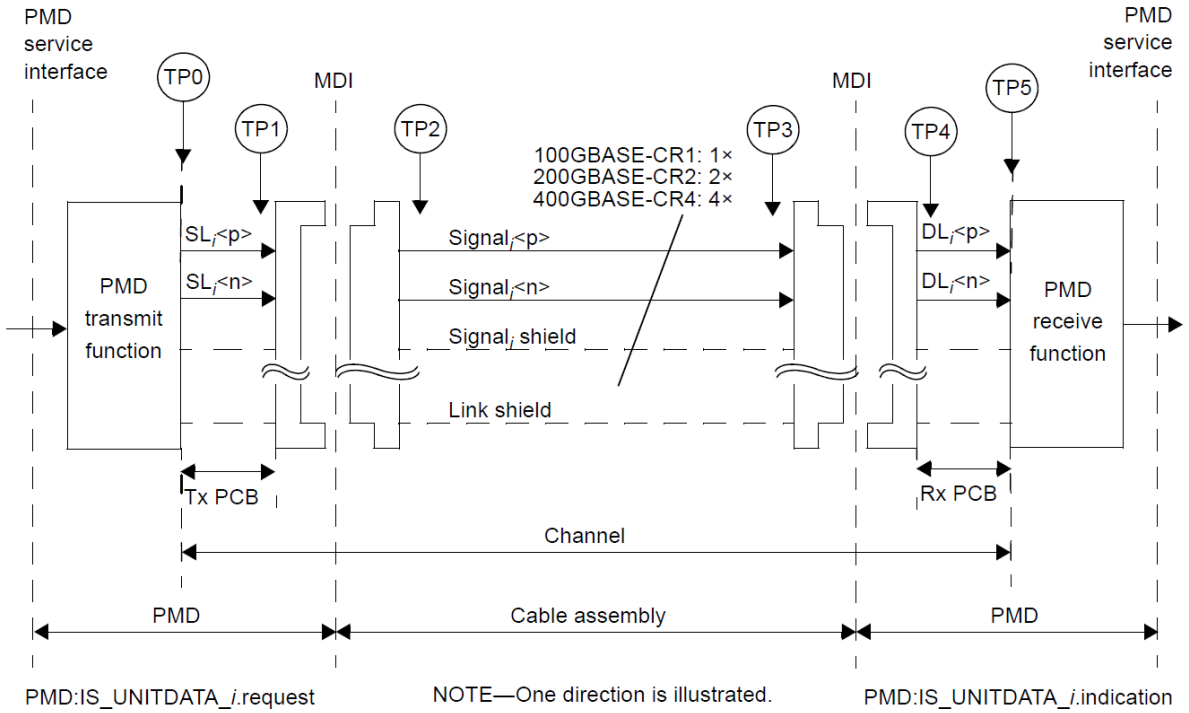


Figure 162–2—100GBASE-CR1, 200GBASE-CR2, or 400GBASE-CR4 link

IEEE Std 802.3ck™-2022

- **Analogous to –CR implementations**
- **For 400GBASE-CR4 MDI Types specified in Table 162C-1**
- **Based on current P802.3dv MDI discussions – generalized approach is being proposed.**

Going Forward

- Prior specifications "enabled" active cables through specification of AUIs.
  - No other specifications provided – PMD, connector, BER performance, etc.
- Same interface as –CR PHYs?
- The scope of the P802.3dv project is bounded by the Physical Layer
  - Can't specify medium, but can bound "performance of channel"

- For discussion
  - The different "active cable" proposals need to be examined
  - Use of AUI interfaces?
    - without additional constraints may be insufficient.
  - What is the medium?
  - "Channel performance" could be bounded
    - A normative "FLER" budget based on AUI to AUI?
    - Latency?
    - Lane-to-lane skew?
    - Other parameters?