

PMA Electricals, PMD, Mixing Segment, and MDI Skeleton Proposal for 10BASE-T1S in D1.2

IEEE P802.3cg 10 Mbps Single Pair Ethernet
Task Force

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Overview

- D 1.1 is underdeveloped in Clause 147's definition of link segment, mixing segment and MDI specifications
 - Much of the skeleton is missing
 - Some of the text is misplaced
 - Confusion between what is MDI and what is mixing segment
- Much technical work needed to define the mixing segment
 - BASE-T hasn't done this kind of work in a while
 - Cabling bodies have not defined it either
- A proposal is needed to get us on the road
 - Isn't intended to be perfect or complete!

Structure– PMD, Link / Mixing segment, MDI

Clause 147

- PMA Electrical Specifications
 - Transmitter specification
 - Receiver Specification
- PMD Specification
 - Terminations
 - Line characteristic impedance and driving
- Link Segment Transmission Parameters
 - RL, IL, MC.
- Missing: MDI, Mixing Segment
- Misplaced: terminations, line characteristic impedance

Clause 146 – typical BASE-T

- PMA Electrical Specifications
 - Transmitter specification
 - Receiver Specification
- Link Segment Characteristics
 - Transmission characteristics (IL, RL, delay, MC...)
 - Noise coupling characteristics
- MDI Specification
 - Connectors (Mechanical)
 - Electrical Specification (RL, balance)
 - Fault tolerance (voltages)

Transmitter's ability to drive line

- 100 ohm line already contained in PMA electrical section
 - 147.4.1 only defines test modes and contains the editor's note below

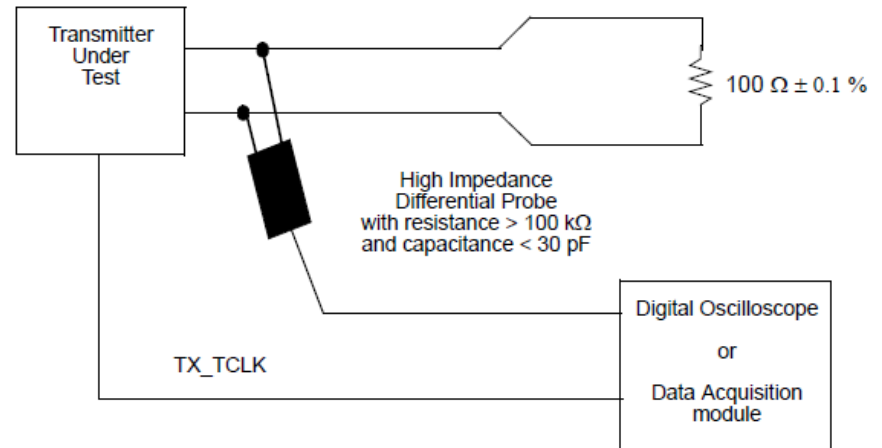


Figure 146-17—Test fixture

Editor's Note (to be removed prior to draft 2.0):

Copy or reference clauses 146.5.3 and 146.5.4 here as they apply as well for 10BASE-T1S.

146.5.4 Transmitter electrical specifications

The PMA shall operate with AC coupling to the MDI. Where a load is not specified, the transmitter shall meet the requirements of this section with a $100\ \Omega \pm 0.1\%$ resistive differential load connected to the transmitter output.

- Question: Do we need to add tests including stressing transmitter under line impedance variation?

Proposal on Transmitter Electricals

- Insert text from 146.5.3 and figure 146-17 as **147.4.2 Test fixtures**
- Insert text from 146.5.4 (but not subclauses) as **147.4.3 Transmitter Electrical Specifications**, make 147.4.1.1 to 147.4.1.4 subclauses 147.4.3.1 through 147.4.3.4
- Specify high impedance mode and test mode:
 - Add new test mode 4 to 147.4.1 – High impedance mode
“When the multidrop option is supported and test mode 4 is enabled, the transmitter presents a high impedance to the line as specified in 147.3.3 for the ‘I’ symbol in multidrop mode.”
 - Add test mode 4 and “High impedance mode” to test mode control register
 - Add **147.4.3.5 Transmitter high impedance mode**
In test mode 4, a transmitter supporting the multidrop mode presents a minimum 10 kOhm impedance to the line from DC to 25 MHz.

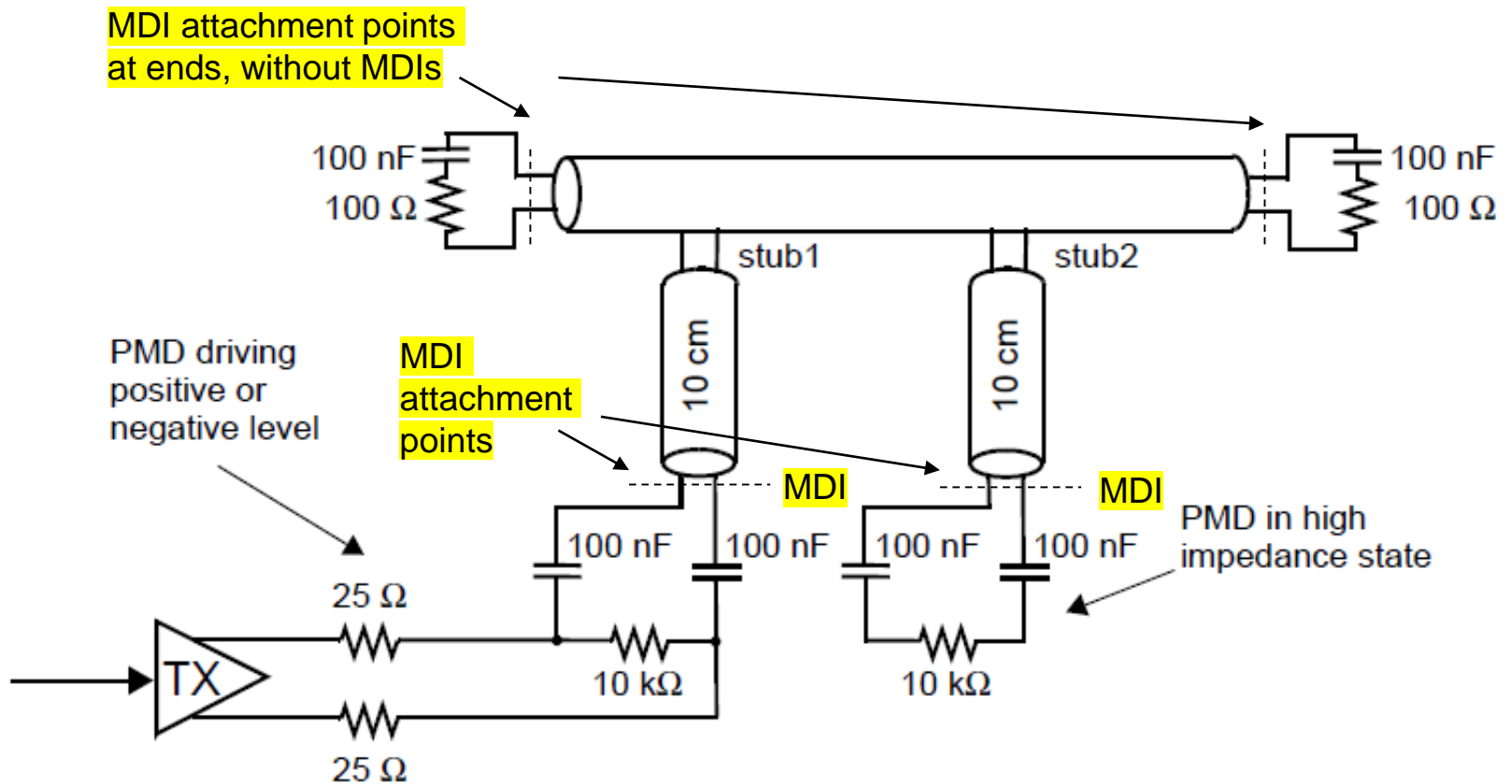
Proposal on PMD Specification

- **Delete 147.5 and subclauses**
 - **Move figure to new ‘mixing segment characteristics’ subclause**
- Add to (new) 147.4.3:
- **Editor’s Note: Reviewers to consider whether additional requirements and test fixtures are needed to test the transmitter tolerance to expected line impedance variations**

Proposal on Mixing Segment

- Insert after existing 147.6 (Link Segment specification):
147.7 Mixing segment specification
10BASE-T1S PHYs supporting multidrop mode is designed to operate over media that meets the requirements specified in this subclause. The term “mixing segment” used in this clause refers to single balanced twisted-pair cabling which may have more than two MDIs attached.
A mixing segment is specified based on automotive cabling supporting up to at least eight nodes and 25 m of cabling. An example mixing segment and reference points is shown in Figure 147-xx.
- Insert at this point, Figure 147-11 from slide 10 of Beruto_3cg_03_0318.pdf as Figure 147-xx and number appropriately, with additional labels as shown on next slide.

Figure for Mixing Segment (from 147-11)



Proposal for Mixing Segment Transmission parameters (RL)

- Insert new subclause:

147.7.1 Return Loss

The mixing segment shall meet the return loss characteristics specified for link segments in 147.6.1 at any MDI attachment point, including ends of the mixing segment, with all other MDI attachment points disconnected or terminated in a minimum 10kOhm impedence.

Proposal for Mixing Segment Transmission parameters (IL)

- Insert new subclause:

147.7.2 Insertion Loss

The mixing segment shall meet the insertion loss characteristics specified for link segments in 147.6.2 between any two MDI attachment points of the mixing segment, with all other MDI attachment points disconnected or terminated in a minimum 10kOhm impedance.

Proposal for Mixing Segment Transmission parameters (MC)

- Insert new subclause:

147.7.3 Mode Conversion Loss

The mixing segment shall meet the mode conversion loss characteristics specified for link segments in 147.6.3 at any MDI attachment point, including ends of the mixing segment, with all other MDI attachment points disconnected or terminated in a minimum 10kOhm impedence.

Editor's note for Mixing Segment specification

- Insert the following editor's note at the top of the mixing segment section:
- Editor's note (to be removed prior to Working Group ballot): The initial mixing segment specifications are based on the point to point link segment requirements. Reviewers are encouraged to review these as well as terminations and PHY requirements, especially MDI return loss when transmitting and high impedance state.

MDI Subclause skeleton

- Following mixing segment specifications, Insert new subclause headers:

147.8 MDI specification

147.8.1 MDI connectors

147.8.2 MDI electrical specification

147.8.2.1 MDI return loss

147.8.3 MDI fault tolerance

- Fill in content as resolved in other comments

Additional missing stuff to fix numbering

- **DO THIS LAST** (or it will create errors – all other numbering in this presentation does **NOT** include this renumbering)
 - Insert skeleton 147.2 Service primitives and interfaces, using text from D1.1 146.2 as a model
 - Insert skeleton (new) 147.6 Management interface (top level only, first paragraph text, but not subclauses)
 - After PMA Electricals and before link segment
- **Renumber existing 147.x subclauses**

Thank You!