
802.3da Mixing Segment Update Trunk Connection and Insertion Loss

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Contributors

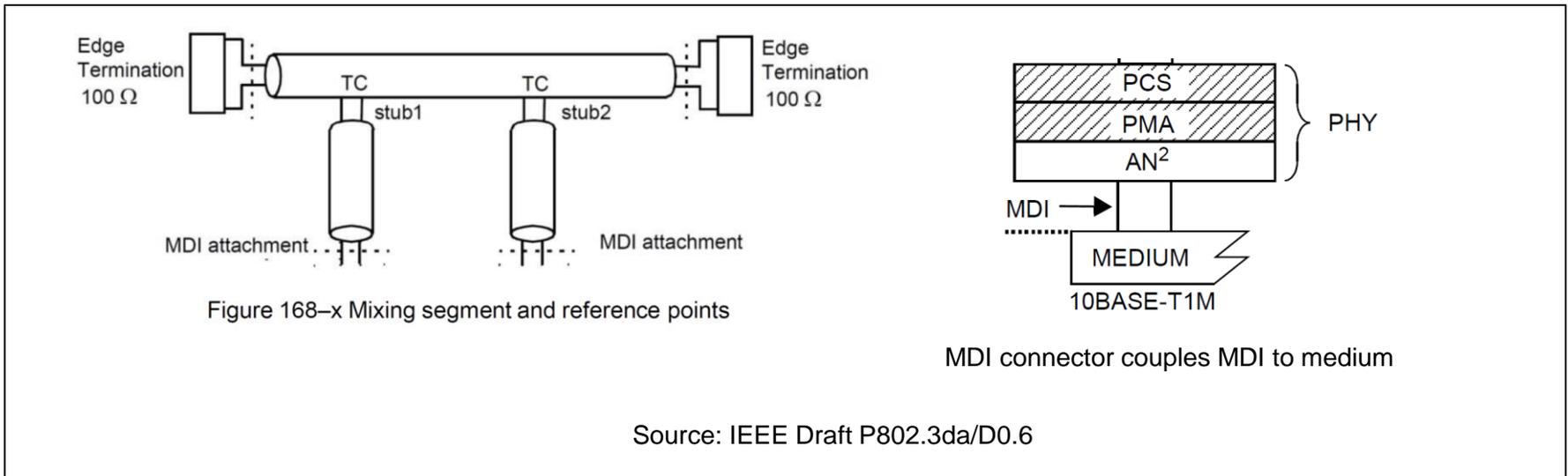
- Bob Voss/Paul Wachtel - Panduit

Purpose

- Background: Up to 75 m trunk cable, 16 node, 10 cm stub lengths, clumped topology with 80 uH, 30 pF node parasitic's, 0.01 V CWA exhibiting RX correlation of ≥ 0.6 can be supported without compensation. Additional nodes can be supported with compensation.
 - With typical TX slide 4 >>https://www.ieee802.org/3/da/public/011723/diminico_SPMD_01_0123.pdf
- The presentation addresses framework for continuing development of mixing segment baseline text with and without compensation.
 - Work to complete mixing segment without compensation
 - + Resolve TBDs in 168.6 in https://www.ieee802.org/3/da/public/062922/diminico_SPMD_02_06292022.pdf
 - Work to complete compensation within mixing segment.
 - + Limit stub lengths (to in-out) to reduce variability in stub compensation (1 cm or equivalent electricals)
 - + Note that the mixing segment specifications in 168.6 are to be met with MDI's or MDI loads attached (TBD).
 - + Specify electrical characteristics of compensation and corresponding MDI loads in 168.6
 - Work to complete compensation in node
 - Specify electrical characteristics at MDI (RL and/or other) to ensure required compensation.
 - Limit stub lengths (to in-out) to reduce variability in stub compensation (1 cm or equivalent electricals)
 - Resolve TBDs in 168.6 in https://www.ieee802.org/3/da/public/062922/diminico_SPMD_02_06292022.pdf

Mixing Segment Review

- https://www.ieee802.org/3/da/802d3da_objectives.pdf (1) Define performance characteristics of a mixing segment for 10Mb/s multidrop single balanced pair networks supporting up to at least 16 nodes, for up to at least 50m reach.



- Performance characteristics of a mixing segment related to topology
 - stub length, node separation, edge terminations
- Performance characteristics of mixing segment impacted by node attachment (DTE).

Mixing Segment Review

168.6 Mixing segment characteristics

10BASE-T1M PHYs are designed to operate over media that meet the requirements specified in this subclause. The 10BASE-T1M mixing segment (1.4.331) is a single balanced pair of conductors that may have more than two MDIs attached.

Figure 168–x shows an example mixing segment with reference points. The mixing segment specifications in 168.6 are referenced to these designated points and are to be met without the MDI or other loads attached. The mixing segment specifications are based on a trunk-stub configuration. Other configurations may be possible, provided they meet the electrical parameters in this 168.6. The example configuration assumes that the trunk comprises TBD m of 1.02mm (18 AWG) 100 Ω cabling and the stubs are 100 Ω balanced pairs of conductors up to 30 cm long. The trunk is terminated at each end into 100 Ω , at a point designated the 'edge termination'. One end of the stub is designated the trunk connection (TC) and the other designated the 'MDI attachment point'.

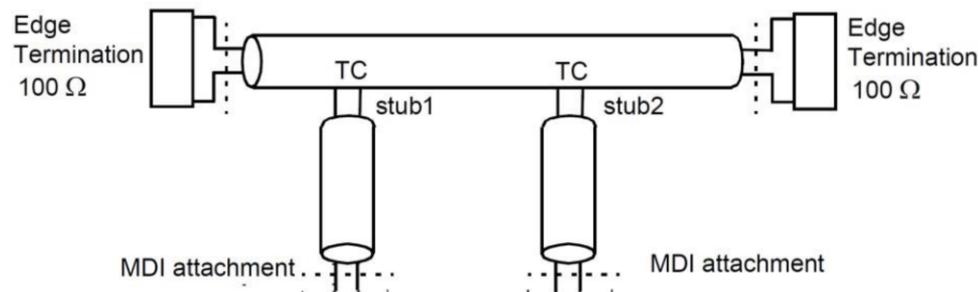


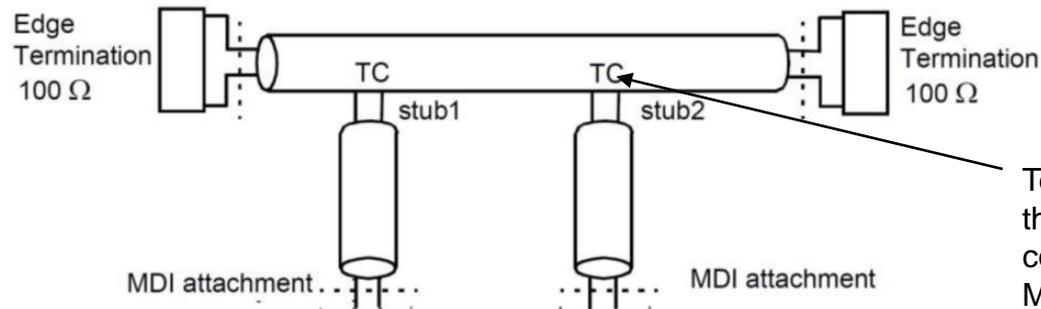
Figure 168–x Mixing segment and reference points

https://www.ieee802.org/3/da/public/062922/diminico_SPMD_02_06292022.pdf

- Objective can be met with topological constraints (up to at least 16 nodes for up to 75 m reach, stubs up to 10 cm long (TBD) and limits on node parasitic's [80 uH, 30 pF])

Mixing Segment with compensation

- In order support topologies of up to 75 meters reach with >16 nodes, node parasitic's [80 uH, 30 pF] need to be either improved (within node) or mitigated within mixing segment "trunk connection".
- Consider compensation within mixing segment



Text not to be included here: Note that electrical characteristics of compensation and corresponding MDI loads to be specified in 168.6

Figure 168-x Mixing segment and reference points

168.6 Mixing segment characteristics

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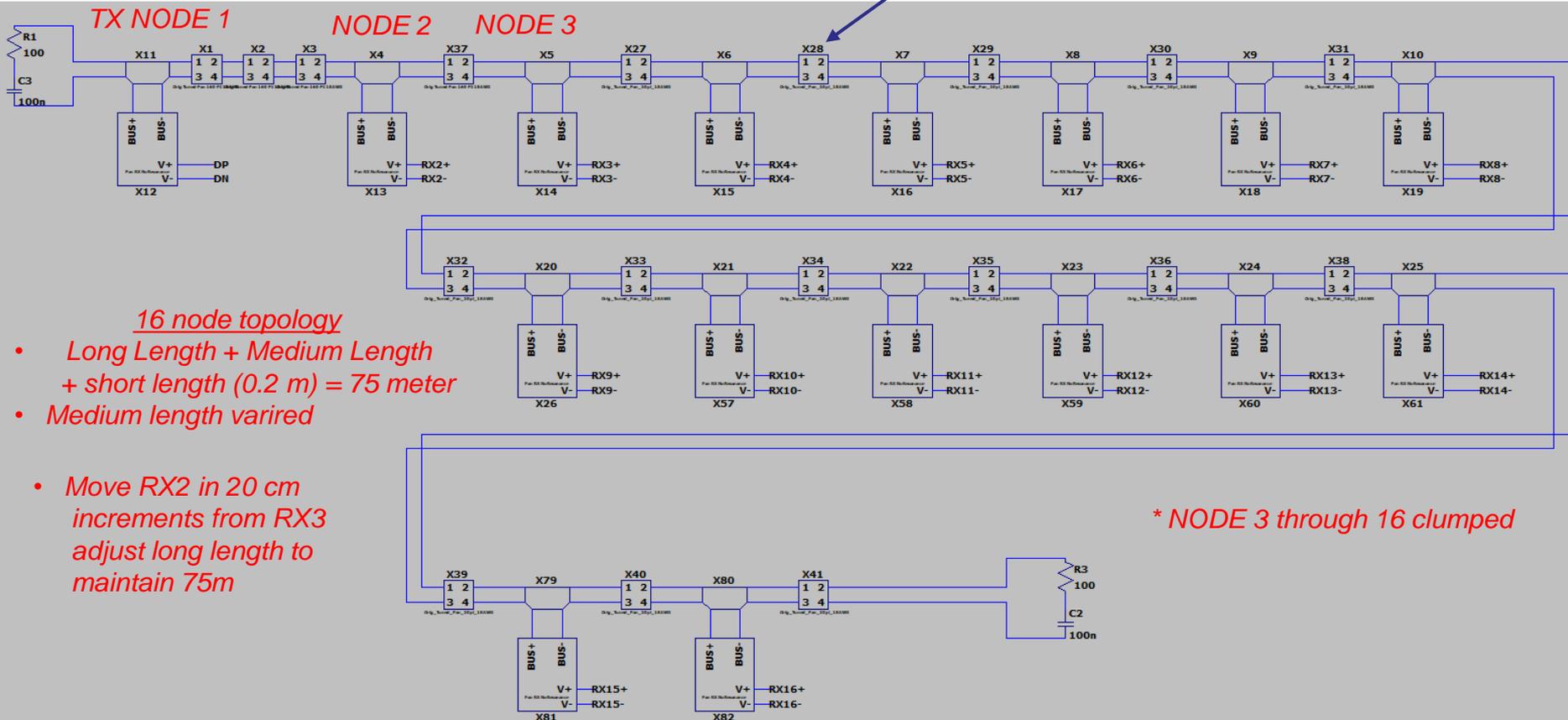
Mixing Segment Insertion Loss vs AWG

Long Length
18 AWG or 23 AWG

Medium Length
18 AWG or 23 AWG

Short Length
18 AWG or 23 AWG

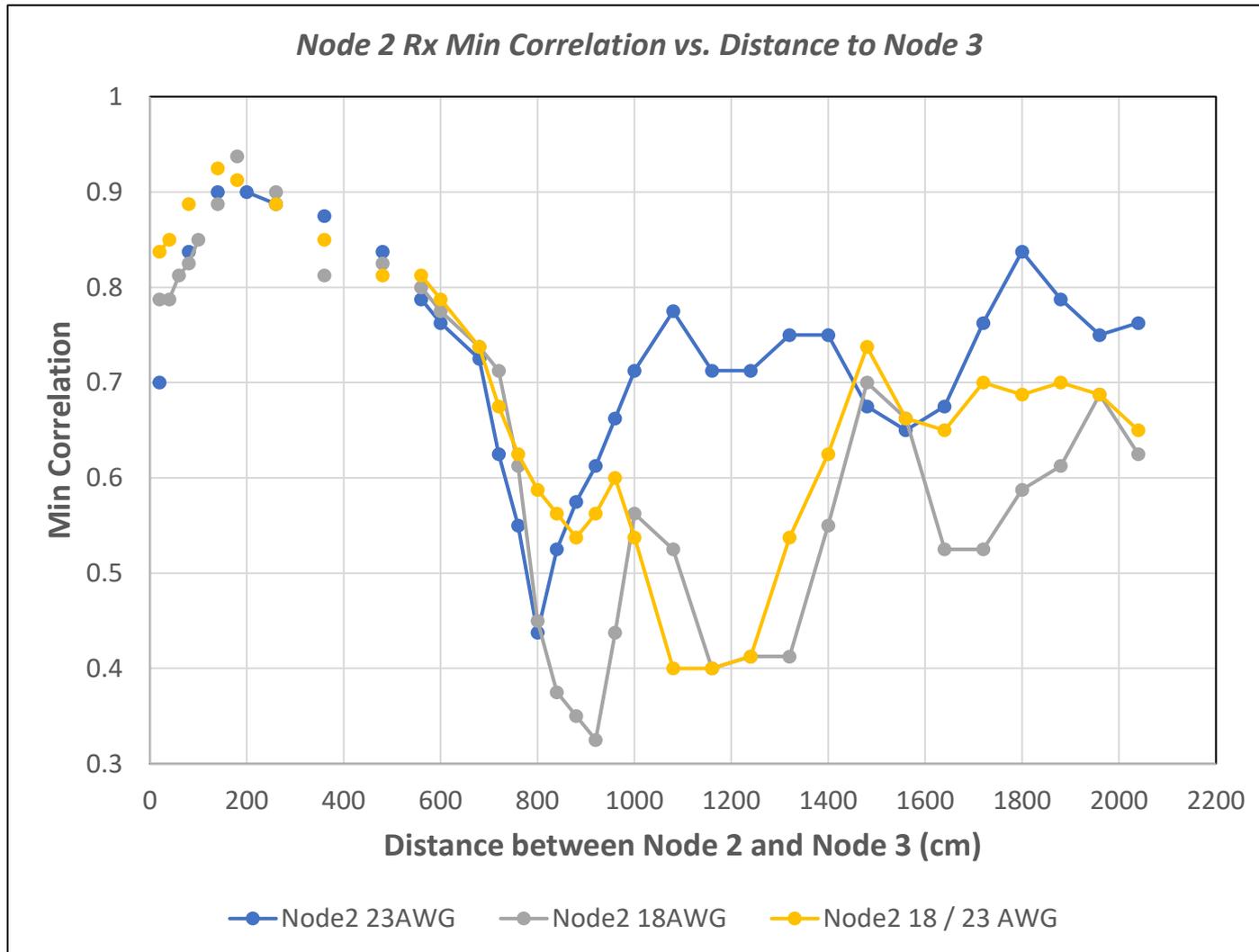
- 75 m, 16 node, clumped topology
- 80 uH, 30 pF node parasitics
- 10 cm stub lengths



- 16 node topology
- Long Length + Medium Length + short length (0.2 m) = 75 meter
- Medium length varied
- Move RX2 in 20 cm increments from RX3 adjust long length to maintain 75m

* NODE 3 through 16 clumped

Mixing Segment Insertion Loss vs AWG



- **Mixing Segment Insertion Loss vs AWG topology slide 7**

Summary

- The presentation addresses framework for continuing development of mixing segment baseline text with and without compensation.
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 - Review > 168.5.4.4 Transmitter Power Spectral Density (PSD)
 - + With typical TX slide 4
>>https://www.ieee802.org/3/da/public/011723/diminico_SPMD_01_0123.pdf