Equivalent system time constant

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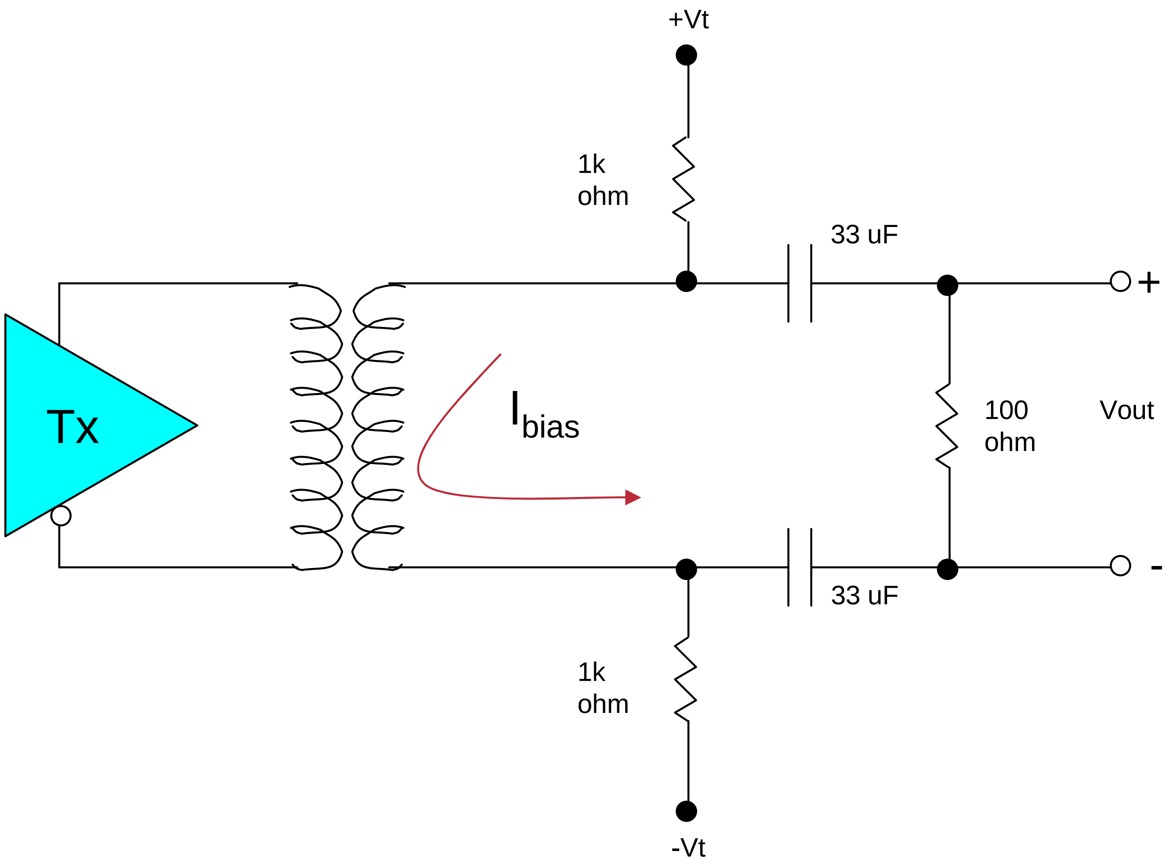
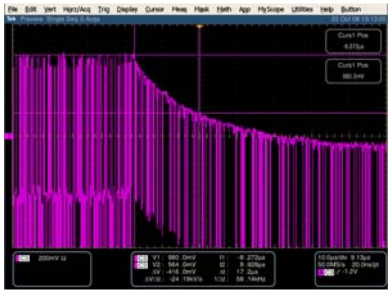
Agenda

- **Test Jig**
- **The problem**
- **Suggested Improvements**

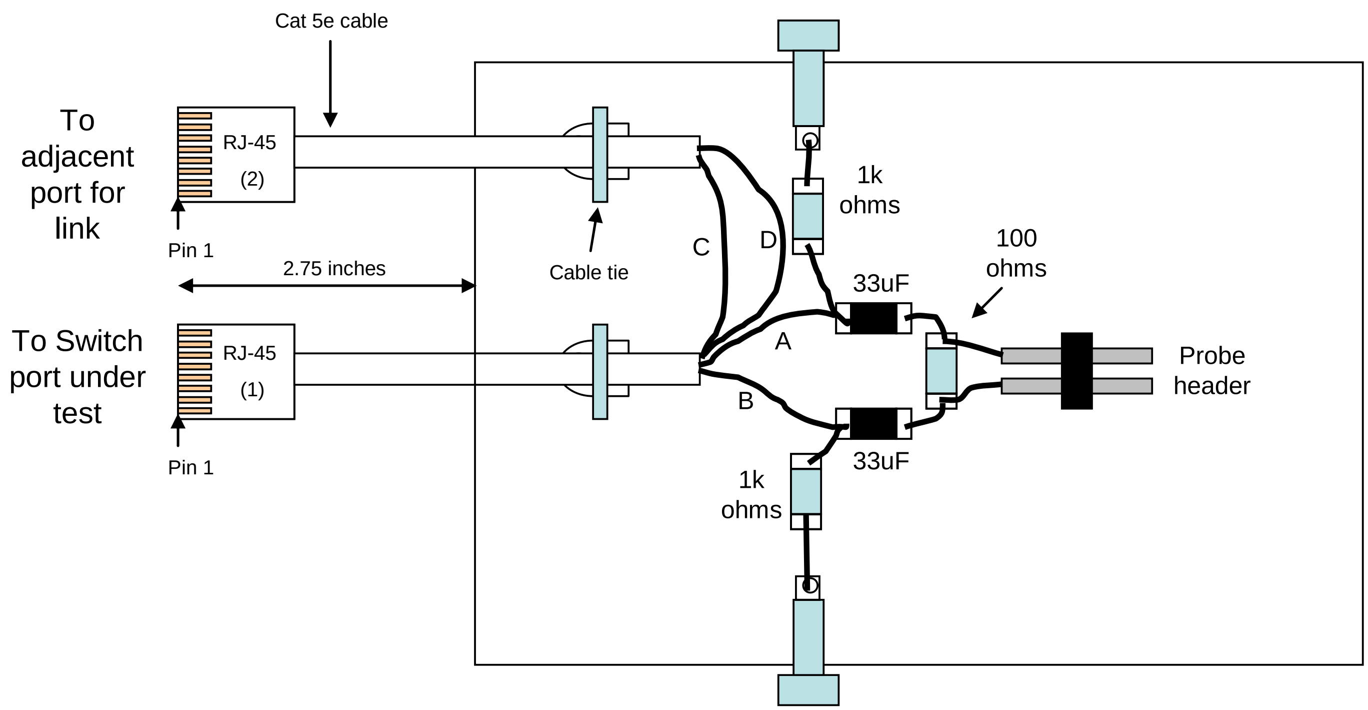
Test Jig Schematic





Note: A 1 uF by-pass capacitor was placed across the supply connection—not shown above.

Test Jig



*Switch Port in MDIX mode

Wire A goes to RJ-45 (1) pin 3 Tx+
Wire B goes to RJ-45 (1) pin 6 Tx-
Wire C goes from RJ-45 (1) pin 1 Rx+ to RJ-45 (2) pin 3 Tx+
Wire D goes from RJ-45 (1) pin 2 Rx- to RJ-45 (2) pin 6 Tx-

Note: A 1 uF by-pass capacitor was placed across the supply connection—not shown above.

BLW Waveform

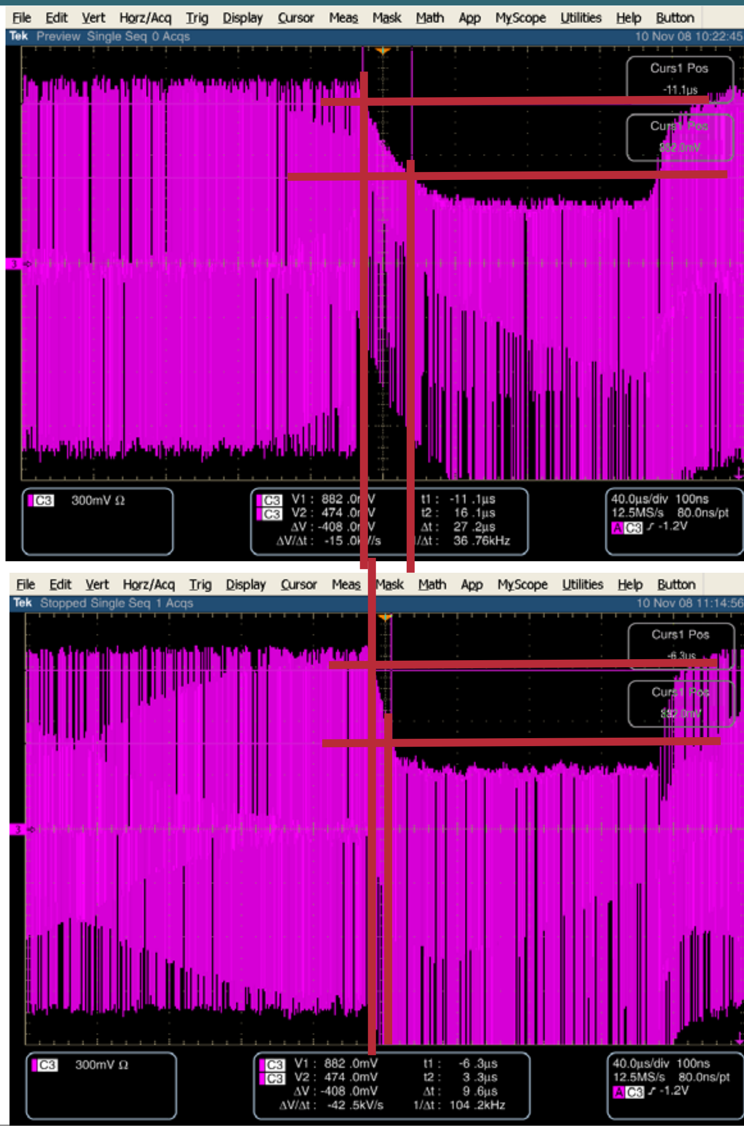
VA – VB
OCL1

PROBLEM: In D3.2, T is fixed from point B.

When the OCL is reduced, the system time constant is more difficult to calculate because the voltage difference between VA and VB is small.

VA – VB
OCL2 < OCL1

BLW Waveform



VA – VC
OCL1

Solution: Add point C at 20% of decay value and place point A at 80% of the decay value.

This ensures a measureable voltage and time difference.

VA – VC
OCL2 < OCL1

Proposed Solution

25.4.4a.1 Equivalent system time constant

While transmitting the Data Dependent Jitter (DDJ) packet of TP-PMD A.2, using the fixture shown in Figure 25–1, the equivalent system time constant, τ, shall be greater than 2.4 µs when calculated using measurement points A and C as defined in Figure 25–1. Point B is the point of maximum baseline wander droop. Relative to a voltage axis having point B at its origin, ~~Point~~ point A is a point earlier in time from Point B with a ~~magnitude~~ voltage amplitude (V_A) that is 80% of the MLT-3 upper envelope value. Relative to a voltage axis having point B at its origin, ~~Point~~ point C is a point between A and B with a ~~magnitude~~ voltage amplitude (V_C) that is 20% of the MLT-3 upper envelope value. The time between point A and C is T. These measurements are to be made for the transmitter pair and observing the differential signal output at the MDI with intervening cable less than 1 m long.

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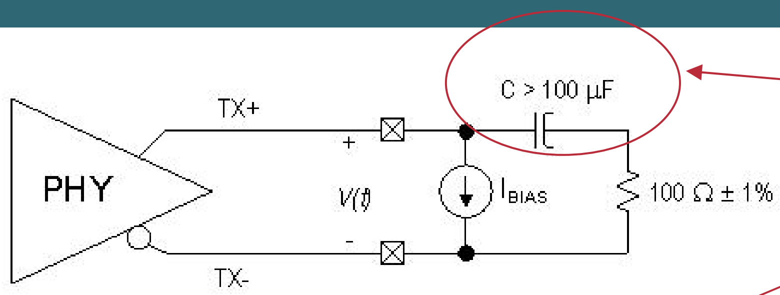
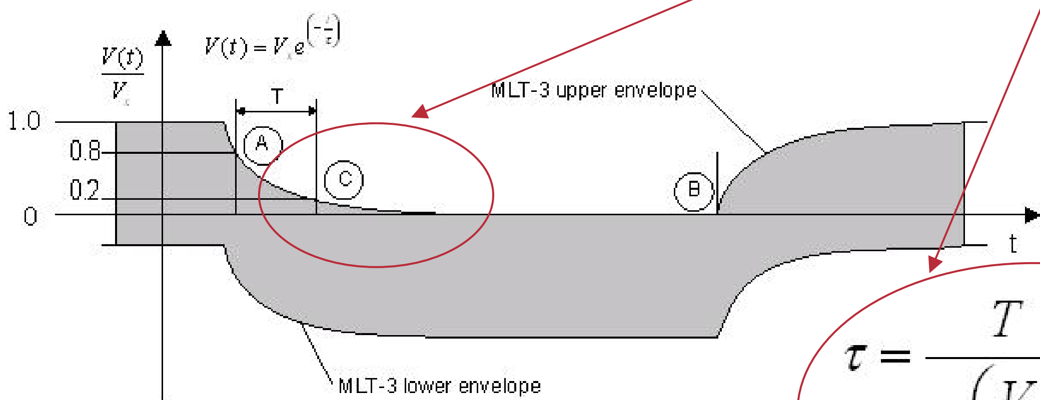
Proposed Solution Continued



Improves accuracy of this calculation.

New point

Adjust equation to remove negative sign, and provide the time constant relative to operating parameters.



$$\tau = \frac{T}{\ln\left(\frac{V_A}{V_C}\right)} = \frac{2L}{R}$$

Note: The value of R represents the fixture resistance. The value of L represents the PHY block inductance.

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