



Power over the MDI

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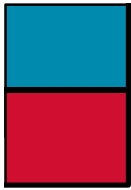
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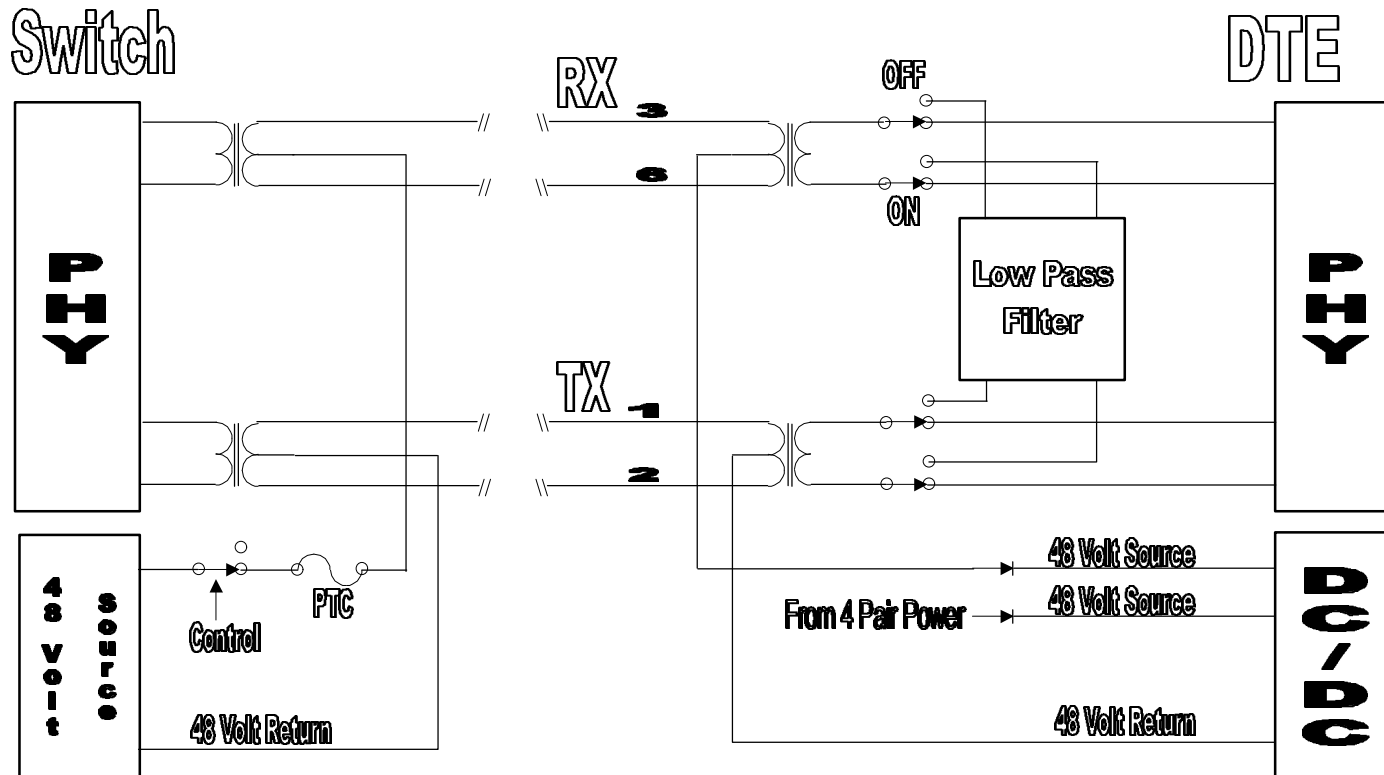


2 Pair Operation

- **Overview**
- **Phone Discovery**
- **Power Delivery**
- **Signal Quality Impact**



2 Pair Overview



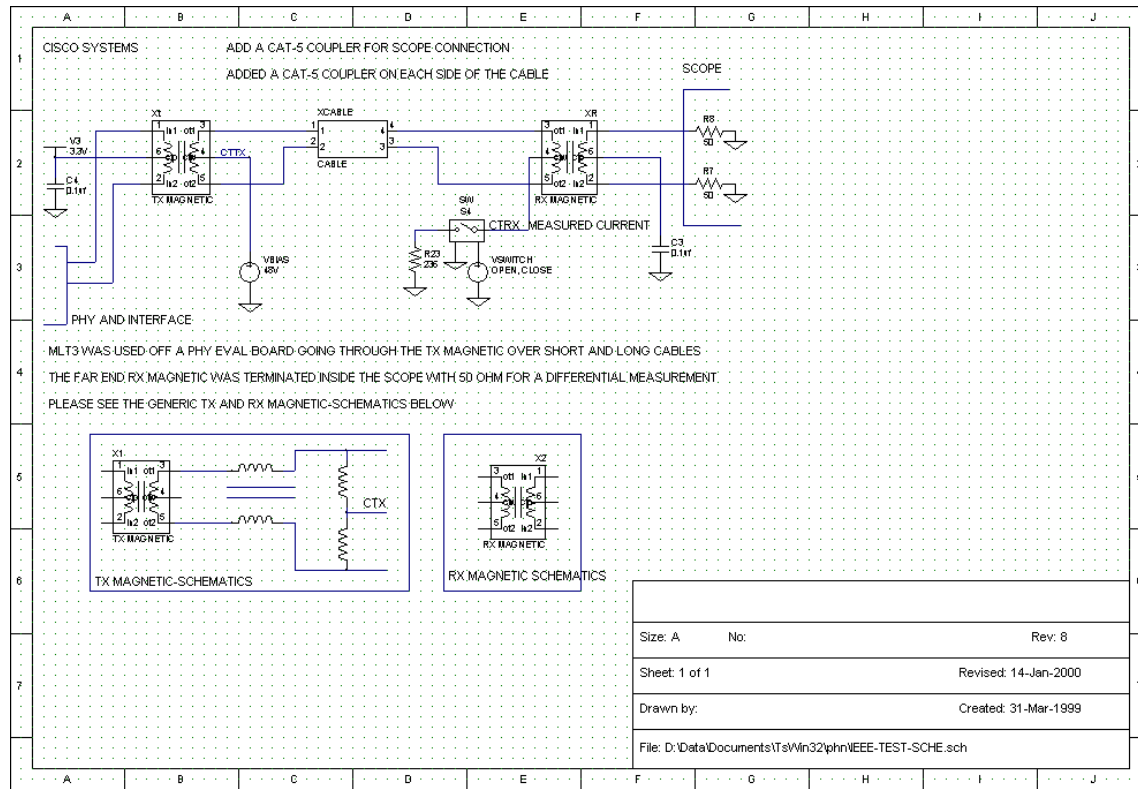


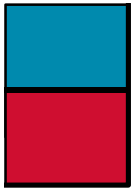
Phone Discovery

- **Using Discovery Tone in Loopback without power (see “DTE Power via MDI” by Vafa Rakshani of Broadcom on 11/8/99)**
- **Each Port on Switch Individually Controlled**
- **Power from Switch up to 8-10 Watts @ 48V (see “LAN Magnetics operating under DC Bias Conditions” by Henry Heinricks of Pulse Engineering on 11/8/99)**



Signal Quality Measurements

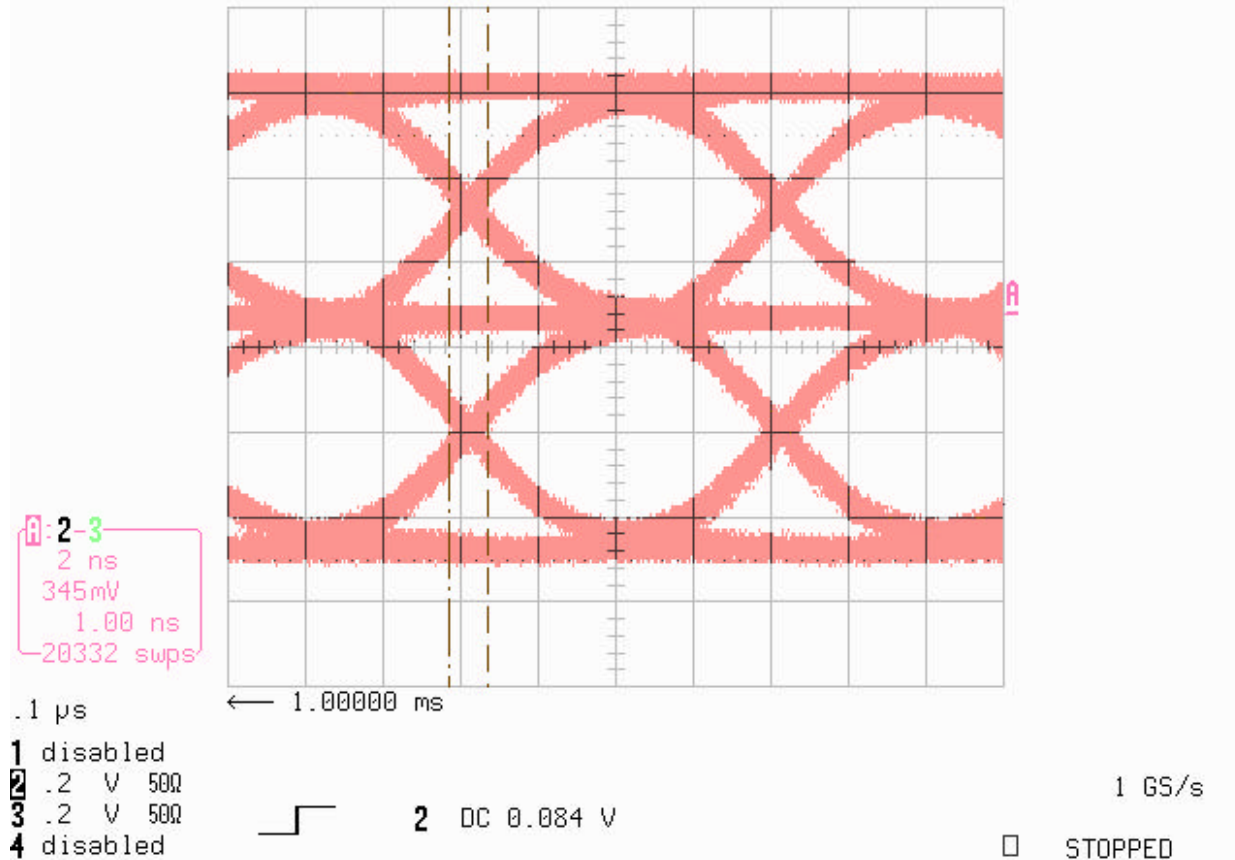




Signal Quality Measurements

14-Jan-00
9:49:50

TX EYE, SHORT CABLE AT 200mA

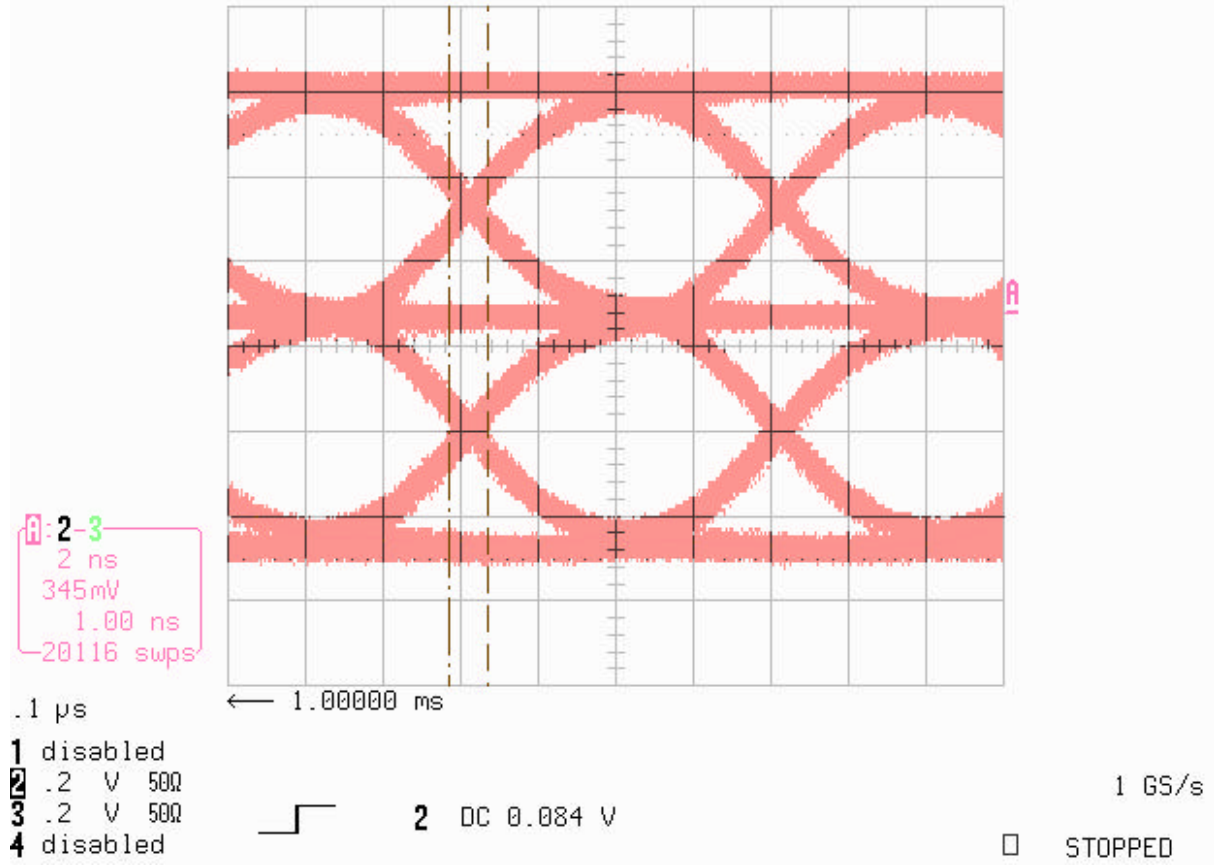




Signal Quality Measurements

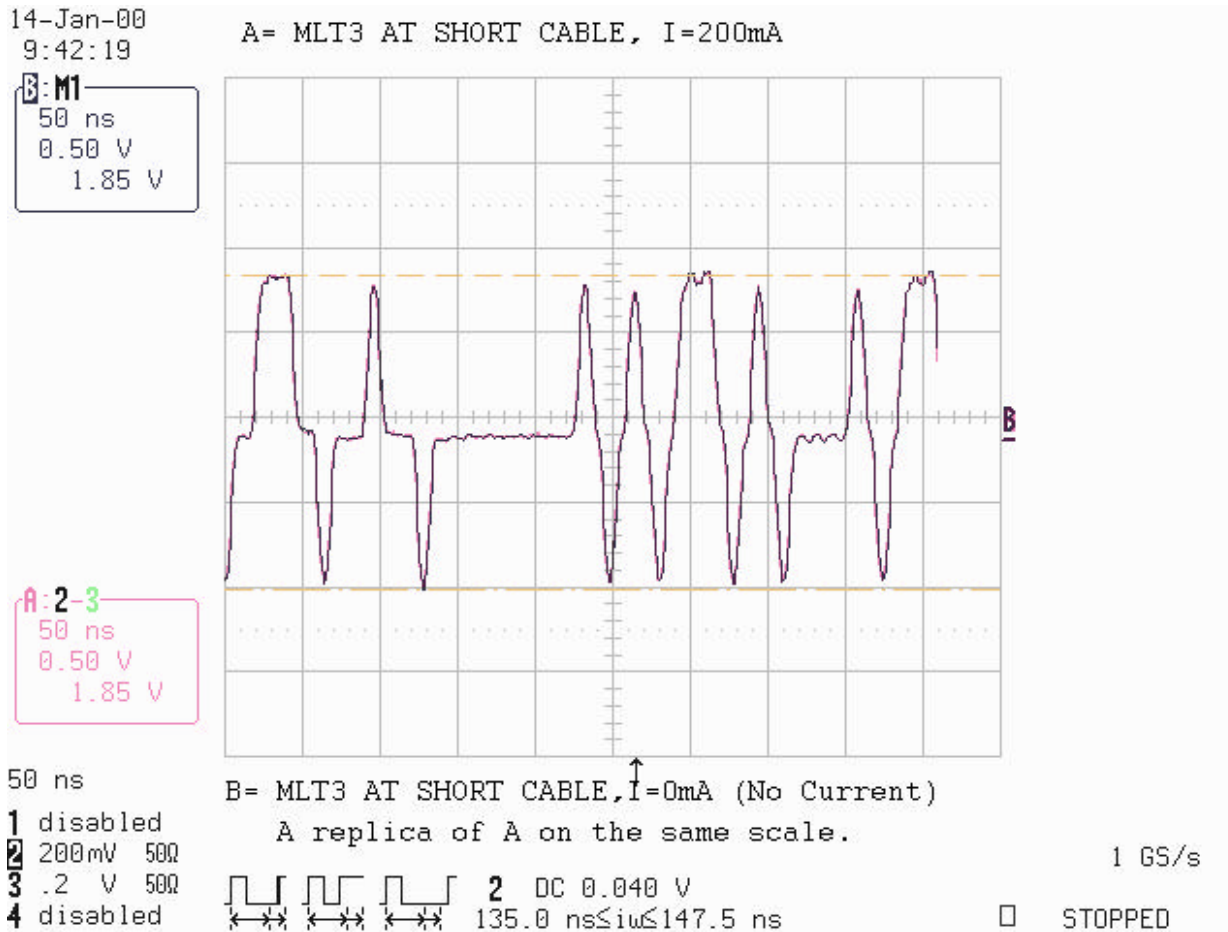
14-Jan-00
9:46:41

A= TX EYE, SHORT CABLE, I=0mA





Signal Quality Measurements



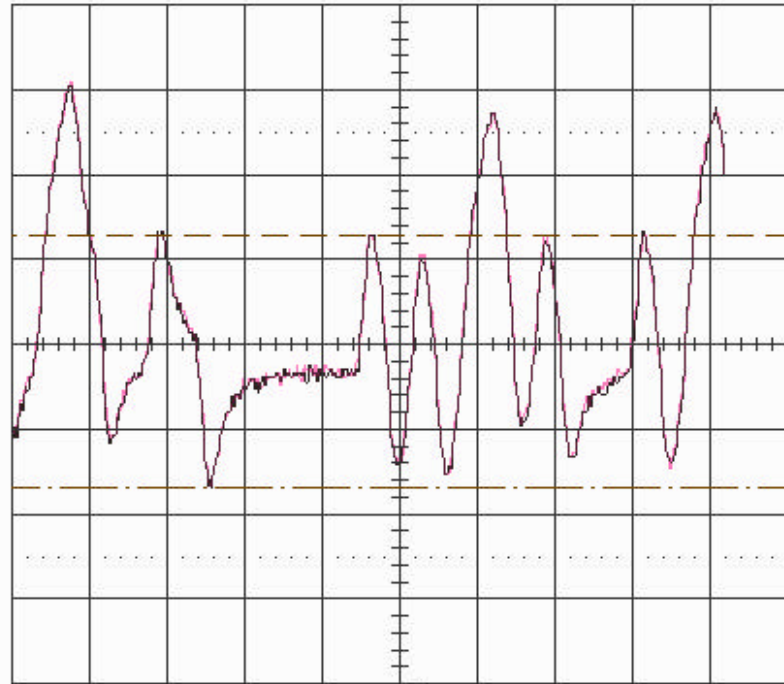


Signal Quality Measurements

14-Jan-00
10:00:14

A= MLT3 AT 120M CAT-5, I=200mA

M2
50 ns
154mV
456mV



A:2-3
50 ns
154mV
456mV

50 ns

B= MLT3 AT 120M CAT-5, I=0mA

- 1 disabled
- 2 200mV 50Ω
- 3 .2 V 50Ω
- 4 disabled

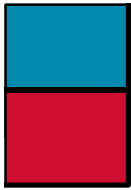
2 DC 0.040 V
135.0 ns ≤ i_w ≤ 147.5 ns

1 GS/s

STOPPED



Cisco Systems



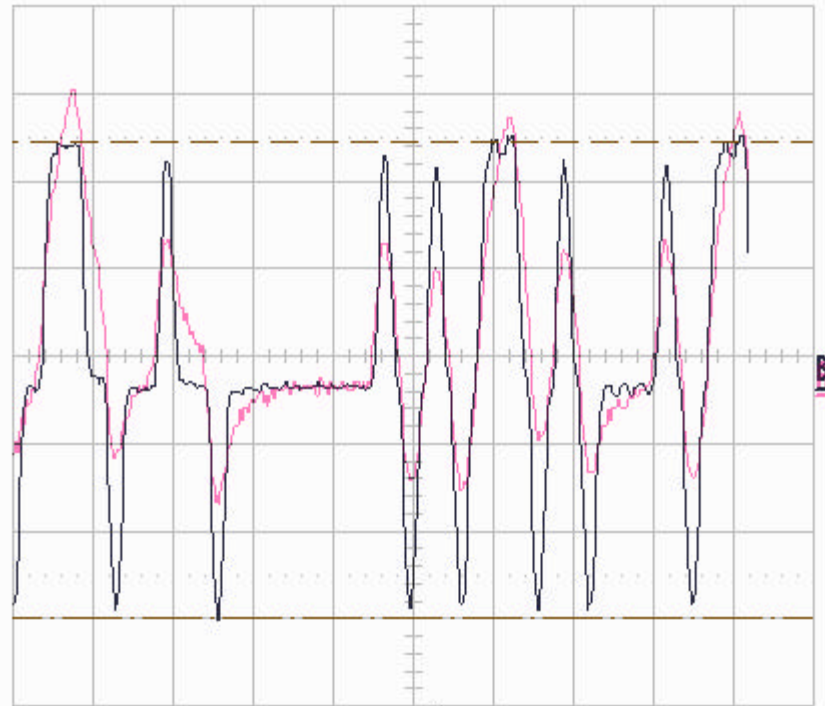
Signal Quality Measurements

14-Jan-00
9:57:29

SHORT AND LONG CABLE WAVEFORMS- REFERENCE

B: M1
50 ns
340mV
1.844 V

A: 2-3
50 ns
154mV
835mV



50 ns

- 1 disabled
- 2 200mV 50Ω
- 3 .2 V 50Ω
- 4 disabled

LONG CABLE = 120M OF CAT- 5, ALONG WITH 3 CAT-5 COUPLERS.
WAVEFORM A= LONG CABLE, WAVEFORM B= SHORT CABLE



2 DC 0.040 V
135.0 ns ≤ t_{iu} ≤ 147.5 ns

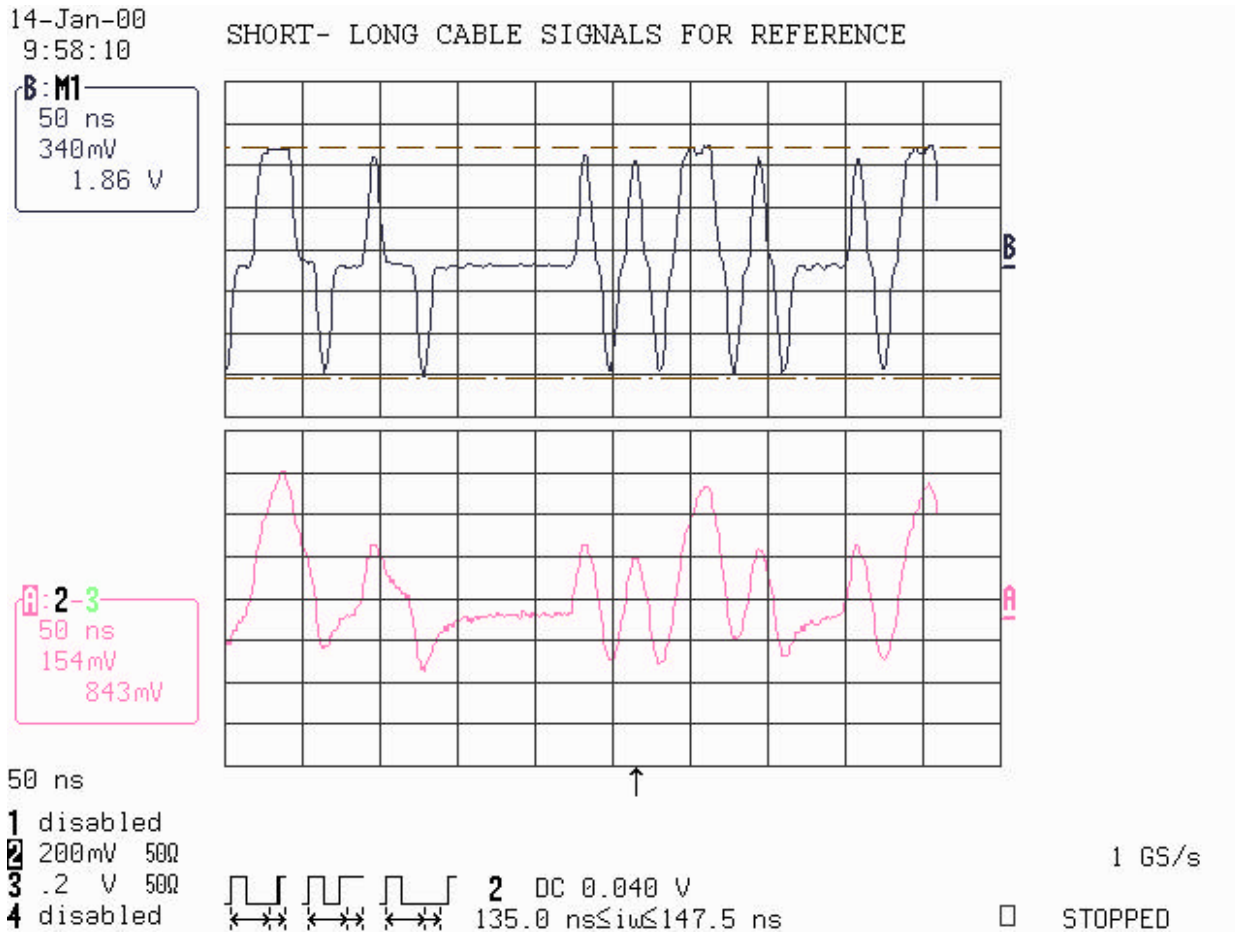
1 GS/s

STOPPED





Signal Quality Measurements



Cisco Systems



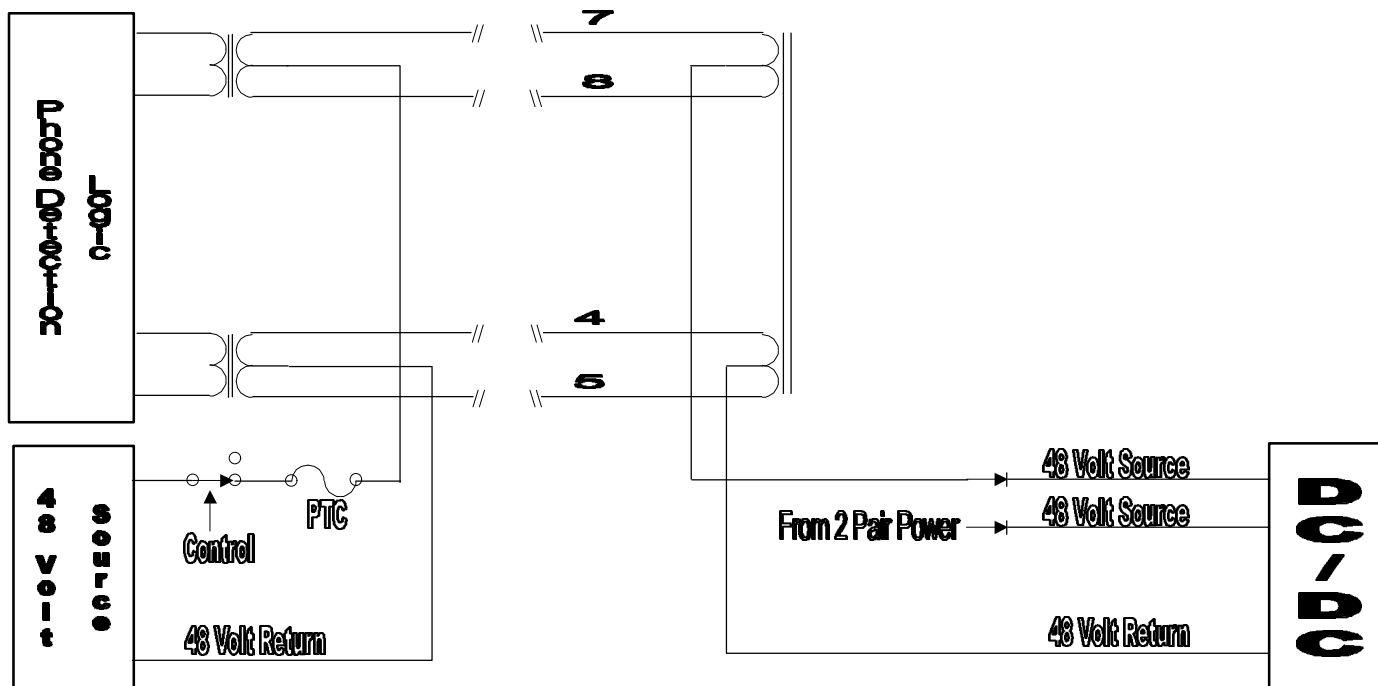
Mid Span (4 Pair) Operation

- **Overview**
- **Phone Discovery**
- **Power Delivery**



Mid Span (4 Pair) Overview

Switch





Phone Discovery/Power Delivery

- **Done with 300 Khz Tone to detect connect and disconnect**
- **Detection and Power done with Pairs 3 and 4**
- **Power from Switch up to 8-10 Watts at 48 Volts**



Combined Interface in DTE

- **Include Both Interfaces in the DTE**
- **Allows for 2 pair Operation on Legacy Wiring. We think there are a significant number of installations with this limitation.**
- **Allows for mid span powering with 4 pair wiring without disturbing the signal quality from the switch to the DTE.**
- **EMI Tested and Verified to meet FCC Class B limits at the DTE and the Switch**