T0: T10 Technical Committee
From: Tariq Abou-Jeyab and Vince Bastiani
Date: February 5, 1999
Subject: Capacitive Loads vs. Real Drives.

In the T10 meeting held Jan. 26, we presented setup and hold time measurements for U160/m SCSI. Several configurations were used including 12 m, 32 AWG, MQT multi-drop cable and 1.5 m, 30 AWG, fully-laminated twist ‘n flat multi-drop cable. We used a U160/m Adaptec host adapter and a U160/m Quantum hard drive and the rest of the loads were just pure capacitive loads, with 15 pF to ground on each of +/- lines.

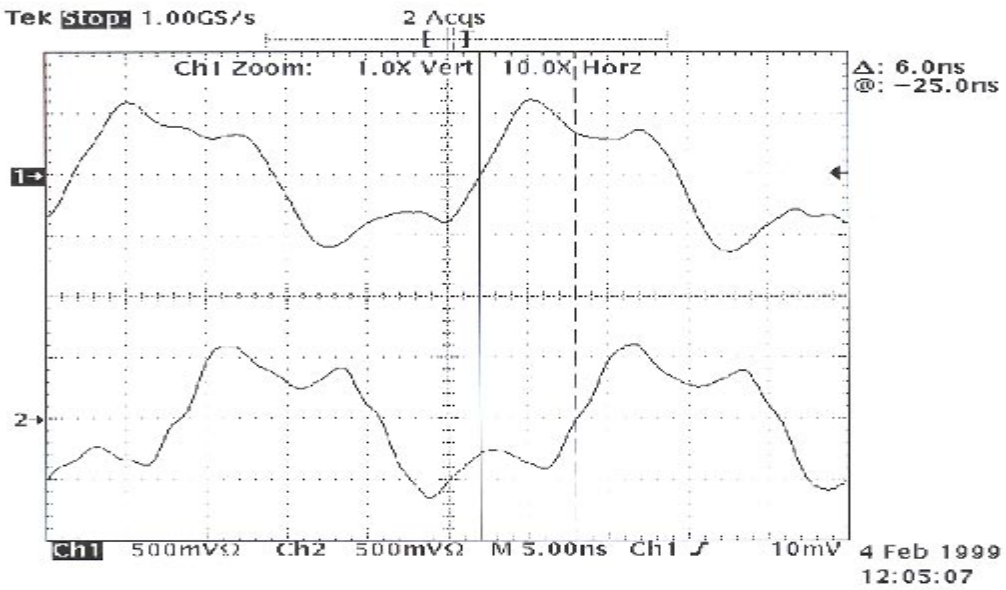
Several people commented about the use of capacitive loads to simulate drives, they felt drives were not totally capacitive. Hence, we decided to run additional testing while placing the drive at two different positions; at the end of the cable near the terminator and at the first load position. This shows using capacitive loads in place of drives is a good approximation when viewing loading effects on setup and hold measurements, and signal quality.

The attached waveforms show the short cable test. We did write operations and viewed the signals as they passed by various load position. We looked at several positions along the two cables with the drive either the first device or the last on the bus. The waveshapes show similar traces whether the signal passed by the drive first or passed by all the capacitive loads before getting to the drive. The reflections seem more severe when the drive is positioned at the end. This would indicate the drive is not pure capacitive but has some resistive nature to it which smoothes the reflective pulses when positioned first, but does not severely impact the amplitude of the signal for this minimum loaded short cable.

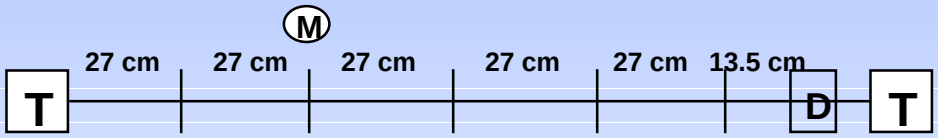
We intend to do some further testing with more drives and longer cables.

DO (L2)

ACK (L2)



setup = 6 ns
hold = 5.8 ns



30 AWG twist' n flat fully-laminate cable

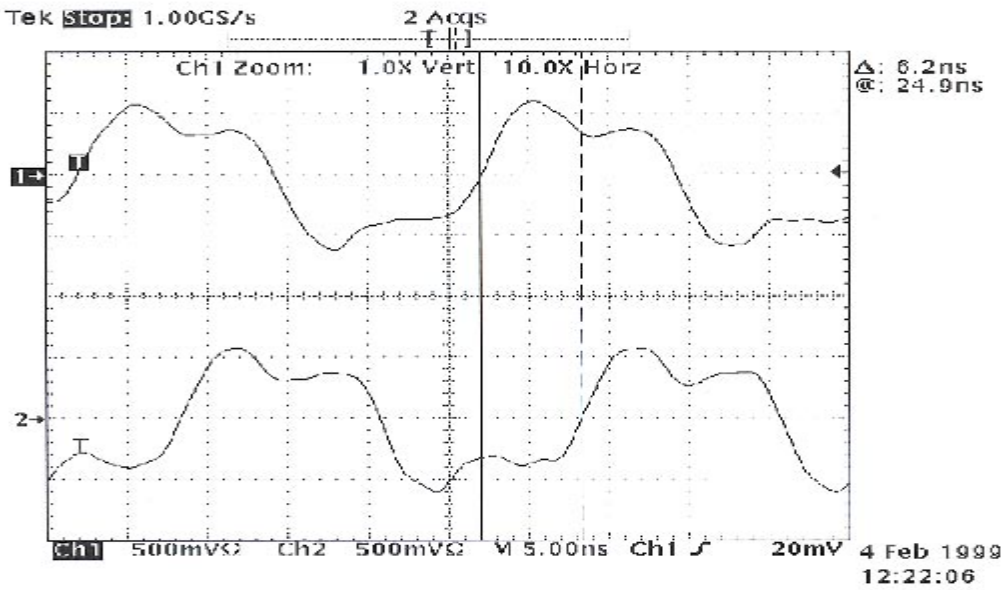
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at end-----looking at L2

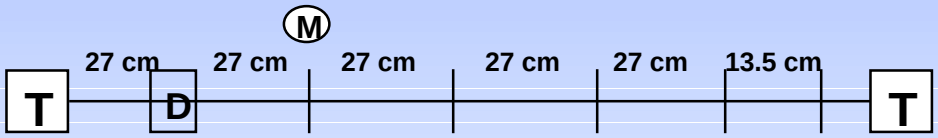
"write operation---1010 pattern"

DO (L2)

ACK (L2)



setup = 6 ns
hold = 5.8 ns



30 AWG twist' n flat fully-laminate cable

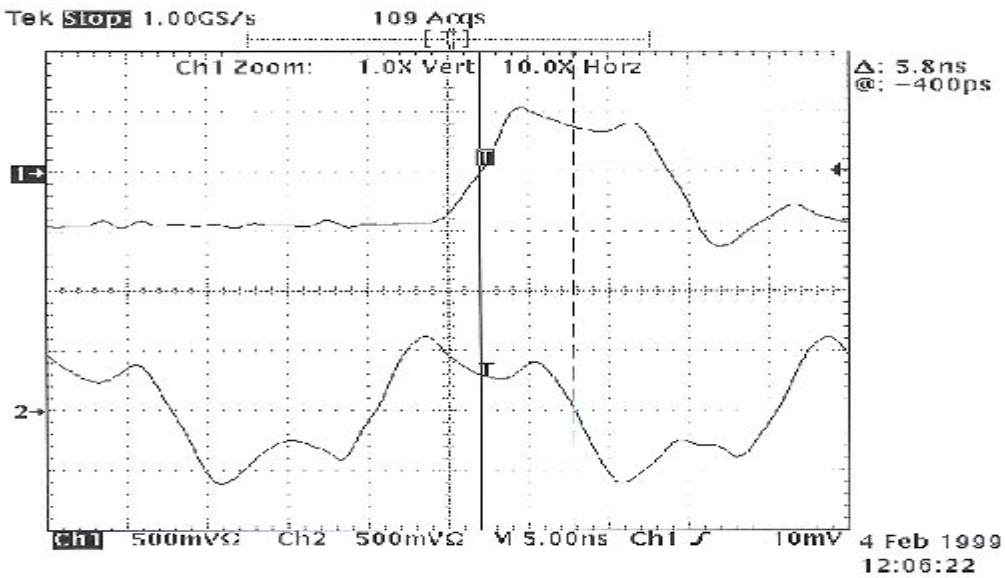
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at beginning-----looking at L2

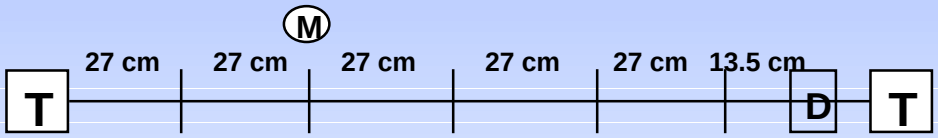
"write operation---1010 pattern"

DO (L2)

ACK (L2)



setup = 5.8 ns
hold = 6 ns



30 AWG twist' n flat fully-laminate cable

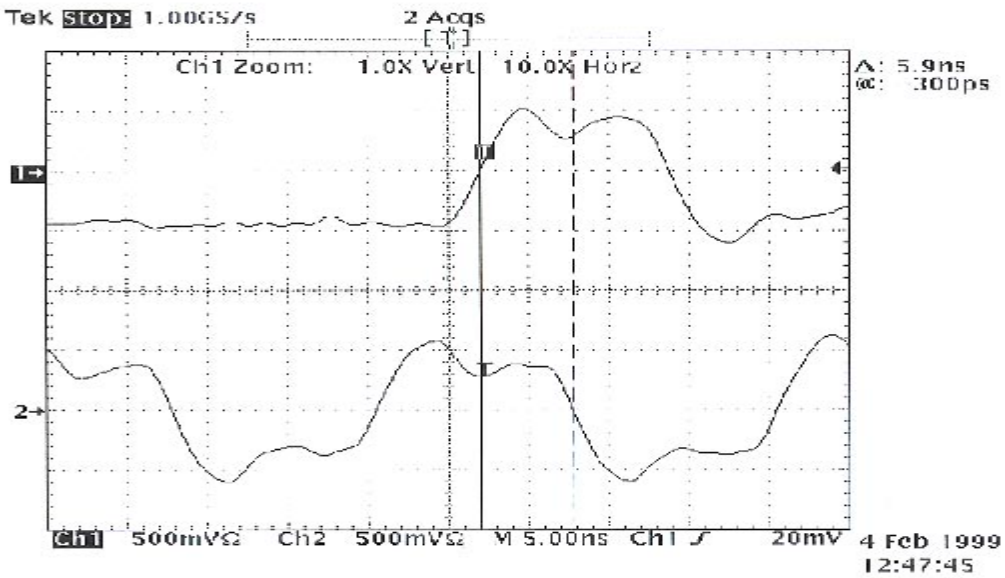
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at end-----looking at L2

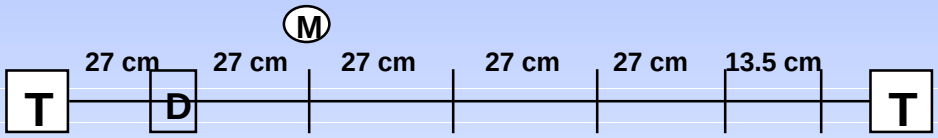
"write operation---isolated pattern"

DO
(L2)

ACK
(L2)



setup = 5.9 ns
hold = 6 ns



30 AWG twist' n flat fully-laminate cable

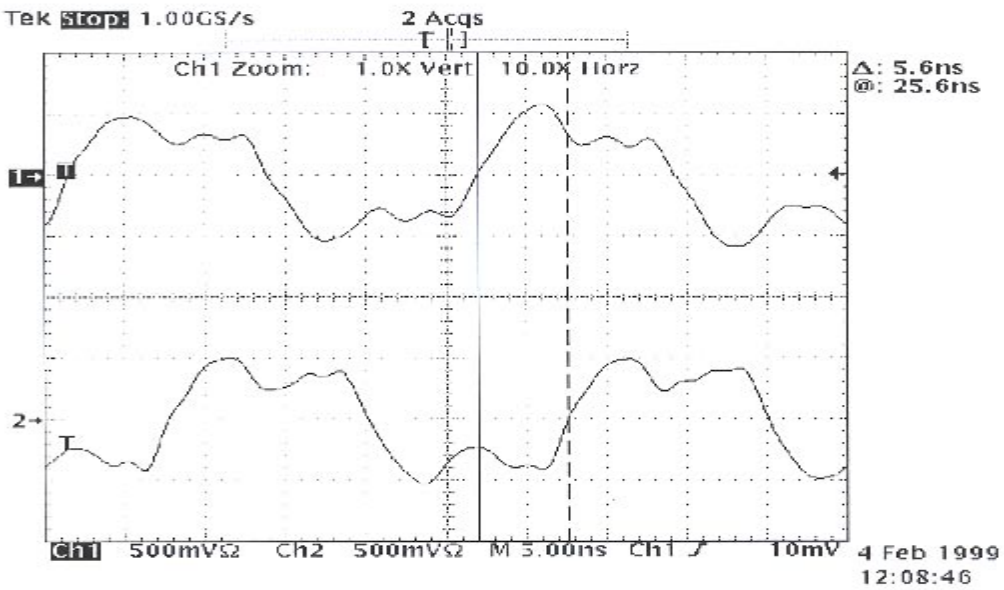
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at beginning-----looking at L2

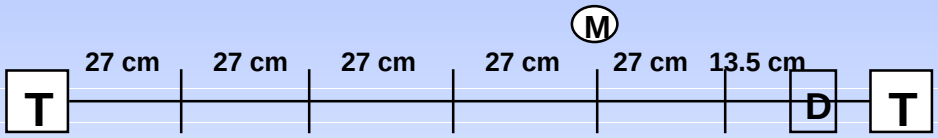
"write operation---isolated pattern"

DO
(L4)

ACK
(L4)



setup = 5.6 ns
hold = 6 ns



30 AWG twist' n flat fully-laminate cable

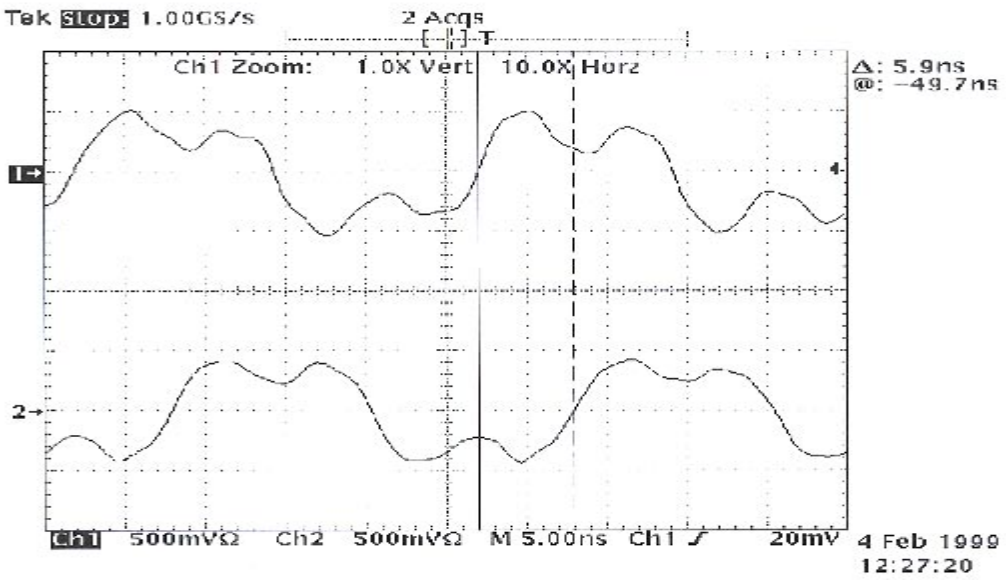
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at end-----looking at L4

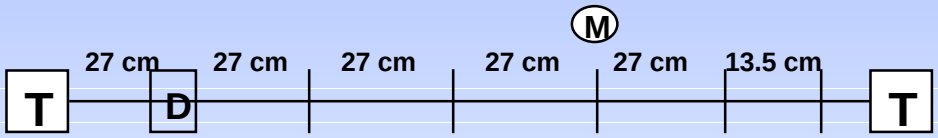
"write operation---isolated pattern"

DO
(L4)

ACK
(L4)



setup = 5.9 ns
hold = 5.8 ns



30 AWG twist' n flat fully-laminate cable

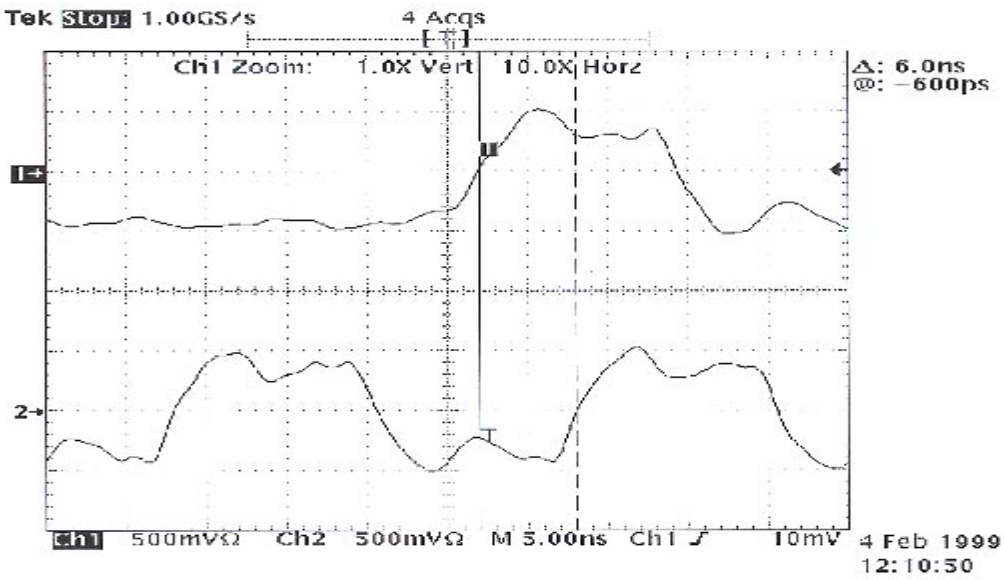
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at beginning-----looking at L4

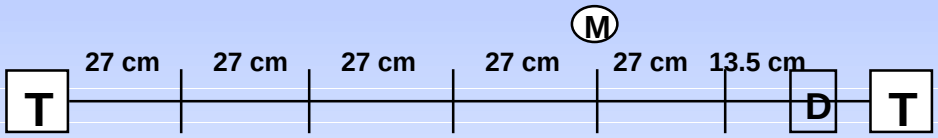
"write operation---1010 pattern"

DO (L4)

ACK (L4)



setup = 6 ns
hold = 6.3 ns



30 AWG twist' n flat fully-laminate cable

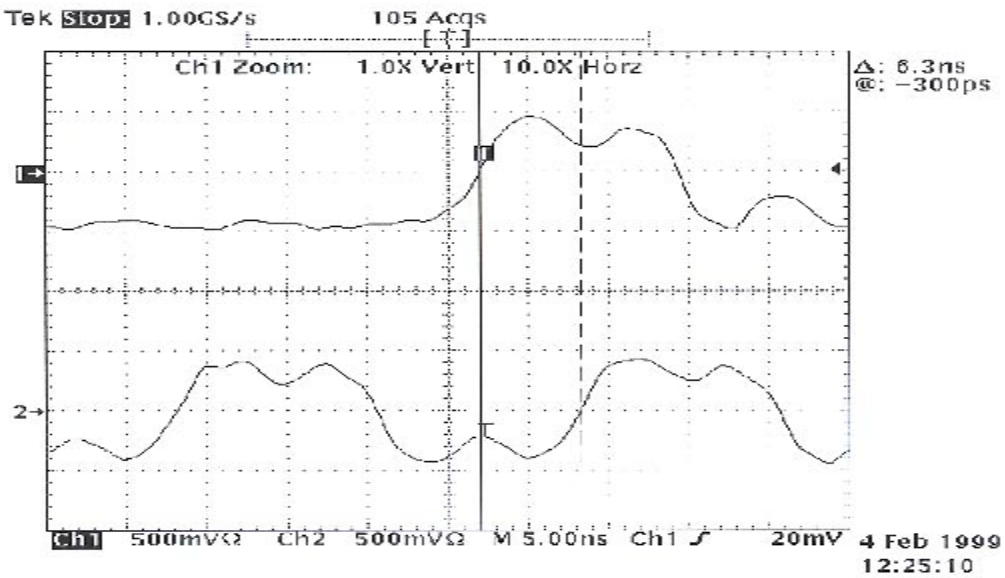
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at end-----looking at L4

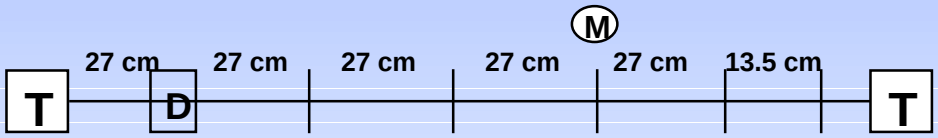
"write operation---isolated pattern"

DO
(L4)

ACK
(L4)



setup = 6.2 ns
hold = 6 ns



30 AWG twist' n flat fully-laminate cable

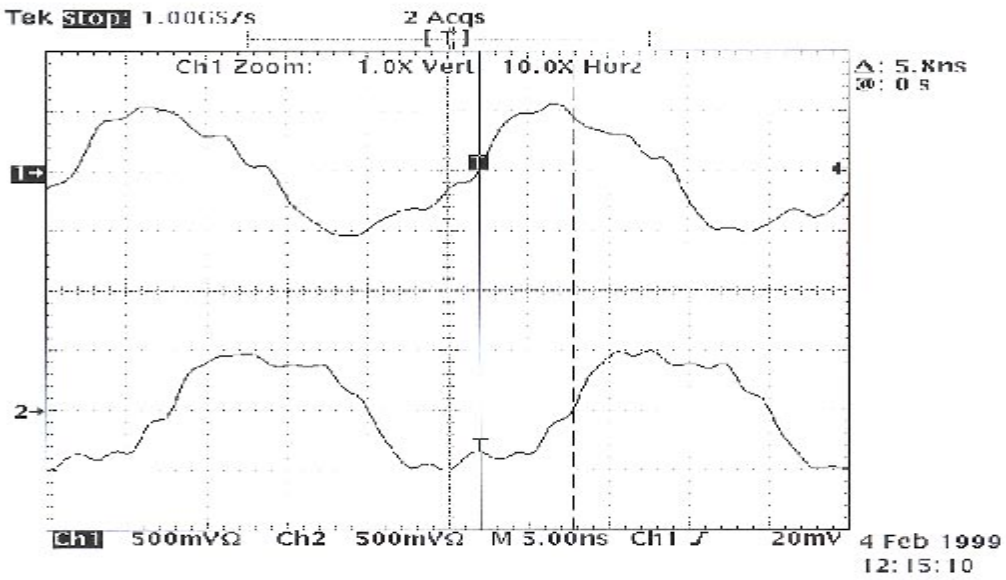
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at beginning-----looking at L4

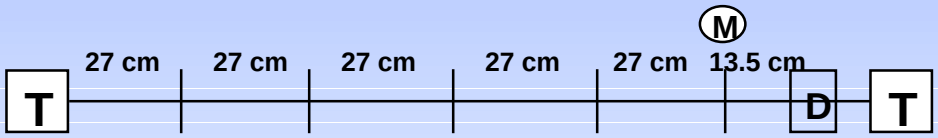
"write operation---isolated pattern"

DO
(L5)

ACK
(L5)



setup = 5.8 ns
hold = 6.1 ns



30 AWG twist' n flat fully-laminate cable

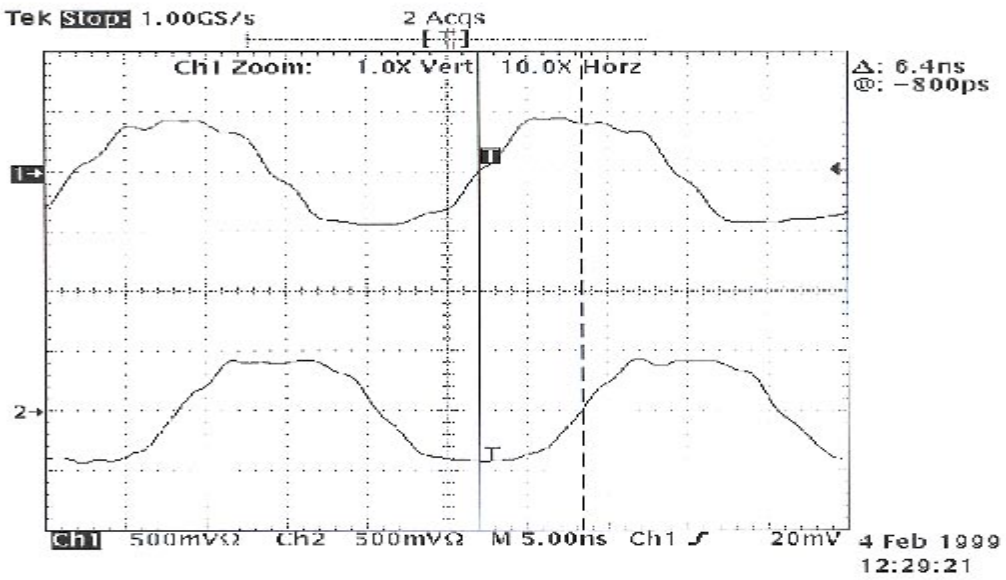
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at end-----looking at L5

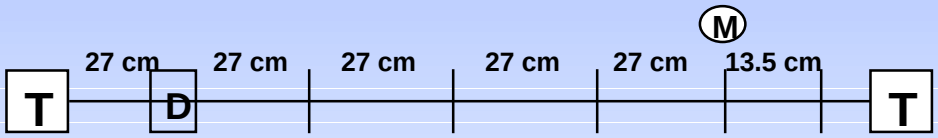
"write operation---isolated pattern"

DO
(L5)

ACK
(L5)



setup = 6.4 ns
hold = 6.5 ns



30 AWG twist' n flat fully-laminate cable

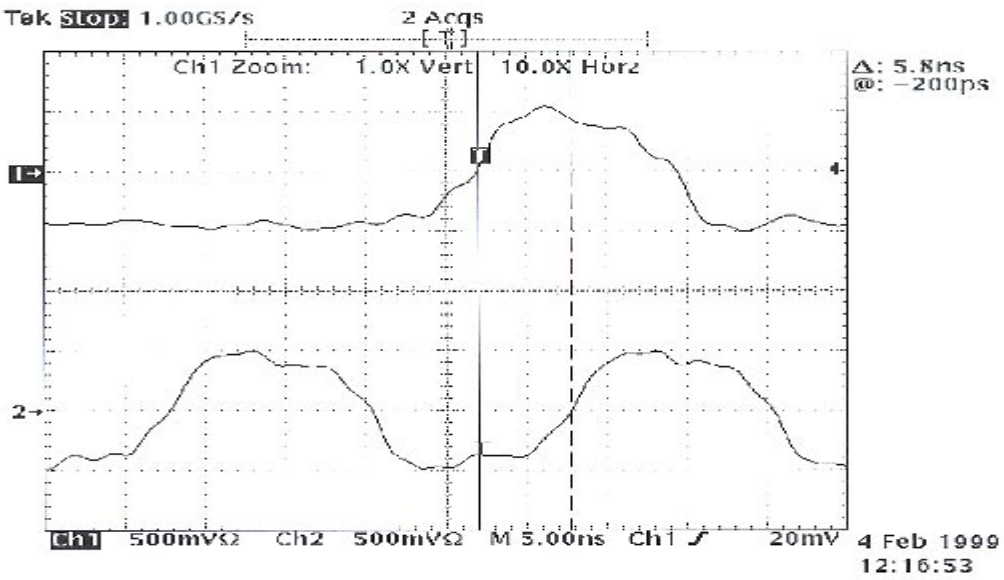
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at beginning-----looking at L5

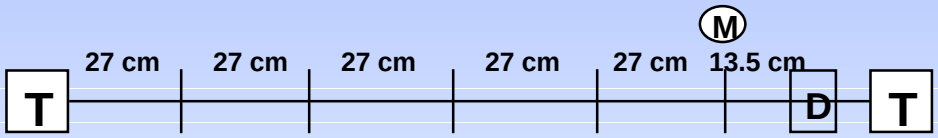
"write operation---1010 pattern"

DO
(L5)

ACK
(L5)



setup = 5.8 ns
hold = 6.6 ns



30 AWG twist' n flat fully-laminate cable

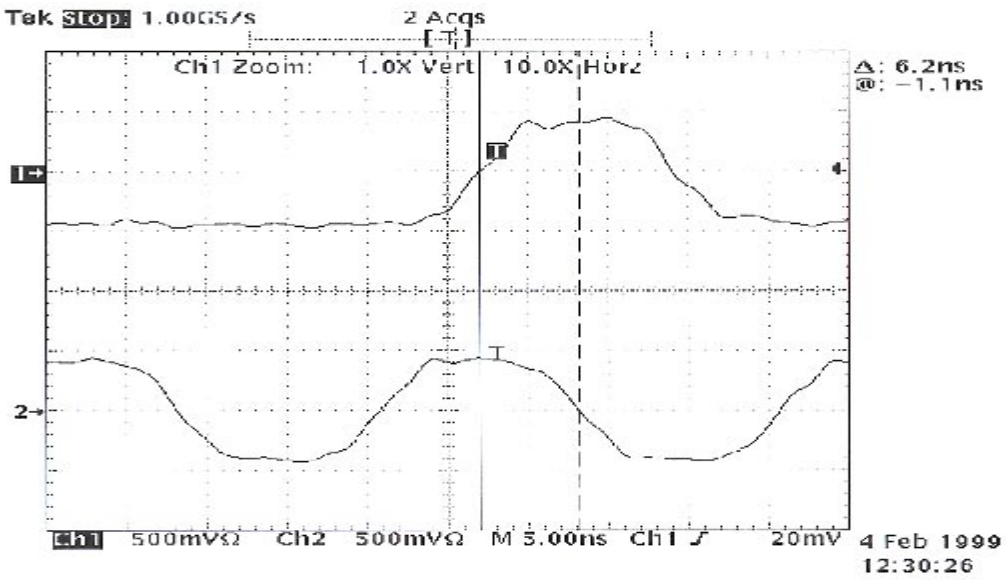
"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at end-----looking at L5

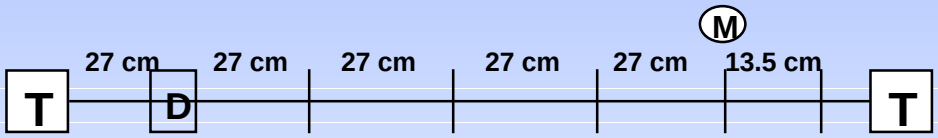
"write operation---isolated pattern"

DO (L5)

ACK (L5)



setup = 6.2 ns
hold = 5.8 ns



30 AWG twist' n flat fully-laminate cable

"setup & hold time measurements for 1.5 m 30 AWG cable"

drive at beginning-----looking at L5

"write operation---isolated pattern"