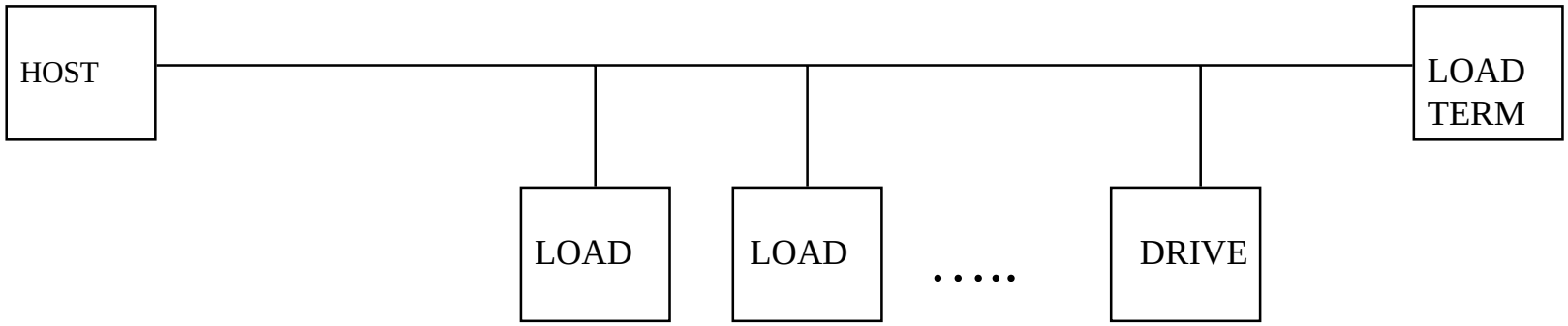
TEST SETUP



- ACK and DATA monitored (write commands)
- Host is Adaptec U160/M device.
- Drive is Quantum U160/M device.
- Loads are passive capacitive load boards with 15 pf loads.
- All data lines are driven with either 1-0-1 or isolated pulse pattern.
- Intent was to look at Setup and Hold at each position on the bus.

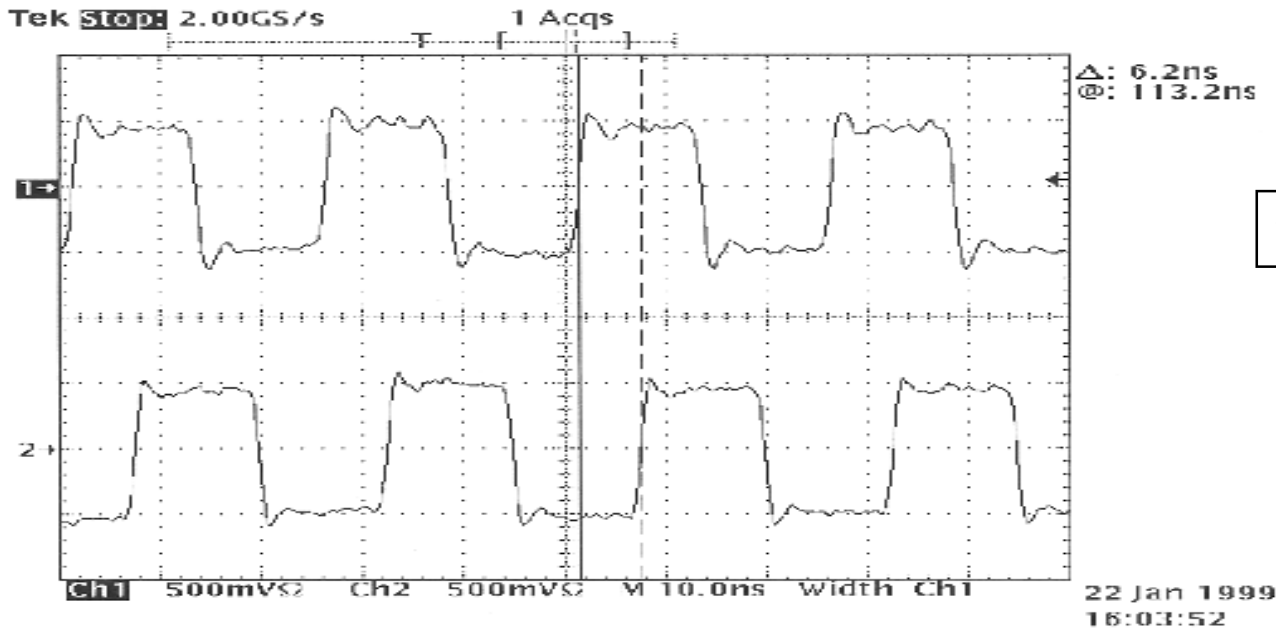
Cable Specifications

Short Cable

- Amphenol Twist 'N' Flat (125-3011)
- 30 gauge solid
- TPE insulation
- 131 ohms differential
- 37 pf / meter capacitance
- 4.71 ns / meter propagation delay
- 0.113 ns /meter delay skew

Long Cable

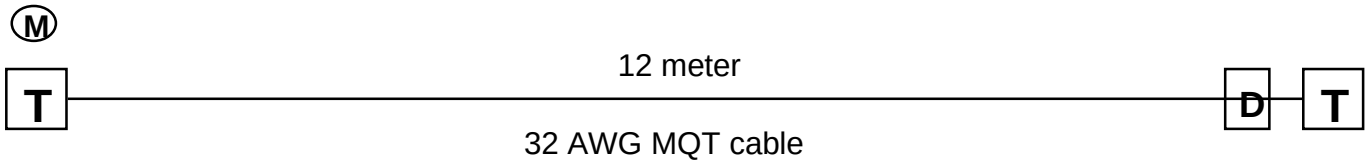
- Hitachi Quick Twist (20036)
- 32 gauge stranded
- PVC insulation
- 130 ohms differential
- 40.6 pf / meter capacitance



DO (host)

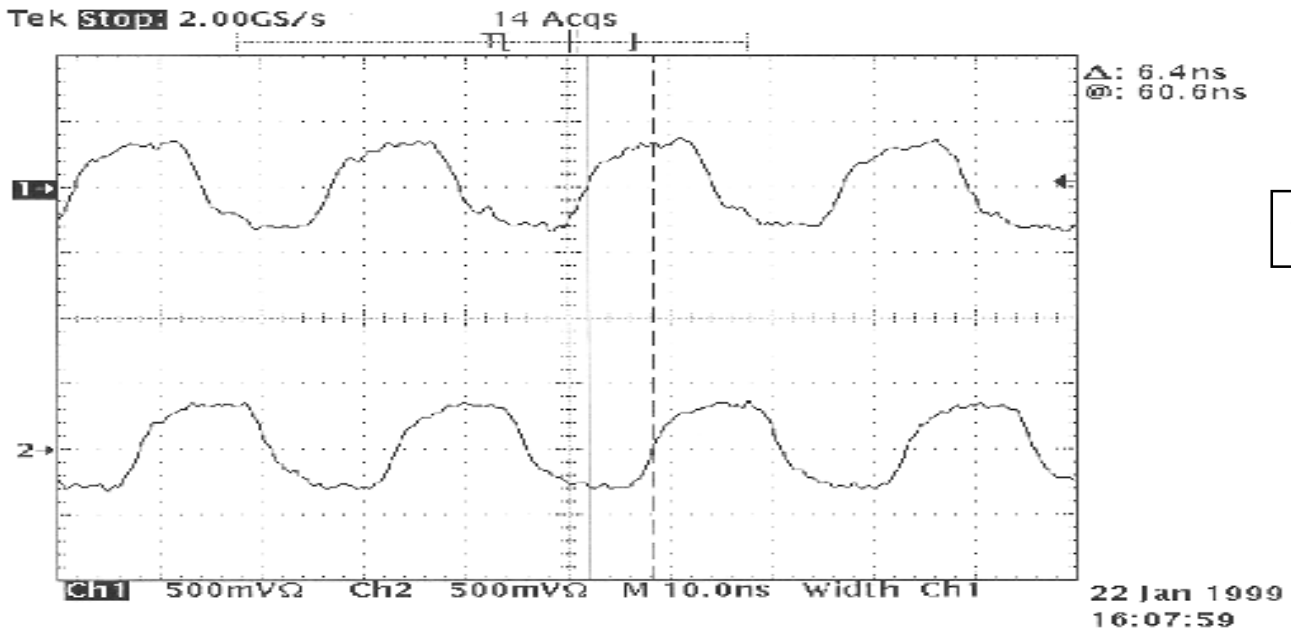
ACK (host)

setup = 6 ns
hold = 6.2 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at the host

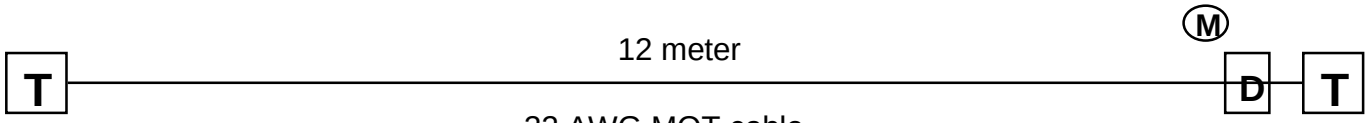
"write operation---1010 pattern"



DO (drive)

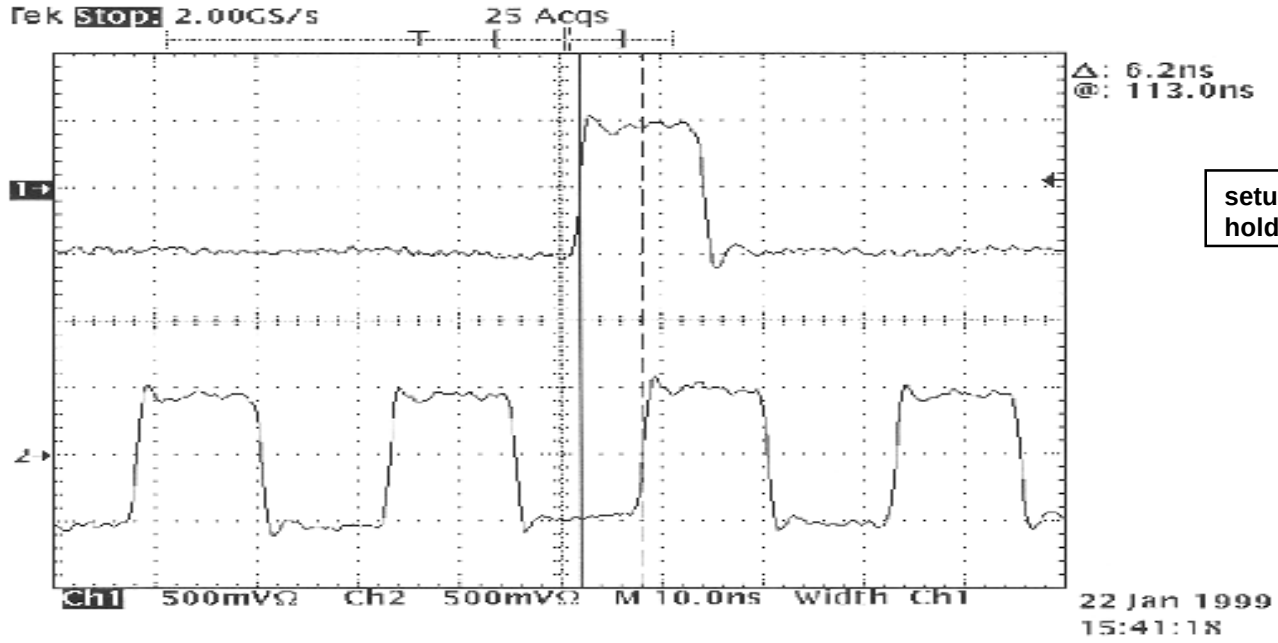
ACK (drive)

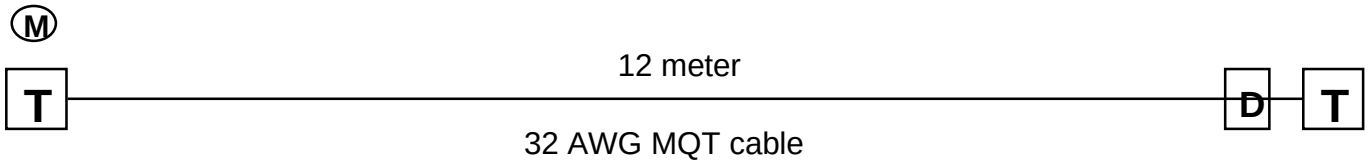
setup = 6.4 ns
hold = 6 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at the drive

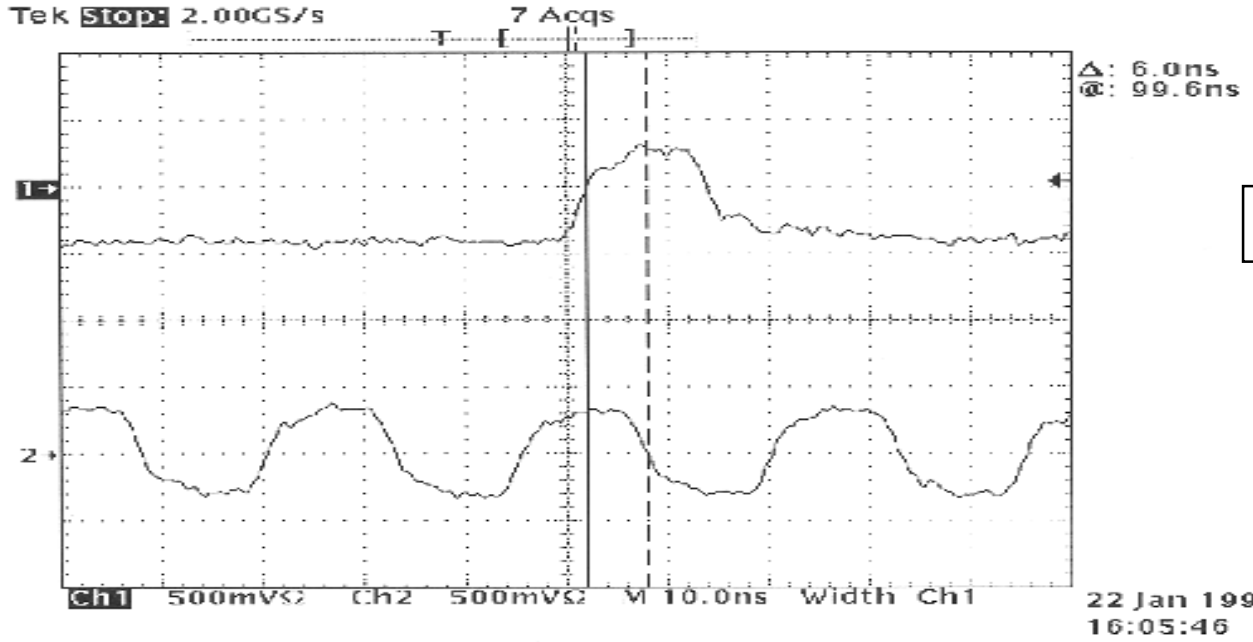
"write operation---1010 pattern"



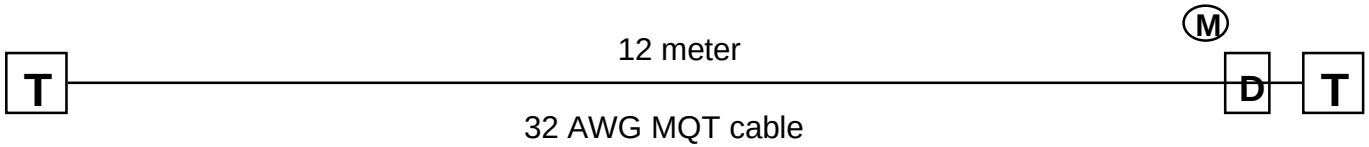


"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at the host

"write operation---isolated pattern"

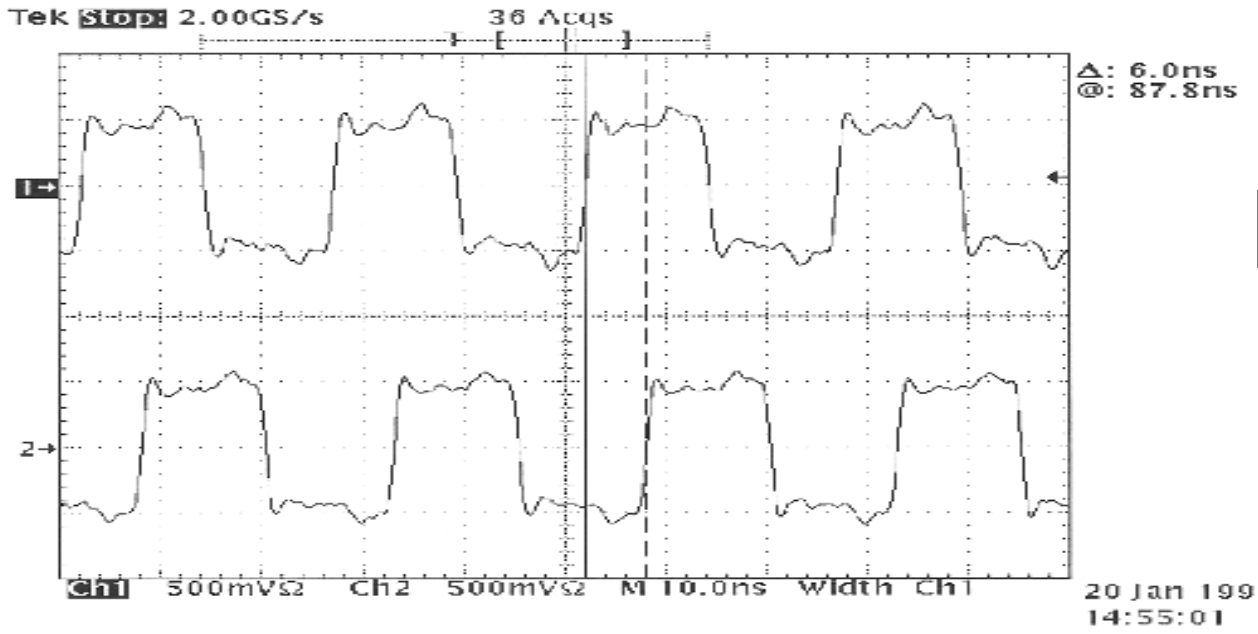


setup = 6 ns
hold = 6 ns

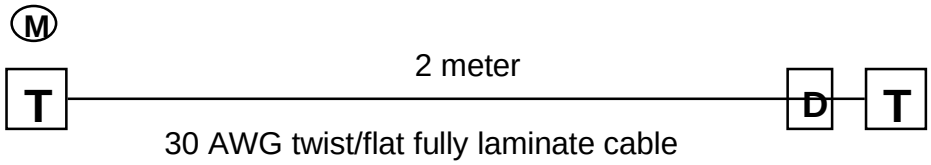


"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at the drive

"write operation---isolated pattern"



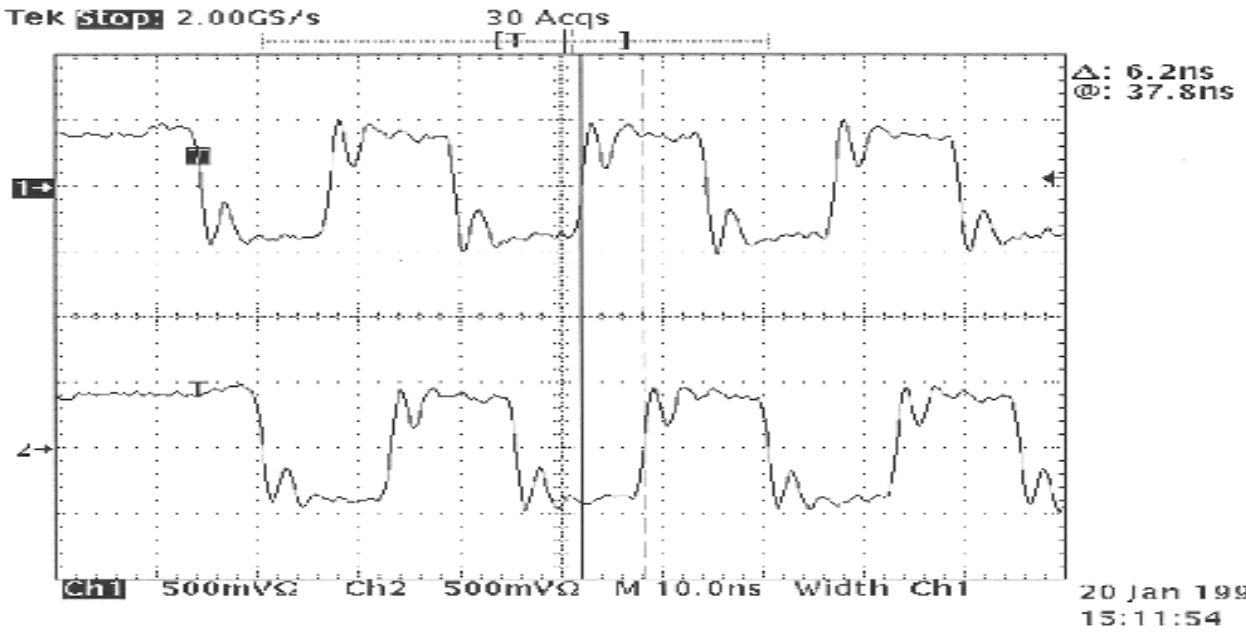
setup = 6 ns
hold = 6.2 ns



"setup & hold time measurements for 2 m 30 AWG cable"

looking at the host

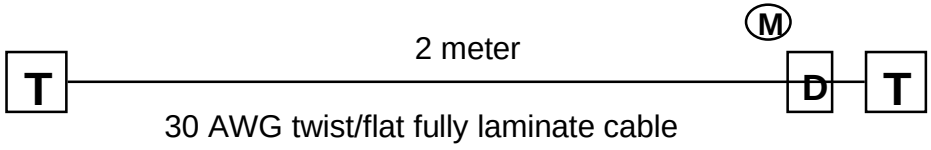
"write operation---1010 pattern"



DO (drive)

ACK (drive)

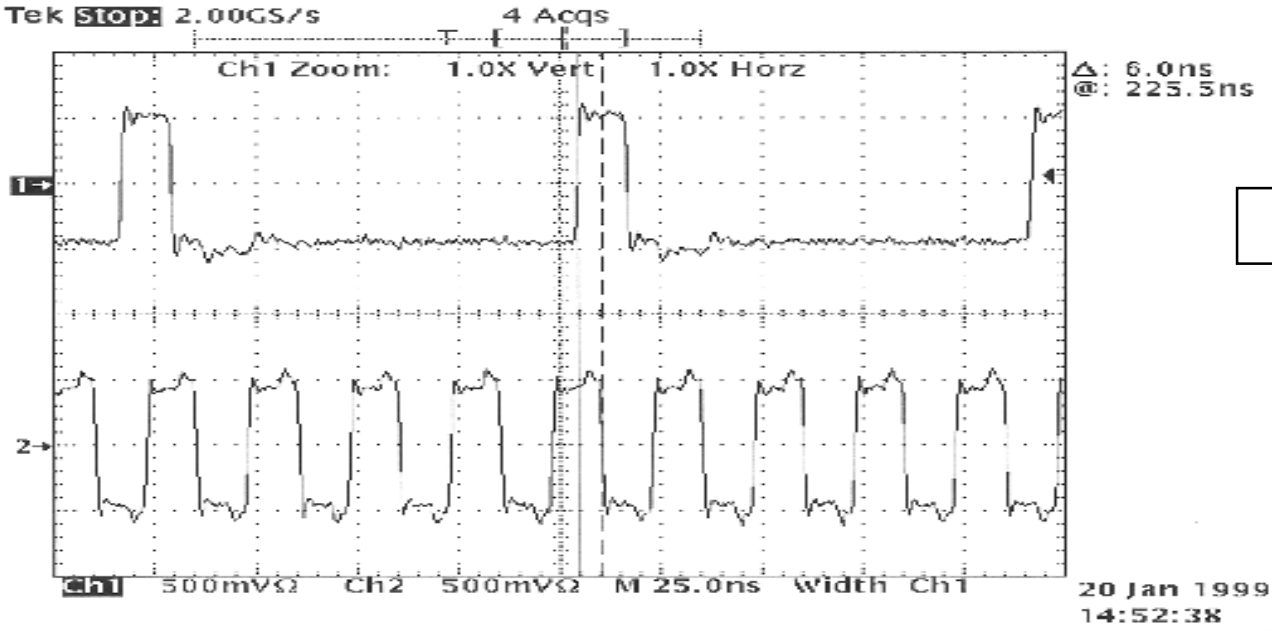
setup = 6.2 ns
hold = 6 ns



"setup & hold time measurements for 2 m 30 AWG cable"

looking at the drive

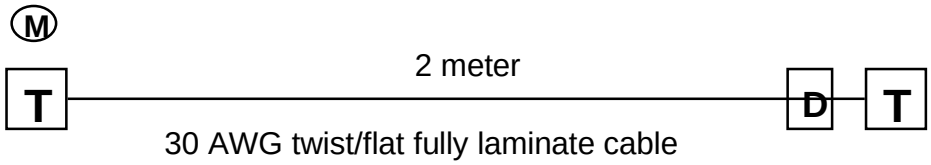
"write operation---1010 pattern"



DO (host)

ACK (host)

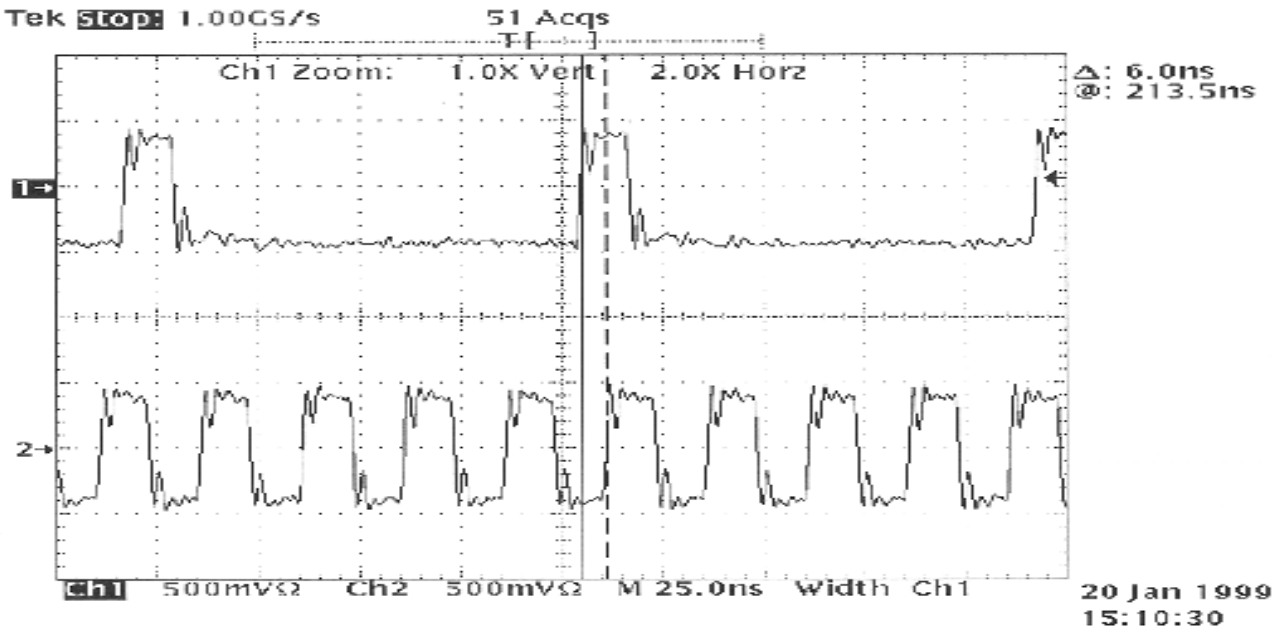
setup = 6 ns
hold = 6 ns



"setup & hold time measurements for 2 m 30 AWG cable"

looking at the host

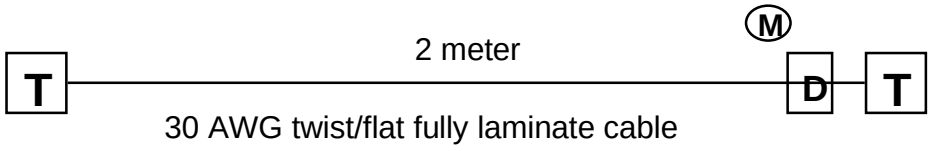
"write operation---isolated pattern"



DO (drive)

ACK (drive)

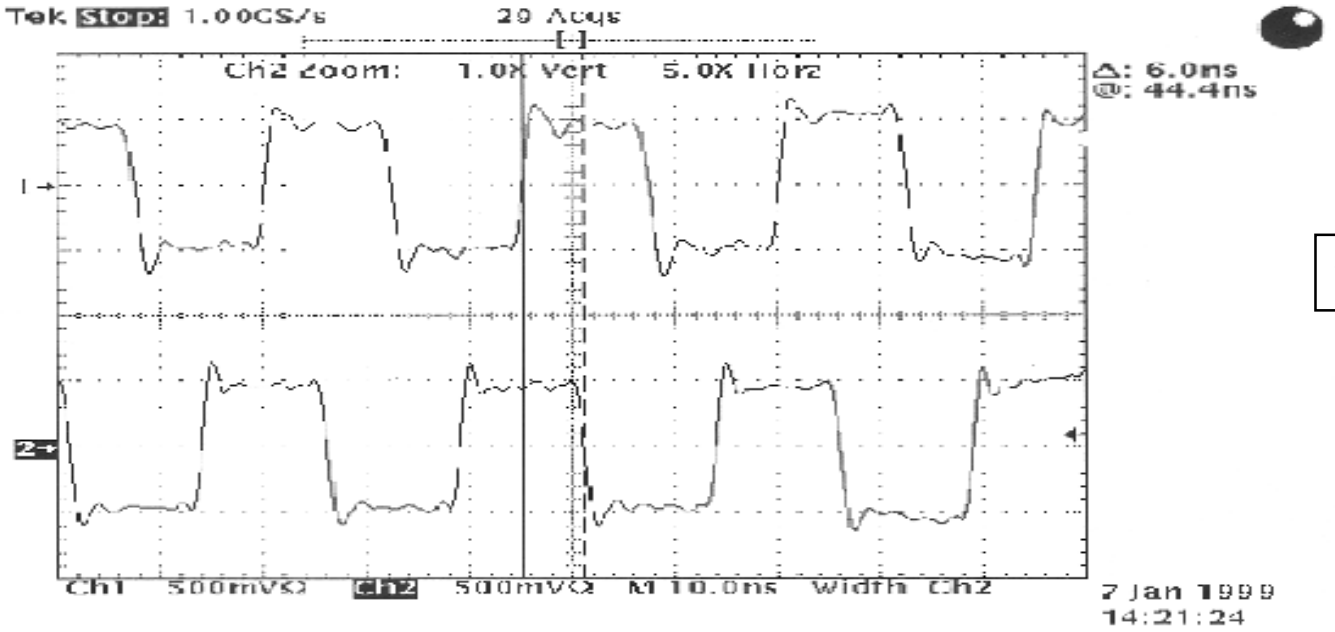
setup = 6 ns
hold = 6.1 ns



"setup & hold time measurements for 2 m 30 AWG cable"

looking at the drive

"write operation---isolated pattern"

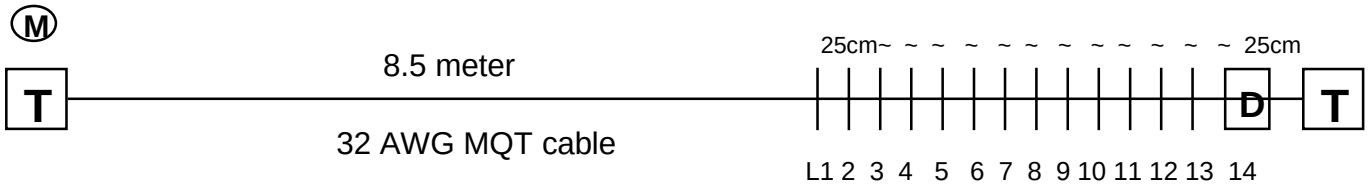


DO (host)

ACK (host)

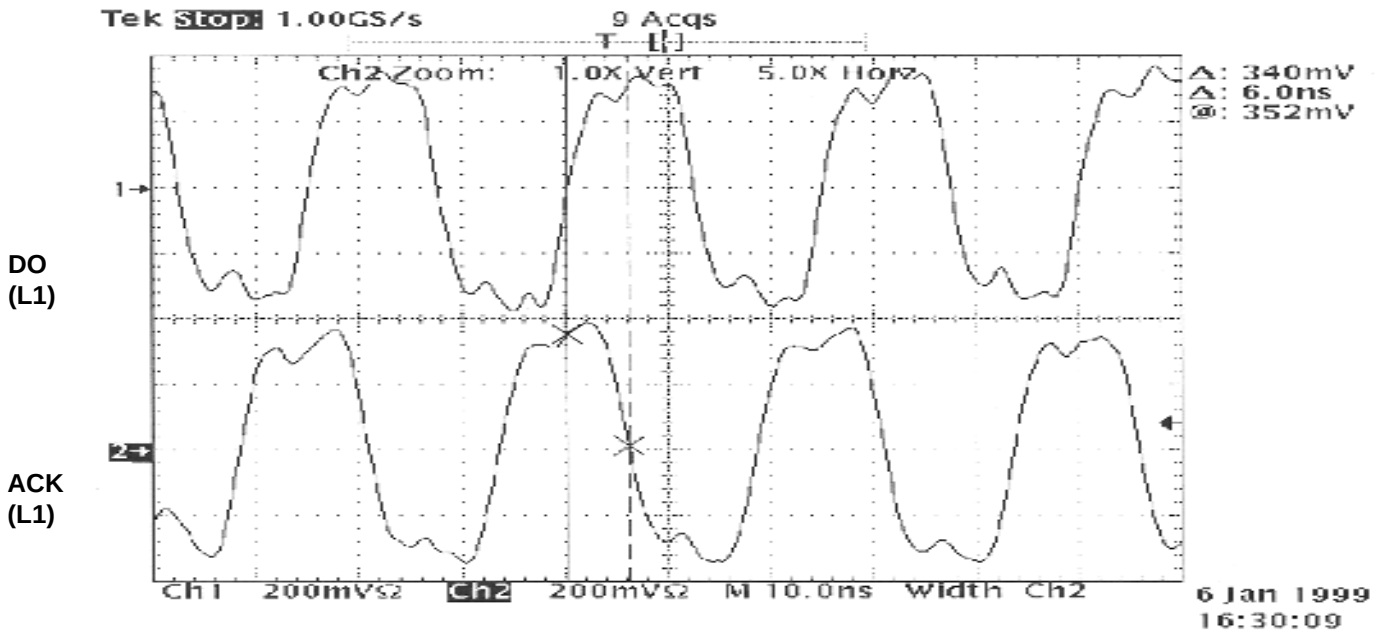
worst case

setup = 5.9 ns
hold = 6.2 ns



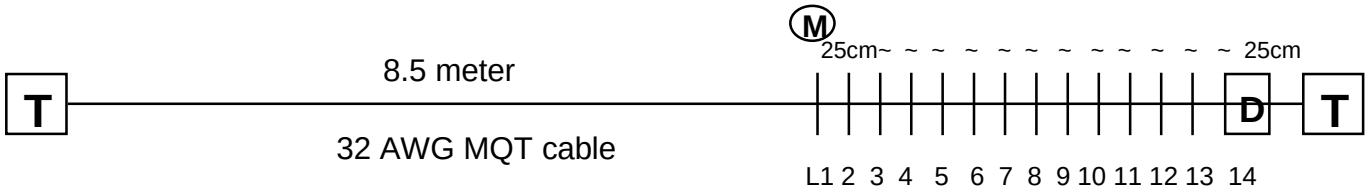
"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at the host

"write operation---1010 pattern"



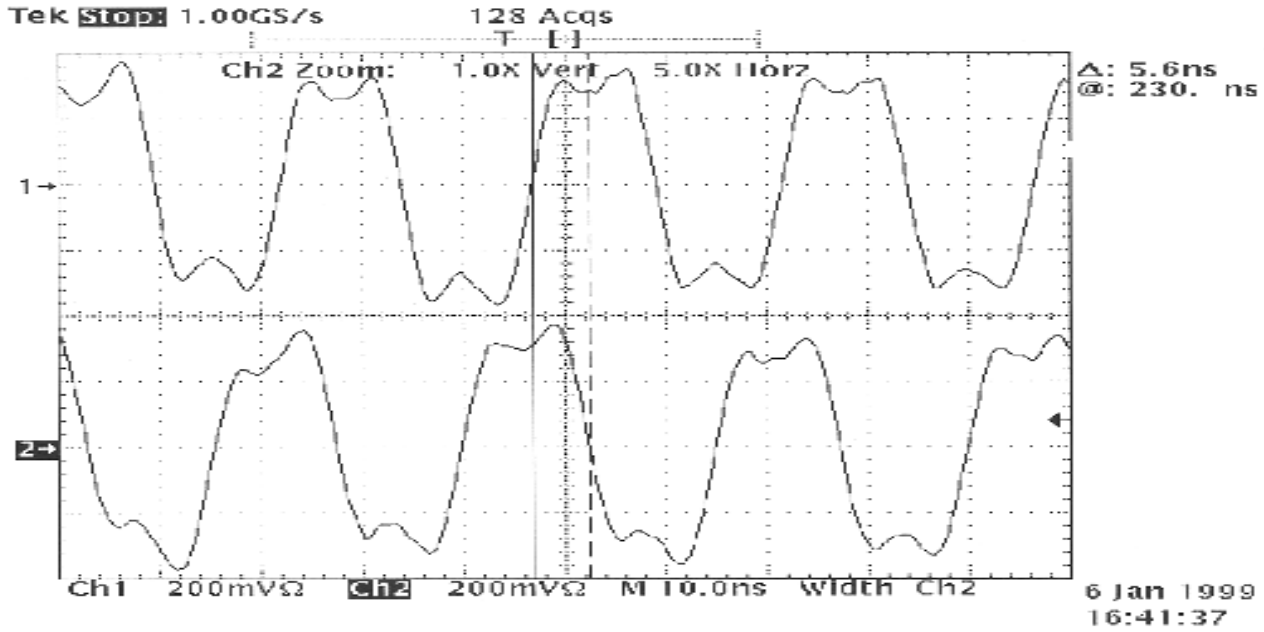
worst case

setup = 6 ns
hold = 6.1 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L1

"write operation---1010 pattern"

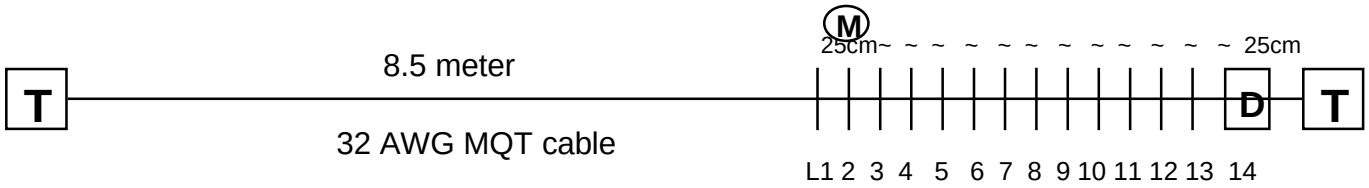


DO (L2)

ACK (L2)

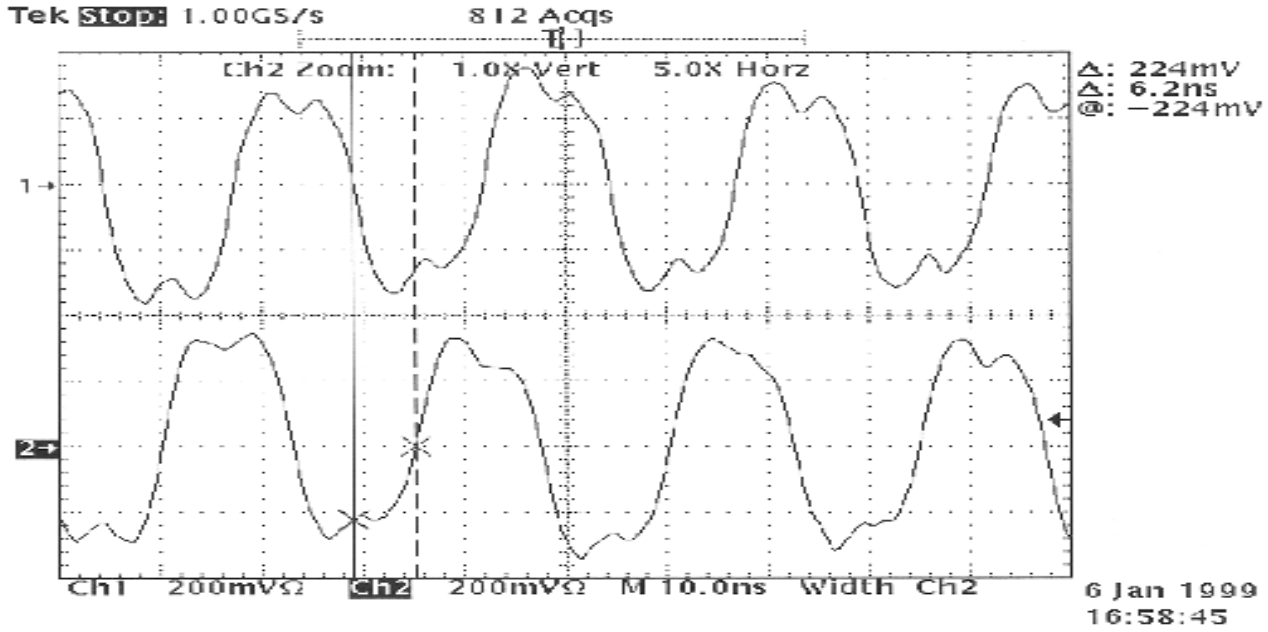
worst case

setup = 5.6 ns
hold = 6.5 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L2

"write operation---1010 pattern"

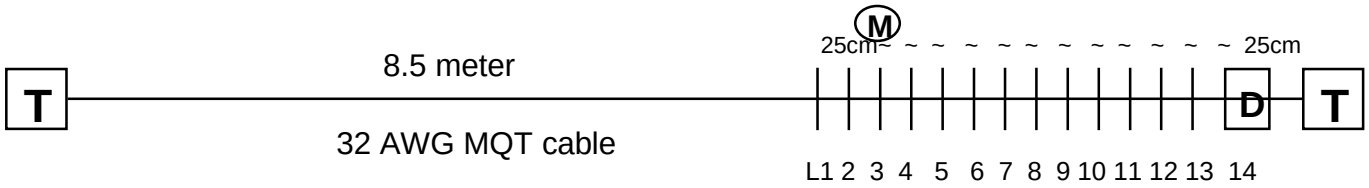


DO (L3)

ACK (L3)

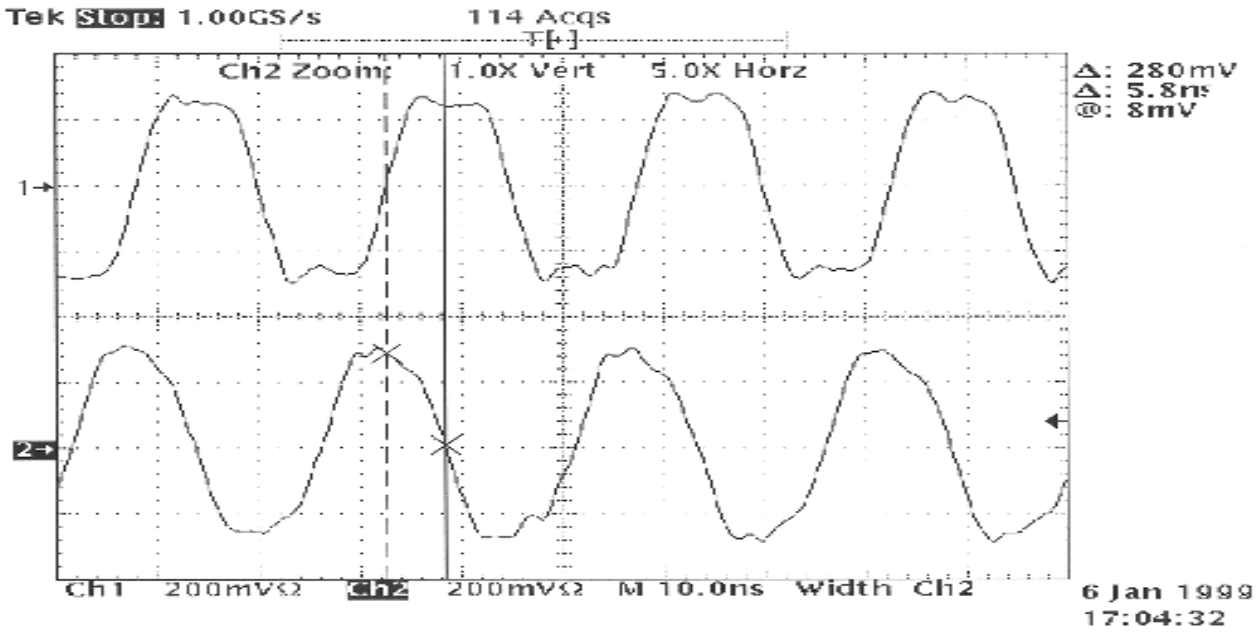
worst case

setup = 5.8 ns
hold = 6 ns



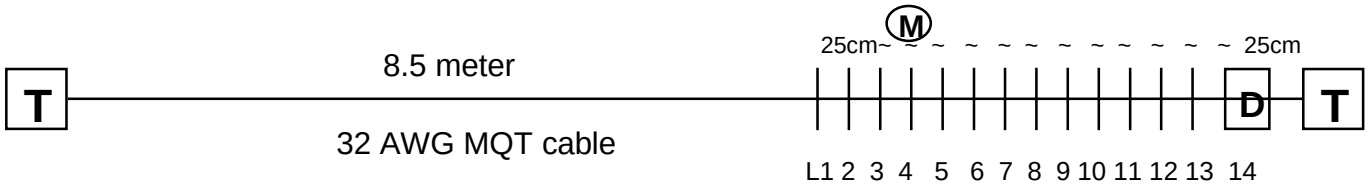
"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L3

"write operation---1010 pattern"



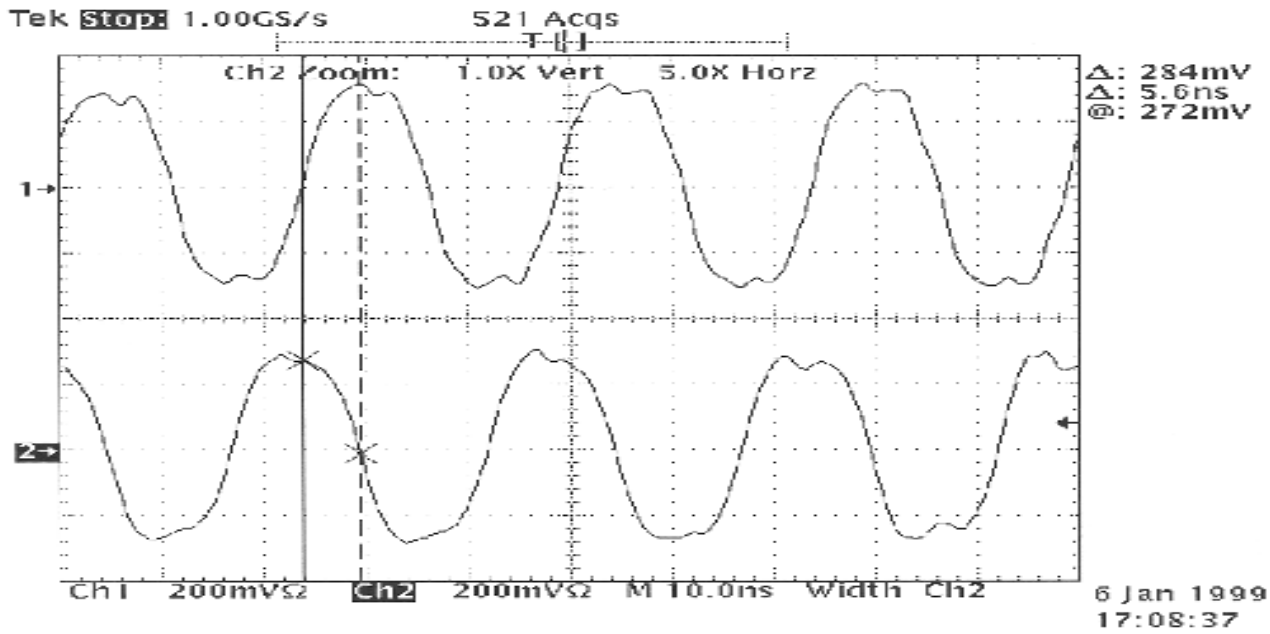
worst case

setup = 5.8 ns
hold = 6.2 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L4

"write operation---1010 pattern"

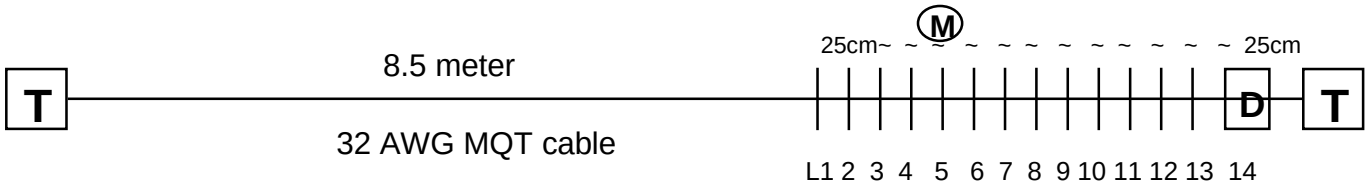


DO (L5)

ACK (L5)

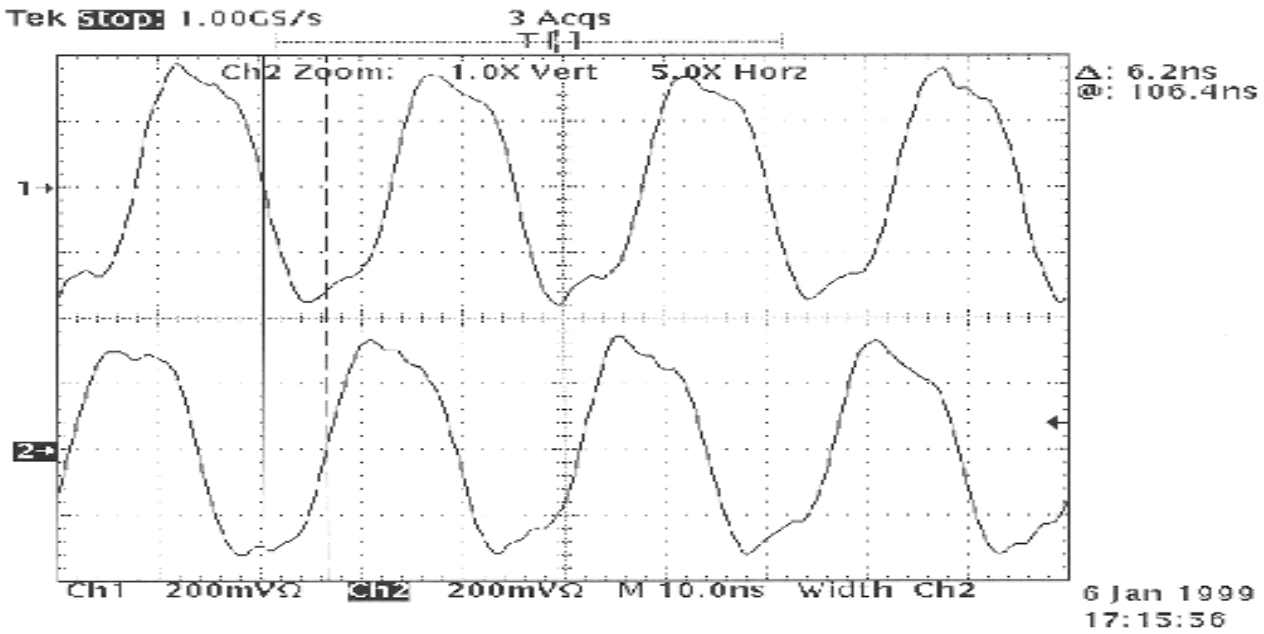
worst case

setup = 5.6 ns
hold = 6.5 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L5

"write operation---1010 pattern"

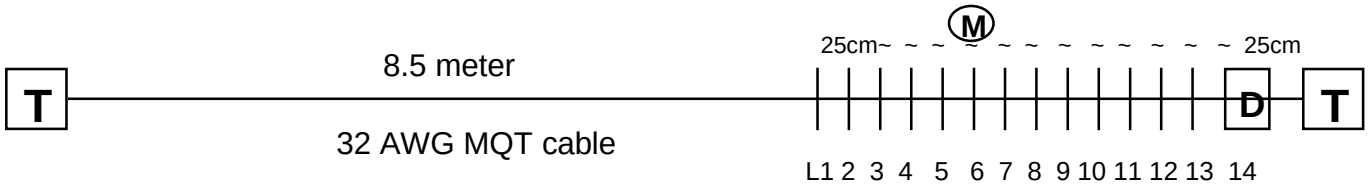


DO (L6)

ACK (L6)

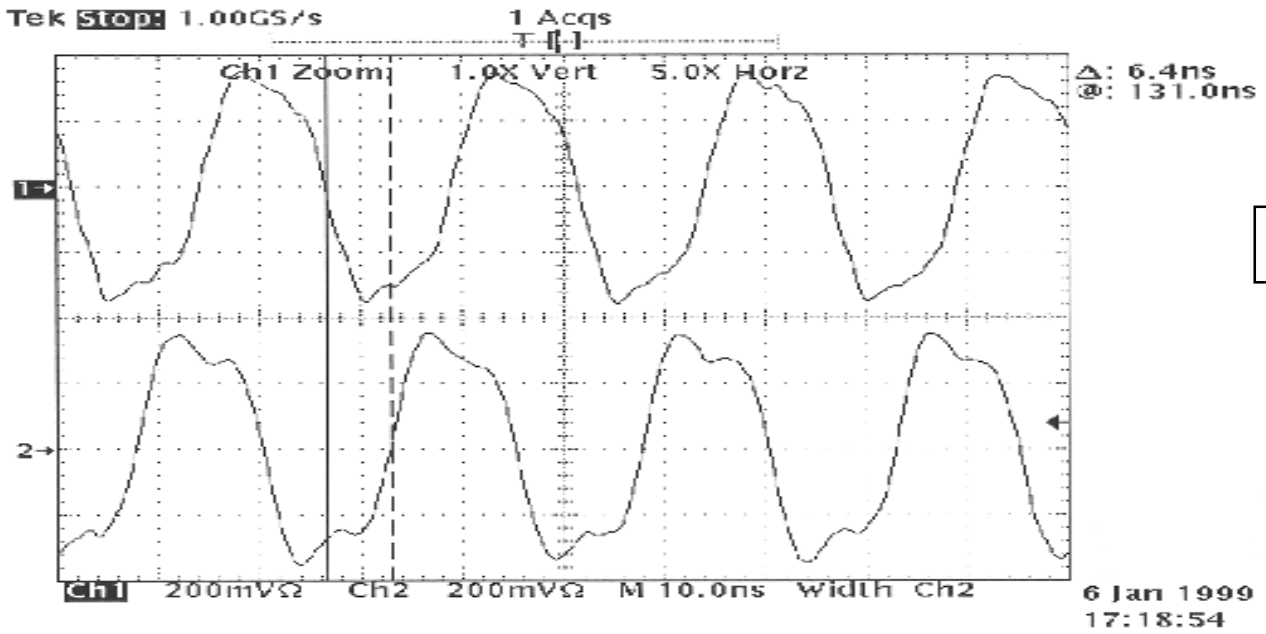
worst case

setup = 6.2 ns
hold = 6.1 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L6

"write operation---1010 pattern"

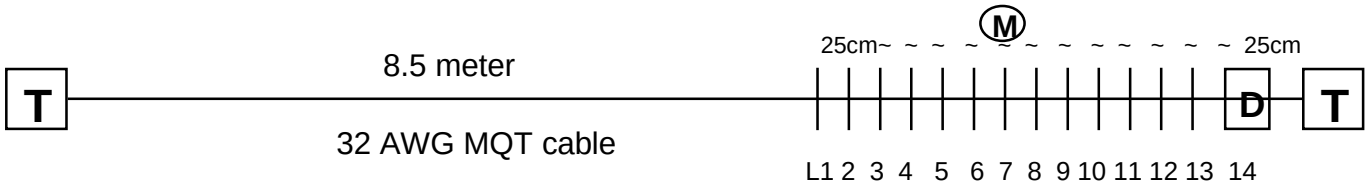


DO (L7)

ACK (L7)

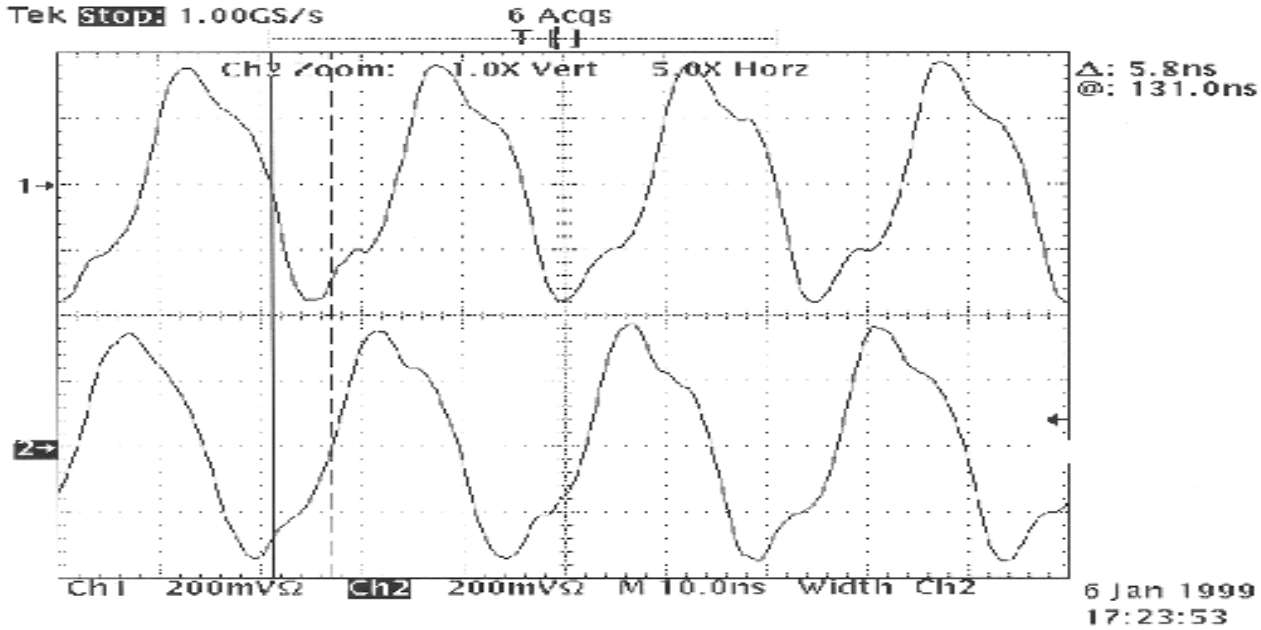
worst case

setup = 6.4 ns
hold = 5.9 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L7

"write operation---1010 pattern"

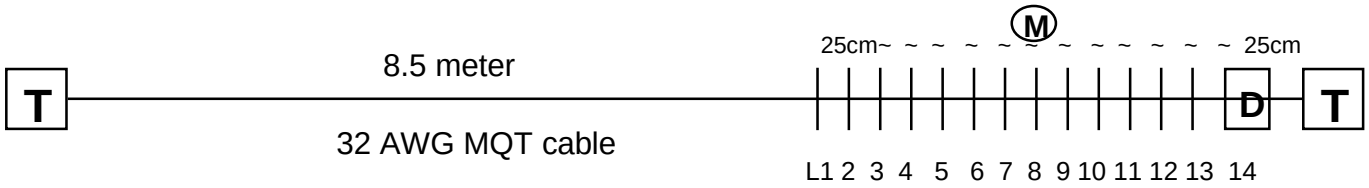


DO (L8)

ACK (L8)

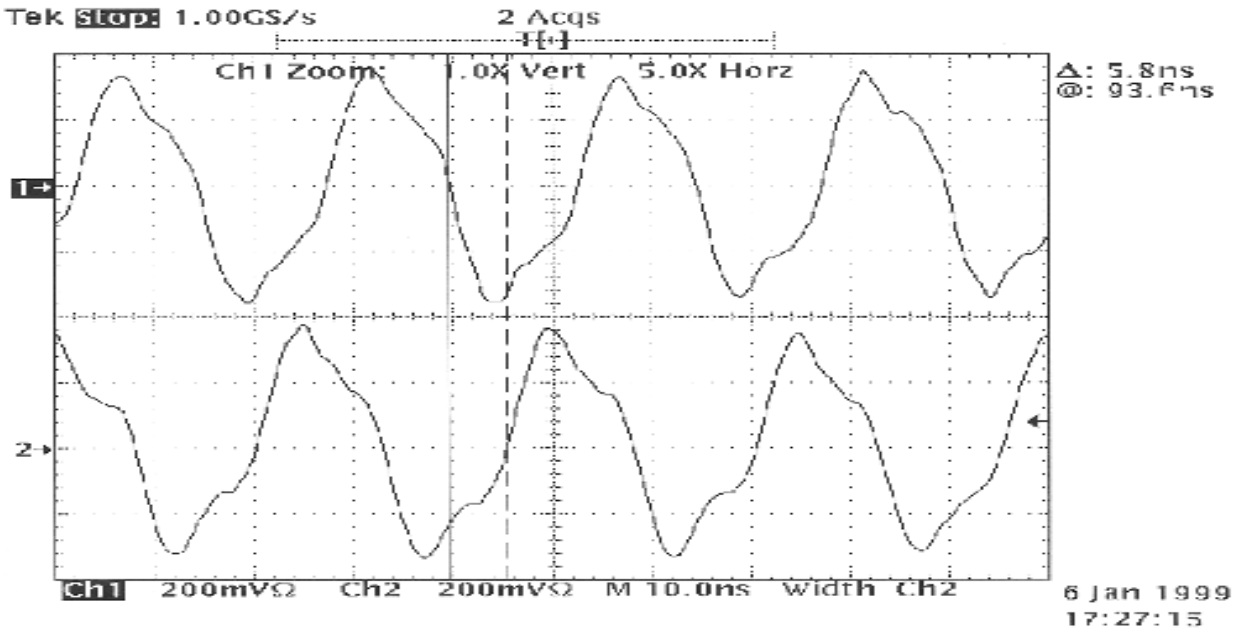
worst case

setup = 5.8 ns
hold = 6.4 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L8

"write operation---1010 pattern"

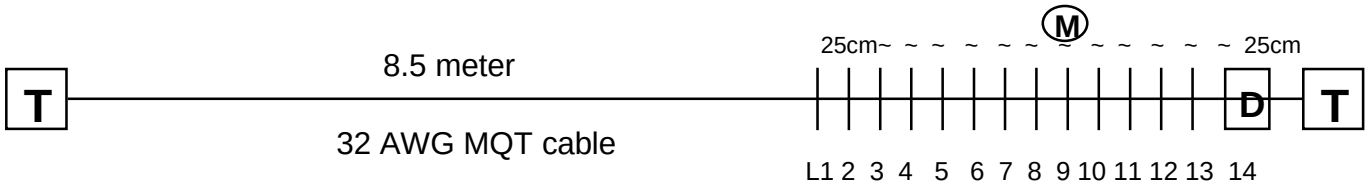


DO (L9)

ACK (L9)

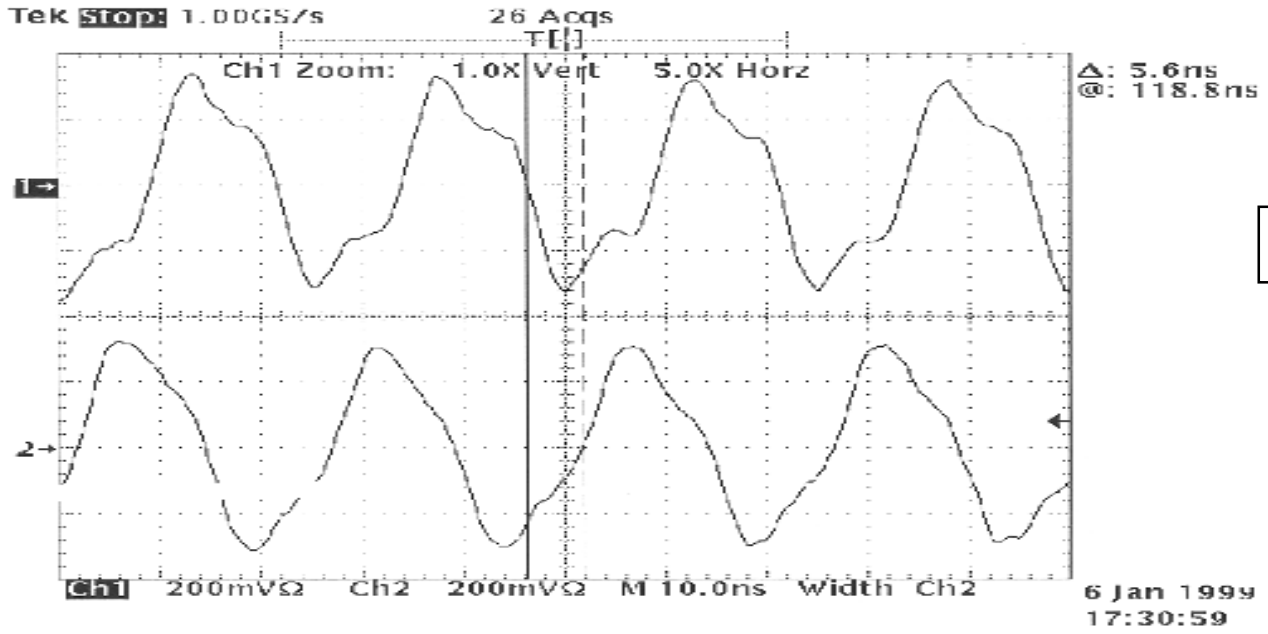
worst case

setup = 5.7 ns
hold = 6.2 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L9

"write operation---1010 pattern"

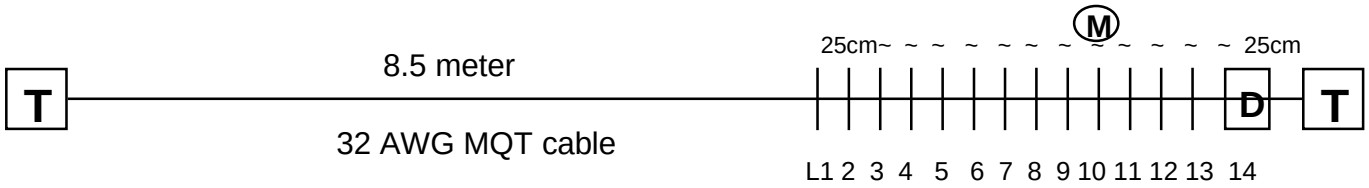


DO (L10)

ACK (L10)

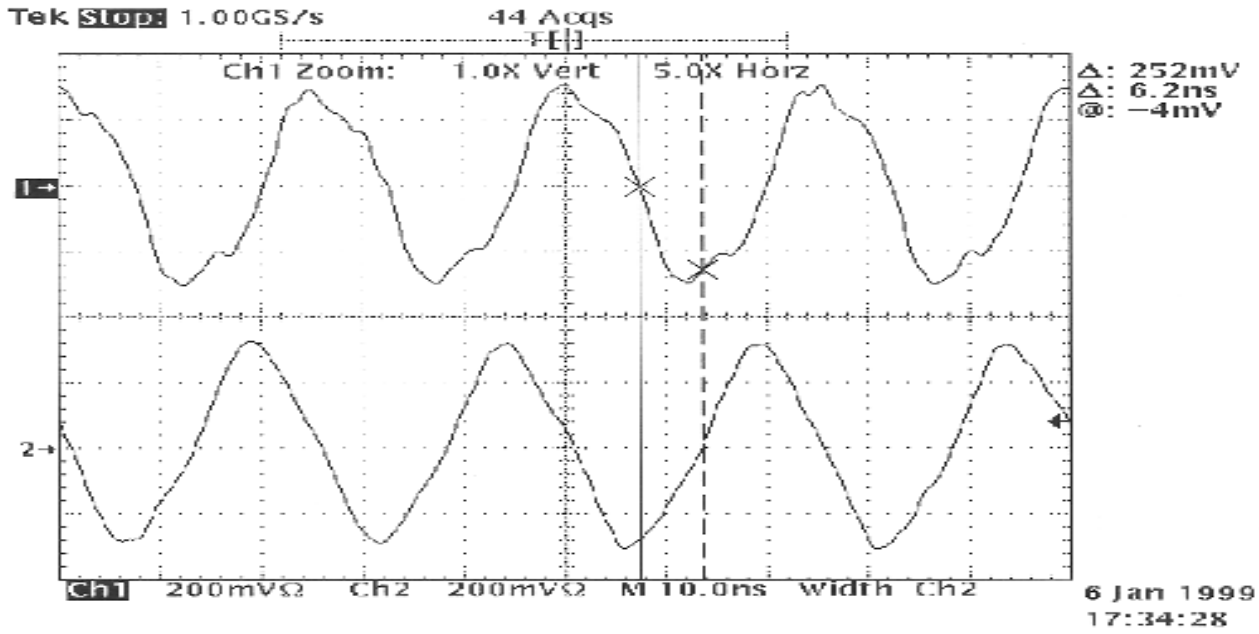
worst case

setup = 5.4 ns
hold = 6.9 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L10

"write operation---1010 pattern"

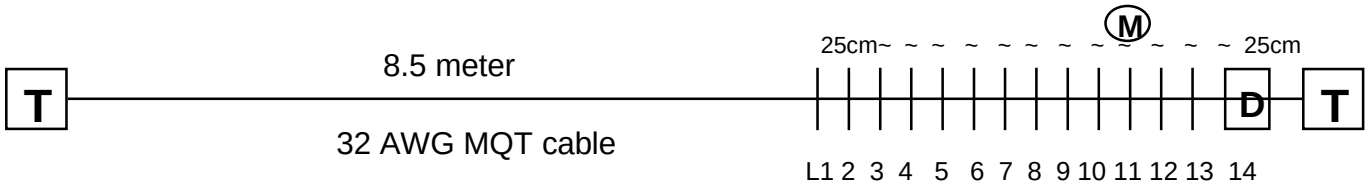


DO (L11)

ACK (L11)

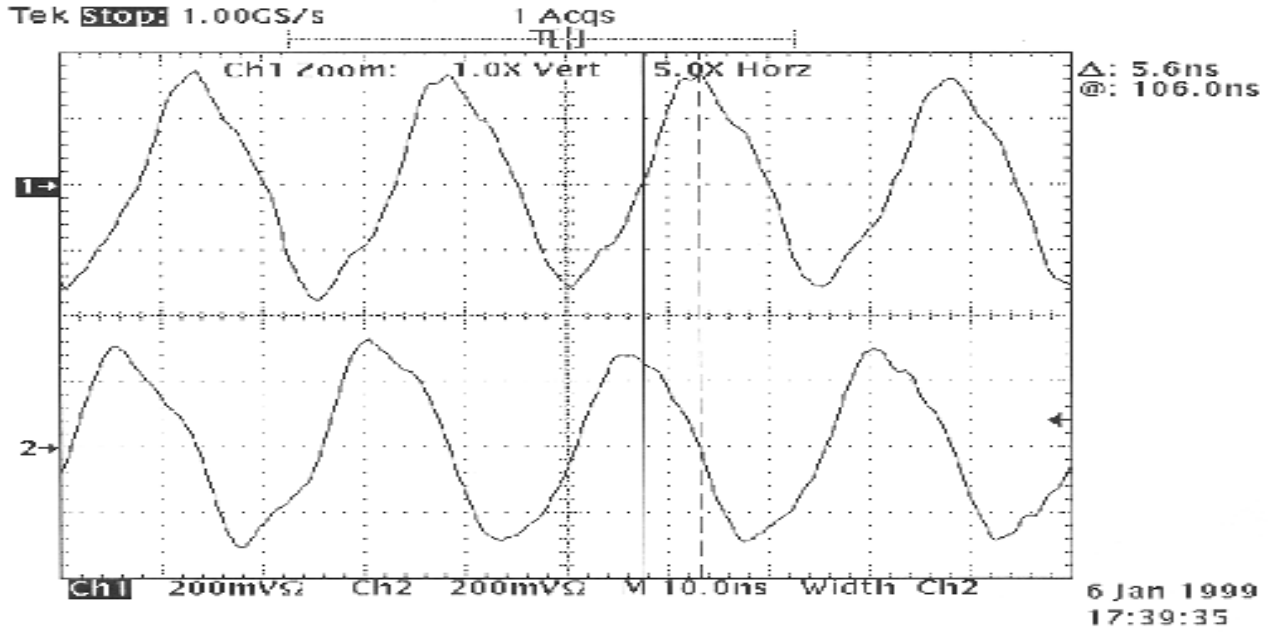
worst case

setup = 5.5 ns
hold = 6.5 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L11

"write operation---1010 pattern"

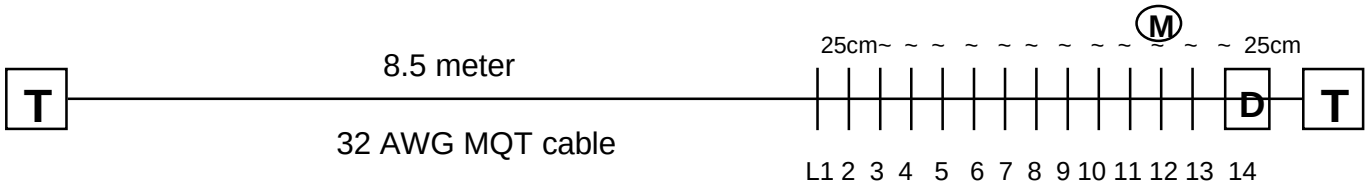


DO (L12)

ACK (L12)

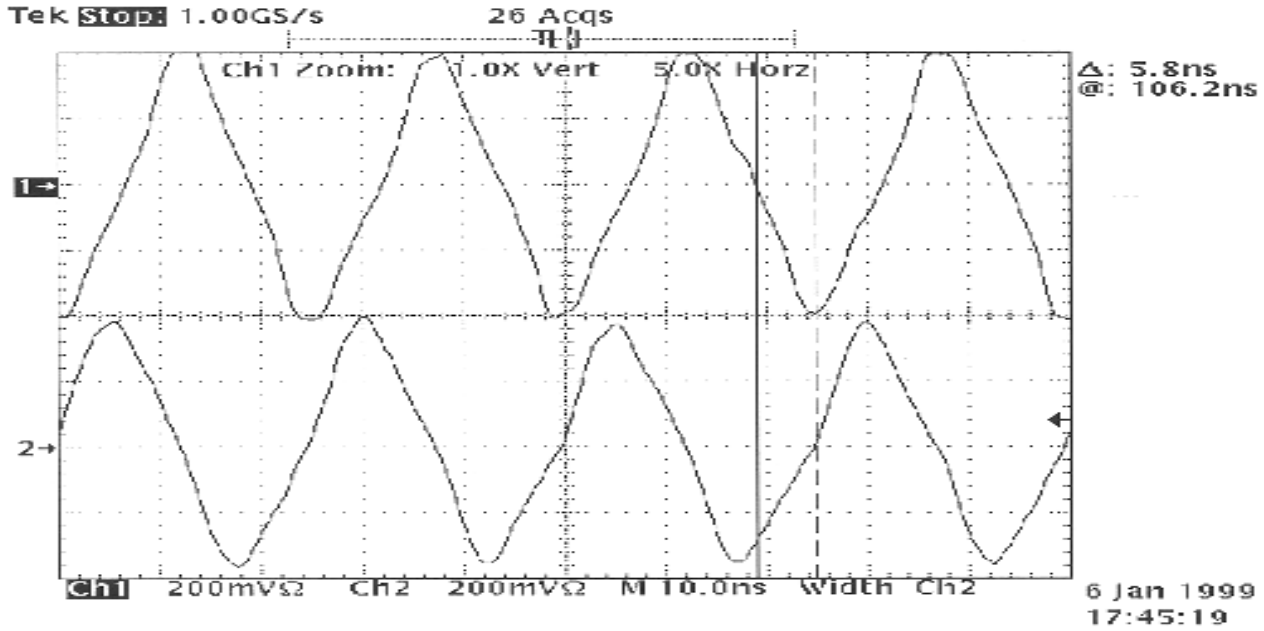
worst case

setup = 5.4 ns
hold = 6.8 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L12

"write operation---1010 pattern"

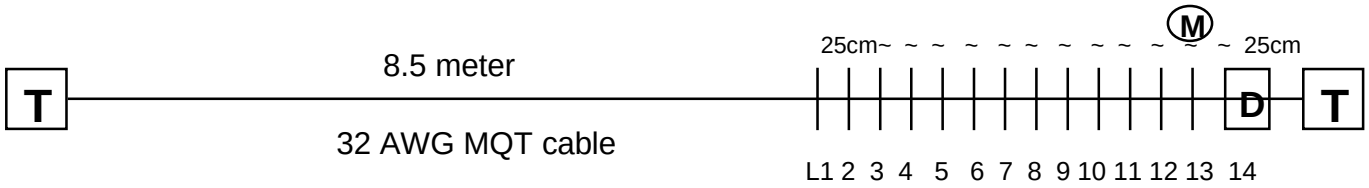


DO (L13)

ACK (L13)

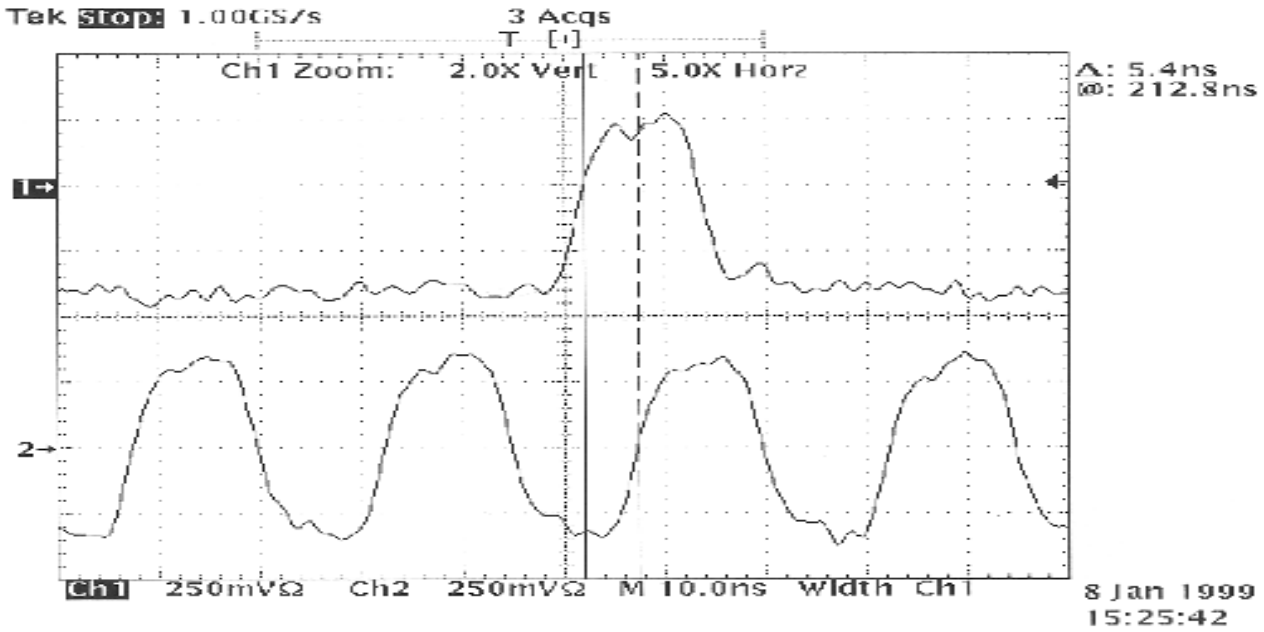
worst case

setup = 5.8 ns
hold = 6.2 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L13

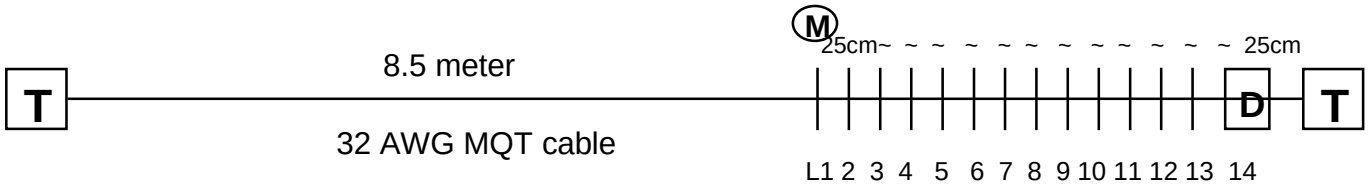
"write operation---1010 pattern"



DO (L1)

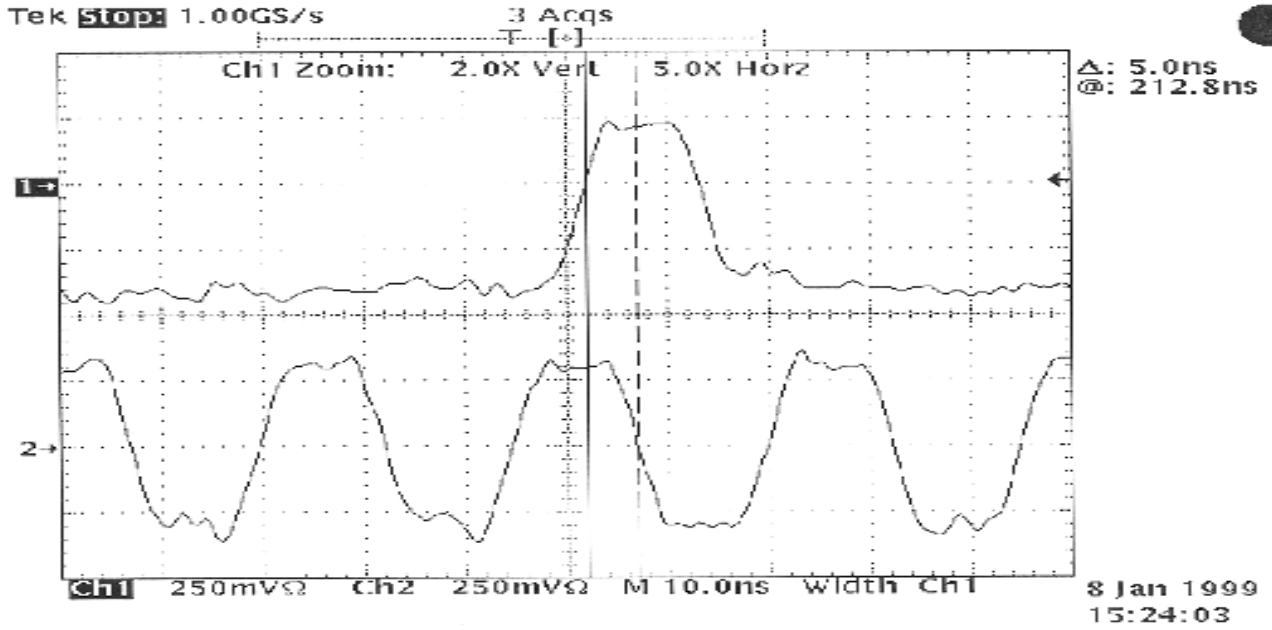
ACK (L1)

setup = 5.4 ns
hold = 6 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L1

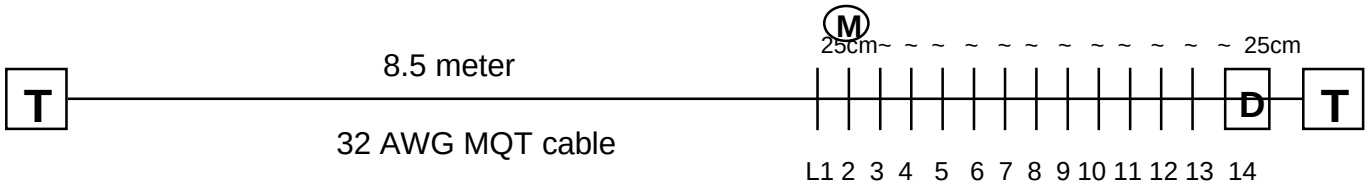
"write operation---isolated pattern"



DO (L2)

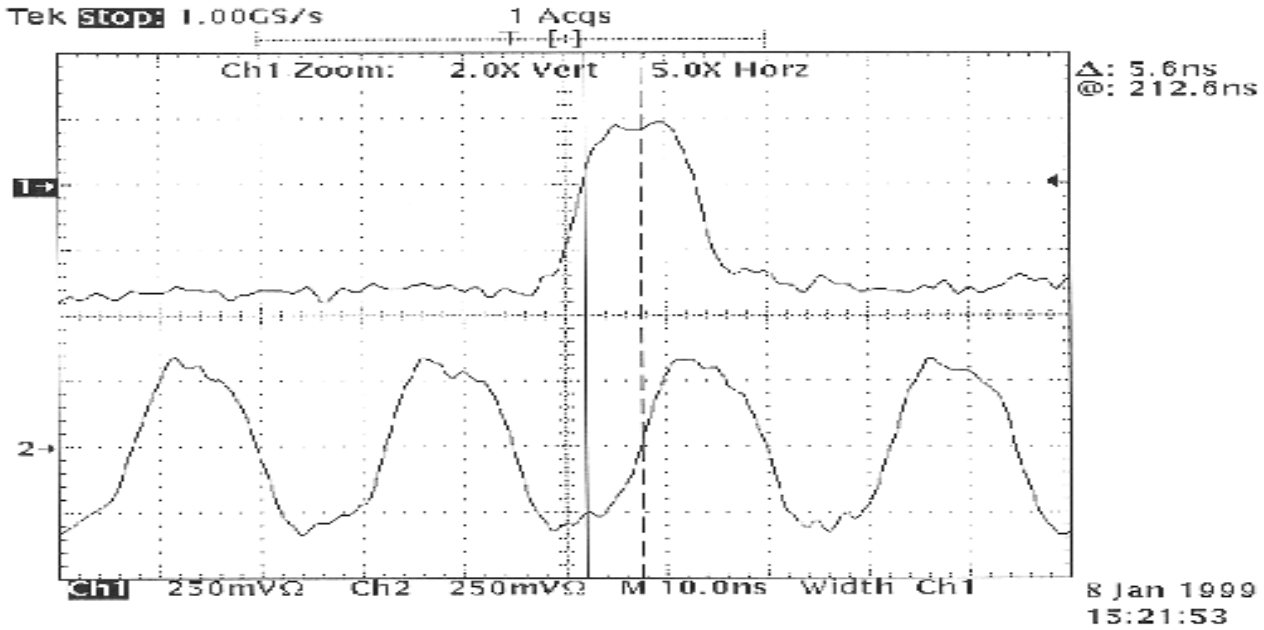
ACK (L2)

setup = 5 ns
hold = 6.4 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L2

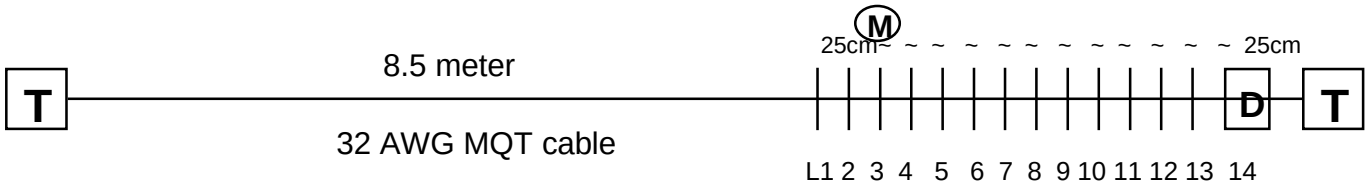
"write operation--- isolated pattern"



DO (L3)

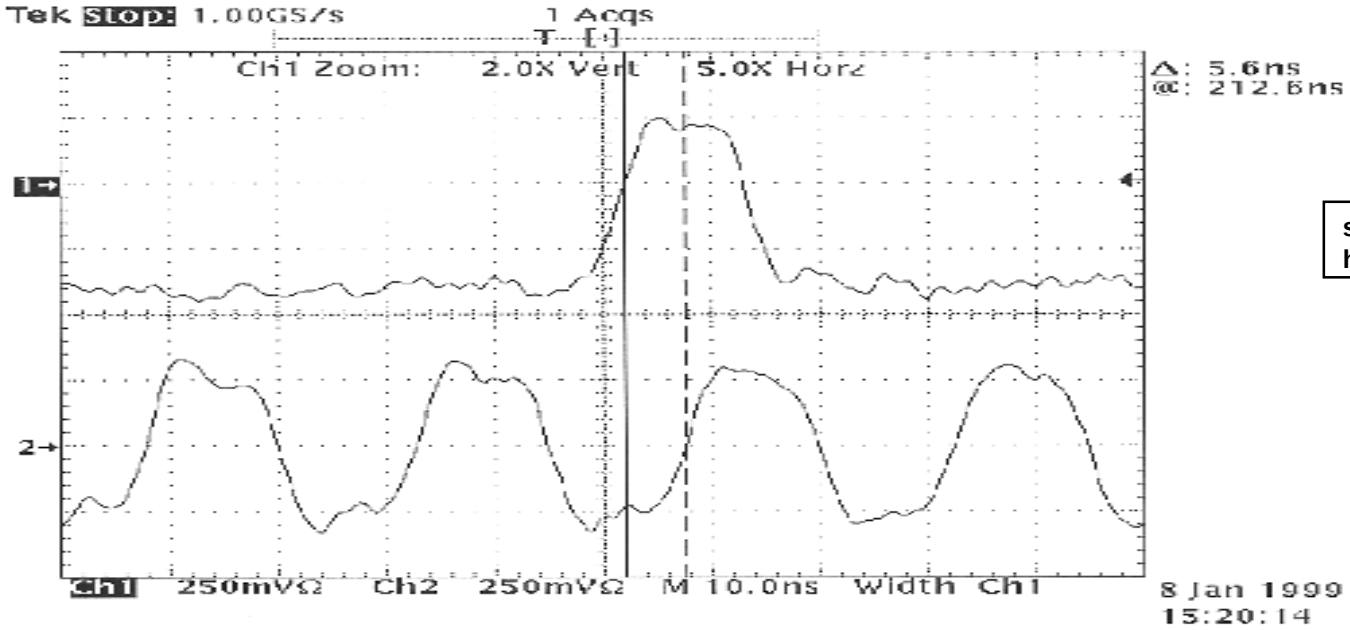
ACK (L3)

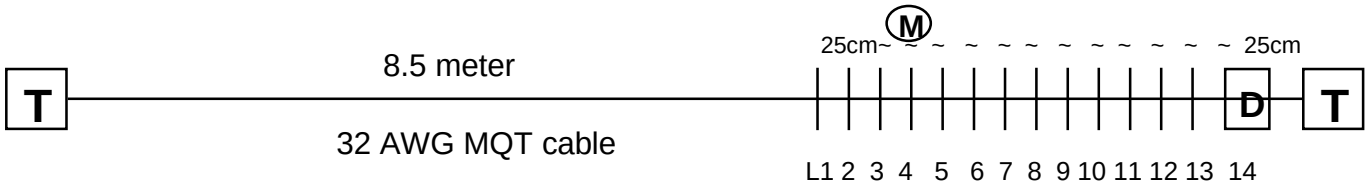
setup = 5.6 ns
hold = 5.6 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L3

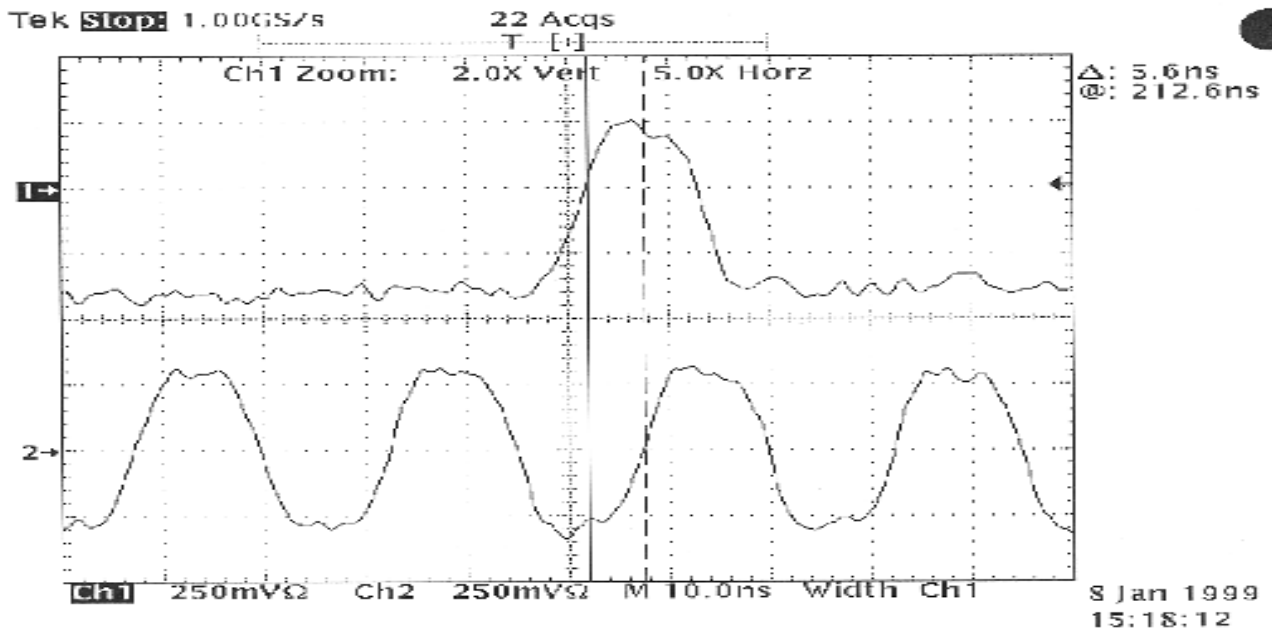
"write operation--- isolated pattern"



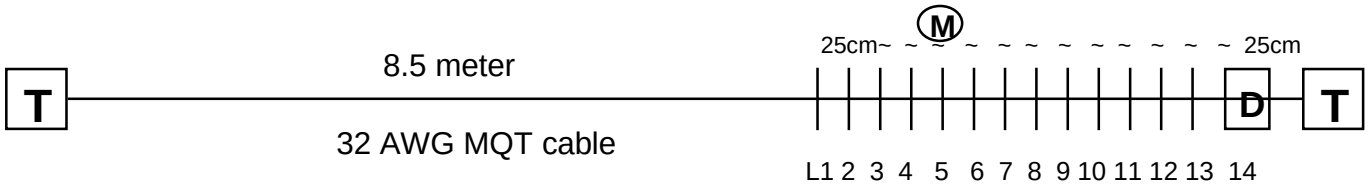


"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L4

"write operation--- isolated pattern"

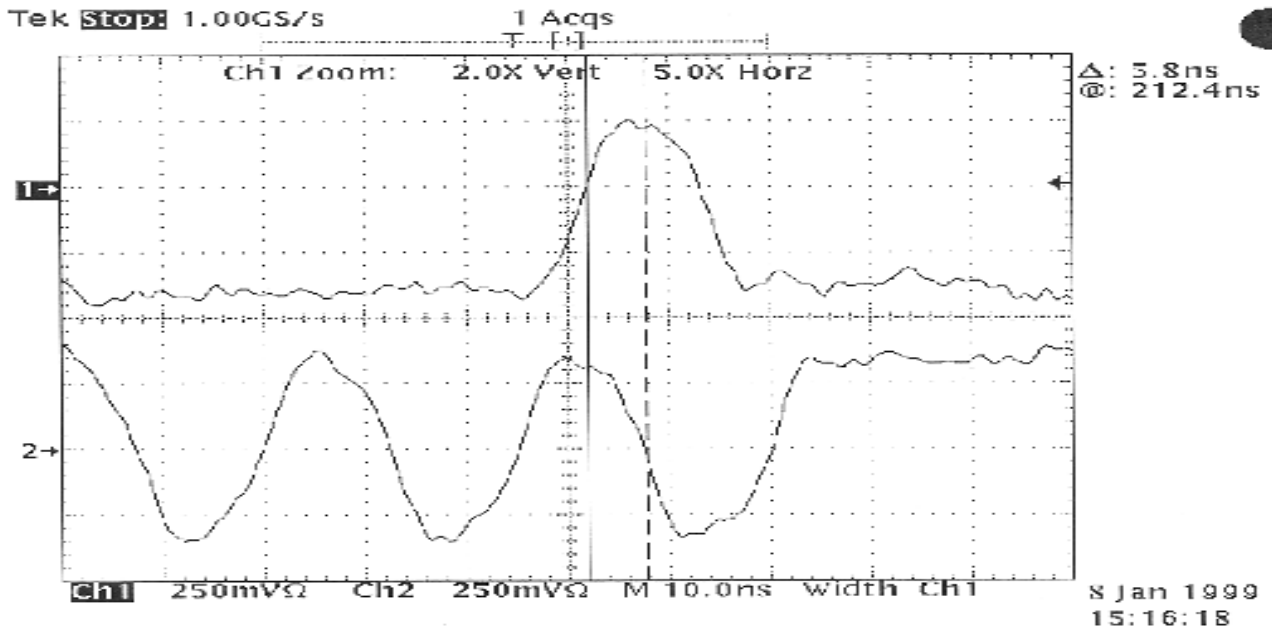


setup = 5.6 ns
hold = 5.4 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L5

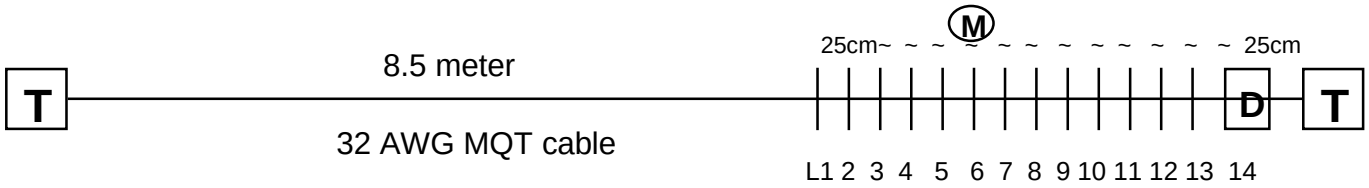
"write operation--- isolated pattern"



DO (L6)

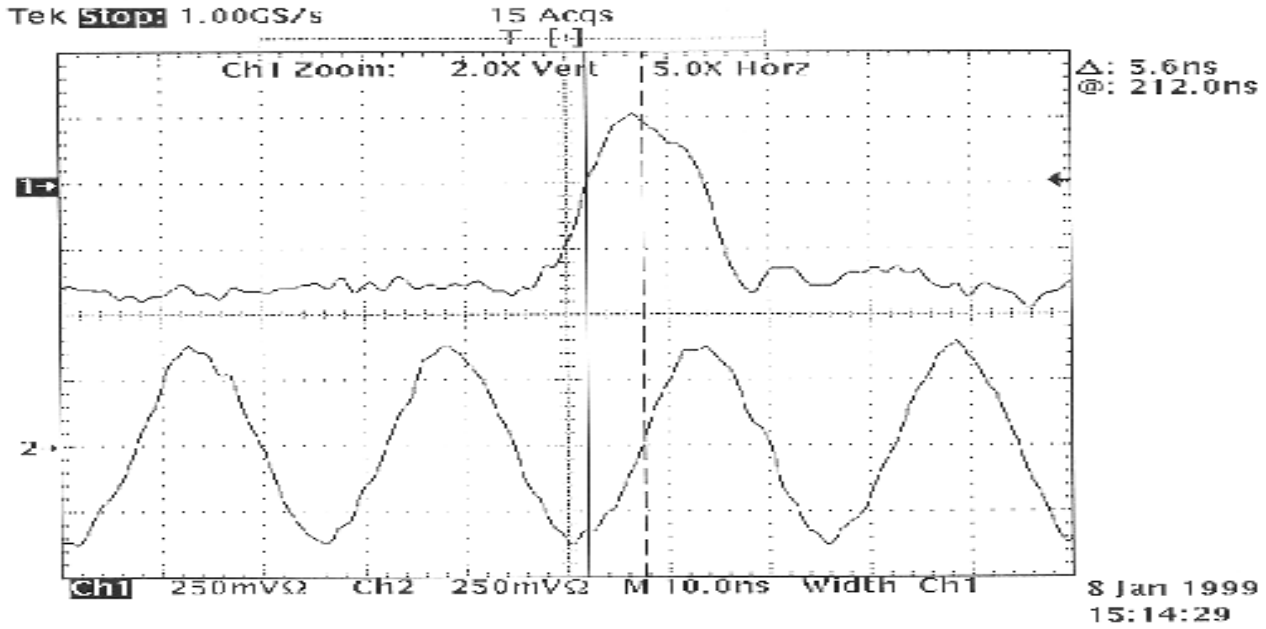
ACK (L6)

setup = 5.8 ns
hold = 5.4 ns

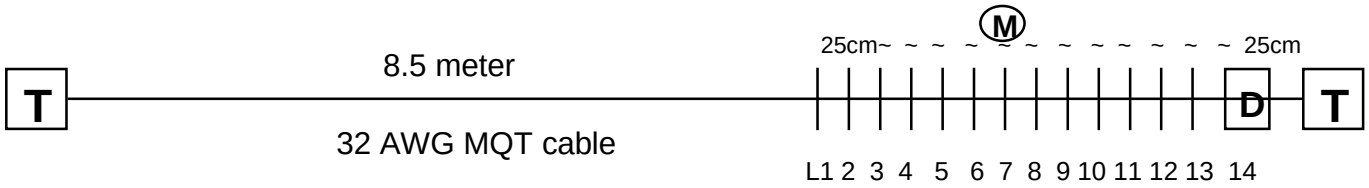


"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L6

"write operation--- isolated pattern"

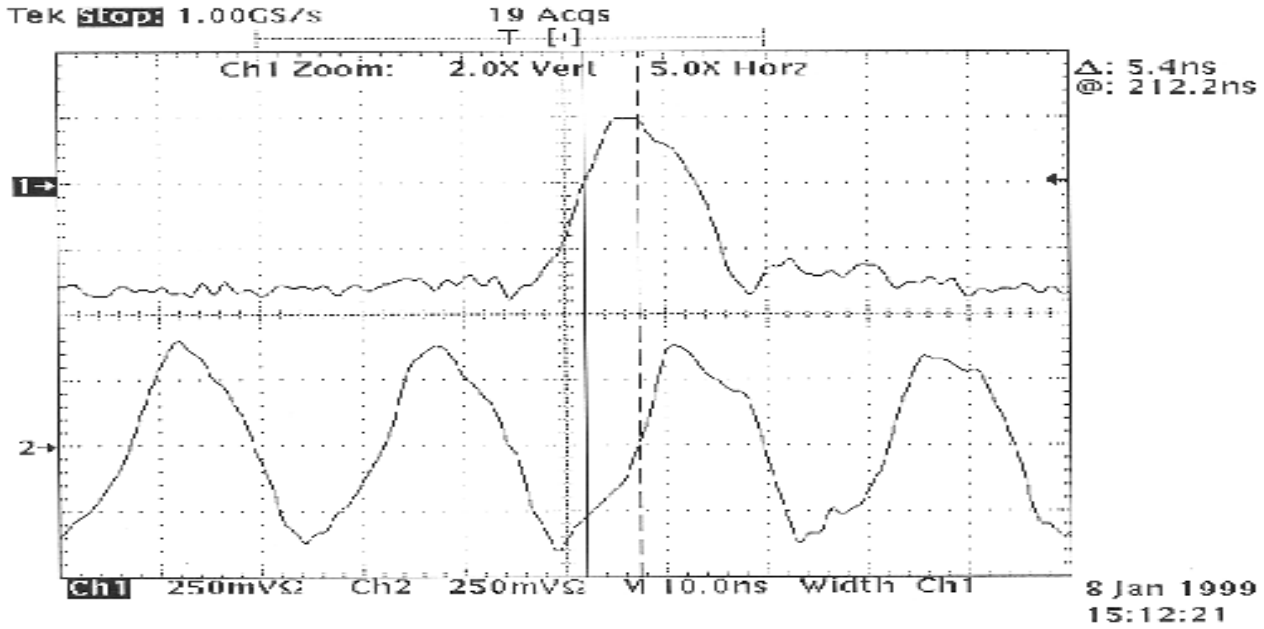


setup = 5.5 ns
hold = 6.2 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L7

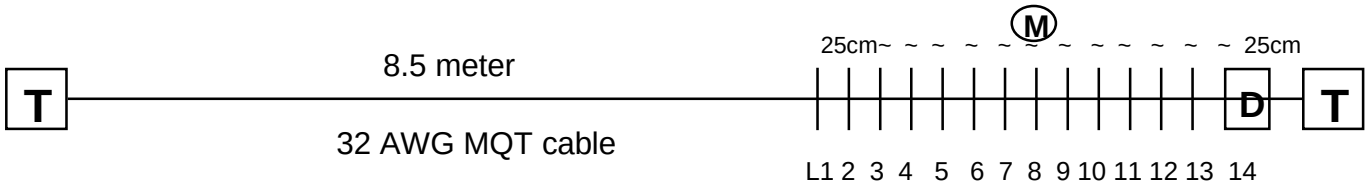
"write operation--- isolated pattern"



DO (L8)

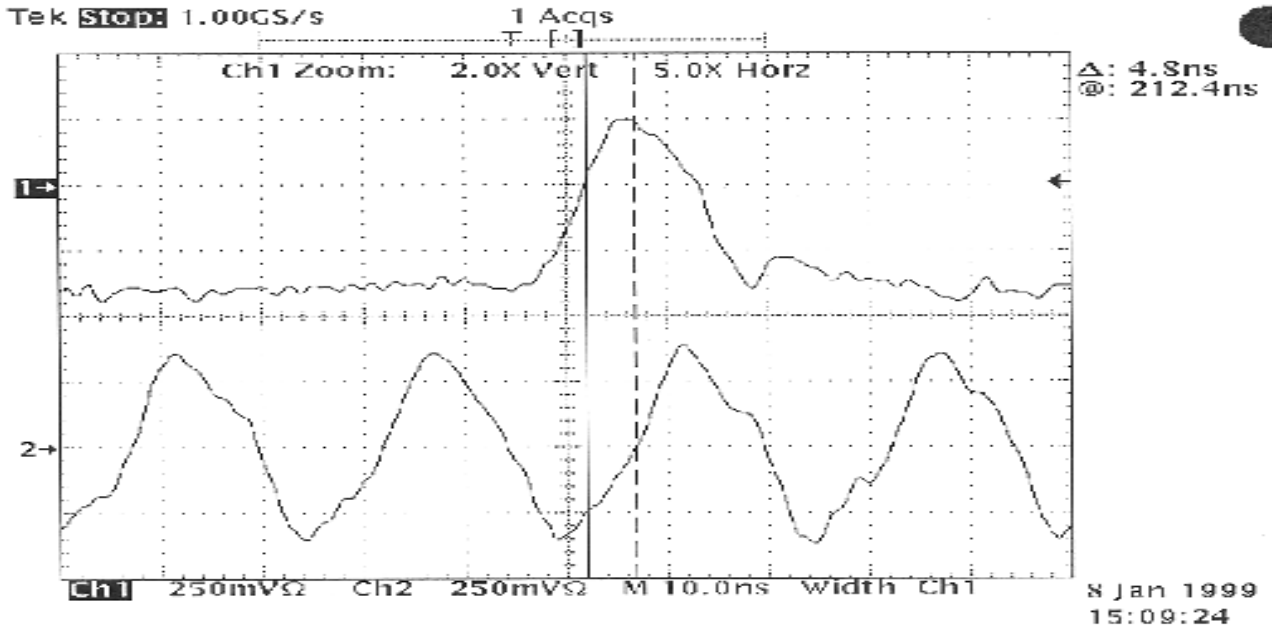
ACK (L8)

setup = 5.4 ns
hold = 5.8 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L8

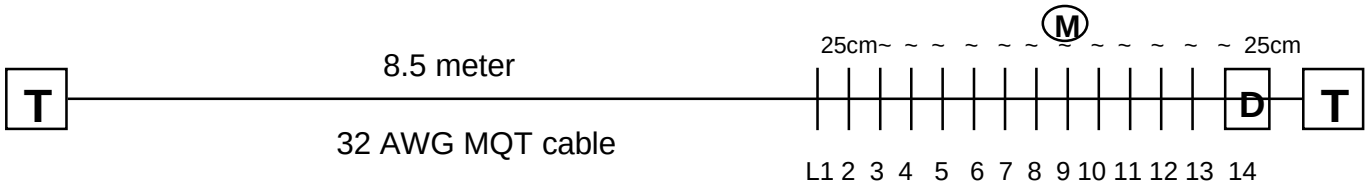
"write operation--- isolated pattern"



DO (L9)

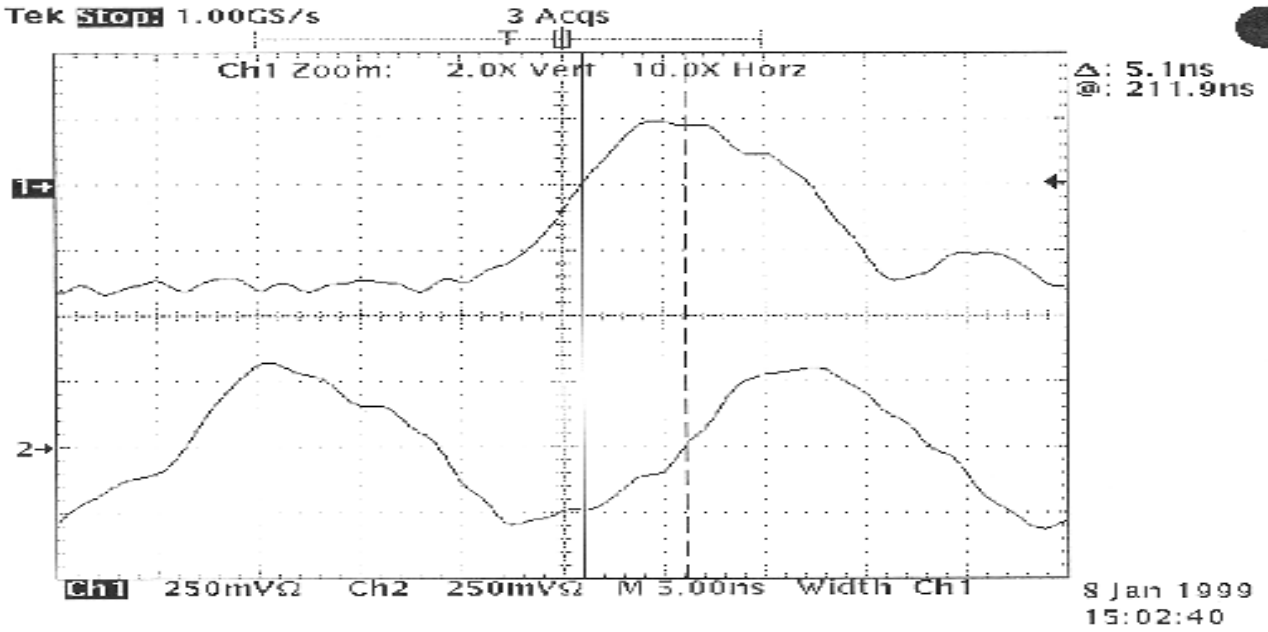
ACK (L9)

setup = 4.8 ns
hold = 6.4 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L9

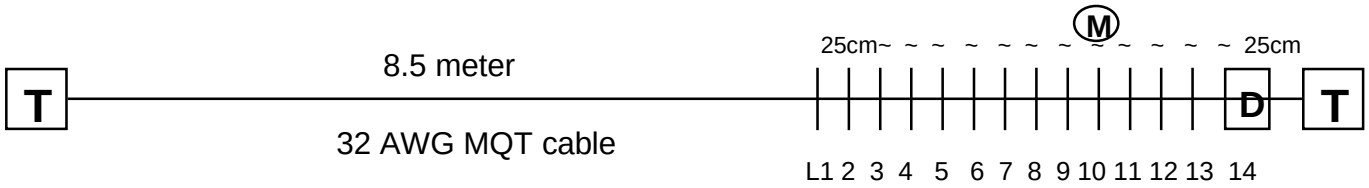
"write operation--- isolated pattern"



DO
(L10)

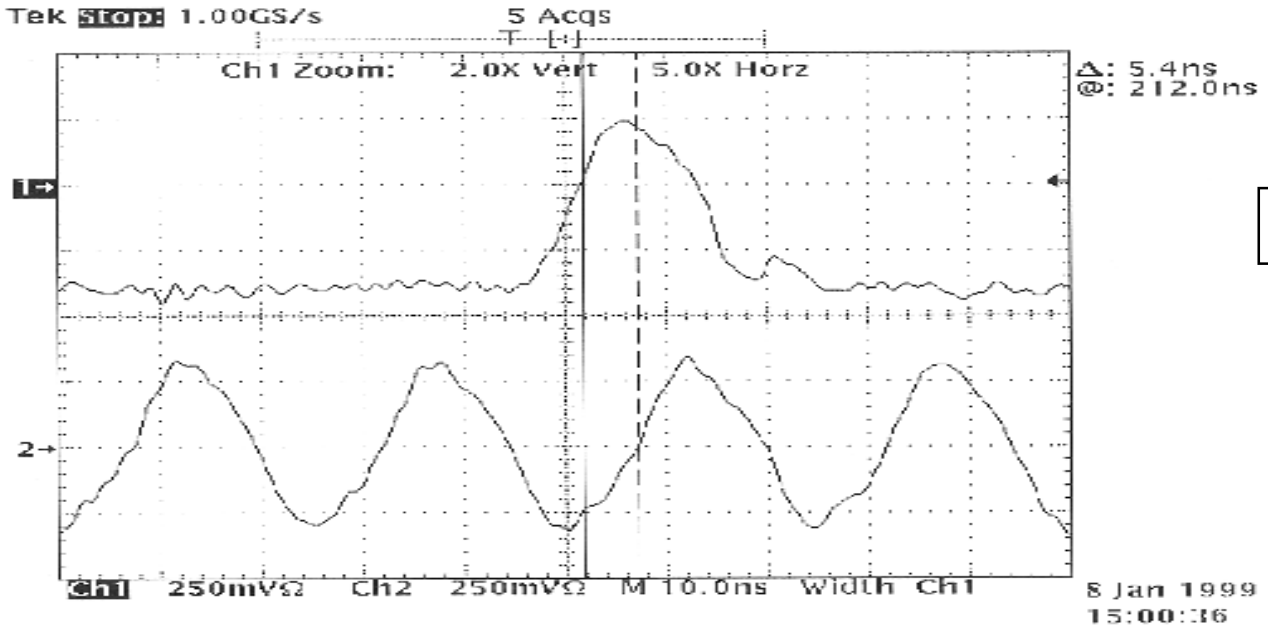
ACK
(L10)

setup = 5.2 ns
hold = 6.2 ns

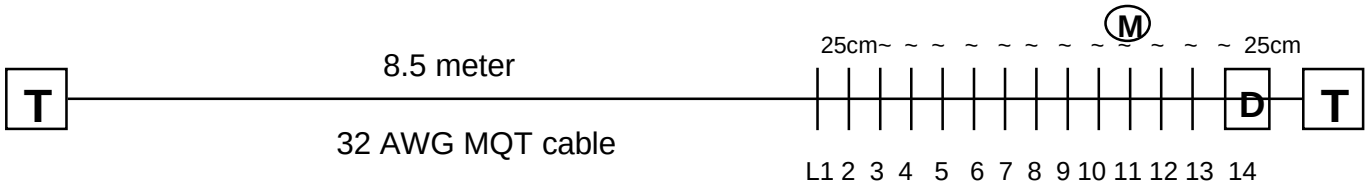


"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L10

"write operation--- isolated pattern"

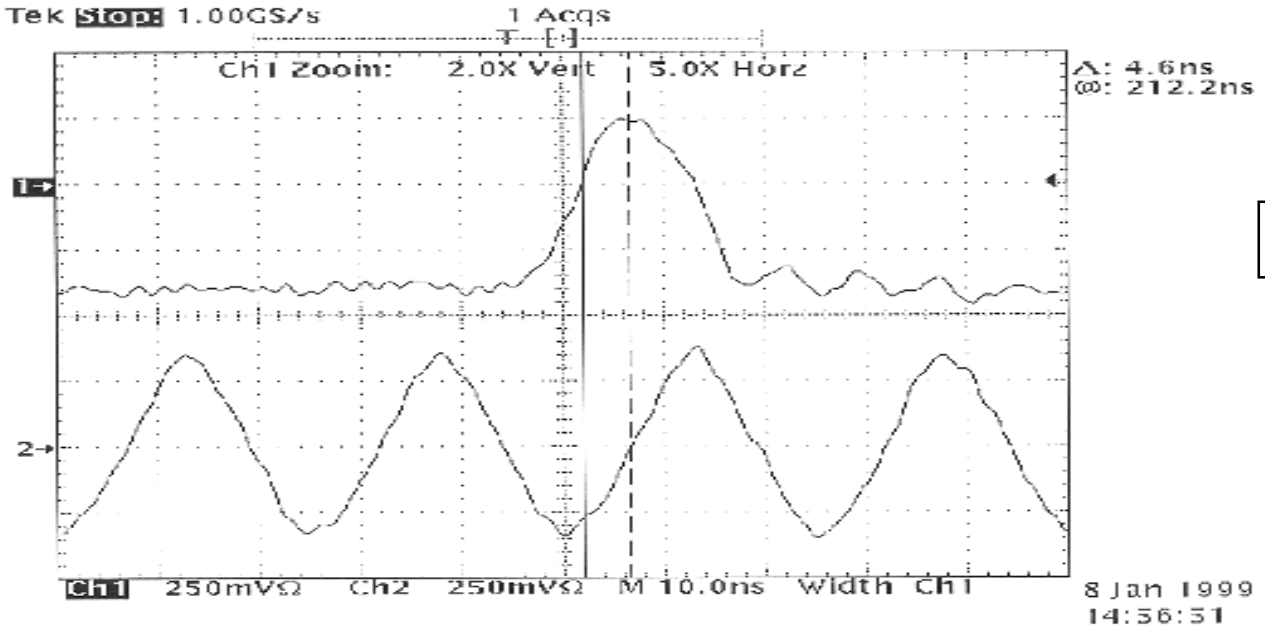


setup = 5.5 ns
hold = 6 ns

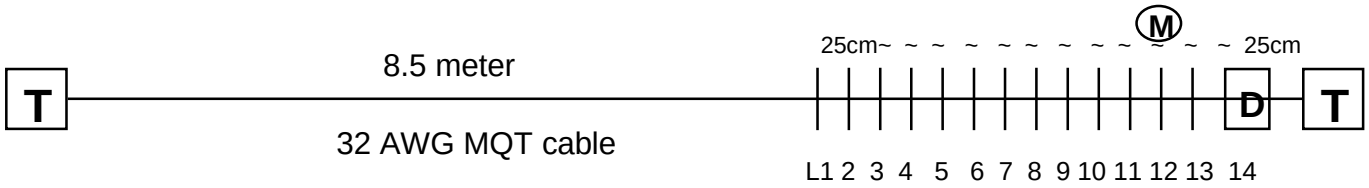


"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L11

"write operation--- isolated pattern"

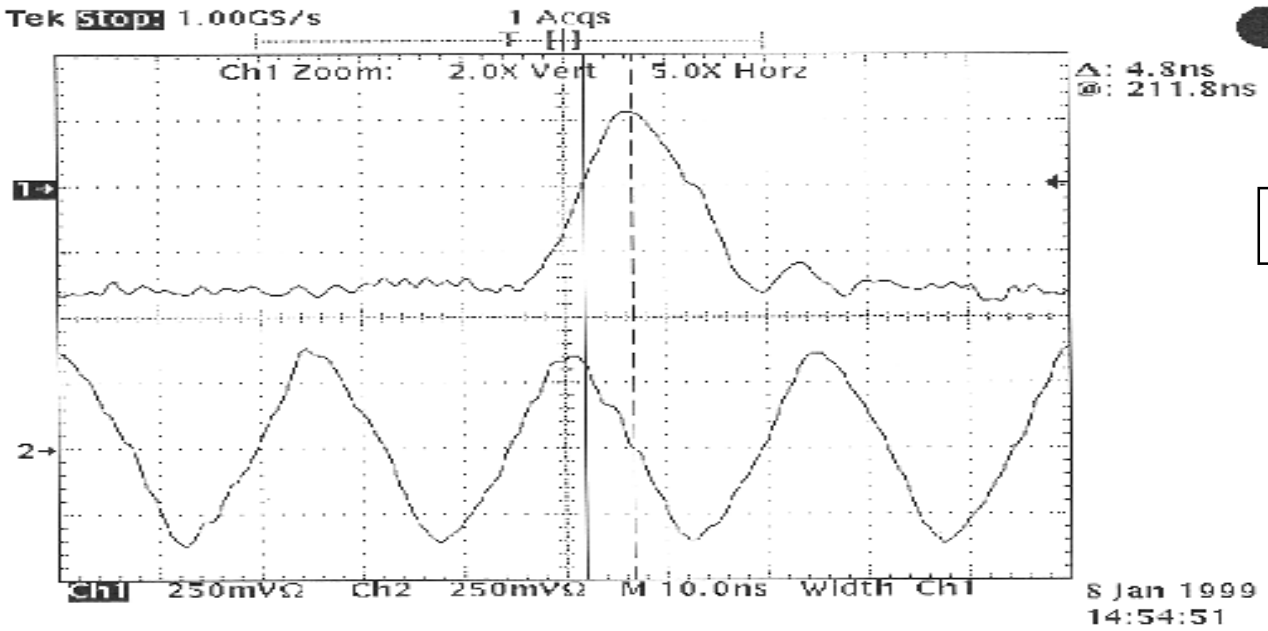


setup = 4.8 ns
hold = 6.5 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L12

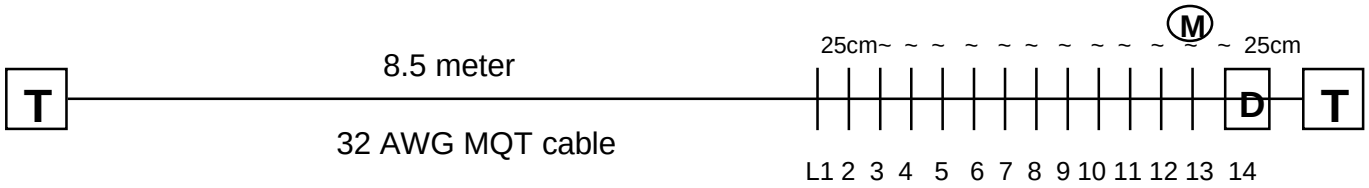
"write operation--- isolated pattern"



DO (L13)

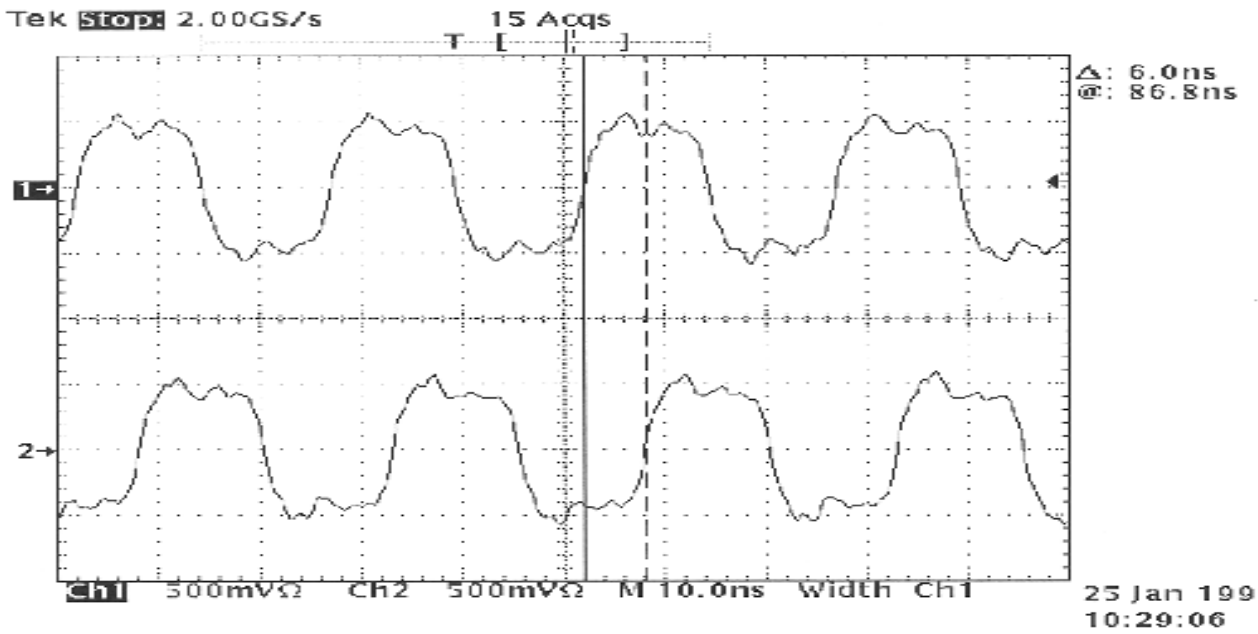
ACK (L13)

setup = 4.8 ns
hold = 6.3 ns



"setup & hold time measurements for 12 m 32 AWG MQT cable"
looking at L13

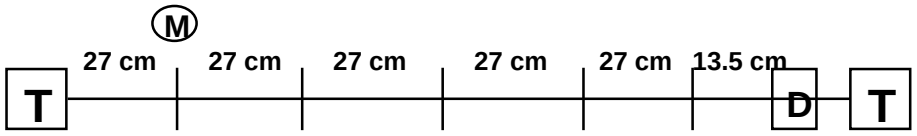
"write operation--- isolated pattern"



DO (L1)

ACK (L1)

setup = 6 ns
hold = 6.3 ns

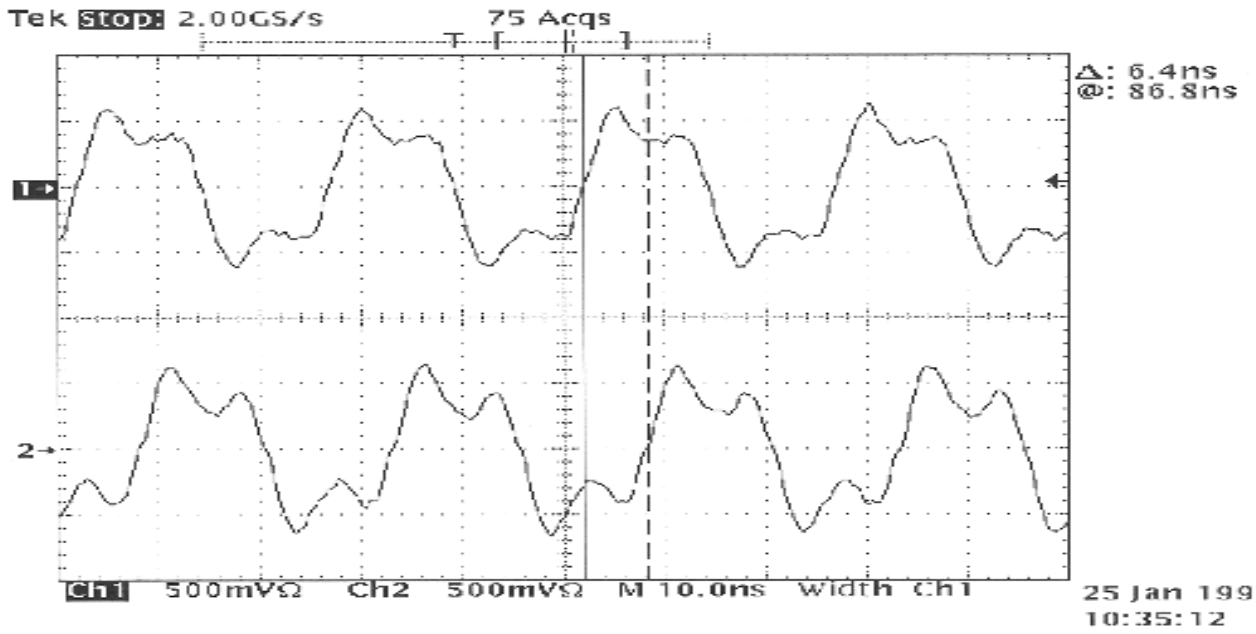


30 AWG twist/flat fully laminate cable

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

looking at L1

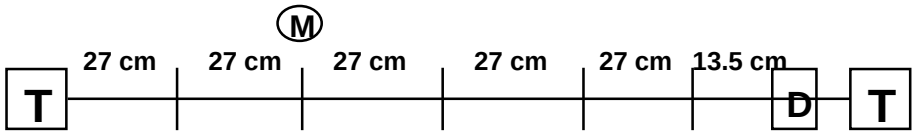
"write operation---1010 pattern"



DO (L2)

ACK (L2)

setup = 6.3 ns
hold = 6 ns

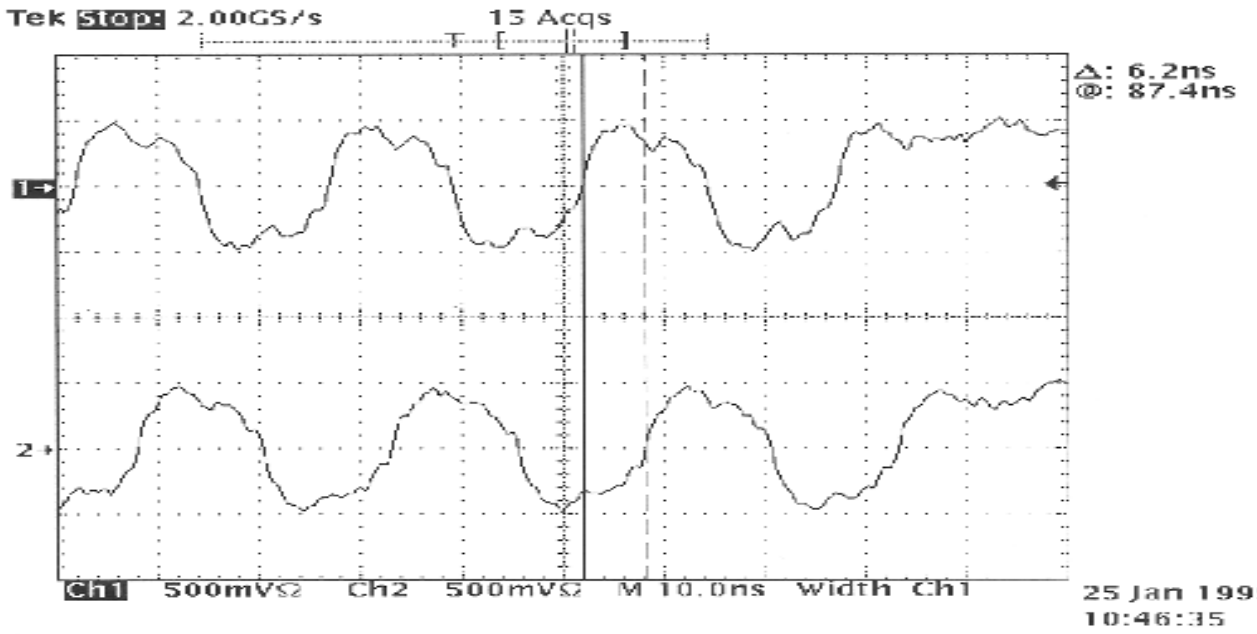


30 AWG twist/flat fully laminate cable

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

looking at L2

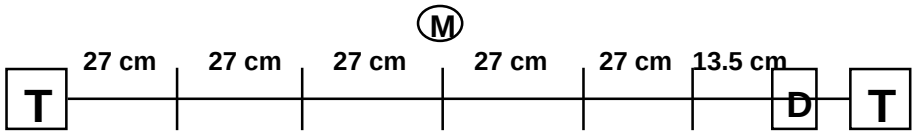
"write operation---1010 pattern"



DO (L3)

ACK (L3)

setup = 6.1 ns
hold = 6.2 ns

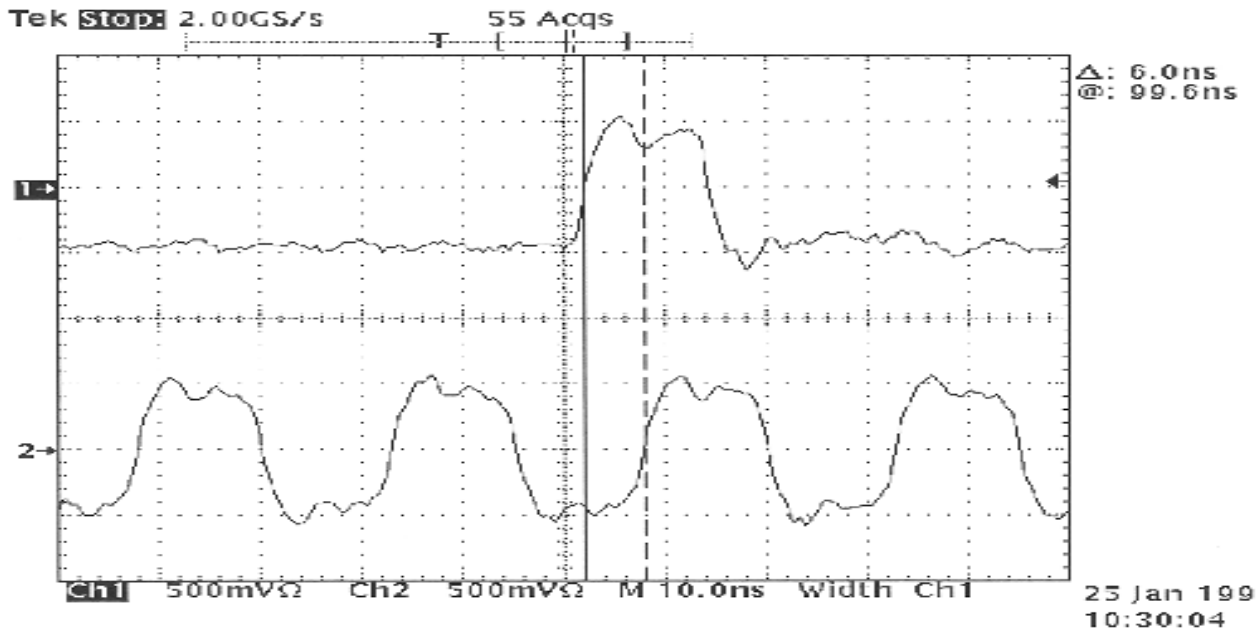


30 AWG twist/flat fully laminate cable

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

looking at L3

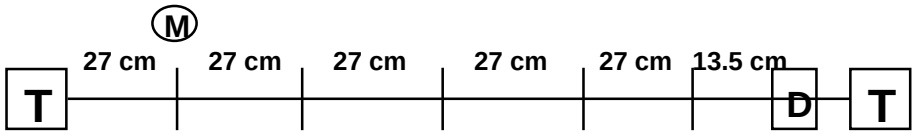
"write operation---1010 pattern"



DO (L1)

ACK (L1)

setup = 6 ns
hold = 6.3 ns

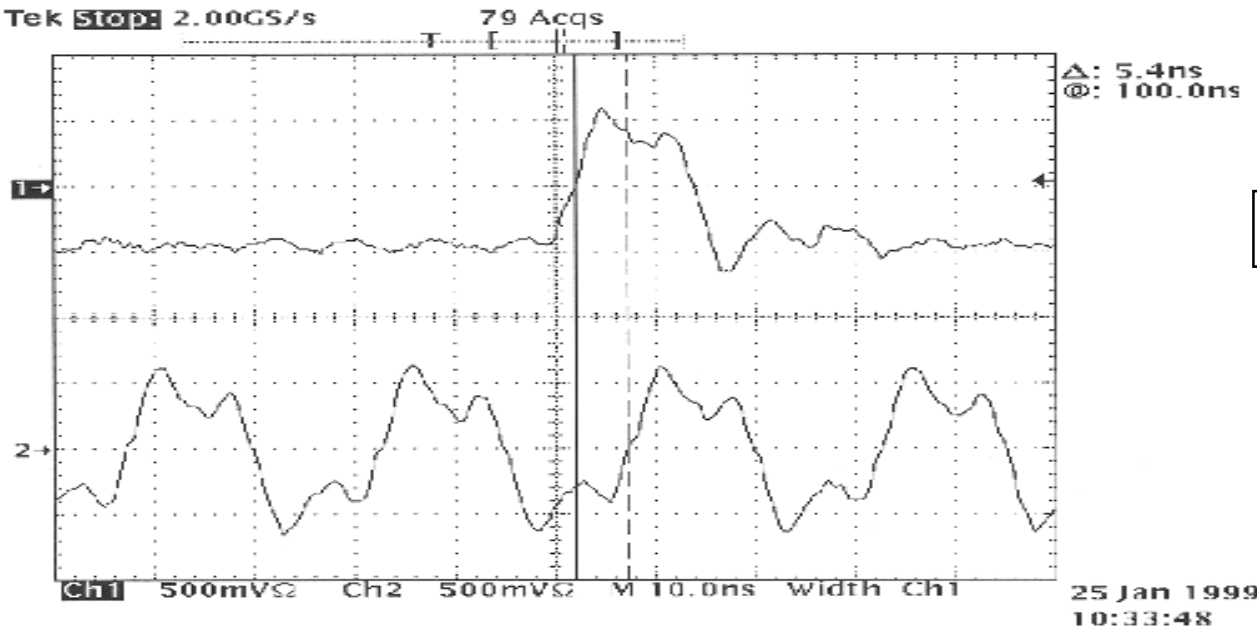


30 AWG twist/flat fully laminate cable

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

looking at L1

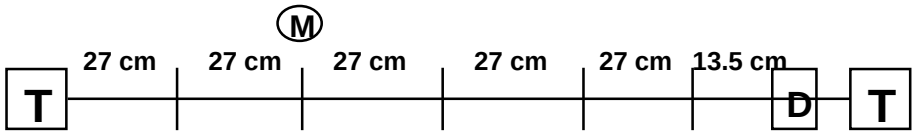
"write operation---isolated pattern"



DO (L2)

ACK (L2)

setup = 5.4 ns
hold = 6.4 ns

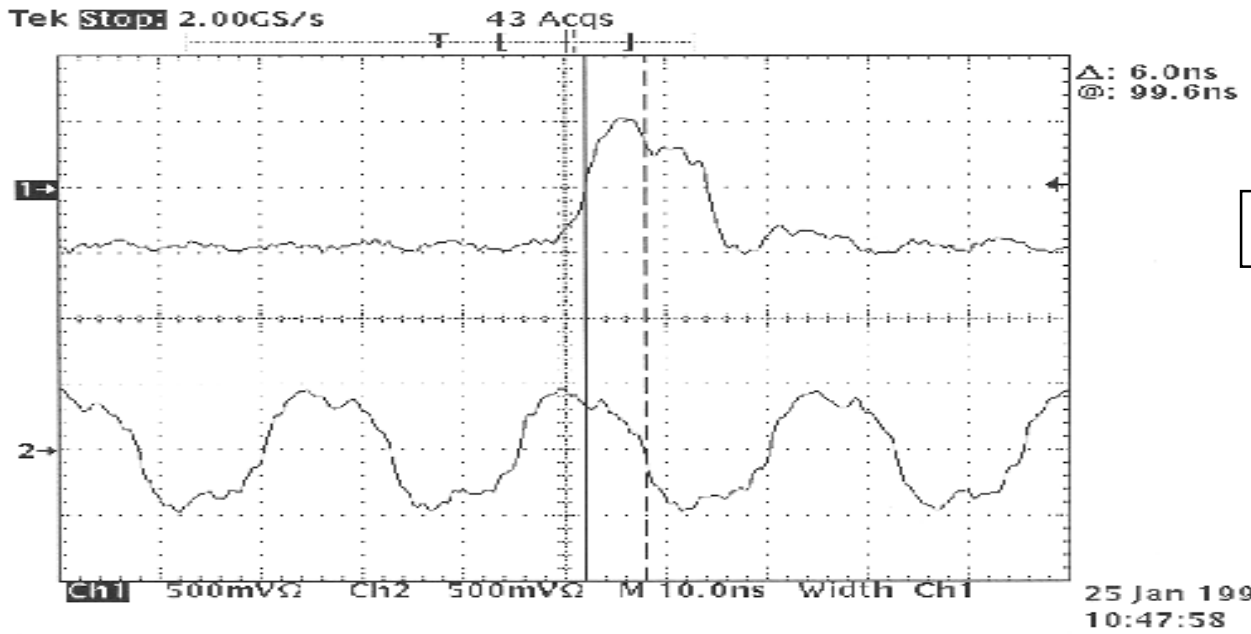


30 AWG twist/flat fully laminate cable

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

looking at L2

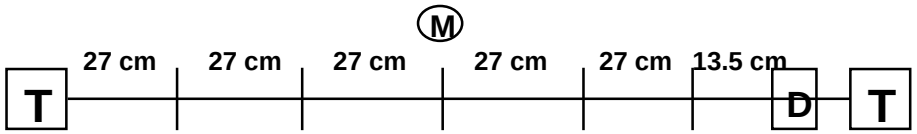
"write operation---isolated pattern"



DO (L3)

ACK (L3)

setup = 6 ns
hold = 6.3 ns



30 AWG twist/flat fully laminate cable

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

looking at L3

"write operation---isolated pattern"

adaptec

SUMMARY

- Good setup and hold times at the transmitter. Well in excess of 5.5 ns.
- No real issues with loss at 12 meters even fully loaded.
- Short cable seems OK as long as spacing rules are met.
- Need to be careful about reflections on short cables. More so than on long cables.
- With max specification of 15 pf loads setup and hold times are OK.