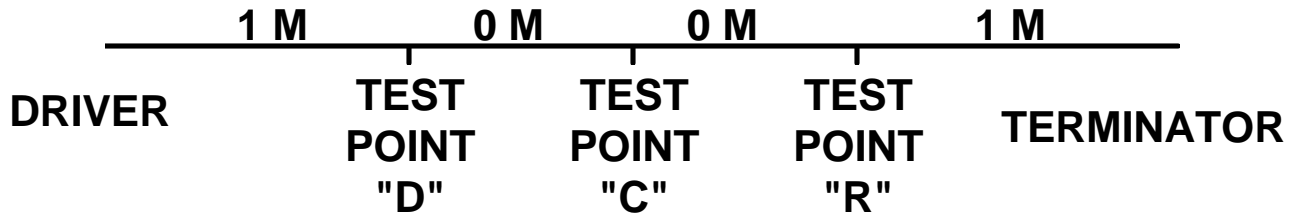# LVD SCSI TEST RESULTS WITH ASYMMETRICAL DRIVERS AND REAL TERMINATORS (FAST 40)

- **SOME DATA WAS ACQUIRED USING REAL LVD DEVICES AND TERMINATORS (POINT TO POINT ONLY)**

- **THESE LAB DEVICES HAD GROSSLY EXCESSIVE CAPACITANCE YET FULL PROTOCOL POINT TO POINT OPERATION WAS SUCCESSFUL AT 22 METERS**

- **THE USE OF ASYMMETRICAL DRIVERS APPEARS TO COMPENSATE FOR THE BIAS FROM THE TERMINATORS**

- **MISTERMINATION CAUSED BY EXCESSIVE CAPACITANCE APPEARS TO BE A LIMITING FACTOR (PRESENT SPECS ARE OK BUT NEED TO BE OBSERVED)**

- **OVERALL THIS DATA APPEARS TO CONFIRM THE ASSUMPTIONS USED FOR THE LVD STANDARD**

- **FULL SIGNAL TEST LOADS ARE BEING BUILT TO ENABLE FULL PROTOCOL TESTING FOR MULTIDROP CONDITIONS**

BILL HAM   DIGITAL EQUIPMENT SPI-2 WORKING GROUP NOV 4, 1996

LVD SCSI TEST RESULTS WITH ASYMMETRICAL DRIVERS AND REAL TERMINATORS (FAST 40)

1 M	0 M	0 M	1 M

DRIVER   TEST POINT "D"   TEST POINT "C"   TEST POINT "R"   TERMINATOR
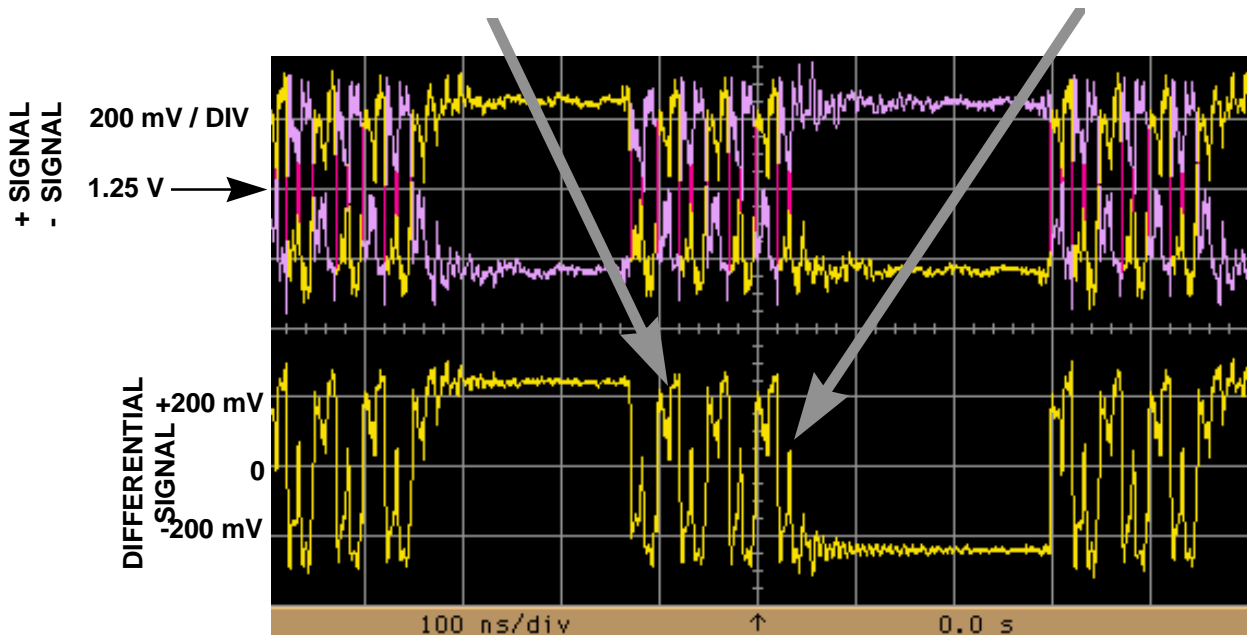
POINT TO POINT CONFIGURATION

THESE LAB DEVICES HAD EXCESSIVE CAPACITANCE BY A FACTOR OF MORE THAN 2X (APPROX 43/43/33)

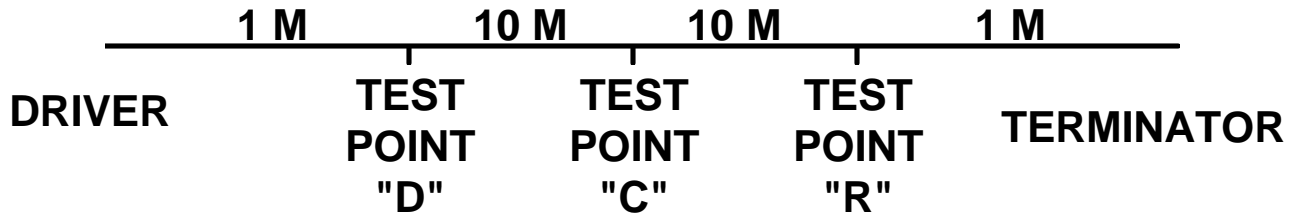**"LEGAL" DEVICES WOULD HAVE NO PROBLEMS**

NOTE SEVERE REFLECTIONS CAUSED BY EXCESSIVE TERMINATION CAPACITANCE

PROBES AT TEST POINT "C"

SYMLVD01

LVD SCSI TEST RESULTS WITH
ASYMMETRICAL DRIVERS
AND REAL TERMINATORS (FAST 40)

	1 M		10 M		10 M		1 M	

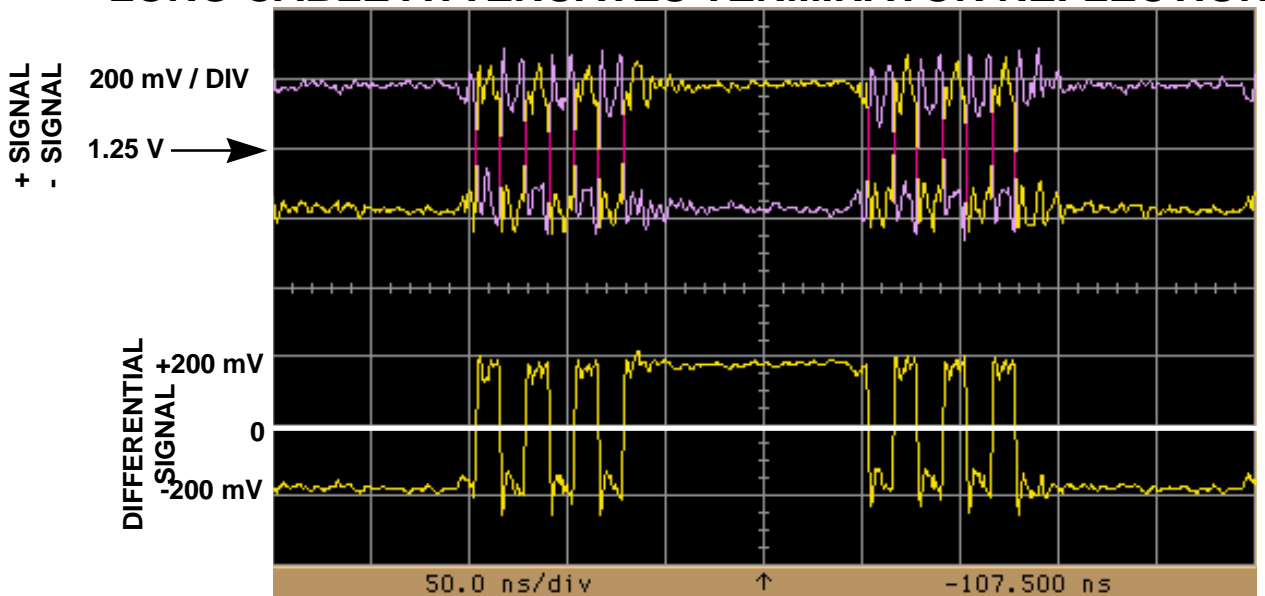DRIVER   TEST POINT "D"   TEST POINT "C"   TEST POINT "R"   TERMINATOR

POINT TO POINT CONFIGURATION

**THESE LAB DEVICES HAD EXCESSIVE CAPACITANCE
BY A FACTOR OF MORE THAN 2X (APPROX 43/43/33)**

**NOTE EXCELLENT SYMMETRY USING ASYMMETRICAL
DRIVERS WITH ACTUAL LVD TERMINATORS**

**NOTE ABSENSE OF REFLECTIONS NEAR DRIVER (HIGH
CAPACITANCE HELPS SLOW DOWN DRIVER EDGES AND
LONG CABLE ATTENUATES TERMINATOR REFLECTION)**

+ SIGNAL - SIGNAL

200 mV / DIV

1.25 V →

DIFFERENTIAL SIGNAL

+200 mV

0

-200 mV

50.0 ns/div   ↑   -107.500 ns

PROBES AT TEST POINT "D"

SYMLVD02

BILL HAM   DIGITAL EQUIPMENT SPI-2 WORKING GROUP NOV 4, 1996

LVD SCSI TEST RESULTS WITH ASYMMETRICAL DRIVERS AND REAL TERMINATORS (FAST 40)

1 M   10 M   10 M   1 M

DRIVER   TEST POINT "D"   TEST POINT "C"   TEST POINT "R"   TERMINATOR
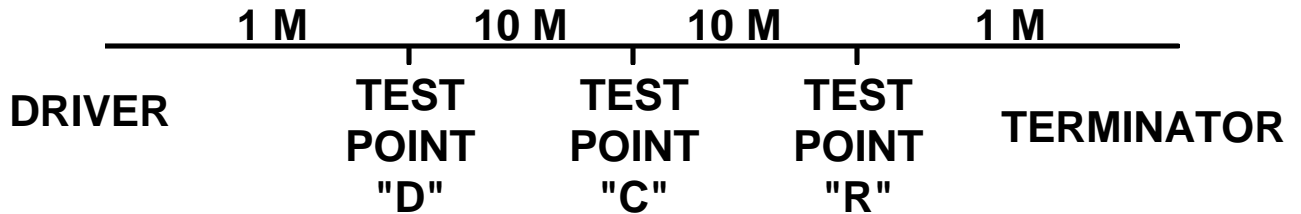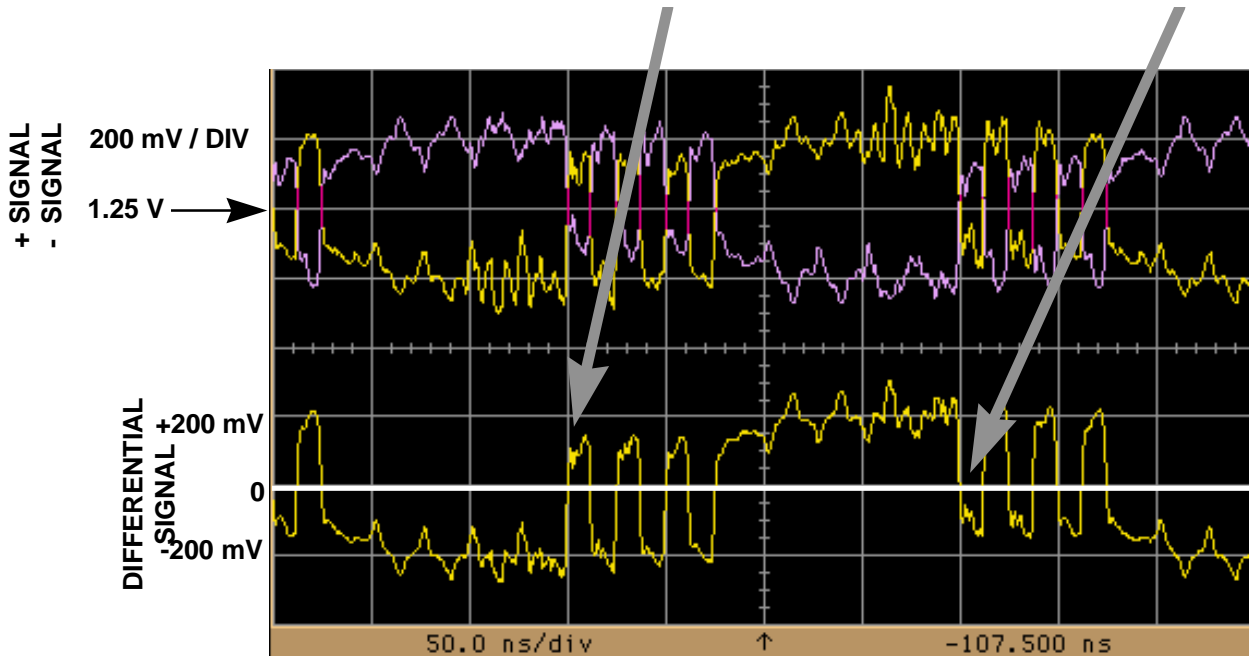
POINT TO POINT CONFIGURATION

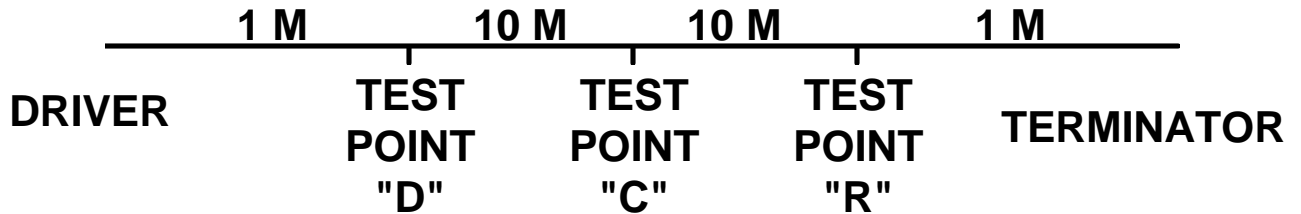## THESE LAB DEVICES HAD EXCESSIVE CAPACITANCE BY A FACTOR OF MORE THAN 2X (APPROX 43/43/33)

NOTE LONG RANGE SYMMETRY BUT SOME LOSS OF SHORT RANGE SYMMETRY CAUSED BY ISI

NOTE REFLECTIONS BEGINNING TO SHOW UP

+ SIGNAL / - SIGNAL

200 mV / DIV

1.25 V →

DIFFERENTIAL SIGNAL

+200 mV

0

-200 mV

50.0 ns/div   ↑   -107.500 ns

PROBES AT TEST POINT "C"   SYMVLD03

BILL HAM   DIGITAL EQUIPMENT SPI-2 WORKING GROUP NOV 4, 1996

LVD SCSI TEST RESULTS WITH
ASYMMETRICAL DRIVERS
AND REAL TERMINATORS (FAST 40)

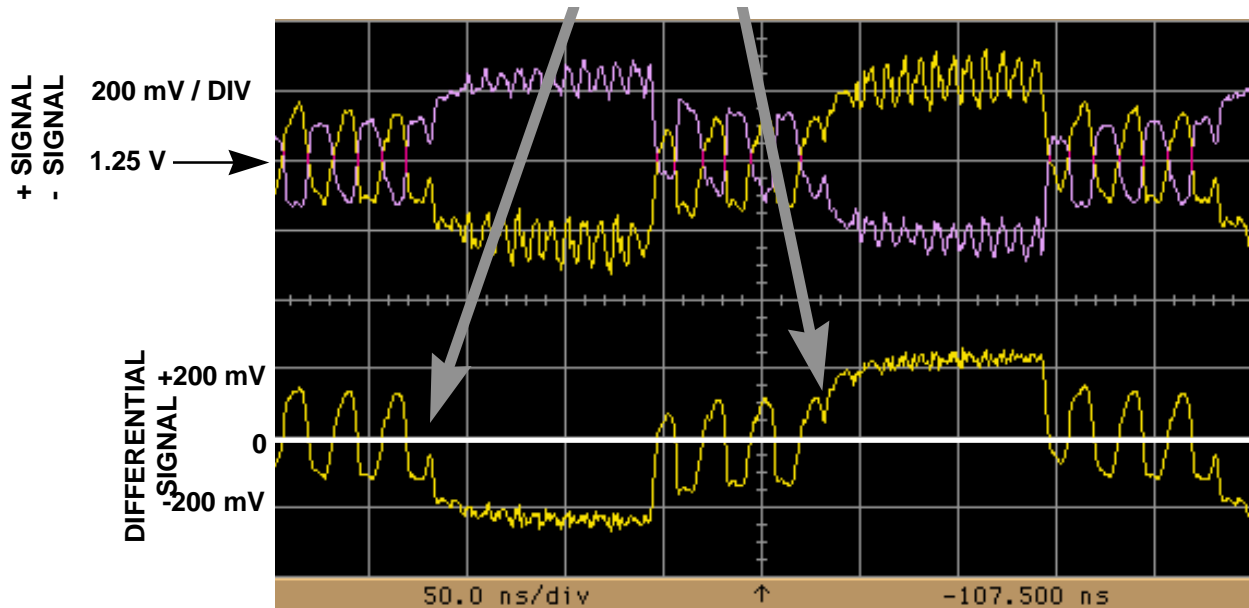|	1 M	10 M	10 M	1 M	
DRIVER	**TEST POINT "D"**	**TEST POINT "C"**	**TEST POINT "R"**		**TERMINATOR**

POINT TO POINT CONFIGURATION

**THESE LAB DEVICES HAD EXCESSIVE CAPACITANCE
BY A FACTOR OF MORE THAN 2X (APPROX 43/43/33)**

**NOTE LONG RANGE SYMMETRY BUT SIGNIFICANT LOSS OF
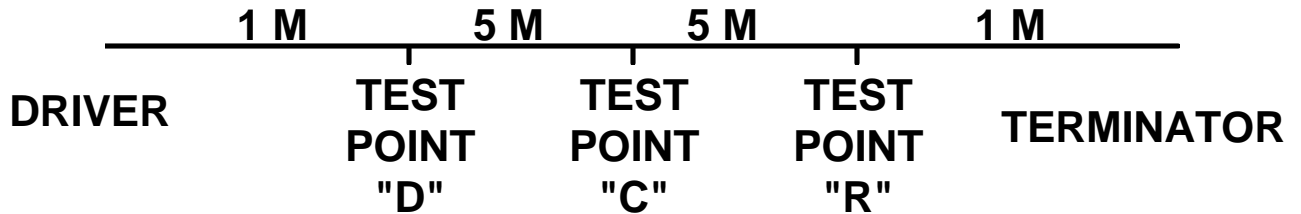SHORT RANGE SYMMETRY CAUSED BY ISI (EXPECTED RESULT)**

**NOTE REFLECTIONS ARE BECOMING THE
LIMITING FACTOR NEAR THE TERMINATOR**

PROBES AT TEST POINT "R"

SYMLVD04

BILL HAM   DIGITAL EQUIPMENT SPI-2 WORKING GROUP NOV 4, 1996

LVD SCSI TEST RESULTS WITH
ASYMMETRICAL DRIVERS
AND REAL TERMINATORS (FAST 40)

1 M	5 M	5 M	1 M

DRIVER TEST POINT "D" TEST POINT "C" TEST POINT "R" **TERMINATOR**
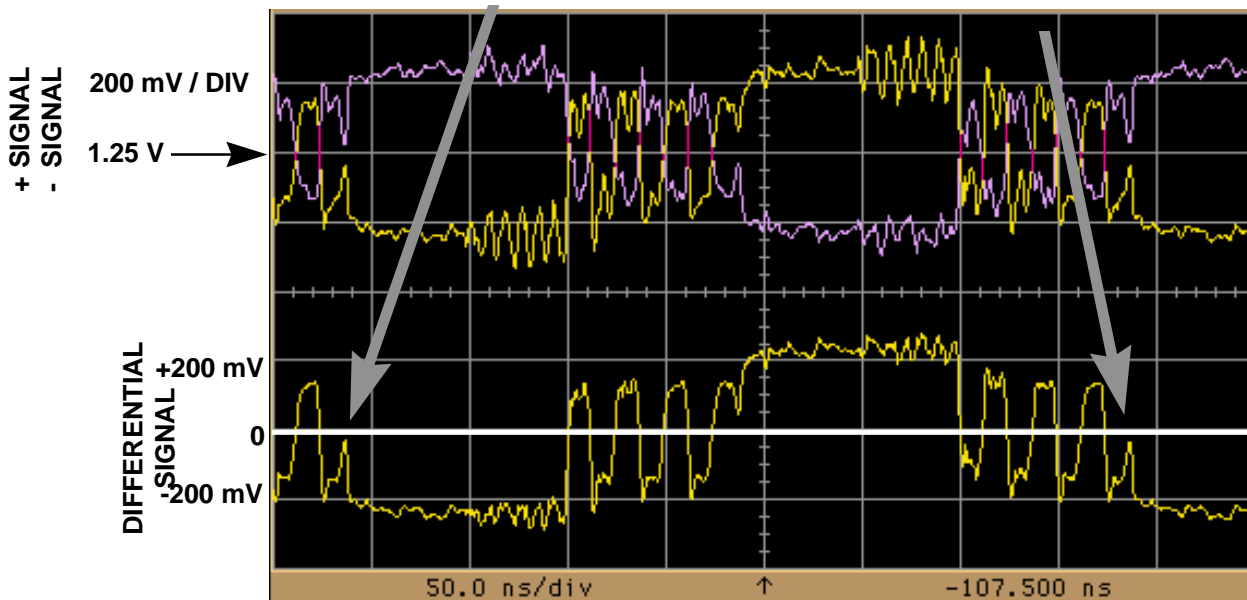
POINT TO POINT CONFIGURATION

**THESE LAB DEVICES HAD EXCESSIVE CAPACITANCE
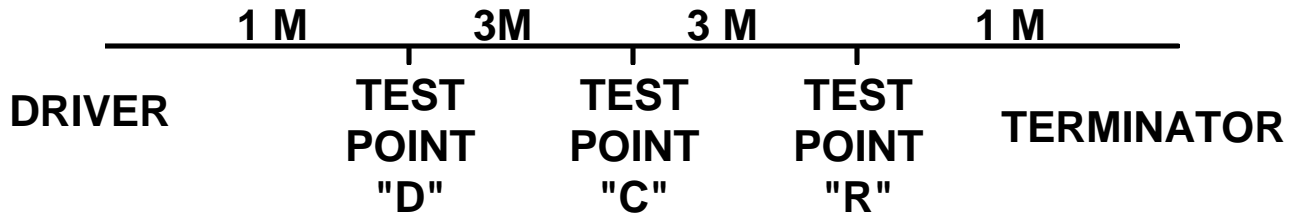BY A FACTOR OF MORE THAN 2X (APPROX 43/43/33)**

NOTE LESS ISI THAN FOR 22 METERS (EXPECTED RESULT)

**NOTE REFLECTIONS STILL SEVERE
NEAR THE TERMINATOR**

+ SIGNAL
- SIGNAL

200 mV / DIV

1.25 V →

DIFFERENTIAL SIGNAL

+200 mV

0

-200 mV

50.0 ns/div   ↑   −107.500 ns

PROBES AT TEST POINT "R"   SYMLVD07

BILL HAM   DIGITAL EQUIPMENT SPI-2 WORKING GROUP NOV 4, 1996

LVD SCSI TEST RESULTS WITH ASYMMETRICAL DRIVERS AND REAL TERMINATORS (FAST 40)

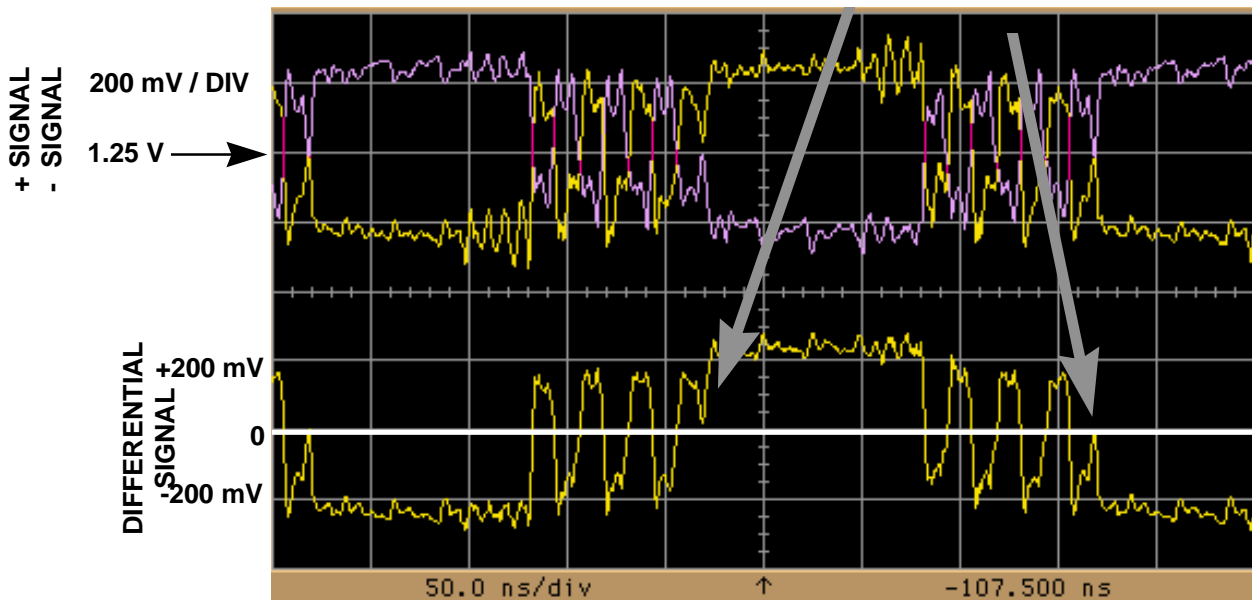|	1 M		3M		3 M		1 M	
DRIVER		TEST POINT "D"		TEST POINT "C"		TEST POINT "R"		TERMINATOR

POINT TO POINT CONFIGURATION

THESE LAB DEVICES HAD EXCESSIVE CAPACITANCE BY A FACTOR OF MORE THAN 2X (APPROX 43/43/33)
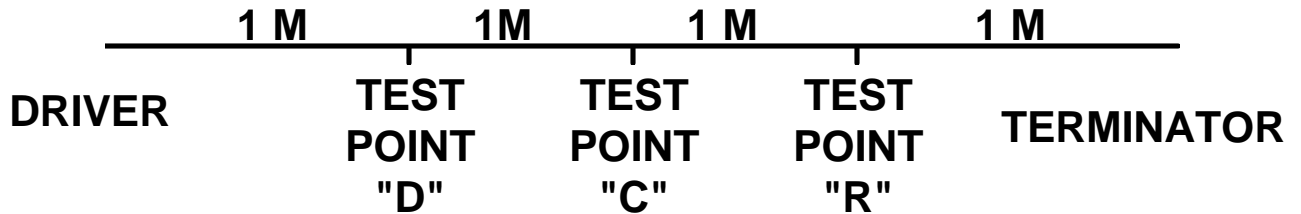
NOTE ISI SMALLER YET (EXPECTED RESULT)

NOTE REFLECTIONS STILL SEVERE NEAR THE TERMINATOR

+ SIGNAL
- SIGNAL

200 mV / DIV

1.25 V →

DIFFERENTIAL SIGNAL
+200 mV
0
-200 mV

50.0 ns/div   ↑   -107.500 ns

PROBES AT TEST POINT "R"   SYMLVD10

LVD SCSI TEST RESULTS WITH ASYMMETRICAL DRIVERS AND REAL TERMINATORS (FAST 40)

1 M   **1M**   **1 M**   **1 M**

DRIVER   **TEST POINT "D"**   **TEST POINT "C"**   **TEST POINT "R"**   **TERMINATOR**
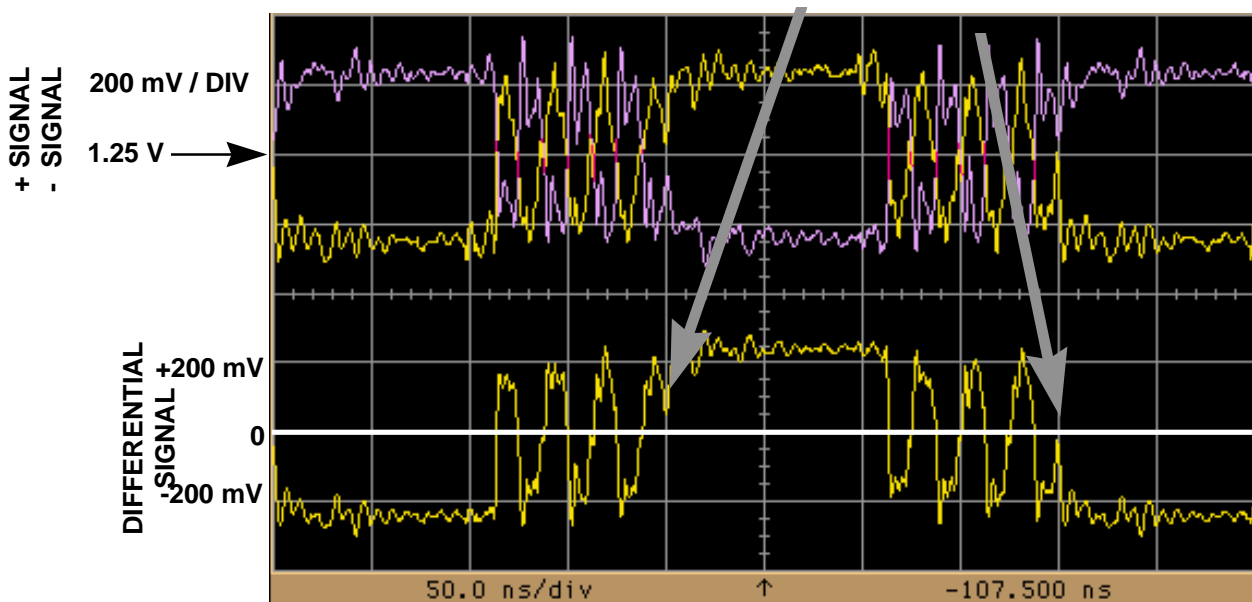
POINT TO POINT CONFIGURATION

THESE LAB DEVICES HAD EXCESSIVE CAPACITANCE BY A FACTOR OF MORE THAN 2X (APPROX 43/43/33)

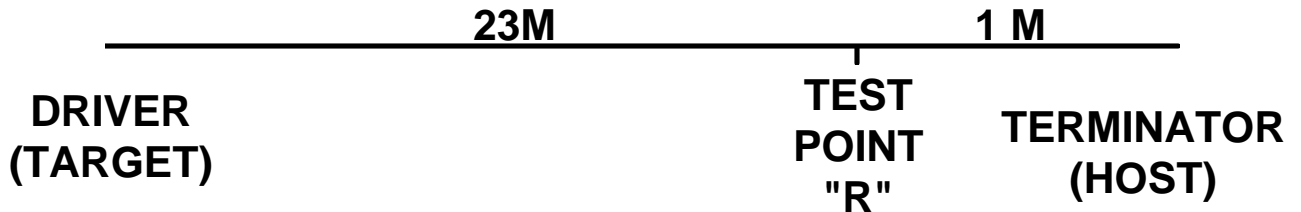## NOTE ISI SMALLER YET (EXPECTED RESULT)

NOTE REFLECTIONS STILL SEVERE (BUT SHORTER) NEAR THE TERMINATOR

+ SIGNAL
- SIGNAL

200 mV / DIV

1.25 V →

DIFFERENTIAL SIGNAL

+200 mV

0

-200 mV

50.0 ns/div   ↑   -107.500 ns

PROBES AT TEST POINT "R" SYMLVD13

BILL HAM   DIGITAL EQUIPMENT SPI-2 WORKING GROUP NOV 4, 1996

LVD SCSI TEST RESULTS WITH
FULL PROTOCOL OPERATION
(FAST 40)

23M | 1 M

**DRIVER
(TARGET)**

**TEST
POINT
"R"**

**TERMINATOR
(HOST)**

POINT TO POINT CONFIGURATION

THESE LAB DEVICES HAD EXCESSIVE CAPACITANCE
BY A FACTOR OF MORE THAN 2X (APPROX 43/43/33)

NOTE: REFLETION HURTS DATA BIT MORE THAN
THE REQ SIGNAL (TIMING COINCIDENCE)

100 mV / DIV

+ REQ/
+ DBP

1.25 V →

25.0 ns/div   0.0 s

PROBES AT TEST POINT "R"   SYMLVD21

BILL HAM   DIGITAL EQUIPMENT SPI-2 WORKING GROUP NOV 4, 1996