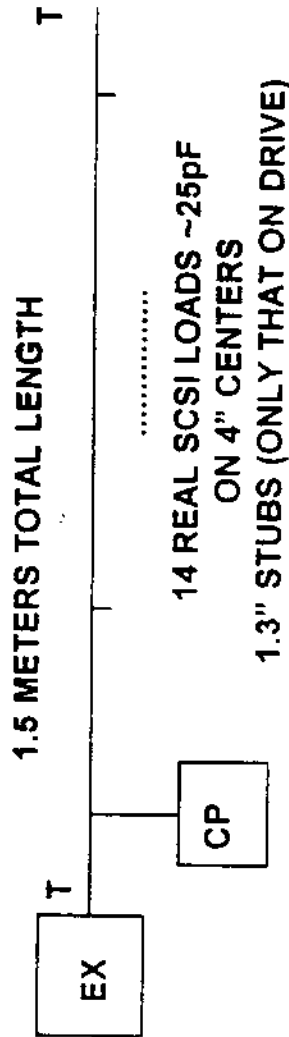
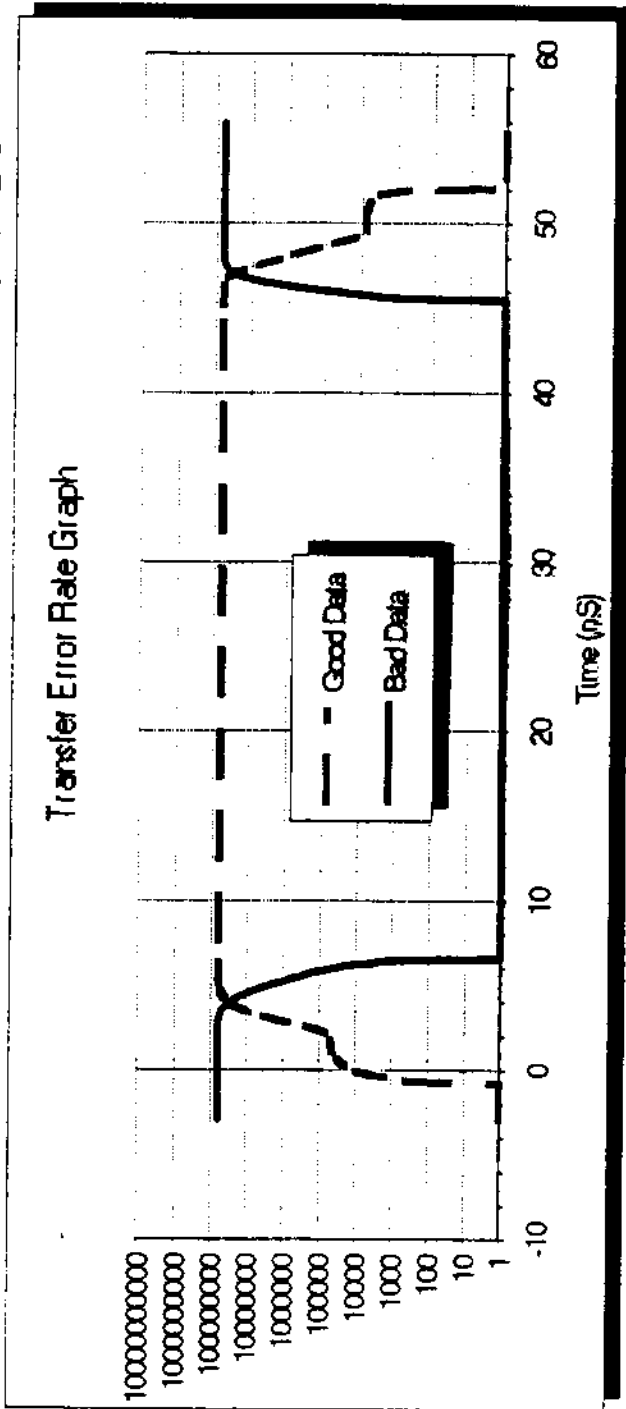


# ULTRA SCSI SSWG

- **SINCE THE LAST ULTRA SCSI SSWG MEETING THE FOLLOWING HAS BEEN ACCOMPLISHED:**
  - **MUCH BETTER HARDWARE FOR TESTING "ADVANCED" CONFIGURATIONS HAS BEEN ACQUIRED:**
    - » **REAL SINGLE ENDED SCSI LOADS**
    - » **SHORTER STUB EXTENSIONS**
    - » **SOFTWARE FOR DISABLING ACTIVE NEGATION ON DATA LINES**
    - » **40 MEGATRANSFER/SEC DIFFERENTIAL TRANSCEIVERS**
  - **NEW DATA ACQUIRED:**
    - » **SUCCESSFUL 40 MEGATRANSFER/SEC WITH SINGLE CHANNEL DIFFERENTIAL OVER 20 METERS (FIRST TRUE ULTRA-2 DATA)**
    - » **FULLY LOADED ULTRA-1 SINGLE ENDED WORST CASE CONFIGURATIONS TESTED:**
      - **STUBS OF 1.3", 2.9", 4.9" AND 10.1" ON 4" CENTERS ON A 1.5 METER BUS**
      - **EFFECT OF ACTIVE NEGATION BRIEFLY EXPLORED**
- **A SET OF MINIMUM RECOMMENDATIONS FOR SINGLE ENDED IS NOW POSSIBLE**

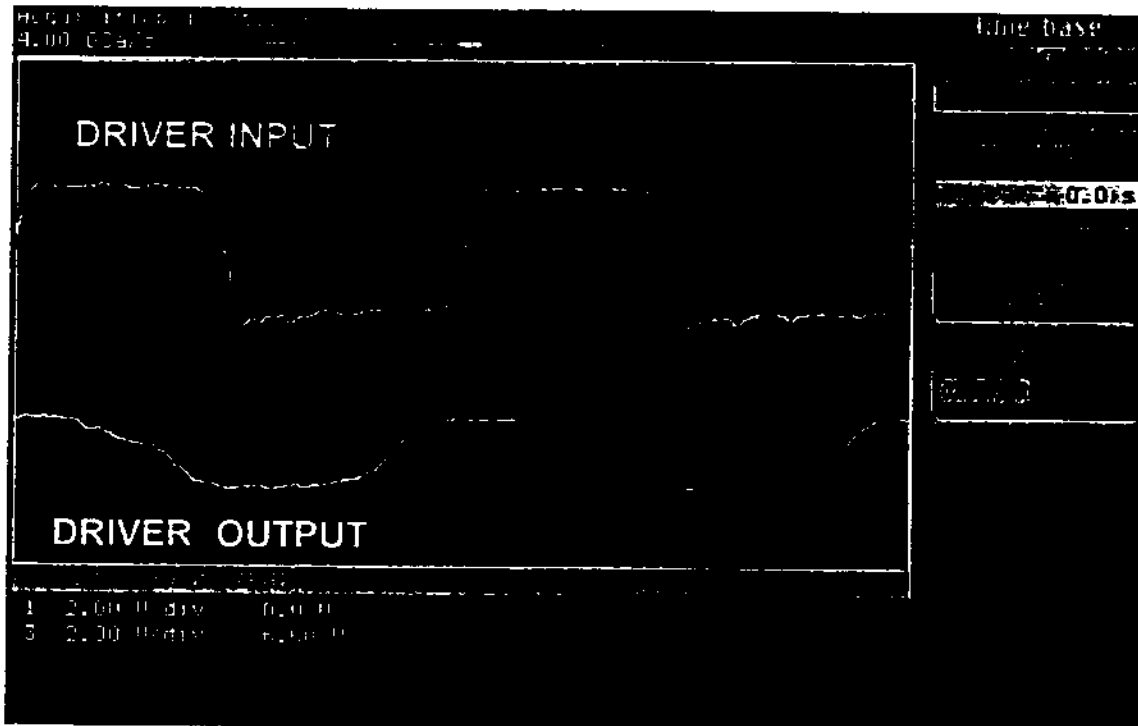
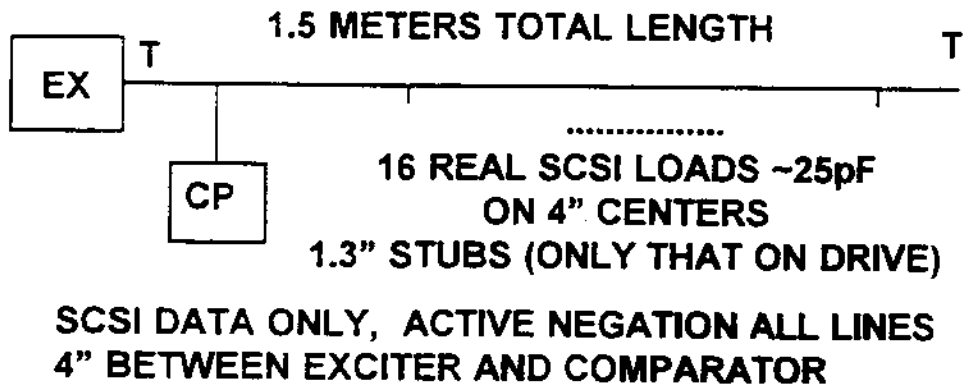
# SINGLE ENDED ULTRA-1 SCSI



SCSI DATA ONLY, ACTIVE NEGATION ALL LINES, 20 MEGATRANSFERS/SEC  
 4" BETWEEN EXCITER AND COMPATOR, ACTIVE TERMINATORS  
 TI SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)

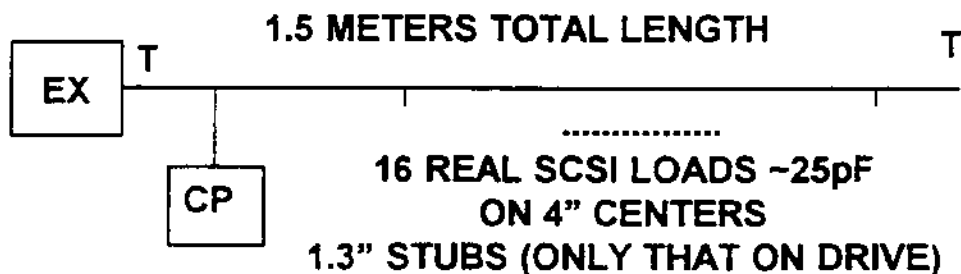
BILL HAM DIGITAL EQUIPMENT MARCH 31, 1994 ULTRA SCSI SSWG

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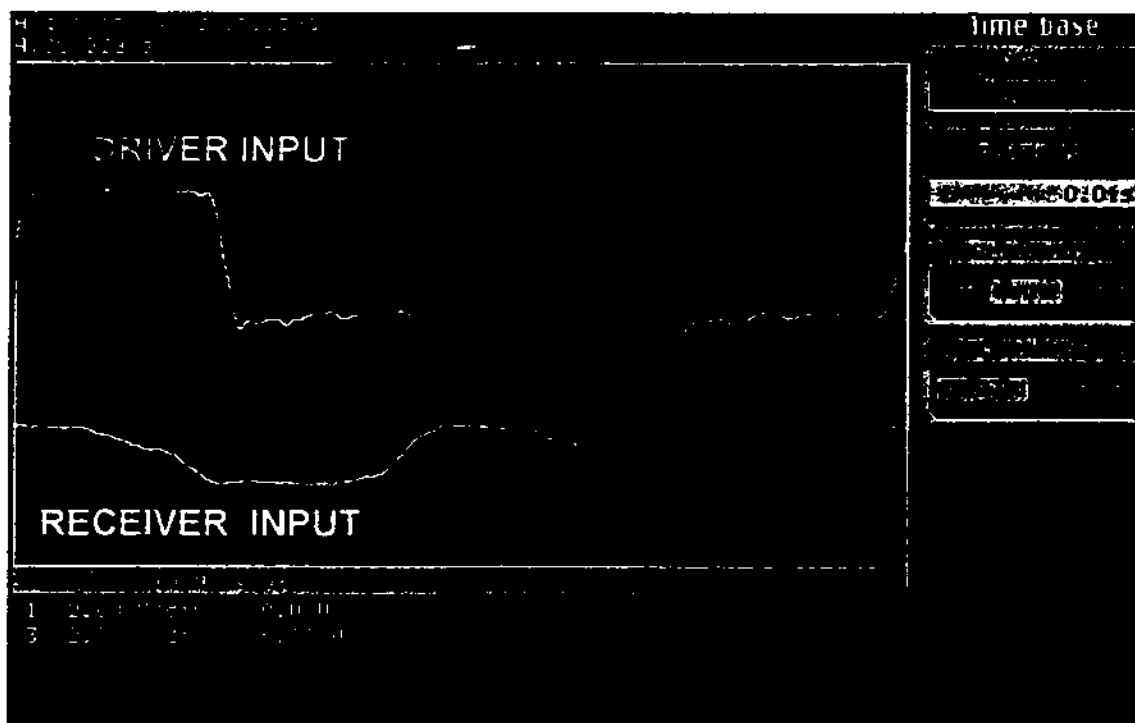


BILL HAM DIGITAL EQUIPMENT ULTRA SCSI WORKING GROUP MARCH 31, 1994

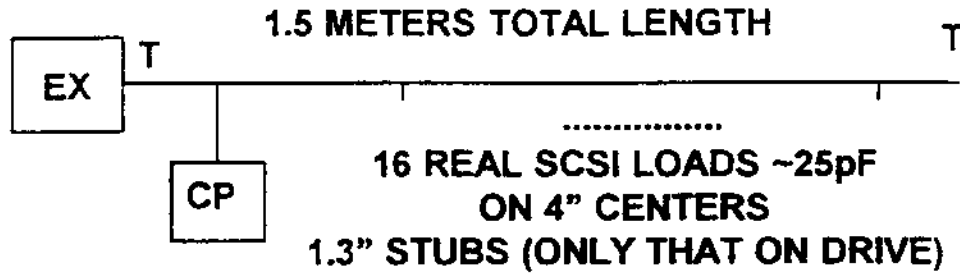
# SINGLE ENDED SCSI -- 20 MEGATRANSFERS/SEC



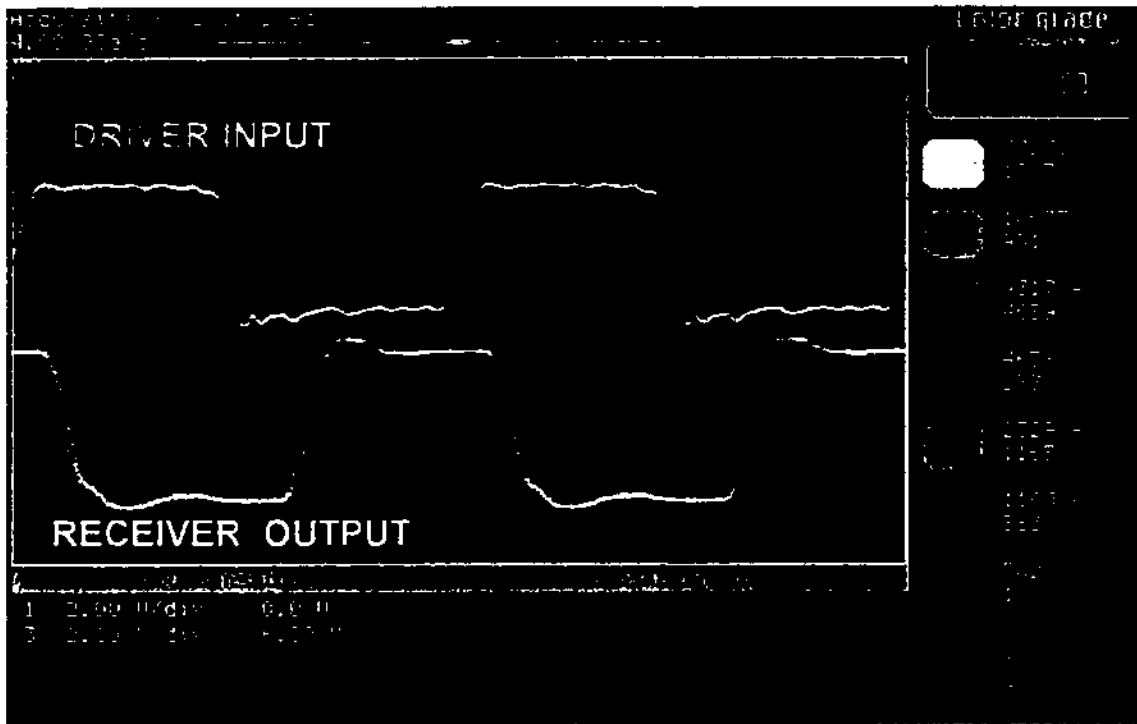
SCSI DATA ONLY, ACTIVE NEGATION ALL LINES  
4" BETWEEN EXCITER AND COMPARATOR



# SINGLE ENDED SCSI -- 20 MEGATRANSFERS/SEC

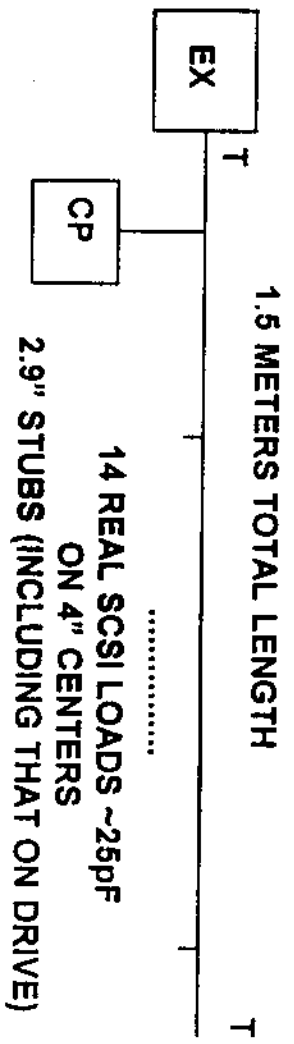
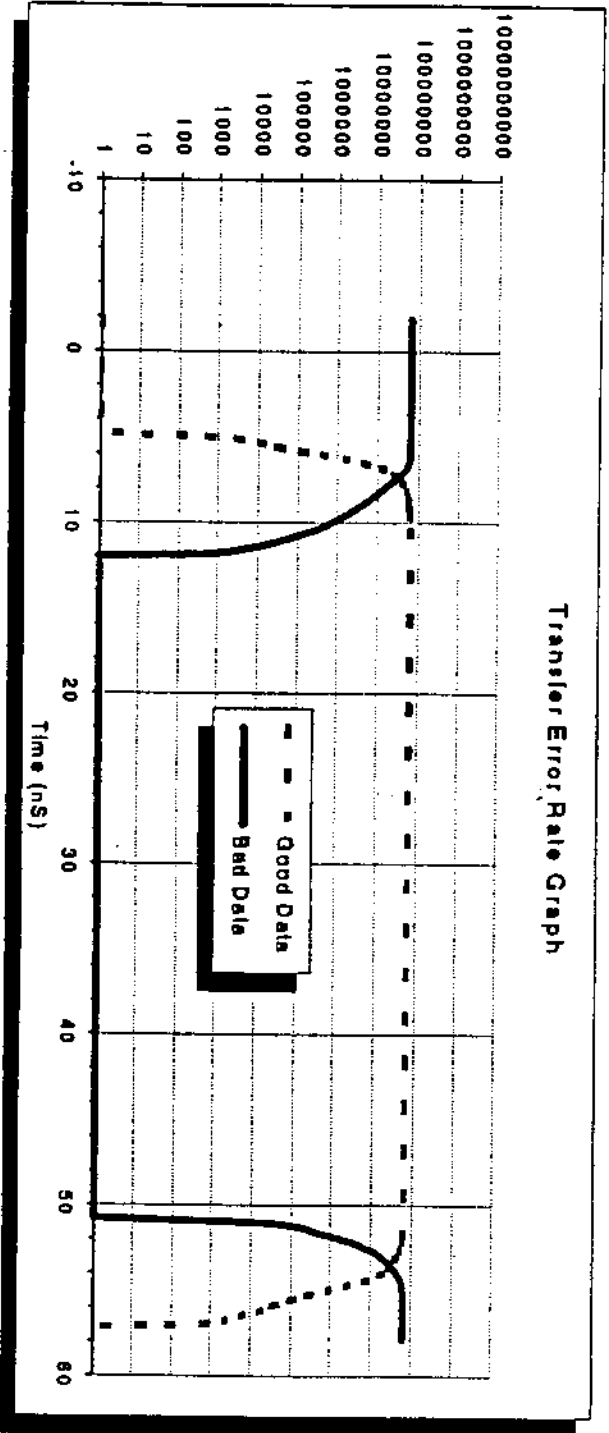


SCSI DATA ONLY, ACTIVE NEGATION ALL LINES  
 4" BETWEEN EXCITER AND COMPARATOR



# SINGLE ENDED ULTRA-1 SCSI

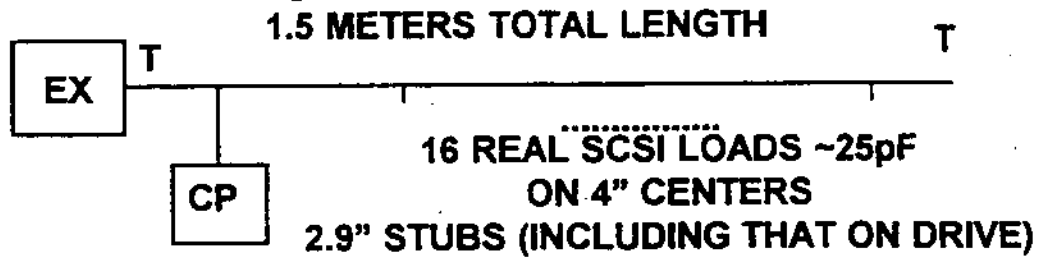
Transfer Error Rate Graph



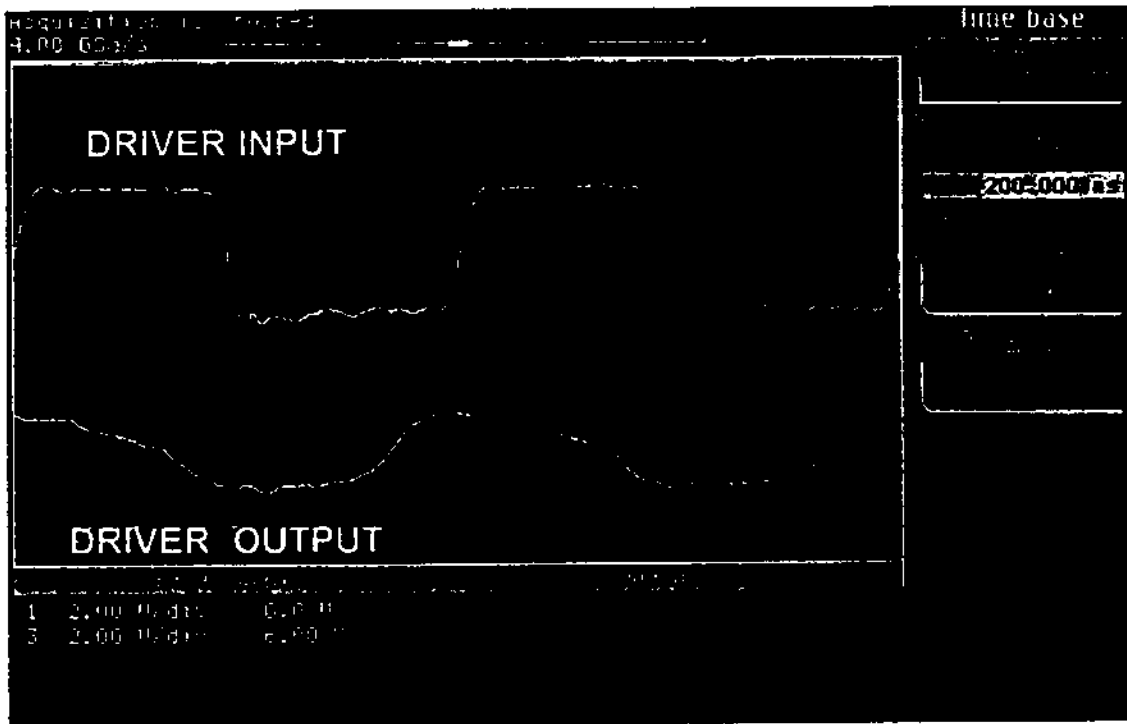
SCSI DATA ONLY, ACTIVE NEGATION ALL LINES, 20 MEGATRANSFERS/SEC  
 4" BETWEEN EXCITER AND COMPARATOR, ACTIVE TERMINATORS  
 TI SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)

BILL HAM DIGITAL EQUIPMENT MARCH 31, 1994 ULTRA SCSI SSWG

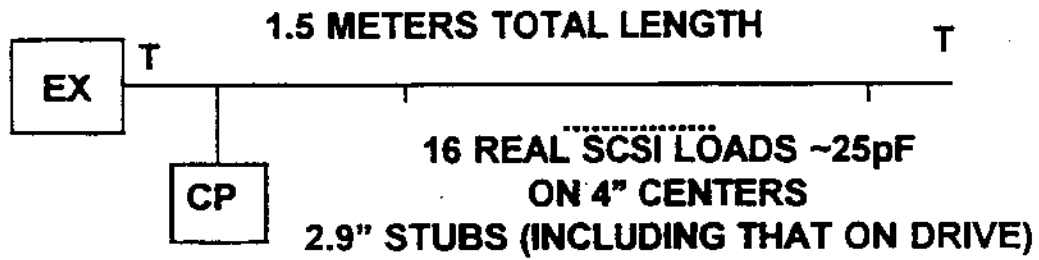
# SINGLE ENDED SCSI -- 20 MEGATRANSFERS/SEC



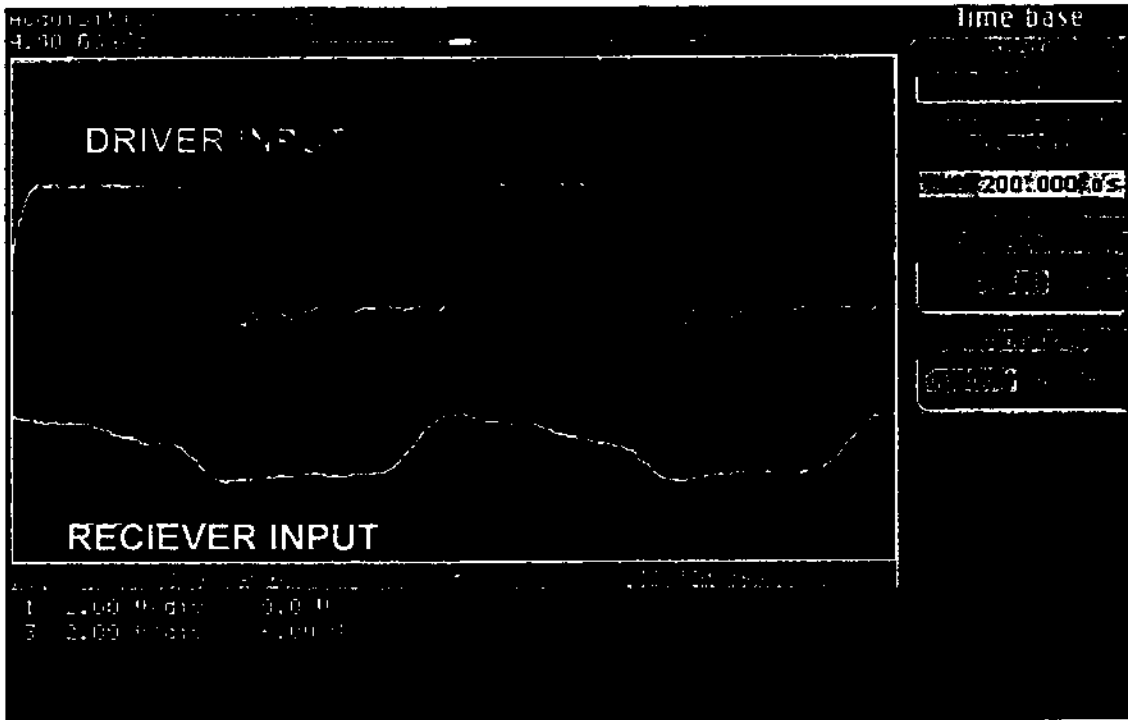
SCSI DATA ONLY, ACTIVE NEGATION ALL LINES  
 4" BETWEEN EXCITER AND COMPARATOR



# SINGLE ENDED SCSI -- 20 MEGATRANSFERS/SEC

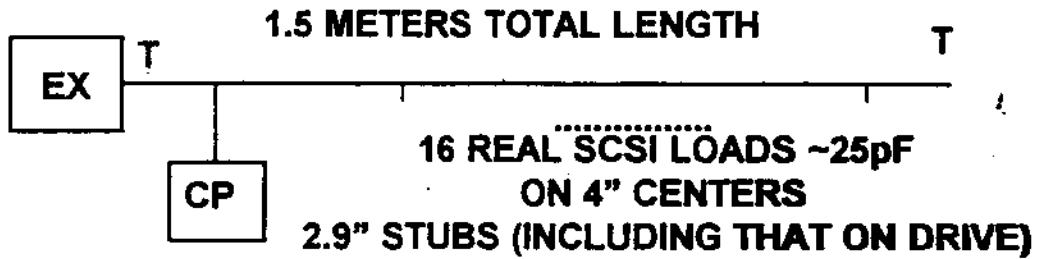


SCSI DATA ONLY, ACTIVE NEGATION ALL LINES  
4" BETWEEN EXCITER AND COMPARATOR

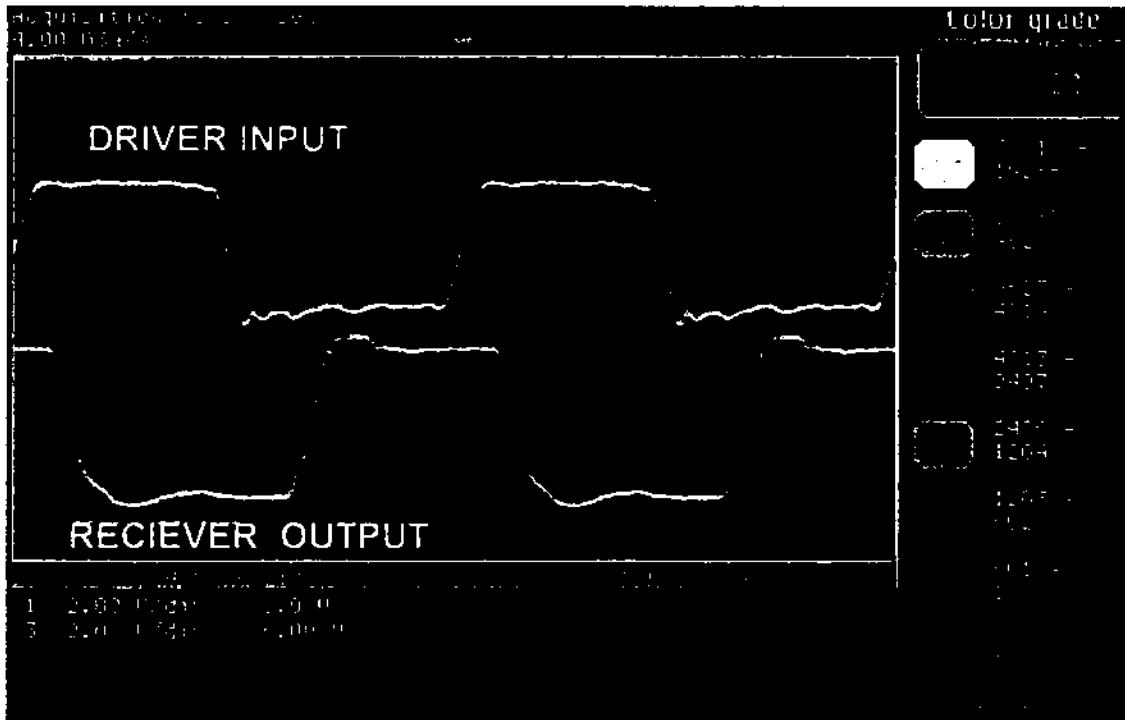




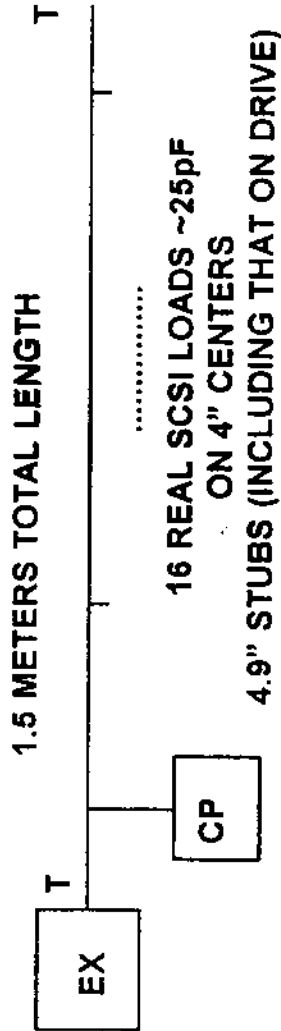
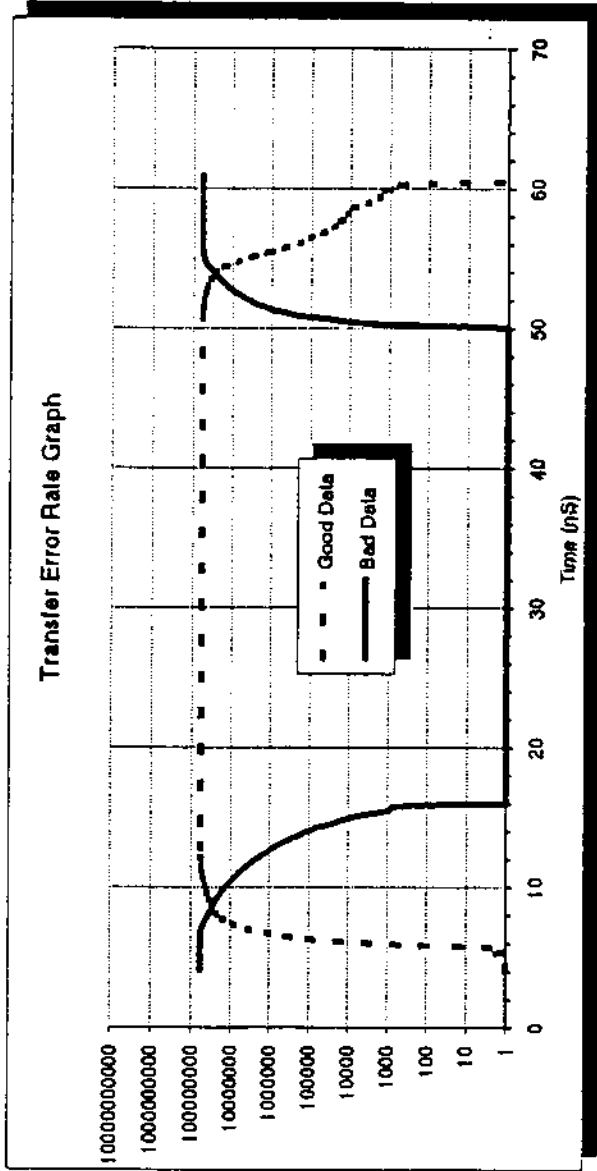
# SINGLE ENDED SCSI - 20 MEGATRANSFERS/SEC



SCSI DATA ONLY, ACTIVE NEGATION ALL LINES  
 4" BETWEEN EXCITER AND COMPARATOR



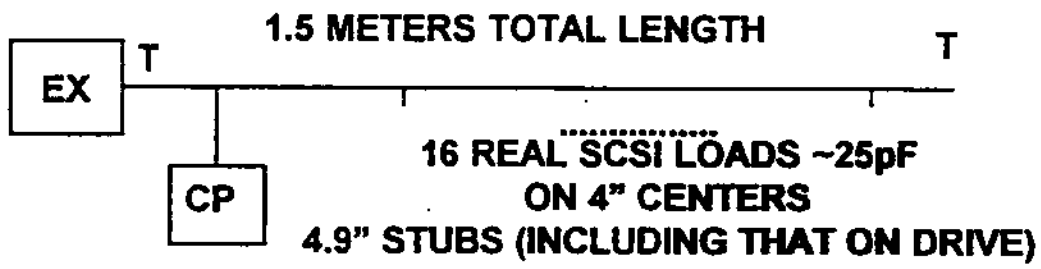
# SINGLE ENDED ULTRA-1 SCSI



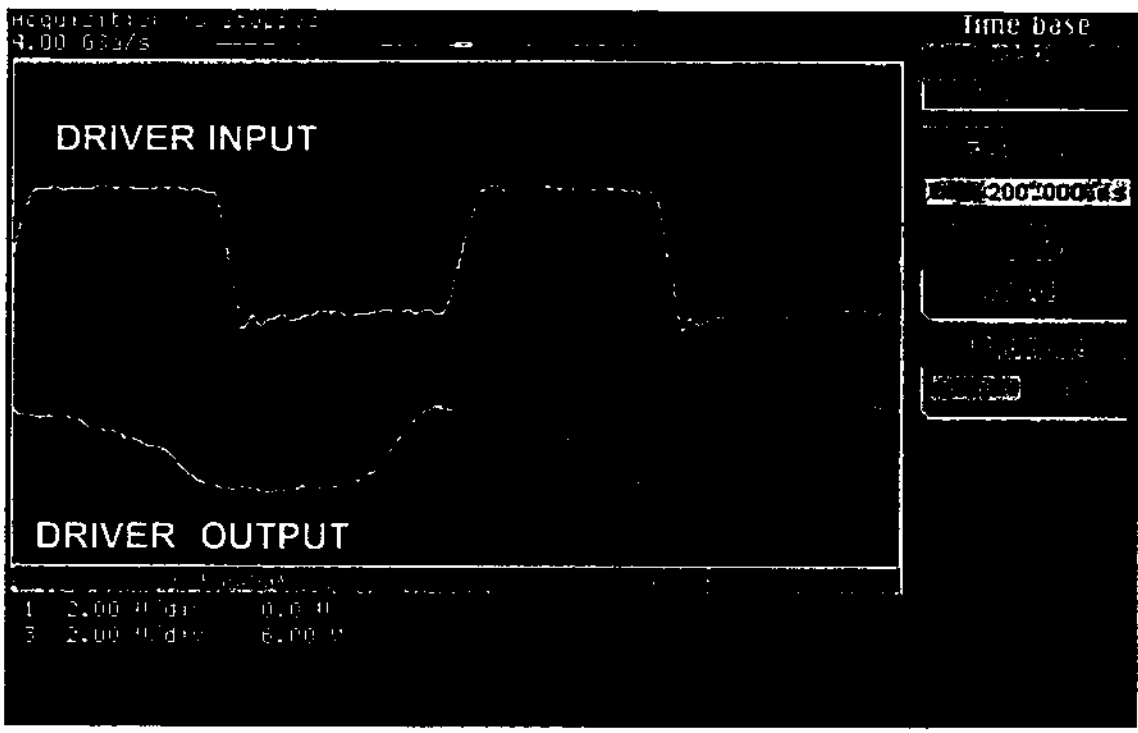
SCSI DATA ONLY, ACTIVE NEGATION ALL LINES, 20 MEGATRANSFERS/SEC  
 4" BETWEEN EXCITER AND COMPATOR, ACTIVE TERMINATORS  
 TI SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)

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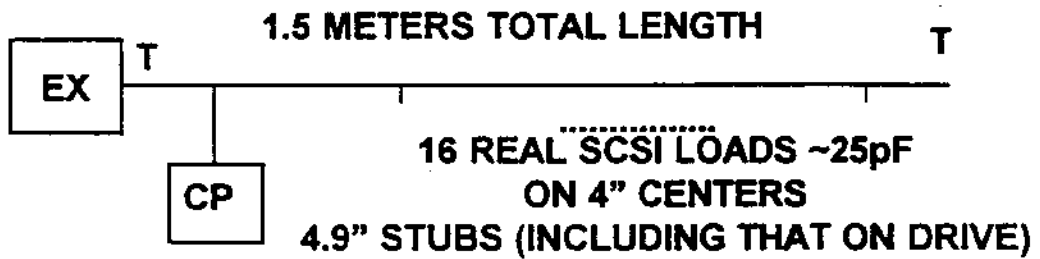
# SINGLE ENDED SCSI -- 20 MEGATRANSFERS/SEC



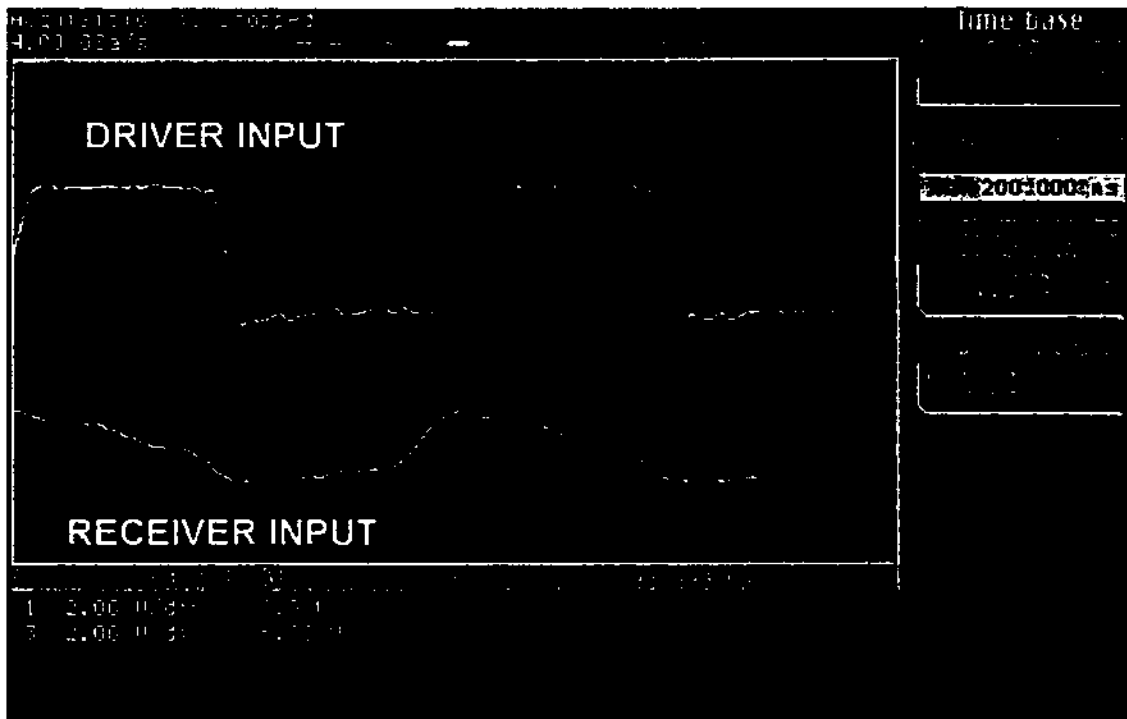
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 4" BETWEEN EXCITER AND COMPARATOR



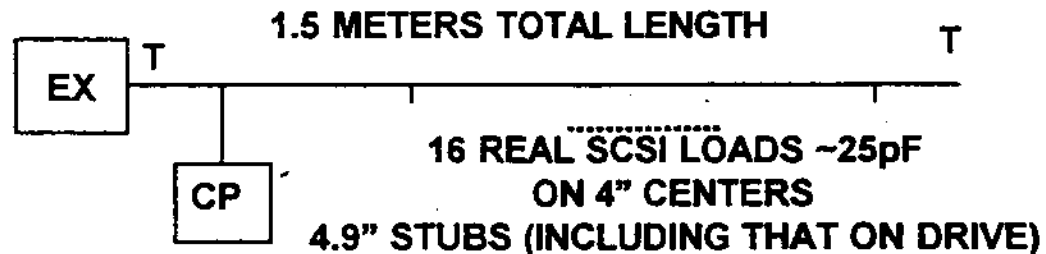
# SINGLE ENDED SCSI -- 20 MEGATRANSFERS/SEC



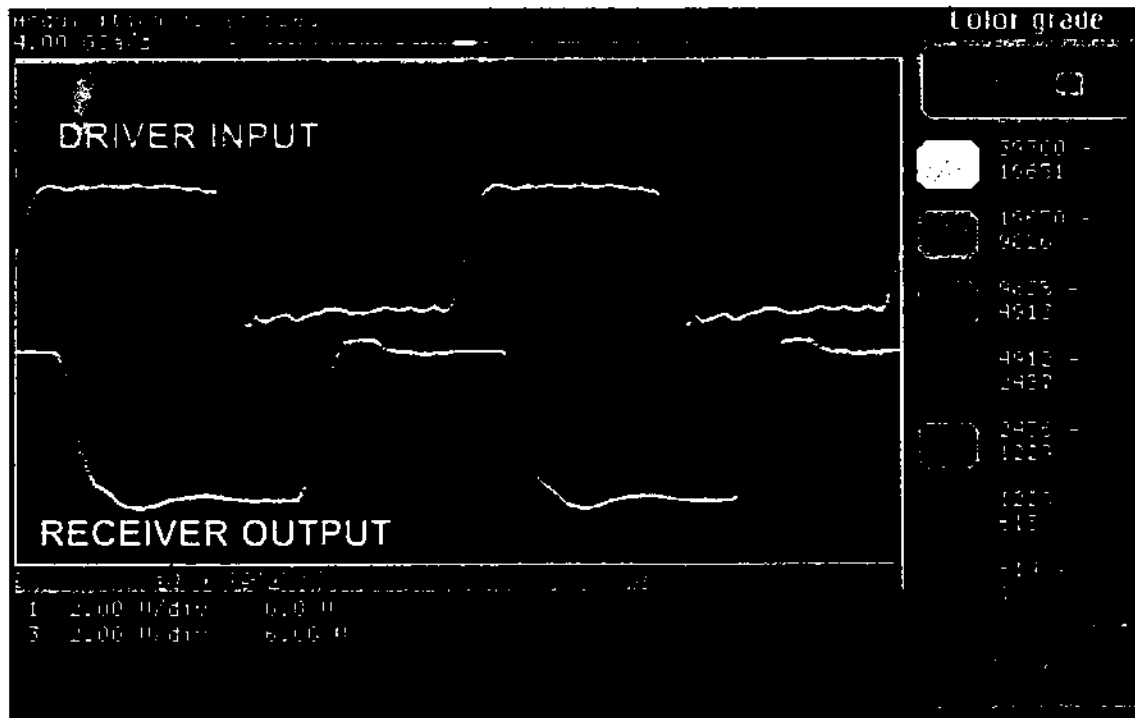
SCSI DATA ONLY, ACTIVE NEGATION ALL LINES  
 4" BETWEEN EXCITER AND COMPARATOR



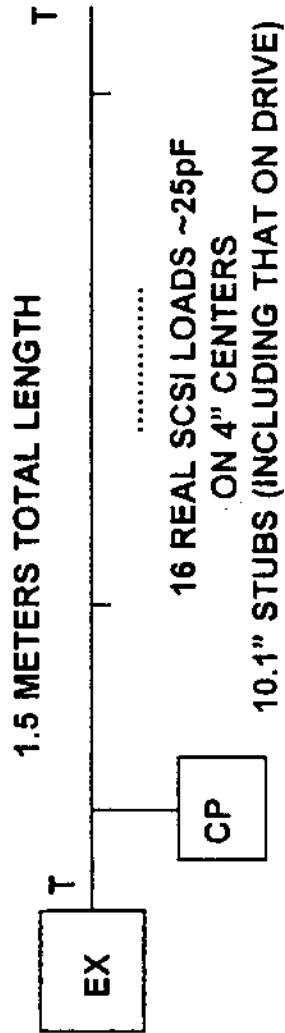
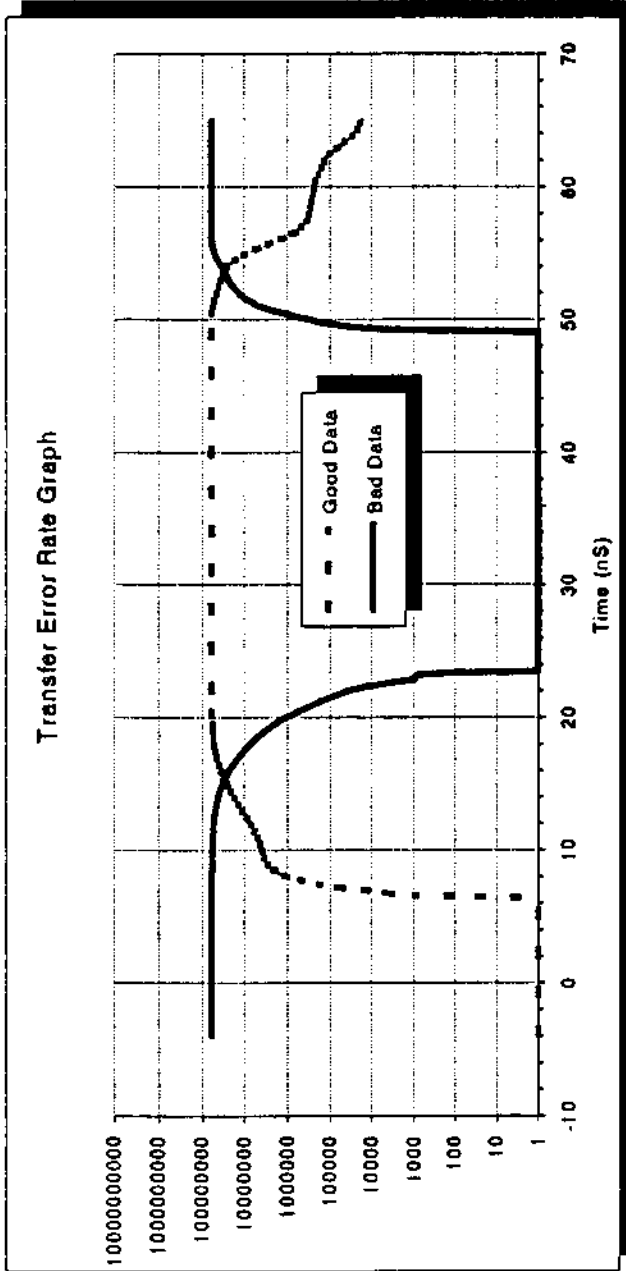
# SINGLE ENDED SCSI - 20 MEGATRANSFERS/SEC



SCSI DATA ONLY, ACTIVE NEGATION ALL LINES  
 4" BETWEEN EXCITER AND COMPARATOR



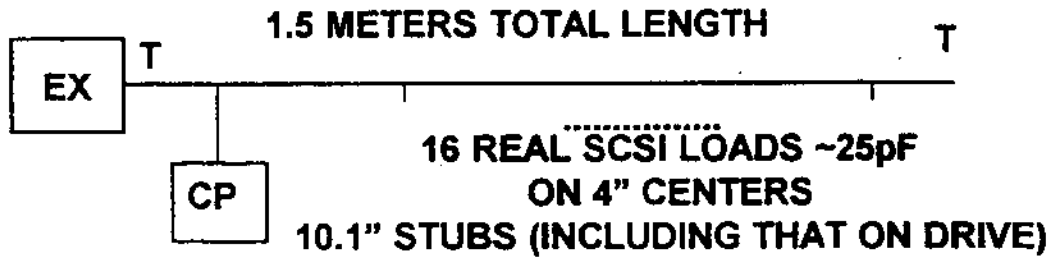
# SINGLE ENDED ULTRA-1 SCSI



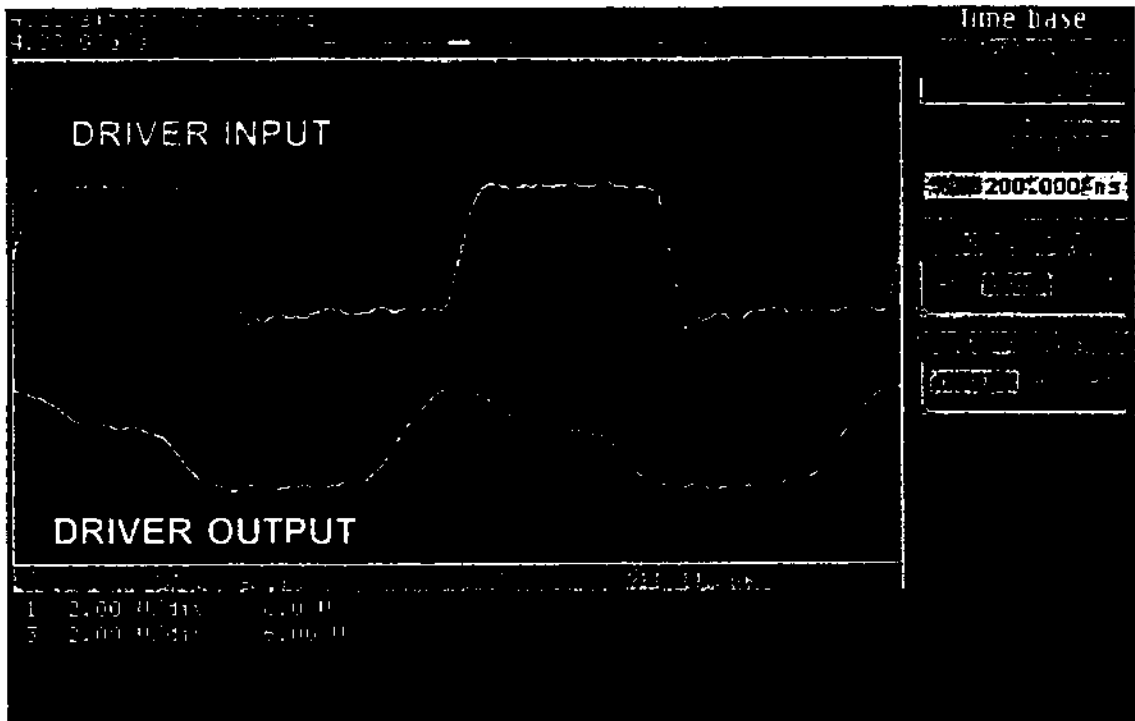
SCSI DATA ONLY, ACTIVE NEGATION ALL LINES, 20 MEGATRANSFERS/SEC  
 4" BETWEEN EXCITER AND COMPATOR, ACTIVE TERMINATORS  
 TI SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)

BILL HAM DIGITAL EQUIPMENT MARCH 31, 1994 ULTRA SCSI SSWG

# SINGLE ENDED SCSI -- 20 MEGATRANSFERS/SEC

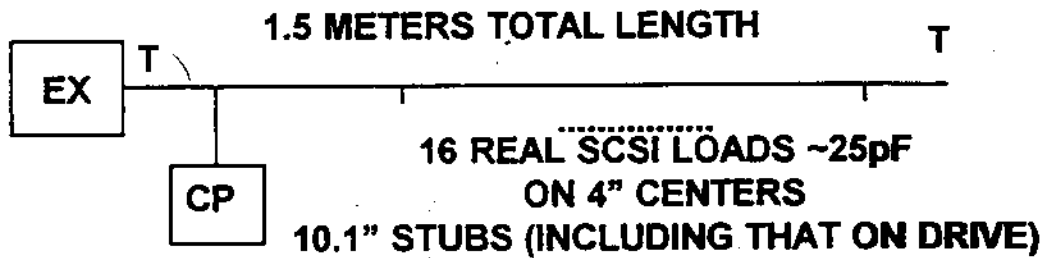


SCSI DATA ONLY, ACTIVE NEGATION ALL LINES  
 4" BETWEEN EXCITER AND COMPARATOR

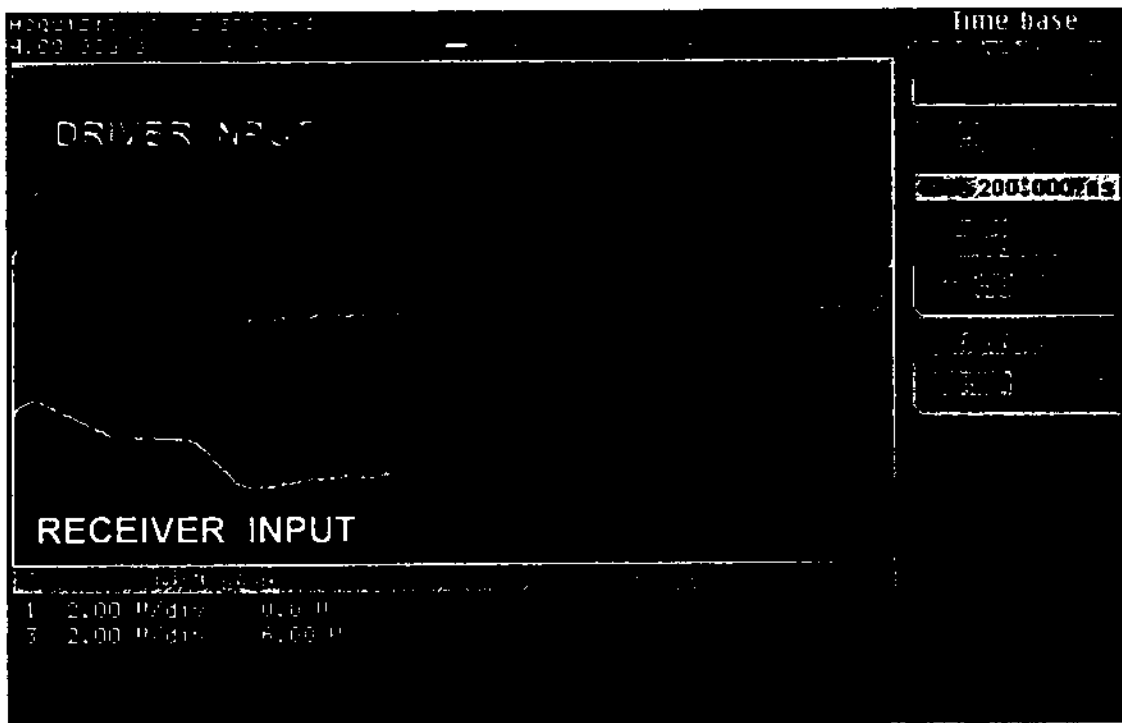


BILL HAM DIGITAL EQUIPMENT ULTRA SCSI WORKING GROUP MARCH 31, 1994

# SINGLE ENDED SCSI - 20 MEGATRANSFERS/SEC

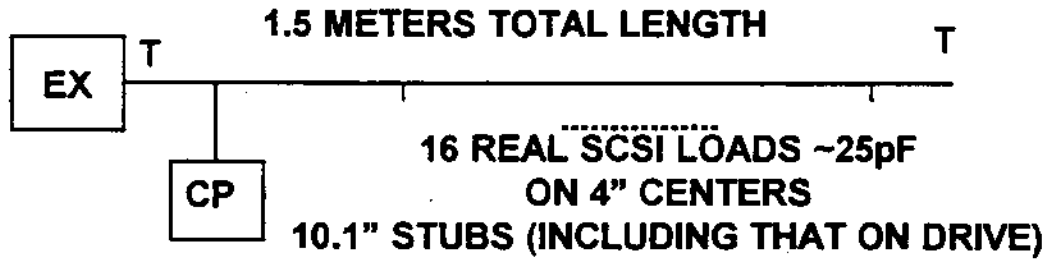


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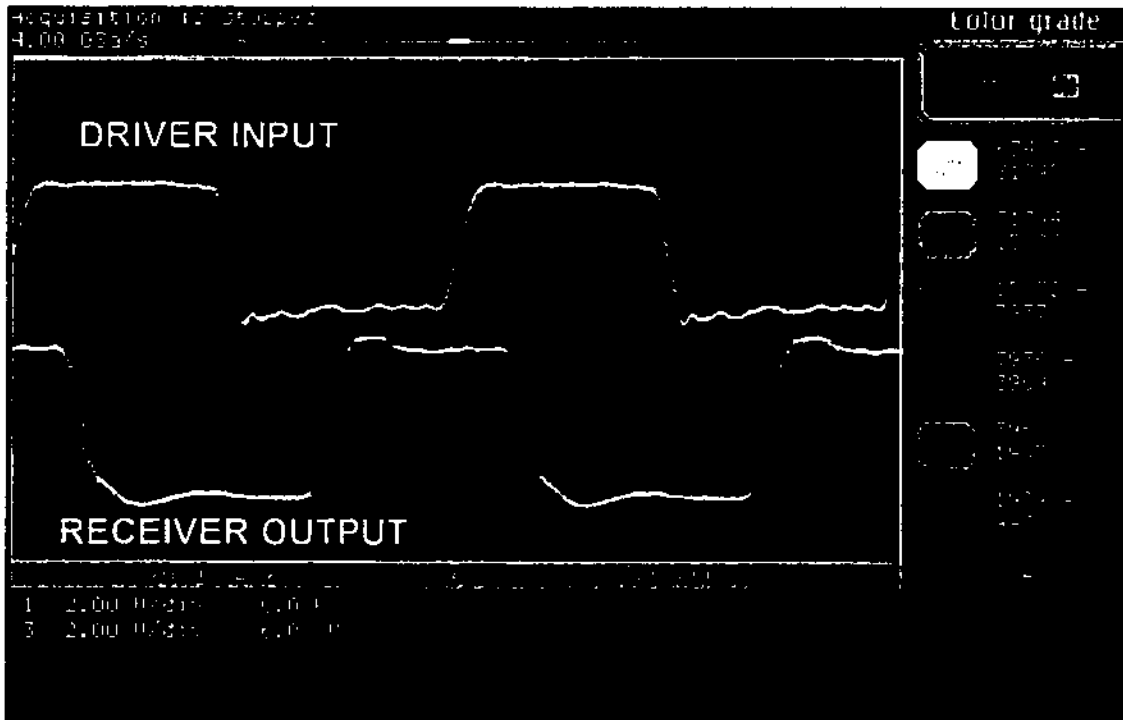




# SINGLE ENDED SCSI -- 20 MEGATRANSFERS/SEC



SCSI DATA ONLY, ACTIVE NEGATION ALL LINES  
 4" BETWEEN EXCITER AND COMPARATOR



# MAX 16 DEVICES / BUS

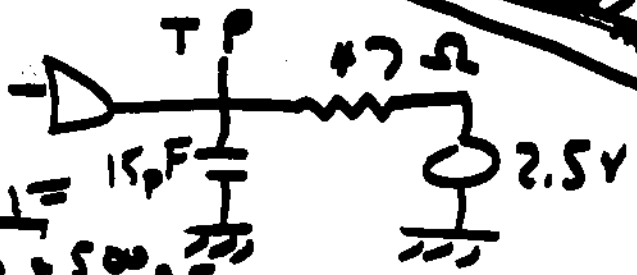
## PRELIMINARY RECOMMENDATIONS FOR SINGLE ENDED ULTRA-1 SCSI RULES:

- 1 - BUS LENGTH LIMITED TO 1.5 METERS
- 1 1 - ACTIVE NEGATION REQUIRED FOR REQ, ACK, DATA, AND PARITY LINES
- 1 - SPI RULES FOR CABLE WIRING MUST BE FOLLOWED
- STUBS SPACING OF 4" MIN WITH 4" MAX STUB LENGTH
- 1 - DEVICE CAPACITANCE LIMITED TO 25 PF
- POSITION CLOCK (REQ, ACK) TO FAVOR SET UP TIME BY 5 NANoseconds
- 1 - MAXIMUM SLEW TIME 8 NANoseconds MINIMUM 4 NANoseconds
- RESTRICT RECEIVER THRESHOLD RANGE AS MUCH AS POSSIBLE - AVOID LOW VOLTAGE THRESHOLDS - BEST SEEMS TO BE AROUND 1.4 VOLTS

NEED  
OUTER  
UNDER  
STANDARD

400 mV  
600 nsec

NEED TEST FIXTURE



RISE TIME = TEST =

WONT CASU LOAD = TEST = 500 pF

Needs signal