ULTRA SCSI
PROGRESS REPORT

- ULTRA SCSI WAS FIRST INTRODUCED AT THE NOVEMBER 1993 SCSI WORKING GROUP
- HAPPENINGS SINCE THEN ARE SUMMARIZED HERE
- NEW DATA FOR 40 MEGATRANSFER /SEC APPLICATIONS ARE PRESENTED
- BUS AND ERROR RATE DATA FROM SFF MEETING ARE PUBLISHED
- SOURCES OF DOCUMENTATION ARE IDENTIFIED
ULTRA SCSI MEETINGS AND DOCUMENTATION

- **NOV 1993 SCSI WORKING GROUP**
  - ULTRA SCSI PROPOSAL INTRODUCED
    - ULTRA-1: 20 MEGATRANSFERS/SEC
    - ULTRA-2: 40 MEGATRANSFERS/SEC
  - FIRST TESTING RESULTS PRESENTED (DIFFERENTIAL 20 MEGATRANSFERS/SEC)
  - AVAILABLE IN SCSI DECEMBER MAILING

- **JAN 1994 SCSI WORKING GROUP**
  - DIFFERENTIAL STUB TESTING RESULTS
  - FIRST 30 METRANSFER/SEC RESULTS
  - AVAILABLE IN FEBRUARY SCSI MAILING

- **JAN 1994 SCSI FORUM**
  - SUMMARY OF PREVIOUS WORK
  - AVAILABLE FROM TECHNOLOGY FORUMS
ULTRA SCSI MEETINGS AND DOCUMENTATION

- MARCH 1994 SFF SSWG (QUANTUM)
  - FIRST SINGLE ENDED RESULTS
    » 20 MEGATRANSFERS/SEC
    » COMPLEX STUB CONFIGURATIONS
  - ALL MAJOR SILICON VENDORS PRESENT
    (BOTH SINGLE ENDED AND DIFFERENTIAL)
  - DETAILED TIMING SPECS PROPOSED BY SILICON VENDORS
  - WAVEFORM ANALYSIS SHOWING SKEW AND JITTER SOURCES
  - TIMING SPECS AND SILICON VENDOR COMMENTS AVAILABLE FROM SFF REFLECTOR (MEETING MINUTES)
  - BUS ERROR RATES AND WAVEFORMS AVAILABLE TODAY
  - NEXT MEETING ANNOUNCED FOR 3/31

- MARCH 1994 SCSI WORKING GROUP
  - FIRST 40 MEGATRANSFER/SEC DATA
  - SINGLE ENDED DATA PUBLISHED
  - PROPOSAL FOR SPI-2 STANDARD PROJECT INITIATED
  - WILL BE AVAILABLE IN APRIL MAILING
SINGLE ENDED ULTRA SCSI

Transfer Error Rate Graph

- Good Data
- Bad Data

Time (nS)

10000000000
1000000000
100000000
10000000
1000000
100000
10000
1000
100
10
1

-10 0 10 20 30 40 50 60

SINGLE ENDED ULTRA SCSI
20 MEGATRANSFERS/SEC -- ALL LINES TRANSFERRING DATA
TI SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)
5 FOOT CABLE, ACTIVE TERMINATORS
NO STUBS
TERMINATORS AT DRIVER/RECEIVER

BILL HAM  DIGITAL EQUIPMENT  MARCH 2, 1994  SFF SSWG
SINGLE ENDED ULTRA SCSI

Transfer Error Rate Graph

-10 0 10 20 30 40 50 60
Time (nS)

Good Data
Bad Data

SINGLE ENDED ULTRA SCSI
20 MEGATRANSFERS/SEC -- SCSI DATA LINES TRANSFERRING DATA
TI SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)
5 FOOT CABLE, ACTIVE TERMINATORS
NO STUBS
TERMINATORS AT DRIVER/ RECEIVER

BILL HAM  DIGITAL EQUIPMENT  MARCH 2, 1994  SFF SSWG
T 5 FEET T
DRVR ________________________ ROUND SHIELDED ________________________ RCVR
20 MEGATRANSFERS/SEC

ALL 27 LINES ACTIVE

DRIVER INPUT
RECEIVER OUTPUT

ONLY SCSI DATA BITS ACTIVE

BILL HAM DIGITAL EQUIPMENT  MARCH 2, 1994  SFF ULTRA SCSI SSWG

319
DRVR 5 FEET  RCVR
ROUND SHIELDED

20 MEGATRANSFERS/SEC

DRIVER INPUT
RECEIVER OUTPUT

ONLY SCSI DATA BITS ACTIVE -- CLOCK AT NOMINAL MID POINT
DRVR  5 FEET  RCVR
ROUND SHIELDED

20 MEGATRANSFERS/SEC

DRIVER INPUT

DRIVER OUTPUT

DRIVER INPUT

RECEIVER INPUT
SINGLE ENDED ULTRA SCSI

20 MEGATRANSFERS/SEC -- SCSI DATA LINES TRANSFERRING DATA
1 SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)
1.5M FLAT CABLE, ACTIVE TERMINATORS
13 8" STUBS ON 4" CENTERS
TERMINATORS AT DRIVER/RECEIVER

BILL HAM  DIGITAL EQUIPMENT  MARCH 2, 1994  SFF SSWG
SINGLE ENDED ULTRA SCSI

20 MEGATRANSFERS/SEC -- SCSI DATA LINES TRANSFERRING DATA
TI SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)
1.5M FLAT CABLE, ACTIVE TERMINATORS
13 8" STUBS ON 4" CENTERS
DRIVING AND RECEIVING NEAR MID BUS

BILL HAM  DIGITAL EQUIPMENT  MARCH 2, 1994  SFF SSWG
1.5 METER FRC

DRVR  T  RCVR

13 8" STUBS
20 MEGATRANSFERS/SEC

DRIVER INPUT
RECEIVER OUTPUT

1.5 METER FRC

DRVR  T  RCVR

13 8" STUBS

DRIVER INPUT
RECEIVER OUTPUT
SINGLE ENDED ULTRA SCSI

20 MEGATRANSFERS/SEC -- SCSI DATA LINES TRANSFERRING DATA
4x SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)
3M FLAT/ROUND CABLE 1.5M/SECTION, ACTIVE TERMINATORS
FLAT SECTION NEAR RECEIVER, 13" STUBS ON 4" CENTERS
TERMINATORS AT DRIVER/RECEIVER

BILL HAM    DIGITAL EQUIPMENT  MARCH 2, 1994  SFF SSWG
1.5 METER RND  |  1.5 METER FRC
DRV  |  RCV

20 MEGATRANSFERS/SEC

13 8" STUBS

DRIVER INPUT

RECEIVER INPUT

DRIVER INPUT

RECEIVER OUTPUT

BILL HAM DIGITAL EQUIPMENT  MARCH 2, 1994  SFF ULTRA SCSI SSWG
SINGLE ENDED ULTRA SCSI

20 MEGATRANSFERS/SEC -- SCSI DATA LINES TRANSFERRING DATA
TI SINGLE ENDED DRIVERS/RECEIVERS (3 SEPARATE CHIPS)
3M FLAT/ROUND CABLE 1.5M/SECTION, ACTIVE TERMINATORS
FLAT SECTION NEAR RECEIVER, NO STUBS
TERMINATORS AT DRIVER/RECEIVER
20 MEGATRANSFERS/SEC

DRIVER INPUT

RECEIVER OUTPUT
DIFFERENTIAL ULTRA-2 SCSI

Transfer Error Rate Graph

PHYSICAL SETUP FOR 40 MEGATRANSFER/SEC TESTING
THIS DATA AT 20 MEGATRANSFERS/SEC
SCSI DATA LINES TRANSFERRING RANDOM DATA
27 SINGLE CHANNEL TRANSCEIVERS (27 CHIPS PER END)
20 METER ROUND 30 GA 34 TWISTED PAIR CABLE
NO STUBS, NO LOADS
TERMINATORS AT DRIVERS/RECEIVERS

BILL HAM DIGITAL EQUIPMENT  MARCH 16, 1994 SCSI WORKING GROUP
DIFFERENTIAL ULTRA-2 SCSI

Transfer Error Rate Graph

PHYSICAL SETUP FOR 40 MEGATRANSFER/SEC TESTING
THIS DATA AT 40 MEGATRANSFERS/SEC
SCSI DATA LINES TRANSFERRING RANDOM DATA
27 SINGLE CHANNEL TRANSCEIVERS (27 CHIPS PER END)
20 METER ROUND 30 GA 34 TWISTED PAIR CABLE
NO STUBS, NO LOADS
TERMINATORS AT DRIVERS/RECEIVERS

BILL HAM DIGITAL EQUIPMENT  MARCH 16, 1994 SCSI WORKING GROUP
DIFFERENTIAL ULTRA-2 SCSI
(EXPANDED SCALE)

PHYSICAL SETUP FOR 40 MEGATRANSFER/SEC TESTING
THIS DATA AT 40 MEGATRANSFERS/SEC
SCSI DATA LINES TRANSFERRING RANDOM DATA
27 SINGLE CHANNEL TRANSCEIVERS (27 CHIPS PER END)
20 METER ROUND 30 GA 34 TWISTED PAIR CABLE
NO STUBS, NO LOADS
TERMINATORS AT DRIVERS/RECEIVERS

BILL HAM DIGITAL EQUIPMENT MARCH 16, 1994 SCSI WORKING GROUP
DIFFERENTIAL ULTRA-2 SCSI

20 METERS ROUND 30 TP CABLE,
TERMINATORS AT DRIVER/RECEIVER
NO STUBS, NO LOADS

DRIVER INPUT

RECEIVER OUTPUT

20 MEGATRANSFERS SCSI DATA ONLY
CLOCK SWEPT

DRIVER INPUT

RECEIVER OUTPUT

40 MEGATRANSFERS SCSI DATA ONLY
CLOCK SWEPT

BILL HAM DIGITAL EQUIPMENT MARCH 16, 1994 SCSI WORKING GROUP
DIFFERENTIAL ULTRA-2 SCSI

20 METERS ROUND 30 TP CABLE, TERMINATORS AT DRIVER/RECEIVER NO STUBS, NO LOADS

20 MEGATRANSFERS SCSI DATA ONLY CLOCK CENTERED

40 MEGATRANSFERS SCSI DATA ONLY CLOCK CENTERED

BILL HAM DIGITAL EQUIPMENT MARCH 16, 1994 SCSI WORKING GROUP