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MEMORANDUM -- 04 Nov 1991

TO: John Lohmeyer, Chairman, X3T9.2
FROM: Bill Spence
SUBJECT: Proposed Specifications for S/E Shielded Cables

PROPOSAL

1. In the SCSI-3 Physical Interface Document, par. 5.1 (p 10), replace the third and fourth paragraphs with the following:

Two driver/receiver alternatives are specified:

- (1) Single-ended drivers and receivers, which allow a maximum total bus length of up to 15 meters, depending on the implementation.
- (2) Differential drivers and receivers, which allow a maximum total bus length of 25 meters.

The single-ended and differential alternatives are mutually exclusive.

2. In the SCSI-3 Physical Interface Document, par. 5.2 (p 10), replace the first paragraph with the following:

The characteristic impedance of cable used for single-ended implementations should be no less than 75 ohms and no more than 110 ohms, measured in single-ended mode. The characteristic impedance of cable used for differential implementations should be no less than 100 ohms and no more than 140 ohms, measured in differential mode. Cable parameters other than characteristic impedance are critical to system integrity.

IMPLEMENTORS NOTE:

Cable manufacturers specify the impedance of their cables in various ways. Single-ended mode impedance is measured from one signal conductor to a node of all the conductors, including shields, if any, which are grounded in single-ended implementations. In unshielded ribbon cables, often only the two adjacent conductors to the conductor being measured are grounded--the so-called ground-signal-ground mode. Differential mode impedance is measured between a pair of conductors, typically with all other conductors floating freely. In round shielded twisted-pair cables, the impedance of the outer conductors should not be less than the average by more than 5 ohms.

3. In the SCSI-3 Physical Interface Document, par. 5.2.1 (p 11), replace 6.0 with 15.0.

JUSTIFICATION

The first rendition of the SCSI-3 Physical Interface Document largely carried over cable provisions which date back to SCSI-1, recast in the proper form for SCSI-3. The above proposals are intended to reflect the work of various members of the committee over the past two years to better define what is needed for SCSI cables to perform properly--particularly in single-ended implementations.

The obviously debatable parameter is the maximum allowed total bus length in single-ended implementations. I have not found anyone who knows of any intrinsic reason why single-ended should be limited below the timing-dictated 25 meter limit of differential. The time-honored 6-meter limit seems to have been performance dictated, and most early implementations in fact could not operate with acceptable reliability with 8 devices on even an 6-meter bus.

With widespread adoption of polyolefin dielectrics in shielded cables, with adherence to the signal-placement rule laid out in the last paragraph of 5.2, and with the use of the Boulay terminator, many implementations achieve higher s/e reliability at well above 6.0 meters than they originally achieved at well below 6 meters. At least one OEM has instituted the 15 meter house limit. A poor implementation may not work at 15 meters, but then a poor enough implementation will not work at 6 meters either.

This length is largely a judgment call. Should we have everyone suggest a number and then adopt the median of the numbers suggested?