MEMORANDUM   --   27 Apr 1992

TO: John Lohmeyer, Chairman, X3T9.2

FROM: Bill Spence, Chair, SPI WG

SUBJECT: Key Changes Proposed for the SPI Standard

The biggest change in the SCSI-3 Parallel Interface (SPI) Standard
from its predecessor material is its physical separation from the
rest of the SCSI-3 Standard. This required some reordering and
repositioning of material but is largely obvious and non-controversial.

Another, more controversial organizational change is the separation of
"soft" from "hard" material. The plan is to append "Annexes" which
will contain a considerable body of "soft" material intended to help
SCSI implementors achieve the desired results. Included herein will
be much of what has heretofore been included in Implementors Notes.
Also included is to be specific guidance on improving reliability in
difficult implementations caused by, e.g., stub clustering, excessive
node capacitance, greater than standard total bus length, etc.

Additional specific significant changes are listed below.

1.   Cable Requirements.

   a.   For the first time, the existence of the two modes of measuring
        cable impedance, differential and single ended, are explicitly
        recognized and limits set for both.

   b.   Instead of impedance being specified in terms of a given cable's
        average impedance, the maximum and minimum levels permitted for
        each active conductor or pair in the cable is specified. viz:

	Single-ended	Differential
Minimum, any signal	75 ohms	120 ohms
Maximum, any signal	96 ohms	145 ohms
Maximum difference	12 ohms	20 ohms

        Fully complying with this table requires the use of AWG 26
        conductor in .050 pitch PVC flat ribbon cable.

   c.   The 6.0 meter maximum length of the single-ended bus in downgraded
        to be a recommendation.

   d.   The adjuration against implementing Fast SCSI single-endedly is
        abandoned, but a recommended 3 m max length is substituted.

   e.   The B cable is out. The P and Q cables are in.

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2. Electrical requirements.

    a. The requirements for termination are expressed in the most basic terms possible: "Each terminator shall source current to the signal line whenever its terminal voltage is below 2.5 volts. This current shall not exceed 24 ma for any line voltage above 0.2 volt." This permits the maximum latitude in developing new terminators and encompasses all presently used terminators, EXCEPT for a 220/330 ohm type terminator operating from a TERMPWR voltage less than 4.2 volts and EXCEPT for the Trung Le/Aeronics terminator (in its high-current-sourcing manifestation) and the Methode SLICK terminator. No specific terminator circuits or devices are shown in the main body. This subject presumably is to be expanded upon in an Annex. Regulated terminators are to emphasized and unregulated terminators deprecated.

    b. Active-negation drivers are recommended for Fast SCSI, and sourced power limit recommendations are established.

    c. A driver minimum transition time of 5 ns is recommended.

    d. There are a number of refinements relating to setup and hold timing and skew.