

X3T9.2/91-209

ENDL CONSULTING

MEMORANDUM -- 08 Dec 1991

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TO: John Lohmeyer, Chair, X3T9.2

FROM: Bill Spence

SUBJECT: A Modest Proposal

It is hereby proposed that practically all of the ills which have been reported to afflict the S/E SCSI Parallel Interface can be corrected by a new, precision design in the SCSI bus receivers. No change in the standard is required, and complete backward compatibility exists. The degree of effort required to design and produce such receivers is not herein estimated. The fact that they are not available by simple modification of existing designs is not considered to be controlling.

The receivers would be designed as though the provisions of the standard with respect to Single-Ended Input Characteristics were modified as follows:

Vih (High-level input voltage) = 1.4 to 5.25 volts dc (signal false)
Minimum input hysteresis = 0.4 volts dc

All other characteristics would be unchanged. Again, parts designed to meet such requirements would also meet the requirements of every SCSI Standard issued or draft.

The significance of this requirement is that a negation rise to only 1.4 volts would be registered as negation, and double clocking could not occur unless the negated signal dipped back down below 1.0 volts. Of all the horror waveforms ever displayed before the committee, practically none would have been mishandled under these rules.

BACKGROUND

A number of people have brought before the committee the problems caused by the existence of SCSI cables with impedances below something like 90 ohms. Low-impedance cables, particularly when used with the original 220/330 ohm terminator with sagging levels of TERMPWR voltage, produce weak negation rises which fall well short of meeting the requirements of the standard--that such signals must rise to at least 2.0 volts.

There have been many references to the essential impedance mismatch in single-ended SCSI. The controlling parameters of these impedances are the minimum voltage swing required by the input characteristics of the receivers and the maximum allowable current sinking allowed by the drivers. Raising the driver current is neither practical nor desirable. Lowering the receiver voltage swing may not be easily practical, but it appears to be very desirable.

SCSI devices with improved receivers as proposed here could be freely substituted into all existing equipment designs and would produce immediate great improvements in signal reliability.

OPTIONAL EXTENSION

Should such improved receivers become available and systems configured with them exclusively, further attractive adjustments would then become available, but only through modification or violation of the standard. Specifically, the open circuit voltage of single-ended terminators could be adjusted downward, while keeping the current sourced into e.g. 0.2 volts up right at 24 ma. This would moderate or eliminate the excess current which drivers currently must sink while discharging the capacitance of low-impedance lines charged to 2.85 volts or more.