

TO: ANSI X3T9.2 Committee
FROM: Jim Schuessler
SUBJECT: Fast SCSI Parameter Selection

The last unresolved question pertaining to Fast SCSI is how the different delays are selected. Delays; Deskew, Cable Skew and Hold, which are different from those in SCSI-1, have been proposed which allow 10M-transfers/sec. This paper attempts to address this question with a solution acceptable to the widest audience.

To initialize your thought process on this, keep in mind Dave McIntyre's letter (X3T9.2/87-154) which states in brief, "The values specified during synchronous transfer negotiation shall be the highest performance parameters the negotiating device can RECEIVE."

- 1.) There are three basic solutions that have been proposed to me for selecting these delays. The first and most stringent is to simply have two, and only two, sets. SCSI-1 numbers are good up to 5M-transfers and past that the new numbers for 10M-transfers are in effect. This places the burden on the receiver since now it must have very short setup and hold requirements - even if receiving at 6M-transfers.
- 2.) The second solution sets intermediate values at 7.5M-transfers. Now any device that wanted to receive between 5 and 7.5M-transfers must only require setup and hold corresponding to the slower 7.5M-transfer (slower than 10M-transfer) rate. Still, ANSI would be constraining chip designers to specific setup and hold requirements which may be more aggressive than they would normally design to.
- 3.) Finally, I have proposed a linear curve between the SCSI-1 numbers at 5M-transfers and the Fast SCSI numbers at 10M-transfers. This means that required setup and hold numbers (the delays) correspond linearly to transfer rate. For example if a 7.5M-transfer receiver were being designed, he could expect at least 40/67.5nS. setup/hold at the transmitters connector. The skews between the transmitting connector and his receiver should be subtracted for the resulting setup/hold to the actual receiver. (See X3T9.2/87-138) Now a designer is free to implement exactly that setup and hold requirement for his receivers as is economical.

In addition, the design of the transmitter may be as simple or complex as desired, in that the fast SCSI device may be capable of only two setup and hold value sets; those for old 5M-transfers and those for 10M-transfers (Exactly solution #1 above.) or the fast SCSI device may be capable of three setup and hold value sets; those for 5, 7.5 and 10M-transfers (Exactly solution #2 above.). The impractical limit would be the transmitter which exactly optimized his setup and hold for each difference in transfer rate. Clearly the chip designer is free to implement as simple and cheap or as complex and versatile a device as required for the specific application.

An example:

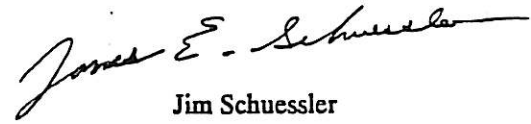
An Initiator requires setup and hold for his receiver corresponding to an 8M-transfer rate, his transmitter is capable of a minimum transfer period corresponding to 6M-transfers. The initiator negotiates with the Target specifying an 8M-transfer rate in the synchronous transfer message.

The Target requires setup and hold values corresponding to a 7M-transfer rate and can also transmit at 7M-transfers/sec. The Target responds with this rate in the synchronous transfer message. The Initiator accepts the 7M-transfer rate. Why? Because the initiator's transmitter provides more setup and hold at the 6M-transfer maximum transmit rate than required by the Target (which can receive with setup/hold corresponding up to 7M-transfers.). In addition, the Initiator accepts the 7M-transfer rate because it only requires setup and hold on the receivers corresponding to the faster 8M-transfer rate.

(over please.)

Recommendation:

I recommend that wording with the intent of number three above be added to the synchronous transfer message section. I proposed wording to that effect in document X3T9.2/87-148.


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