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Ms.Lynn Bara
X3 Secretariat (X3T9.2)
AMERICAN NATIONAL STANDARDS INSTITUTE
TECHNICAL COMMITTEE
1250 I street, NW Suite 200
Washington DC. 20005 USA

Dear Ms.Bara,

RE) SCSI-2 SYNCH TRANSFERS

It is our first time to write a letter to you.
We have got your name by Mr.J.Mang of Toshiba America Information & Systems , Inc.

We have been developing and manufacturing CD-ROM drives ,which have SCSI interface, for US and other market.

According to the talks with some of our customers who would like to connect our drive with their system by SCSI interface, we have encountered a interface problem caused by the different interpretation of SCSI.

We would much appreciate it, if you would inform us of your comment for this issue(detailed information is as per attached).

The points are as follows :

- (1) Attached document item CC) : Please let us know which operation is correct A-LSI or B-LSI.
- (2) Attached document item BB) : Does the implementation executed by Toshiba meets the requirement of SCSI standard.

We thank you for your kind assistance in advance and wait for your reply.

sincerely yours,

TOSHIBA CORPORATION



JUNZO NERIISHI

Manager

Media & Communications Group
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SUBJECT: SYNCHRONOUS TRANSFER INTERPRETATIONAA) Outline of problem

We have encountered a SCSI control LSI (A-LSI) of which the interpretation of synchronous transfer seems to be different from ours, and that causes SCSI bus hang problem.

The problem is;

When synchronous transfer mode is selected, A-LSI issues an ACK pulse only after the offset is reached or if the transfer length is less than the offset value.

Also A-LSI issues an ACK pulse at the assertion of the last REQ pulse.

Our system executes two different transfer modes during synchronous mode.

First mode is used to transfer large amount of data from DRAM.

In this mode, as our SCSI control LSI (B-LSI) sends REQ pulses until it reaches the negotiated offset, no problem occurs and the data is transferred successfully.

Another mode is used to transfer small amount of data, such as INQUIRY data or MODE SENSE data, that is basically stored in the SRAM for microprocessor.

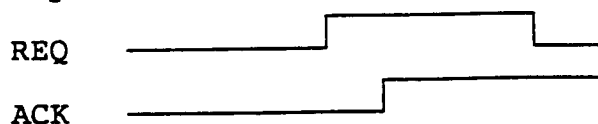
In this mode, our B-LSI asserts REQ signal until it receives the leading edge of ACK signal, which is similar to asynchronous operation.

Therefore SCSI bus hangs because A-LSI expects negotiated number of REQ pulses to receive, while B-LSI expects ACK signal to be asserted.

BB) Our implementation

Our implementation is;

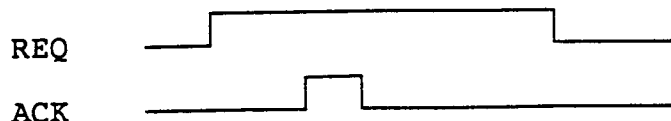
Assert REQ signal and then wait ACK assertion like asynchronous mode.



We believe that this is not asynchronous but synchronous with offset zero implementation.

And as it is allowed to do data transfer less offset, that offset zero is included, our implementation meets SCSI requirement.

Note) The only difference between synchronous of REQ/ACK offset of zero and asynchronous mode is the handling of following sequence, we suppose.



Above sequence, that the ACK signal negates prior to the negation of the REQ signal, might occur for Synchron mode, however it never occur for Asynch mode.

CC) Disputed points

We suppose that there exists following two points.

- 1) A-LSI sends ACK pulse only after the offset is reached to the negotiated offset.
B-LSI asserts REQ signal and wait for ACK signal.
- 2) Detecting the trailing edge of REQ pulse, A-LSI sends ACK pulse.
Detecting the leading edge of ACK pulse, B-LSI takes action.

DD) Basis of our interpretation

Point-1)

As to point (1) above, we believe that the initiator should respond to the first REQ pulse.

The basis is the following description of SCSI-2.

<<Quote>>-----	-----
Responding Device SDTR response	Implied Agreement
-----	-----
(1) Non-zero REQ/ACK offset	Each device transmits data with a transfer period to or greater than and a <u>REQ/ACK offset</u> equal to or <u>less</u> than the values received in the other device's SDTR message.
-----	-----<<Unquote>>

We believe that the target has a right to control (select) the offset during data transfer and that A-LSI's sequence is inappropriate because it requests the target to do data transfer with REQ/ACK offset equal to the value.

Point-2)

We believe that the initiator should act at the leading edge of REQ pulses.

The basis is the following description of SCSI-2.

<<Quote>>-----
The ACK signal may be asserted as soon as the leading edge of the corresponding REQ pulse has been received.
-----<<Unquote>>

It doesn't say "shall" but "may", however SCSI spec implies our interpretation that the host asserts the ACK signal in response to the leading edge of the REQ signal, we believe. Also there is an another description that;

<<Quote>>-----
If the number of REQ pulses exceeds the number of ACK pulses by the REQ/ACK offset, the target shall not assert the REQ signal until after the leading edge of the next ACK pulse is received.
-----<<Unquote>>

This also implies that the SCSI device should act at the leading edge of REQ/ACK pulses, we suppose.