



**InterOffice Memo**

**X3T9.2/ rev 001**

**To:** X3T9.2 Committee  
**From:** Norman H. Harris, I/O Standards Architect  
**Date:** August 11, 2000  
**Subject:** **SCSI-3 Wide Bus Parity Handling Considerations**

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**Statement of Problem/Introduction**

It has come to our attention that the SCSI-2 and SCSI-3 specification contain ambiguities in the area of Selection/Reselection parity handling when different width devices appear on the same bus. The main problem is that narrower width devices do not drive the full bus width, resulting in parity errors for silicon that performs parity checking on these undriven byte lanes.

The proposed tables included for addition to SCSI-3 SPI show the specific requirements for differing sizes of initiators and targets for selection and reselection. "Normal" means compliance with the rules as presently defined in SCSI-3 SPI, Rev 12.. The "current" requirements include parity checking to confirm selection/reselection. The proposed requirements specify parity checking as an optional additional check. Selection and reselection rules are listed separately for the sake of clarity.

**Current Selection Requirements**

- initiators must be set to an ID within the range of the narrowest device on the bus
- targets must detect 2 and only 2 bits active for a valid selection
- targets must check parity on only those bytes that have one or more data bits and/or the respective parity bit active

**Current Reselection Requirements**

- initiators must detect 2 and only 2 bits active for a valid reselection
- initiators must check parity on only those bytes that have one or more data bits and/or the respective parity bit active.

An alternative to the above requirements is offered in order to simplify the selection/ reselection requirements ( and hence the hardware to support them). It is argued that the requirement of 2 and only 2 bits active on the bus is sufficient to guarantee valid selection or reselection independent of the parity bit. Therefore, a subset of the above rules is offered to clarify and replace **Section 10.3.2 Selection Indication** and **Table 11 "Parity Checking Rules"** in SPI (X3T9.2/855D revision 12). **Section 10.4.1-"reselection indication" is proposed amended to include the "reselection parity check" rules.** Parity checking becomes optional to validate selection/reselection.. Parity generation requirements remain unaltered

The following text is proposed: <in bold letters indicates changes against SPI rev 12>

### 10.8 Selection Indication

The selection indication contains the initiator SCSI ID, the target SCSI ID, the attention flag, and the parity flag.

When the SEL signal and the SCSI ID bit assigned to the target PIA are true and the BSY and I/O signals are false for at least a bus settle delay the target PIA shall:

- 1) examine the DATA BUS for valid SCSI ID's <and optionally for parity>
- 2) <if parity is examined and found invalid, set the parity flag>
- 3) < clear parity flag if parity is examined and found valid>
- 4) Set attention flag if the ATN signal is true
- 5) clear the ATN flag if the ATN signal is false
- 6) generate a selection indication

< The SCSI ID's are valid (indicating a valid selection) if two and only two bits are true on the DATA BUS. The initiator(s) must be set to an ID within the range of the narrowest device data path on the bus.> Parity checking rules for a variety of initiator/target bus widths for selection is given from rules in Table 11 (b).

<add this table and accompanying text>

**TABLE 11 (a) Selection Parity Checking Rules**

<b>Selection Parity check</b>	8 bit Initiator	16 bit Initiator	32 bit Initiator
8 bit Target	Initiator - Normal  Target - Normal	Initiator - ID must be 0-7  Target - Normal	Initiator - ID must be 0-7  Target - Check P
16 bit Target	Initiator - Normal  Target - Check only P parity bit, no data bits active on 8-15	Initiator - Normal  Target - Normal	Initiator - ID must be 0-15  Target - Check P, P1
32 bit Target	Initiator - Normal  Target - Check only P, no data bits active on 8-31	Initiator - Normal  Target - Check P, P1, no data bits active on 16-31	Initiator - Normal  Target - Normal

Note:"initiator- normal" means initiator may be assigned any available address in the configuration  
 "target-normal"-means targets detect 2 and only 2 bits active on DATA BUS for a valid selection and **target optionally checks parity** only on those bytes that have one or more data bits or the respective parity bit active.

### 10.4.2 Reselection Indication

The reselection indication contains the target SCSI ID, the initiator SCSI ID and the parity flag.

When the SEL signal and the SCSI ID bit assigned to the initiator PIA and the I/O signal are true and the BSY signal is false for at least a bus settle delay the initiator PIA shall:

- 1) <examine the DATA BUS for valid SCSI IDs and optionally check for parity>
- 2) <if parity is examined, set the parity flag if valid parity is not detected>
- 3) <if parity is examined, clear the parity flag if valid parity is detected>
- 4) generate a selection indication

<The SCSI ID's are valid (indicating a valid reselection) if two and only two bits are true on the DATA bus. >

<add this table and accompanying text>

**Table 11(b)-Reselection Parity Checking Rules**

<b>Reselection Parity check</b>	8 bit Initiator	16 bit Initiator	32 bit Initiator
8 bit Target	Initiator - Normal  Target - Normal	Initiator - Check P, no data bits active on 8-15  Target - Normal	Initiator - Check P, no data bits active on 8-31  Target - Normal
16 bit Target	Initiator - Normal  Target - Normal	Initiator - Normal  Target - Normal	Initiator - Check P, P1, no data bits active on 16-31  Target - Normal
32 bit Target	Initiator - Normal  Target - Normal	Initiator - Normal  Target - Normal	Initiator - Normal  Target - Normal

"Initiator normal" -means initiator may assume any address available in the configuration. Initiator will detect 2 and only 2 bits active on DATA BUS for a valid reselection. The initiator may optionally check parity on those bytes that have one or more data bits or the respective parity bit active.

"target normal" -refers to a well behaved target generating ID and parity as required by SPI