

To: T10 Technical Committee
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Subject: Normal Arbitration Fairness Control in SPI-3

Revision 3: Removed SPC-2 and FCP-2 changes accepted by T10. Removed all QAS discussion.

SPI-2 and SPI-3 include an Annex titled "SCSI Bus Fairness" which defines an optional arbitration fairness algorithm. To date, we have not found any targets implementing the arbitration fairness algorithm. It has not been proven in actual systems. However, targets are starting to implement it. Unlike most SPI features, there is no standard way to identify targets that support the fairness algorithm, or to enable or disable the fairness algorithm in those that do. We propose controlling the algorithm with the Disconnect-Reconnect mode page (2h) FAIR ARBITRATION field (approved by T10 on 5/6/99).

Existing text

SPI-3 prohibits using any bits in this page that it does not mention in section 18.1.1 "Physical disconnect-reconnect mode page" (spi3r07 PDF page 188):

"SCSI parallel devices shall only use physical disconnect-reconnect page parameter fields defined below. If any other fields within the physical disconnect-reconnect page of the MODE SELECT command contain a non-zero value, the device server shall return CHECK CONDITION status for that MODE SELECT command. The sense key shall be set to ILLEGAL REQUEST and the additional sense code set to ILLEGAL FIELD IN PARAMETER LIST."

Recommended change

SPI-3 Revision 7, section 18.1.1:

Add the FAIR ARBITRATION field to table 68, from SPC-2 revision 10 table 114.

Add this text after table 68:

"If the FAIR ARBITRATION field is set to 000b, the target shall not use arbitration fairness during normal arbitration. If this field is set to a nonzero value, the target shall use arbitration fairness during normal arbitration. (See Annex B)

The target shall always use arbitration fairness during quick arbitration.

SPI-3 Revision 7, Section B.1 Model:

Add this paragraph:

"Arbitration fairness in targets is controlled with the Disconnect-reconnect mode page (see section 11.8.1.1)."

SPI-3 Revision 7, 10.2.1 NORMAL ARBITRATION phase

Make these changes:

The procedure for a SCSI device to obtain control of the SCSI bus is as follows:

a) The SCSI device shall first wait for the BUS FREE phase to occur. The BUS FREE phase is detected whenever both the BSY and SEL signals are simultaneously and continuously false for a minimum of a bus settle delay.

NOTE 21 - This bus settle delay is necessary because a transmission line phenomenon known as a wired-OR glitch may cause the BSY signal to briefly appear false, even though it is being driven true.

b) The SCSI device shall wait a minimum of a bus free delay after detection of the BUS FREE phase (i.e. after the BSY and SEL signals are both false for a bus settle delay) before driving any signal.

c) Following the bus free delay in step (b), the SCSI device may arbitrate for the SCSI bus by asserting both the BSY signal and its own SCSI ID, however the SCSI device shall not arbitrate (i.e. assert the BSY signal and its SCSI ID) if more than a bus set delay has passed since the BUS FREE phase was last observed. If arbitration fairness is enabled in the Disconnect-Reconnect mode page (see 18.1.1), the SCSI device shall not arbitrate until its fairness register is cleared (see Annex B).