Date: Jan 10, 2000

To: T10 Committee (SCSI)

From: George Penokie (IBM)

Subject: Paced information unit timing description

1 Overview

This contains a new section that will be added to SPI-4 rev 1. It also includes flow control.

1.0.0.1 Paced information unit transfer

Editors Note 1 - GOP: This section needs a close looking at. It was moved here because of the additional requirements only being able to transfer data during the data valid state and the requirement the data and REQ/ACK transition at the same time as data. Also added in is the flow control/read steaming controls.

Information units shall be transferred on the DT DATA OUT phase and the DT DATA IN phase, and the information units' embedded iuCRC shall be used to detect information unit data errors.

If the I/O signal is true (transfer to the initiator) and the phase of the P1 signal indicates data is valid, to transfer SPI information units the target:

1) Shall drive the DB(15-0) signals to their values and transition the REQ signal;
    1) If read streaming is enabled and the current SPI data streaming information unit is the last SPI data stream information unit of the current read stream then the target shall assert PCRC_A one transmit setup time before one of REQ assertions within the SPI data streaming information unit but no latter than the fourth from the last REQ assertion; and
    2) the target shall negate the PCRC_A signal within one transmit hold time after the last REQ negation of the current SPI data streaming information unit.
2) shall wait at least one transmit setup time from DB(15-0) being driven with valid data;
3) shall hold the DB(15-0) signals valid for a minimum of one transmit hold time;
4) may change or release the DB(15-0) signals; and
5) shall not change the REQ signal for a minimum of one transmit assertion period.

If the I/O signal is true (transfer to the initiator), to receive SPI information units the initiator shall:

1) Read the value on the DB(15-0) signals within one receive hold time of the transition of the REQ signal; and
2) respond with an ACK transition.

If the I/O signal is false (transfer to the target) and the phase of the P1 signal indicates data is valid, to transfer SPI information units the initiator:

1) Shall wait until detecting a REQ transition;
2) shall drive the DB(15-0) signals to their values and transition the ACK signal;
3) shall delay at least one transmit setup time;
4) shall hold the DB(15-0) signals valid for at least one transmit hold time;
5) shall not change the ACK signal for a minimum of one transmit assertion period; and
6) may then change or release the DB(15-0) signals.

If the I/O signal is false (transfer to the target), to receive SPI information units the target:

1) Shall read the value of the DB(15-0) signals within one receive hold time of the transition of the ACK;
    1) If write flow control is enabled and the current SPI data streaming information unit is the last SPI data stream information unit of the current write stream then the target shall assert PCRC_A one transmit setup time before one of REQ assertions within the SPI data streaming information unit but no latter than the fourth from the last REQ assertion; and
    2) the target shall negate the PCRC_A signal within one transmit hold time after the last REQ negation of the current SPI data streaming information unit.

As a result of a SPI information unit always being an even number of transfers, the REQ and ACK signals are negated both before and after the transmission of the SPI information unit.

Paced information unit transfers exception handling conditions are defined in 10.8.3.3.3, and 10.8.3.3.4.