Date: July 19, 2000

To: T10 Committee (SCSI)

From: George Penokie (IBM)

Subject: Make PPR Pace_On bit reserved

Overview

The PPR bit labeled pace_on is redundent with the negoatied rate of f-160 and above. Therefore is should be made reserved.

The changes to SPI-4 follow:

Table 1 - PARALLEL PROTOCOL message format

Bit / Byte	7	6	5	4	3	2	1	0
0	EXTENDED MESSAGE (01h)							
1	EXTENDED MESSAGE LENGTH (06h)							
2	PARALLEL PROTOCOL REQUEST (04h)							
3	TRANSFER PERIOD FACTOR							
4	RESERVED							
5	REQ/ACK OFFSET							
6	TRANSFER WIDTH EXPONENT (m)							
7	P_EN	RESERVED			~~PACE_ON~~ RESERVED	QAS_REQ	DT_REQ	IU_REQ

~~A pacing transfers enabled bit (PACE_ON) of zero indicates that paced transfers shall be disabled. A PACE_ON bit of one indicates that paced transfers shall be used on all DT DATA phases. For negotiated transfer periods greater than 6,25 ns the PACE_ON bit shall be set to zero. For a negotiated transfer period of 6.25 ns the PACE_ON bit shall be set to one.~~

Table 2 - TRANSFER PERIOD FACTOR field

Code	Description
00h-07h	Reserved (note 1)
08h	Transfer period equals 6,25 ns (note 2). This code is only valid if the PROTOCOL OPTIONS field has a value selected that supports DT data ~~paced~~ transfers.
09h	Transfer period equals 12,5 ns (note 3). This code is only valid if the PROTOCOL OPTIONS field has a value selected that supports DT data transfers.
0Ah	Transfer period equals 25 ns (note 4)
0Bh	Transfer period equals 30,3 ns (note 4)
0Ch	Transfer period equals 50 ns (note 5)
0Dh-18h	Transfer period equals the period factor x 4 (note 5)
19h-31h	Transfer period equals the period factor x 4 (note 6)
32h-FFh	Transfer period equals the period factor x 4 (note 7)

note:
1 - Faster timings may be allowed by future SCSI parallel interface standards.
2 - Fast-160 data is latched every 6,25 ns.
3 - Fast-80 data is latched every 12,5 ns.
4 - Fast-40 data is latched every 25 ns or 30,3 ns.
5 - Fast-20 data is latched using a transfer period of less than or equal 96 ns and greater than or equal to 50 ns.
6 - Fast-10 data is latched using a transfer period of less than or equal 196 ns and greater than or equal 100 ns.
7 - Fast-5 data is latched using a transfer period of less than or equal 1 020 ns and greater than or equal to 200 ns

Table 3 - Valid protocol options bit combinations

~~PACE_ON~~	QAS_REQ	DT_REQ	IU_REQ	**Description**
~~0~~	0	0	0	Use ST DATA IN and ST DATA OUT phases to transfer data
~~0~~	0	1	0	Use DT DATA IN and DT DATA OUT phases with data group transfers
~~0~~	0	1	1	Use DT DATA IN and DT DATA OUT phases with information unit transfers
~~0~~	1	1	1	Use DT DATA IN and DT DATA OUT phases with information unit transfers and use QAS for arbitration
~~1~~	~~0~~	~~1~~	~~1~~	~~Use DT DATA IN and DT DATA OUT phases with information unit transfers and paced transfers~~
~~1~~	~~1~~	~~1~~	~~1~~	~~Use DT DATA IN and DT DATA OUT phases with information unit transfers, paced transfers, and use QAS for arbitration~~

The initiator sets its values according to the rules above to permit it to receive data successfully. If the target is able to receive data successfully with these values (or smaller periods or larger REQ/ACK offsets or both), it returns the same values in its PARALLEL PROTOCOL REQUEST message, except for the P_EN value. If it requires a larger period, a smaller REQ/ACK offset, or a smaller transfer width in order to receive data successfully, it substitutes values in its PARALLEL PROTOCOL REQUEST message as required, returning unchanged any value not required to be changed. If the ~~PACE_ON bit is set to zero~~ TRANSFER PERIOD FACTOR contains a value greater than 08h, each SCSI device when transmitting data shall respect the negotiated limits set by the other's PARALLEL PROTOCOL REQUEST message, but it is permitted to transfer data with larger periods, smaller synchronous REQ/ACK offsets, or both. If the TRANSFER PERIOD FACTOR contains a value equal to or less than 08h ~~PACE_ON bit is set to one~~, each SCSI device when transmitting data shall transmit data at the negotiated transfer period but smaller synchronous REQ/ACK offsets are allowed. The completion of an exchange of PARALLEL PROTOCOL REQUEST messages implies an agreement as shown in table 4.

Table 4 - PARALLEL PROTOCOL REQUEST messages implied agreements

Target's PARALLEL PROTOCOL REQUEST response	Implied agreement
Non-zero REQ/ACK offset and a transfer period factor greater than 08h	Synchronous transfer (i.e., Each SCSI device transmits data with a period equal to or greater than and a REQ/ACK offset equal to or less than the negotiated values received in the target's PPR message).
Non-zero REQ/ACK offset and a transfer period factor less than or equal 08h	Paced transfer (i.e., Each SCSI device transmits data with a period equal to and a REQ/ACK offset equal to or less than the negotiated values received in the target's PPR message).
REQ/ACK offset equal to zero	Asynchronous transfer
Transfer width exponent equal to 1	16-bit data
Transfer width exponent equal to zero	Eight-bit data
Protocol options equal to zero and transfer period factor less than or equal to 09h	Eight-bit/asynchronous transfer with PROTOCOL OPTIONS field set to zero
IU_REQ, DT_REQ, and QAS_REQ equal to zero	ST DATA IN and ST DATA OUT phases to transfer data
P_EN bit equal to zero	Precompensation to be disabled at originating SCSI device
P_EN bit equal to one	Precompensation to be enabled at originating SCSI device
DT_REQ equal to one	DT DATA IN and DT DATA OUT phases with data group transfers
IU_REQ, and DT_REQ equal to one	DT DATA IN and DT DATA OUT phases with information units
IU_REQ, DT_REQ, and QAS_REQ equal to one	DT DATA IN and DT DATA OUT phases with information units and use QAS for arbitration
~~IU_REQ, PACE_ON, and DT_REQ equal to one~~	~~DT DATA IN and DT DATA OUT phases with information units and paced transfers~~
~~IU_REQ, PACE_ON, DT_REQ, and QAS_REQ equal to one~~	~~DT DATA IN and DT DATA OUT phases with information units transfers, paced transfers, and use QAS for arbitration~~
MESSAGE REJECT message	The initiator shall set eight-bit/asynchronous transfer with protocol options field set to zero
Parity error (on responding message)	Eight-bit/asynchronous transfer with PROTOCOL OPTIONS field set to zero
Unexpected bus free (as a result of the responding message)	Eight-bit/asynchronous transfer with PROTOCOL OPTIONS field set to zero
No response	Eight-bit/asynchronous transfer with protocol options field set to zero