To:	**T10 Membership**
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Subject:	**Margin Control**
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1   Margin Control Message

The margin control message provides a means to adjust the margin parameters during the domain validation sequence. It is recommended that all parameters be adjusted to their nominal setting when a bus free phase occurs.

Table 1 defines the message format.

Table 1 - Margin Control Message

Byte	Bit 7	6	5	4	3	2	1	Bit 0
0	Message Code (nnh)							
1	Reserved							
2	Reserved							
3	Margin Parameter				Margin Parameter Offset			

Table 2 defines the parameters that may be margined.

Table 2 - Margin Parameter

Code	Margin Parameter
0000b	Reserved
0001b	Signal Ground Bias
0010b	Driver Pre-comp
0011b	Reserved
0100b	Driver Strength
0101b	Slew Rate
0110b	Terminator Impedance
0111b-1101b	Reserved
1110b	General Purpose
1111b	Experimental Test

The signal ground bias cancellation is disabled when the margin parameter offset is 0001b and enabled when the margin parameter offset is 0100b.

The terminator impedance parameter allows for adjusting the impedance of terminators to reduce reflections. The steps are recommended to be in 5 ohm increments.

The experimental test parameter is for use in developing margin tests. It shall not be used on a permanent basis; useful margin test parameters should be encoded into the reserved fields via a request to the T10 committee.

The general purpose parameter is used in lieu of the five specific parameters. It indicates that the receiving device should adjust its margin parameters on transmitters to according to its algorithm for margining.

The remaining margin parameters are self-explanatory based on their titles. The exact adjustment to the parameter is defined by the vendor since it is closely tied the implementation.

Table 3 defines the adjustment of the margin parameter

Table 3 - Margin Parameter Offset Adjustment

Value 3,2,1,0	Offset Adjustment
0111b	Offset three steps in negative direction
0110b	Offset two steps in negative direction
0101b	Offset one step in negative direction
0100b	Nominal Setting
0000b	Not changed
0001b	Offset one step in positive direction
0010b	Offset two steps in positive direction
0011b	Offset three steps in positive direction
1000-1111b	Reserved

The margin parameter offset adjustment field allows for three steps in each direction from nominal settings, a return to nominal settings (default) and an unchanged option. This allows margin parameters to be tested in various combinations for maximum flexibility.

2   Margin Control, Information Units

If Fast 160 is negotiated only information units are to be transferred. Therefore, the Margin Control message cannot be used for Domain Validation margining. It is proposed that Byte 1 of the SPI L_Q Information Unit contain the Margin control Parameters. Bits 7-4 contain the Margin Parameter and Bits 3-0 contain the Margin Parameter Offset Adjustments as defined in Table 2 and Table 3 . The devices shall follow the normal Information Unit Protocol and report statuses as defined in the SPI-4 standard.

If the Command is not a READ or WRITE BUFFER command, with Echo Buffer bit set, the Margin Parameter and Margin Parameter Offset fields shall be ignored.

2.1   WRITE BUFFER Data Transfer

The SPI L_Q information unit sent by the target to retrieve the write data shall contain the Margin Parameter and Margin Parameter Offset values issued in the initial connection. When the Initiator transfers the data the Margin Parameter and Margin Parameter Offset fields shall be identical to those sent in the initial connection.

2.2   READ Buffer

If the target does not support the Margin Parameter requested then it shall return a value of zero in the Margin Parameter field. If the target does not support the Margin Parameter Offset requested then it shall return the nearest value of offset that it supports.