

## Proposal for SPI-5 Programmable Termination

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Purpose: The high frequency attenuation of signals for Fast-320 and higher speeds, in cable and backplane systems is a major problem. The high frequency signal can be smaller than the reflected wave from the termination. The loaded cable and backplane high frequency impedance is often much lower than the 85 ohm specification due to the effects of Periodic Structures that create a Comb filter at these frequencies. The 100 -110 ohm termination needs to adjust to the impedance of the loading of the backplane. The backplanes are often designed at the upper range of the impedance limits of 135 ohms, but with the loading of the drives impedances in the 55 ohm range have been commonly seen on these systems.

This proposal changes the differential bias from a voltage to a current specification.

This proposal leaves the nominal termination at 100 to 110 ohms, but allows for an adjustable terminator that may be set during the SCSI Domain Validation procedure.

Changes to section 7.3.1 LVD Terminations

Table 20 I-V requirements for differential impedance, common mode impedance, and  $V_{BIAS}$  tests.

$V_1$  and  $V_2$  should be changed to current values for better accuracy,  $V_1$  and  $V_2$  are the effects of current and impedance and should be changed to reflect just the current.  $V/S = I$  for  $I_1$  to  $I_2$  range of 1.0 to 1.1 mA.

Table 20 changes

**Table 20 - I-V requirements for differential impedance, common mode impedance, and VBIAS tests**

Values (figure 33)	Differential impedance and VBIAS tests <sup>a</sup> (figure 32)	Common mode impedance and VBIAS tests (figure 34)
V1 (mV)	<del>100</del> N/A	1125
V2 (mV)	<del>125</del> N/A	1375
I <sub>1</sub> (mA) *	1.0	N/A
I <sub>2</sub> (mA) *	1.1	N/A
V3 (V)	1, 0	2,0
V4 (V)	-1,0	0,5
I <sub>max</sub> (mA)	9,00	N/A
I <sub>min</sub> (mA)	-11,25	N/A
S <sub>1</sub> (Ohms)	50 - 125 **	75 – 100 ***
S <sub>2</sub> (Ohms)	60 - 135 **	300 – 400 ***
Measurement	D.C.	D.C.
<sup>a</sup> V <sub>A</sub> + V <sub>B</sub> = 2,5 ± 0,2 V (figure 32)		
* I = V/S		
** The differential impedances of S <sub>1</sub> and S <sub>2</sub> can be set to any value from 55 to 130 ohms with an accuracy of +/- 5 ohms. The difference between S <sub>1</sub> and S <sub>2</sub> shall not exceed 10 ohms. The differential impedance shall be set to a nominal 105 ohms if it is not in a closed system.		
*** Common mode S <sub>1</sub> and S <sub>2</sub> impedance change with the differential impedance changes, the nominal S <sub>1</sub> 100 ohms and S <sub>2</sub> 110 ohms differential is S <sub>1</sub> common mode 100 and S <sub>2</sub> common mode 300 ohms.		
<b>N/A means not applicable</b>		

Note: The driver specifications should be changed to current drive, not the voltage into one termination arrangement. The drivers should be rated for system impedances from 55 to 130 ohms, not for a nominal impedance to insure the output cells will perform correctly over the system load range. A loaded backplane may see 55 ohm termination on both ends of the bus, versus 105 ohms. (this is a recommendation for another proposal, but not part of this proposal.)

Add a paragraph below Table 20

Programmable terminators shall be adjustable from the nominal value of 105 ohms to a range between 55 and 130 ohms.