SPI-4 Driver - Receiver Assumptions

00-239r0
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These are the assumptions that the receiver timing diagrams and driver levels are based on for SPI-4. These were all discussed in 00-227r2 at the May 2000 meetings which generated the new version of the timing diagrams, receiver requirements and drive levels.

1. All measurements are at the device connector.

2. Receivers have a +/-30 mV DC offset.

3. 10% DC loss from terminator tolerance, DC loss and connectors

4. 40% AC loss at 80 MHz over the DC signal level.

5. Drivers for first transition drives strong, after the first bit the drive level drops to the weak driver 60 to 78% of the strong driver. The weak driver must be greater or equal to 320 mV, the strong driver must be less than or equal to 800 mV. Drivers must meet the asymmetry $((0.69 * V)+50)$. Improving the asymmetry to $((0.80 * V)+50)$ will improve the signal level at the receiver and may be required for SPI-5.

6. System noise and crosstalk is 60 mV

7. Receivers must have an active filter that will allow 80 MHz signals that only reach zero crossing when system noise and crosstalk is considered, to be a valid signal. This requires an active filter that will boost the high frequency (80 MHz) signals up to 2X the DC level.

8. Receivers must reject high frequency noise, 3 times the fundamental (Fast-160 – 80MHz, 240 MHz must be rejected).

9. Training pattern required for active filter calibration and skew compensation.

See attached Table A.1 Changes

The receiver mask is not possible without an active filter. New mask need to be created with the active filter.

Table A1 should be

Table A.1 - System level requirements

Parameter	Minimum	Maximum	Cross-reference
V_A (except OR-tied signals) <fast-160	-1 V	-100 mV	note 1
V_A (except OR-tied signals) fast-160	-1 V	0 mV	note 5
V_N (except OR-tied signals) <fast-160	100 mV	1 V	note 1
V_N (except OR-tied signals) fast-160	0 mV	1 V	note 5
V_A (OR-tied signals)	-3,6 V	-100 mV	note 1
V_N (OR-tied signals)	100 mV	125 mV	note 1
attenuation (%) <fast-160		15	note 2
attenuation (%) fast-160		40	note 2
loaded media impedance (Ohms)	85	135	note 3
unloaded media impedance (Ohms)	110	135	Subclause 6.3
terminator bias (mV)	100	125	Subclause 7.3.1
terminator impedance (Ohms)	100	110	Subclause 7.3.1
device leakage (μA)	-20	20	Table 16
number of SCSI devices	2	16	Subclause 4.7
ground offset level (mV)	-355	355	note 4

Note:
1 -These are the signal levels at the receiver, the system allows 60 mV crosstalk for calculating the minimum driver level.
2 -Measured from the driver to the farthest receiver.
3 -Caused by the addition of device capacitive load (see table 9 for calculations).
4 -This is the difference in voltage signal commons for SCSI devices on the bus (see figure 3).
5 - These are the signal levels at the receiver, the system allows 60 mV crosstalk for calculating the minimum driver level for the first bit and sequential bits use <Fast-160.