T10/02-047r1						
Preliminary Timing Budget for Fast-320 (U-640)					**How to get there**	
William Petty, LSI Logic (03/12/2002)						
		Proposed for SPI-5	From SPI-4	From SPI-3	From SPI-3	
Transfer Rate / Clock Info		**Fast-320**	**Fast-160**	**Fast-80**	**Fast40**	
	Basic Period (ns)	6.250	12.500	25.000	25.000	
	DT Period	3.125	6.250	12.500	0.000	
	Period Tolerance	0.030	0.030	0.600	0.700	
Deterministic errors						
	Silicon TX Driver Routing Skew	0.750	0.750	1.500	1.500	
	Package Skew (Initiator)	0.000	0.065	0.065	0.065	
	PCB Layout Skew (Initiator)	0.200	0.200	0.200	0.200	
	Cable Skew (@ 25ps/Ft)	2.500	2.500	2.500	2.500	
	PCB Layout Skew (Target)	0.200	0.200	0.200	0.200	
	Package Skew (Target)	0.000	0.065	0.065	0.065	
	Silicon RX Routing Skew	0.750	0.750	1.500	1.500	
	Receiver Amplitude Dependent Skew	0.200	0.000	0.200	0.200	Via Amplitude Normalization
	TX HL Vs LH Matching	0.500	0.000	0.500	0.500	Via Deskew of both rising & falling edges
	RX HL Vs LH Matching	0.350	0.000	0.500	0.500	Via Deskew of both rising & falling edges
	Receive offset induced asymmetry	0.800	0.000	0.000	0.000	
	Cable Distortion ISI	4.000	4.000	3.000	3.000	Will require Amplitude Normalization
Total of Deterministic errors		**12.060**	**8.530**	**10.030**	**10.030**	
Correctable total		**9.000**	**7.530**	**NA**	**NA**	
Non-Deterministic errors						
	System Noise TX + RX	0.400	0.500	0.000	0.000	Via system Improvements
	Clock Jitter	0.250	0.250	0.500	0.500	
	Cross Talk Induced Jitter	0.500	0.700	0.500	0.500	Via Cable requirements
	Receiver chip noise	0.200	0.200	0.000	0.000	
	Receiver Amplitude Dependent Skew	0.000	0.200	0.200	0.200	
	TX HL Vs LH Matching	0.000	0.500	0.500	0.500	
	RX HL Vs LH Matching	0.000	0.350	0.500	0.500	
	Strobe Placement Accuracy (X2)	0.200	0.500	0.000	0.000	Via Silicon Improvements
	Data Deskew Accuracy (X2)	0.200	0.300	0.000	0.000	Via Silicon Improvements
Total of Non-Deterministic errors		**1.810**	**3.560**	**3.400**	**3.600**	
Total Error Budget SPI-4		13.870	12.090	13.430	13.630	
Compensatable Total		9.200	6.530	0.000	0.000	
Data Setup/Hold without any corrections		-5.373	-2.920	0.985	7.210	
Data Setup/Hold with Single edge Deskew		-3.173	-0.655	NA	NA	
Data Setup/Hold + PreComp		-2.173	0.345	NA	NA	
SPI-5 Additions						
Data Setup/Hold with Dual edge Deskew		-2.648	-0.655	NA	NA	
Data Setup/Hold + PreComp		-1.148	0.845	NA	NA	
Data Setup/Hold + Offset correction		-0.848	0.845	NA	NA	
Data Setup/Hold + Amplitude normalization		0.032	0.845	NA	NA	
	NOTE Cable timings based on good quality twisted pair round shielded cable					
	* These values (in all or part) are removed by the Training Logic					
	* Calculated Value					
	* Reduced Values (From SPI-4)					
	* Possible to Reduce these values					
	* This error was not accounted for prior to SPI-5					