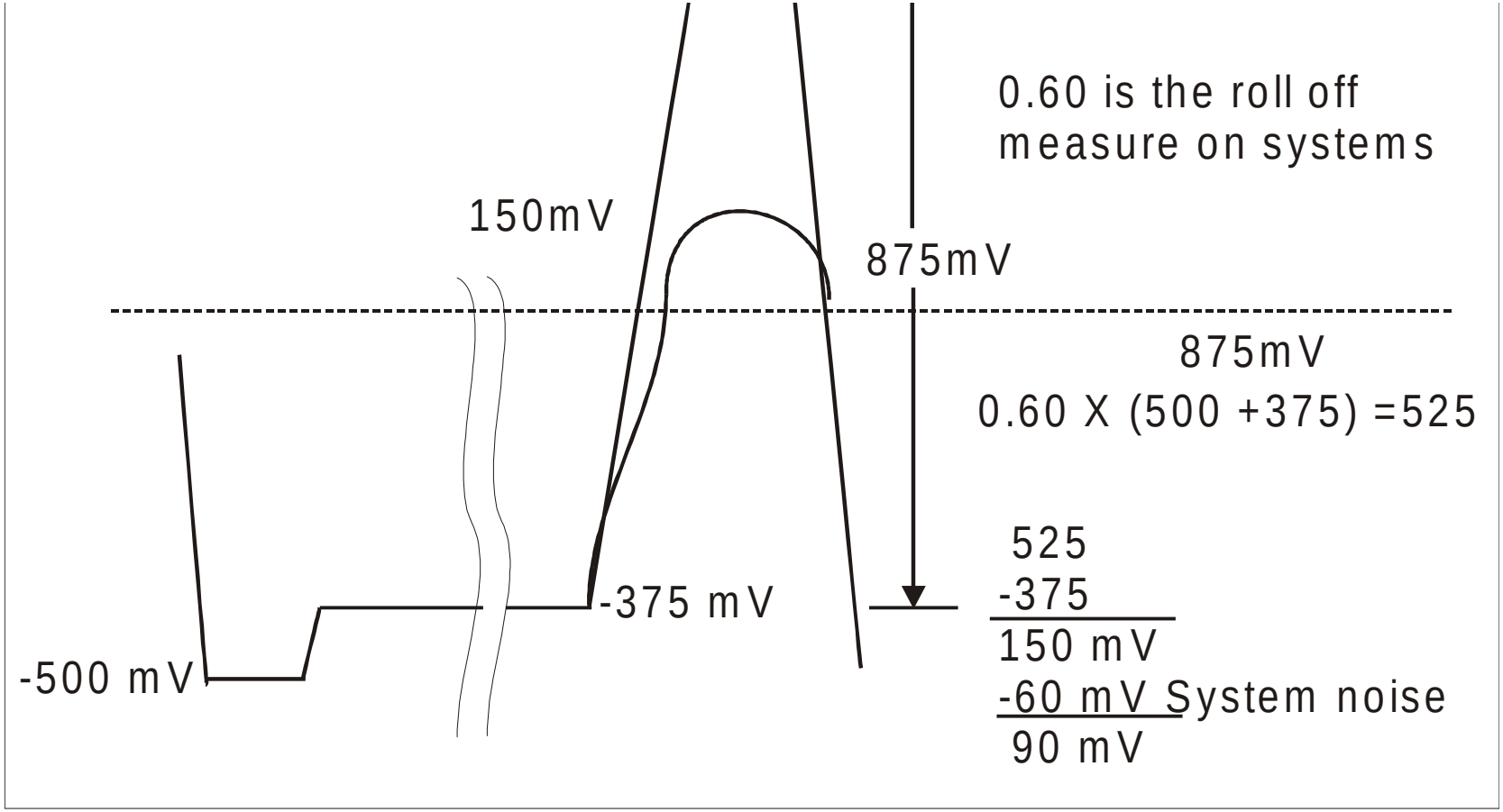
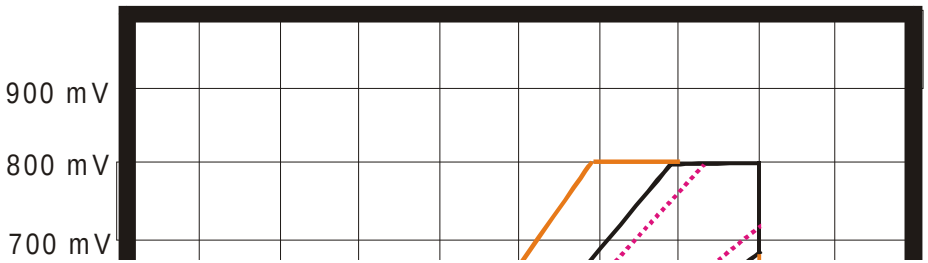
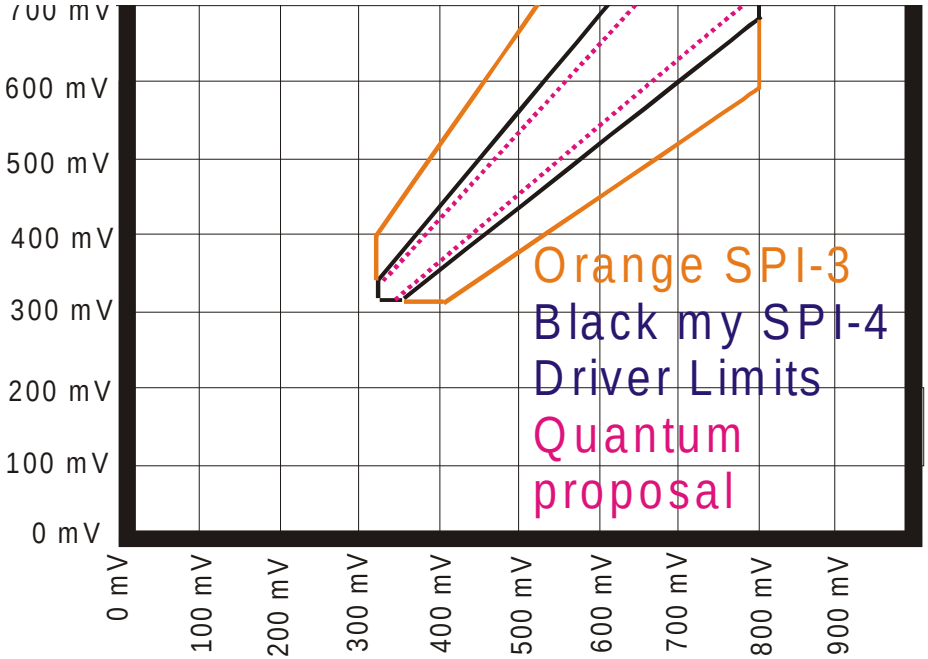
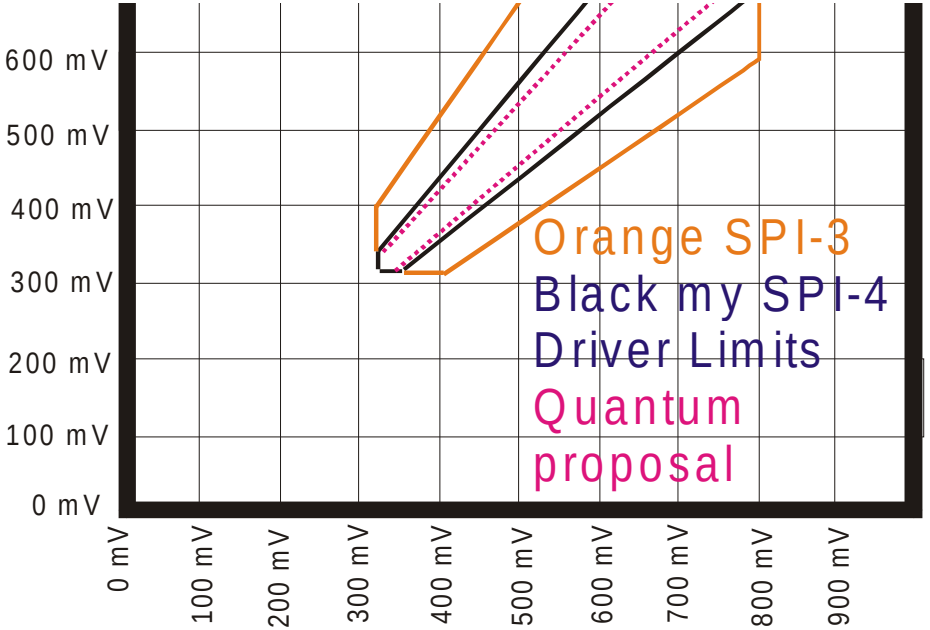
Driver Precomp Proposal, Review

00-227r4	11-Jully-2000									
Paul Aloisi - TI	**320**	**410**	**427**	**485**	**500**	**533**	**600**	**700**	**800**	**Millivolt drive**
Nominal Voltage										
No driver imbalance, matched assertion and negation										
Driver fall back 22%	249.6	**319.8**	**333.06**	**378.3**	**390**	**415.74**	**468**	**546**	**624**	410.2564 mV
Driver fall back 25%	240	307.5	**320.25**	**363.75**	**375**	**399.75**	**450**	**525**	**600**	426.6667 mV
Driver Fall back 33%	211.2	270.6	281.82	**320.1**	**330**	**351.78**	**396**	**462**	**528**	484.8485 mV
Driver Fall Back 40%	192	246	256.2	291	300	**319.8**	**360**	**420**	**480**	533.3333 mV
Worst case, no driver tolerance										Min high drive, for 320 mV
Cable roll off to 60% signal -60 mV crosstalk & Noise										
Trans FB 22% to assert (60%)	32.16	**58.08**	**62.976**	**79.68**	**84**	**93.504**	**112.8**	**141.6**	**170.4**	mV signal at the receiver minus cable loss
	22.944	**46.272**	**50.6784**	**65.712**	**69.6**	**78.1536**	**95.52**	**121.44**	**147.36**	10% DC loss from cable, connectors and terminators
Trans FB 25% roll off to 60%	36	63	**68.1**	**85.5**	**90**	**99.9**	**120**	**150**	**180**	mV signal at the receiver minus cable loss
Trans FB 33% roll off to 60%	47.52	77.76	83.472	**102.96**	**108**	**119.088**	**141.6**	**175.2**	**208.8**	mV signal at the receiver minus cable loss
Trans FB 40% roll off to 60%	55.2	87.6	93.72	114.6	120	**131.88**	**156**	**192**	**228**	mV signal at the receiver minus cable loss
	43.68	72.84	78.348	97.14	102	**112.692**	**134.4**	**166.8**	**199.2**	10% DC loss from cable, connectors and terminators
						(((V+VFB)*.6)-Vfb)-60)				**46 mV receiver required, 60 mV Crosstalk and Systen**
20 mV @ receiver	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**mV** **Active filter required**
80 mV @ receiver	**80**	**80**	**80**	**80**	**80**	**80**	**80**	**80**	**80**	**mV** 99-295 wide pulse
100 mV @ receiver	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**mV** **Bold Black does not work without Active F**
										Purple 20 mV receiver - active Filter?
										Red 80 mV receiver
No Fall back - toleranced 15%	**5.2**	**15.1**	**16.97**	**23.35**	**25**	**28.63**	**36**	**47**	**58**	**Blue 100 mV receiver**
	-1.32	**7.59**	**9.273**	**15.015**	**16.5**	**19.767**	**26.4**	**36.3**	**46.2**	10% DC loss from cable, connectors and terminators
Improved Tolerance driver asymmetry		**15%**								
Cable roll off to 60% signal -60 mV crosstalk & Noise										
Trans FB 22% to assert (60%)	33.36	**51.18**	**54.546**	**66.03**	**69**	**75.534**	**88.8**	**108.6**	**128.4**	mV signal at the receiver minus cable loss
	24.024	**40.062**	**43.0914**	**53.427**	**56.1**	**61.9806**	**73.92**	**91.74**	**109.56**	10% DC loss from cable, connectors and terminators
Trans fb 25% roll off to 60%	37.2	56.1	**59.67**	**71.85**	**75**	**81.93**	**96**	**117**	**138**	
Trans fb 33% roll off to 60%	48.72	70.86	75.042	**89.31**	**93**	**101.118**	**117.6**	**142.2**	**166.8**	
Trans fb 40% roll off to 60%	56.4	80.7	85.29	100.95	105	**113.91**	**132**	**159**	**186**	mV signal at the receiver minus cable loss
	44.76	66.63	70.761	84.855	88.5	**96.519**	**112.8**	**137.1**	**161.4**	10% DC loss from cable, connectors and terminators
										Active filter may be required
Drive tolerance calculation						**(((0.85*V)+50+Vfb)*0.6)-Vfb)-60**				**Helps, but not enough? - 40 mV receiver needed**


0.60 is the roll off
measure on systems
150mV
875mV
875mV
0.60 X (500 +375) =525
525
-375
150 mV
-60 mV System noise
90 mV
-375 mV
-500 mV


900 mV
800 mV
700 mV


700 mV
600 mV
500 mV
400 mV
300 mV
200 mV
100 mV
0 mV
0 mV
100 mV
200 mV
300 mV
400 mV
500 mV
600 mV
700 mV
800 mV
900 mV
Orange SPI-3
Black my SPI-4
Driver Limits
Quantum
proposal



SPI-3

	320	340	400	427	485	500	600	700	800	Millivolt drive
Nominal Voltage										
SPI-2/3 driver	320	340	400	427	485	500	600	700	800	**320**
Isolated Transition	164	178	220	238.9	279.5	290	360	430	500	mV signal at the receiver minus cable loss
SPI-3 Receiver signal	**130.4**	**142.3**	**178**	**194.065**	**228.575**	**237.5**	**297**	**356.5**	**416**	15% cable loss

100 mV @ receiver	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**mV**	
										Minimum signal at the receiver	
Tolorance driver											
SPI-2/3 driver	320	340	400	427	485	500	600	700	800	320	
Cable roll off to 85% signal										mV	
Trans FB min to assert (85%)	122.18	130.91	157.1	168.8855	194.2025	200.75	244.4	288.05	331.7	mV signal at the receiver minus cable loss	
SPI-2/3 calculations	**94.853**	**102.2735**	**124.535**	**134.5527**	**156.0721**	**161.6375**	**198.74**	**235.8425**	**272.945**	15% cable loss	**First step min 320 mV**
Should be SPI-2/3	**76.635**	**83.1825**	**102.825**	**111.6641**	**130.6519**	**135.5625**	**168.3**	**201.0375**	**233.775**	25% cable & system loss	

Additional Data on backplane losses shows that SPI-2 and SPI-3 should have been 25% loss.
Minimum drive level did not work in the worst case.

mV

First step 320 mV marginal

n Noise

Filter