Driver Precomp Proposal, Review DC loss of the backplane is much higher, 16 ohms for 15 slot backplane

00-382r1 31-Oct-00 4 ohms cable DC 500 mV strong driver

Paul Aloisi - TI	**370**	**475**	**495**	**500**	**560**	**620**	**700**	**740**	**800**	**Millivolt drive**
Nominal Voltage										60 - 78% weak
No driver imbalance, matched assertion and negation										**66 - 50% weak**
Driver Fallback 22%	288.6	370.5	386.1	390	436.8	483.6	546	577.2	624	474.359 mV
Driver Fall back 33%	244.2	313.5	326.7	330	**369.6**	**409.2**	**462**	**488.4**	**528**	560.6061 mV
Driver Fall Back 40%	222	285	297	300	336	372	420	444	480	616.6667 mV
Driver Fall Back 50%	185	237.5	247.5	250	280	310	350	**370**	**400**	740 Min high drive, for 370 mV

Assuming perfect driver assymetry Signals levels below are at the connector of the receiving device, use the numbers with DC loss

No Fall back	**14**	**35**	**39**	**40**	**52**	**64**	**80**	**88**	**100**	
Precomp off	**-3.02**	**13.15**	**16.23**	**17**	**26.24**	**35.48**	**47.8**	**53.96**	**63.2**	23% DC loss from cable, connectors and terminators

Worst case, no driver tolerance **35 mV** **-5 mV receiver required - Adaptive Active Filter - no eye pattern**

Cable roll off to 60% signal -60 mV crosstalk & Noise

Trans FB 22% roll off to 60%	**22.0512**	**45.336**	**49.7712**	**50.88**	**64.1856**	**77.4912**	**95.232**	**104.1024**	**117.408**	23% DC loss from cable, connectors and terminators
Trans FB 33% roll off to 60%	**35.7264**	**62.892**	**68.0664**	**69.36**	**84.8832**	**100.4064**	**121.104**	**131.4528**	**146.976**	23% DC loss from cable, connectors and terminators
Trans FB 40% roll off to 60%	**42.564**	**71.67**	**77.214**	**78.6**	**95.232**	**111.864**	**134.04**	**145.128**	**161.76**	23% DC loss from cable, connectors and terminators
Trans FB 50% roll off to 60%	**53.96**	**86.3**	**92.46**	**94**	**112.48**	**130.96**	**155.6**	**167.92**	**186.4**	23% DC loss from cable, connectors and terminators

((((V+VFB)*.6)-Vfb)*0.77)-60) **100 mV receiver required, 60 mV Crosstalk and System Noise**

Color code **Adaptive Active filter required, eye pattern**

20 mV @ receiver **Grey is illegal** 99-295 wide pulse

80 mV @ receiver **Bold Black does not work without Adaptive Active Filter**

100 mV @ receiver **Purple 20 mV receiver - active Filter**

Red 80 mV receiver

Driver Assymetry caclulations **Blue 100 mV receiver**

No Fall back - toleranced 10%	**-22**	**-7.3**	**-4.5**	**-3.8**	**4.6**	**13**	**24.2**	**29.8**	**38.2**	Without DC loss
Precomp off	**-30.74**	**-19.421**	**-17.265**	**-16.726**	**-10.258**	**-3.79**	**4.834**	**9.146**	**15.614**	23% DC loss from cable, connectors and terminators

Improved Tolerance driver asymmetry **10%** **-30 mV receiver required - Adaptive Active Filter - no eye pattern**

Cable roll off to 60% signal -60 mV crosstalk & Noise **Recommended -100 mV Adaptive Active Filter**

Weak 78% roll off to 60%	-5.6688	**12.765**	**16.2762**	**17.154**	**27.6876**	**38.2212**	**52.266**	**59.2884**	**69.822**	23% DC loss from cable, connectors and terminators
Weak 66% roll off to 60%	8.0064	30.321	34.5714	35.634	**48.3852**	**61.1364**	**78.138**	**86.6388**	**99.39**	23% DC loss from cable, connectors and terminators
Weak 60% roll off to 60%	14.844	39.099	43.719	44.874	58.734	**72.594**	**91.074**	**100.314**	**114.174**	23% DC loss from cable, connectors and terminators
Weak 50% roll off to 60%	26.24	53.729	58.965	60.274	75.982	91.69	112.634	**123.106**	**138.814**	23% DC loss from cable, connectors and terminators

DC & AC Loss (((0.77*((V*0.9)-23))+(Vfb*.77))*0.6)-(Vfb*.77))-60 **45 mV receiver needed minimum**

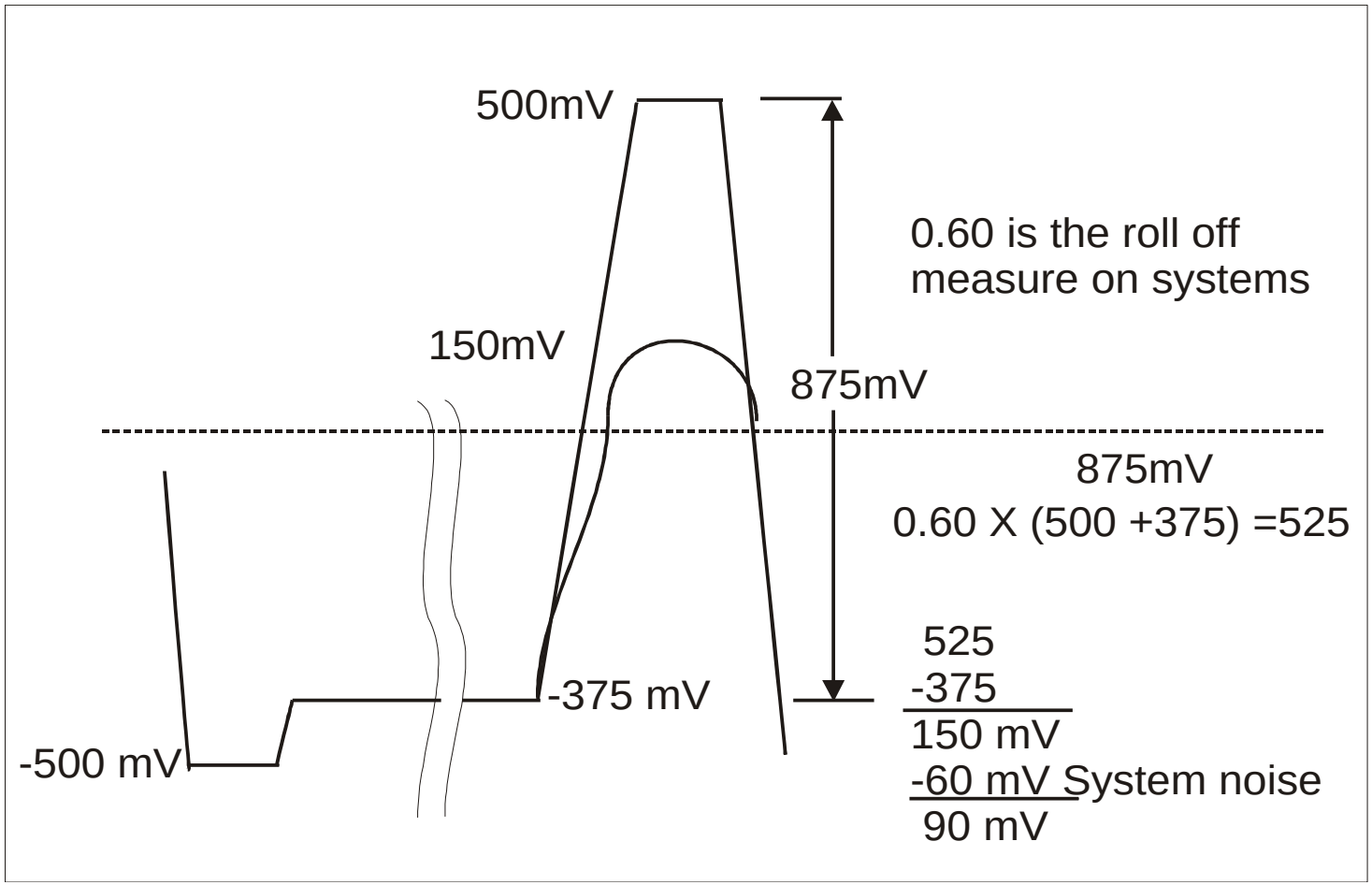
Drive tolerance calculation

Seagate numbers limits configuration

Weak 78% roll off to 70%	40.4234	**72.44**	**78.5384**	**80.063**	**98.3582**	**116.6534**	**141.047**	**153.2438**	**171.539**	23% DC loss from cable, connectors and terminators
Weak 66% roll off to 70%	50.6798	85.607	92.2598	93.923	**113.8814**	**133.8398**	**160.451**	**173.7566**	**193.715**	23% DC loss from cable, connectors and terminators
Weak 60% roll off to 70%	55.808	92.1905	99.1205	100.853	121.643	**142.433**	**170.153**	**184.013**	**204.803**	23% DC loss from cable, connectors and terminators
Weak 50% roll off to 70%	64.355	103.163	110.555	112.403	134.579	156.755	186.323	**201.107**	**223.283**	23% DC loss from cable, connectors and terminators

DC & AC Loss (((0.77*((V*.9)-23))+(Vfb*.77))*0.7)-(Vfb*.77))-60

100 mV Receiver needed for minimum


500mV
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

SPI-3

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	Millivolt drive
Cable roll off to 85% signal										
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
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
Should be SPI-2/3	**125.7702**	**135.0949**	**163.069**	**175.6573**	**202.699**	**209.6925**	**256.316**	**302.9395**	**349.563**	23% DC and 5% ACcable & system loss

Additional Data on backplane losses shows that SPI-2 and SPI-3 should have been 28% loss.
Minimum drive level did not work in the worst case.