

Driver Precomp Proposal, Review

00-227r2

17-May-00

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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% cable loss, DC loss, connector & terminator tolerance
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% cable loss, DC loss, connector & terminator tolerance

46 mV receiver required, 60 mV Crosstalk and System

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

Blue 100 mV receiver

Tolerance driver, asymetry

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

Trans FB 22% to assert (60%)	2.64	11.82	13.554	19.47	21	24.366	31.2	41.4	51.6	mV signal at the receiver minus cable loss
	-3.624	4.638	6.1986	11.523	12.9	15.9294	22.08	31.26	40.44	10% cable loss, DC loss, connector & terminator tolerance
Trans fb 25% roll off to 60%	6.48	16.74	18.678	25.29	27	30.762	38.4	49.8	61.2	
Trans fb 33% roll off to 60%	18	31.5	34.05	42.75	-60	49.95	60	75	90	
Trans fb 40% roll off to 60%	25.68	41.34	44.298	54.39	57	62.742	74.4	91.8	109.2	mV signal at the receiver minus cable loss
	17.112	31.206	33.8682	42.951	45.3	50.4678	60.96	76.62	92.28	10% cable loss, DC loss, connector & terminator tolerance

5 mV receiver required, Active filter required 2X boost

Signal at the receiver

Drive tolerance calculation

$((0.69 \cdot V) + 50 + V_{fb}) \cdot 0.6 - V_{fb}$

Improved Tolerance driver asymetry

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

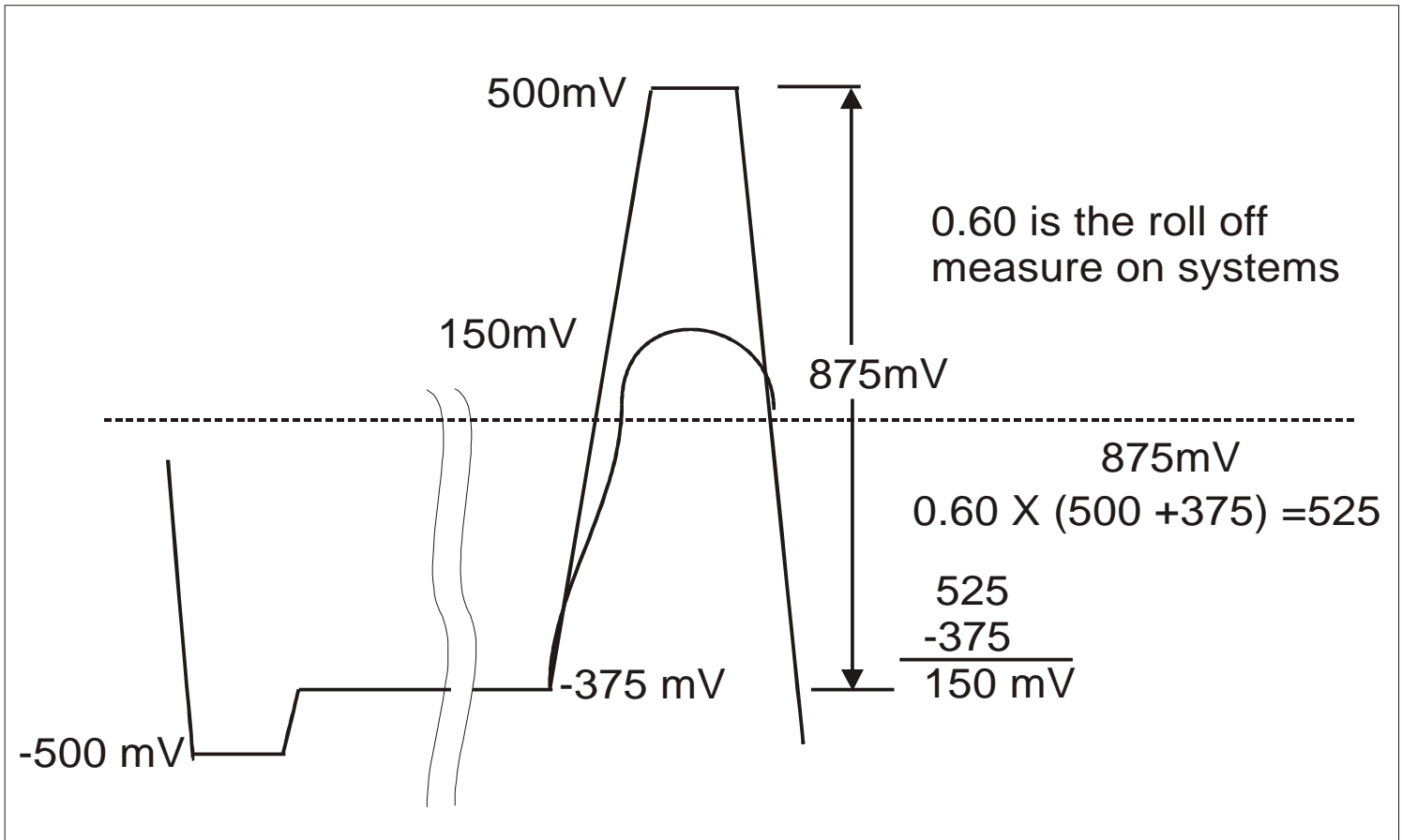
Trans FB 22% to assert (60%)	23.76	38.88	41.736	51.48	54	59.544	70.8	87.6	104.4	mV signal at the receiver minus cable loss
	15.384	28.992	31.5624	40.332	42.6	47.5896	57.72	72.84	87.96	10% cable loss, DC loss, connector & terminator tolerance
Trans fb 25% roll off to 60%	27.6	43.8	46.86	57.3	60	65.94	78	96	114	
Trans fb 33% roll off to 60%	39.12	58.56	62.232	74.76	78	85.128	99.6	121.2	142.8	
Trans fb 40% roll off to 60%	46.8	68.4	72.48	86.4	90	97.92	114	138	162	mV signal at the receiver minus cable loss
	36.12	55.56	59.232	71.76	75	82.128	96.6	118.2	139.8	10% cable loss, DC loss, connector & terminator tolerance

Active filter required, 1.5x boost minimum

Helps, but not enough - 30 mV receiver needed

Drive tolerance calculation

$((0.8 \cdot V) + 50 + V_{fb}) \cdot 0.6 - V_{fb}$



Adding terminator tolerance and connector loss reduces 150 mV by 10% = 135 mV
 Crosstalk and system noise subtracts 60 mV leaving 75 mV for the receiver

SPI-3

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

100 mV @ receiver **100 100 100 100 100 100 100 100 100 mV**
Minimum signal at the receiver

Tolerance driver

SPI-2/3 driver	320	400	427	485	500	600	700	800	320
Cable roll off to 85% signal									
Trans FB min to assert (85%)	122.18	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	124.535	134.5527	156.0721	161.6375	198.74	235.8425	272.945	15% cable loss
Should be SPI-2/3	76.635	102.825	111.6641	130.6519	135.5625	168.3	201.0375	233.775	25% cable mV

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.

First step 320 mV marginal

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