

Driver Precomp Proposal, Review

00-227r3

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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

No Fall back - tolerated

-25.52 -24.26 -24.022 -23.21 -23 -22.538 -21.6 -20.2 -18.8

Tolerance driver, asymetry

-28.968 -27.834 -27.6198 -26.889 -26.7 -26.2842 -25.44 -24.18 -22.92

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

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

Improved Tolerance driver asymetry

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

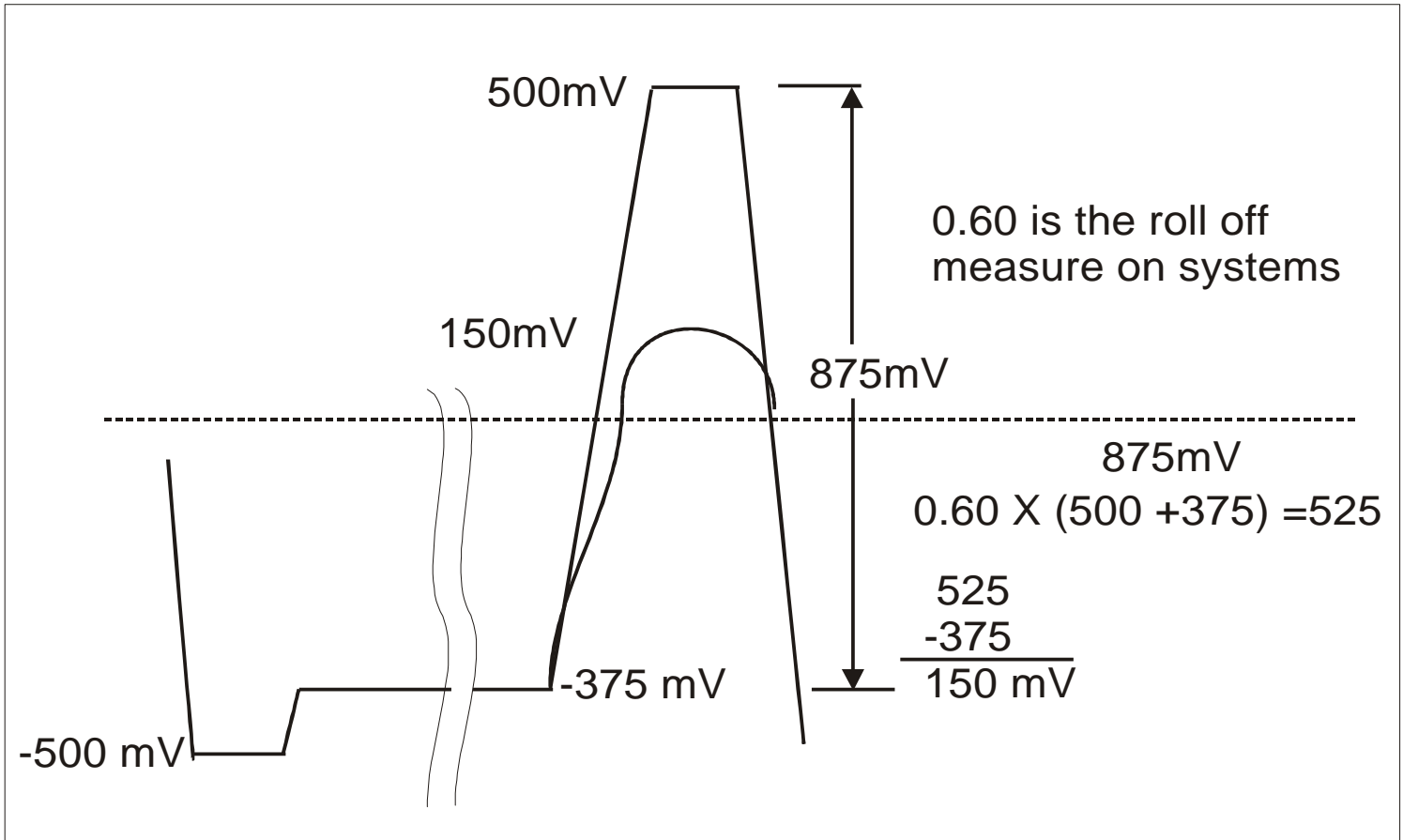
Trans FB 22% to assert (60%)	23.76	38.88	41.736	51.48	54	59.544	70.8	87.6	104.4	mV signal at the receiver minus cable loss
	15.384	28.992	31.5624	40.332	42.6	47.5896	57.72	72.84	87.96	10% cable loss, DC loss, connector & terminator tolerance
Trans fb 25% roll off to 60%	27.6	43.8	46.86	57.3	60	65.94	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

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



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	340	400	427	485	500	600	700	800	Millivolt drive
SPI-2/3 driver	320	340	400	427	485	500	600	700	800	320 mV
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 First step min 320 mV

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

Tolerance driver

SPI-2/3 driver	320	340	400	427	485	500	600	700	800	320
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 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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