

**Driver Precomp Proposal, Review**

00-227r4

11-Jun-00

**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	<b>319.8</b>	<b>333.06</b>	<b>378.3</b>	<b>390</b>	<b>415.74</b>	<b>468</b>	<b>546</b>	<b>624</b>	410.2564 mV
Driver fall back 25%	240	307.5	<b>320.25</b>	<b>363.75</b>	<b>375</b>	<b>399.75</b>	<b>450</b>	<b>525</b>	<b>600</b>	426.6667 mV
Driver Fall back 33%	211.2	270.6	281.82	<b>320.1</b>	<b>330</b>	<b>351.78</b>	<b>396</b>	<b>462</b>	<b>528</b>	484.8485 mV
Driver Fall Back 40%	192	246	256.2	291	300	<b>319.8</b>	<b>360</b>	<b>420</b>	<b>480</b>	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	<b>58.08</b>	<b>62.976</b>	<b>79.68</b>	<b>84</b>	<b>93.504</b>	<b>112.8</b>	<b>141.6</b>	<b>170.4</b>	mV signal at the receiver minus cable loss
	22.944	<b>46.272</b>	<b>50.6784</b>	<b>65.712</b>	<b>69.6</b>	<b>78.1536</b>	<b>95.52</b>	<b>121.44</b>	<b>147.36</b>	10% cable loss, DC loss, connector & terminator tolerance
Trans FB 25% roll off to 60%	36	63	<b>68.1</b>	<b>85.5</b>	<b>90</b>	<b>99.9</b>	<b>120</b>	<b>150</b>	<b>180</b>	mV signal at the receiver minus cable loss
Trans FB 33% roll off to 60%	47.52	77.76	<b>83.472</b>	<b>102.96</b>	<b>108</b>	<b>119.088</b>	<b>141.6</b>	<b>175.2</b>	<b>208.8</b>	mV signal at the receiver minus cable loss
Trans FB 40% roll off to 60%	55.2	87.6	93.72	114.6	120	<b>131.88</b>	<b>156</b>	<b>192</b>	<b>228</b>	mV signal at the receiver minus cable loss
	43.68	72.84	78.348	97.14	102	<b>112.692</b>	<b>134.4</b>	<b>166.8</b>	<b>199.2</b>	10% cable loss, DC loss, connector & terminator tolerance
	<b>((V+VFB)*.6)-Vfb)-60</b>									<b>46 mV receiver required, 60 mV Crosstalk and System</b>

<b>20 mV @ receiver</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20 mV</b>	<b>Active filter required</b>
<b>80 mV @ receiver</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80 mV</b>	99-295 wide pulse
<b>100 mV @ receiver</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100 mV</b>	<b>Bold Black does not work without Active F</b>

<b>No Fall back - toleranced 31%</b>	<b>-25.52</b>	<b>-24.26</b>	<b>-24.022</b>	<b>-23.21</b>	<b>-23</b>	<b>-22.538</b>	<b>-21.6</b>	<b>-20.2</b>	<b>-18.8</b>		<b>Purple 20 mV receiver - active Filter?</b>
<b>Tolerance driver, asymetry</b>	<b>-28.968</b>	<b>-27.834</b>	<b>-27.6198</b>	<b>-26.889</b>	<b>-26.7</b>	<b>-26.2842</b>	<b>-25.44</b>	<b>-24.18</b>	<b>-22.92</b>		<b>Red 80 mV receiver</b>
											10% <b>Blue 100 mV receiver</b>

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

Trans FB 22% to assert (60%)	2.64	<b>11.82</b>	<b>13.554</b>	<b>19.47</b>	<b>21</b>	<b>24.366</b>	<b>31.2</b>	<b>41.4</b>	<b>51.6</b>	mV signal at the receiver minus cable loss
	-3.624	<b>4.638</b>	<b>6.1986</b>	<b>11.523</b>	<b>12.9</b>	<b>15.9294</b>	<b>22.08</b>	<b>31.26</b>	<b>40.44</b>	10% cable loss, DC loss, connector & terminator tolerance
Trans fb 25% roll off to 60%	6.48	16.74	<b>18.678</b>	<b>25.29</b>	<b>27</b>	<b>30.762</b>	<b>38.4</b>	<b>49.8</b>	<b>61.2</b>	
Trans fb 33% roll off to 60%	18	31.5	34.05	<b>42.75</b>	<b>-60</b>	<b>49.95</b>	<b>60</b>	<b>75</b>	<b>90</b>	
Trans fb 40% roll off to 60%	25.68	41.34	44.298	54.39	57	<b>62.742</b>	<b>74.4</b>	<b>91.8</b>	<b>109.2</b>	mV signal at the receiver minus cable loss
	17.112	31.206	33.8682	42.951	45.3	<b>50.4678</b>	<b>60.96</b>	<b>76.62</b>	<b>92.28</b>	10% cable loss, DC loss, connector & terminator tolerance
	<b>((0.69*V)+50+Vfb)*0.6)-Vfb)-60</b>									<b>5 mV receiver required, Active filter required 2X boost:</b>
										Signal at the receiver

**Drive tolerance calculation**

**Improved Tolerance driver asymetry**      15%

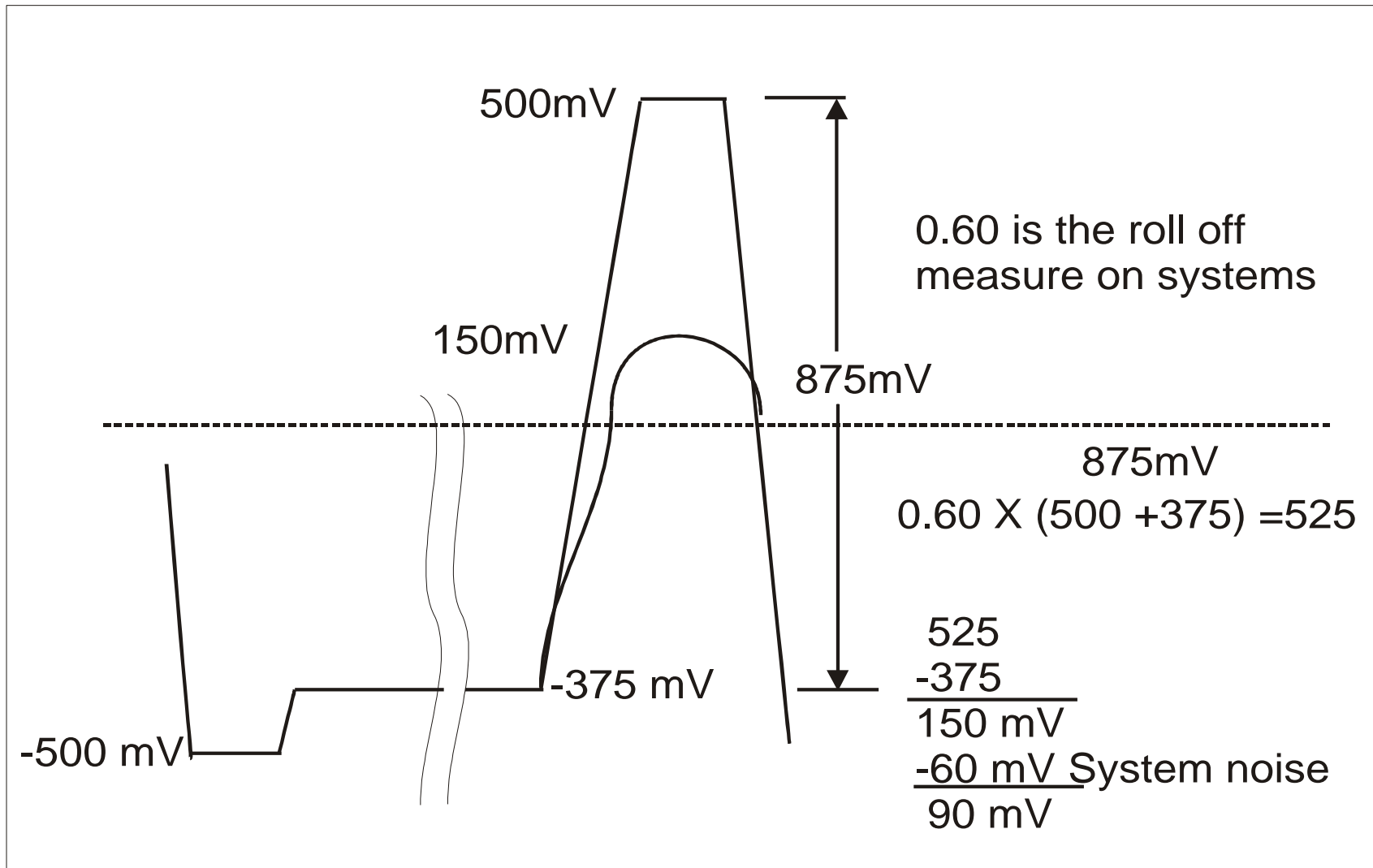
**Cable roll off to 60% signal -60 mV crosstalk & Noise**

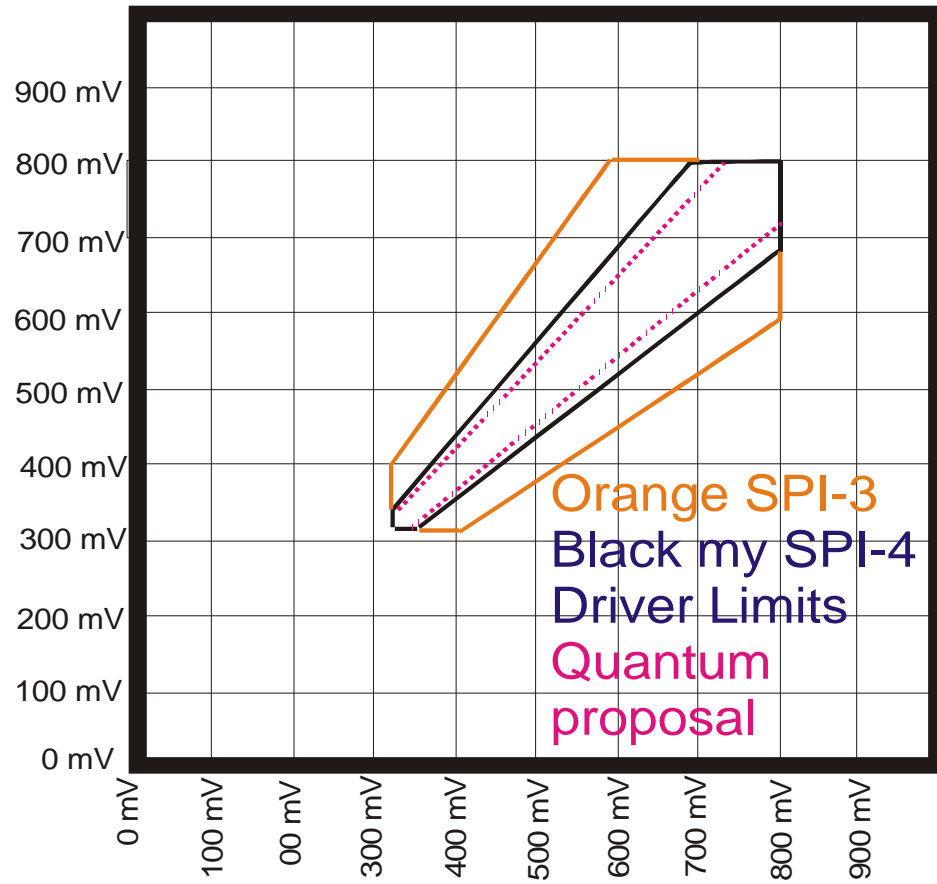
Trans FB 22% to assert (60%)	33.36	<b>51.18</b>	<b>54.546</b>	<b>66.03</b>	<b>69</b>	<b>75.534</b>	<b>88.8</b>	<b>108.6</b>	<b>128.4</b>	mV signal at the receiver minus cable loss
	24.024	<b>40.062</b>	<b>43.0914</b>	<b>53.427</b>	<b>56.1</b>	<b>61.9806</b>	<b>73.92</b>	<b>91.74</b>	<b>109.56</b>	10% cable loss, DC loss, connector & terminator tolerance
Trans fb 25% roll off to 60%	37.2	56.1	<b>59.67</b>	<b>71.85</b>	<b>75</b>	<b>81.93</b>	<b>96</b>	<b>117</b>	<b>138</b>	
Trans fb 33% roll off to 60%	48.72	70.86	75.042	<b>89.31</b>	<b>93</b>	<b>101.118</b>	<b>117.6</b>	<b>142.2</b>	<b>166.8</b>	
Trans fb 40% roll off to 60%	56.4	80.7	85.29	100.95	105	<b>113.91</b>	<b>132</b>	<b>159</b>	<b>186</b>	mV signal at the receiver minus cable loss
	44.76	66.63	70.761	84.855	88.5	<b>96.519</b>	<b>112.8</b>	<b>137.1</b>	<b>161.4</b>	10% cable loss, DC loss, connector & terminator tolerance

**Drive tolerance calculation**

**((0.85\*V)+50+Vfb)\*0.6)-Vfb)-60**

**Active filter may be required**  
**Helps, but not enough? - 40 mV receiver needed**





**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	<b>320</b> 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	<b>130.4</b>	<b>142.3</b>	<b>178</b>	<b>194.065</b>	<b>228.575</b>	<b>237.5</b>	<b>297</b>	<b>356.5</b>	<b>416</b>	15% cable loss <b>First step min 320 mV</b>

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
<b>SPI-2/3 calculations</b>	<b>94.853</b>	<b>102.2735</b>	<b>124.535</b>	<b>134.5527</b>	<b>156.0721</b>	<b>161.6375</b>	<b>198.74</b>	<b>235.8425</b>	<b>272.945</b>	15% cable loss
<b>Should be SPI-2/3</b>	<b>76.635</b>	<b>83.1825</b>	<b>102.825</b>	<b>111.6641</b>	<b>130.6519</b>	<b>135.5625</b>	<b>168.3</b>	<b>201.0375</b>	<b>233.775</b>	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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