Effect of Varying Transmitter Amplitude on Ultra320 SCSI Receiver Equalization

Russ Brown
Quantum Corporation

SCSI Physical Working Group Meeting
07 March 2000
Dallas, TX
• All receiver equalization data presented by Quantum to this point has been based on a 400mV base-to-peak transmitter amplitude.

• This was intentional to allow comparison to 1.8x transmitter precomp boost (720mV base-to-peak) and still remain within the SPI specification.

• The following data is for a "worst case" configuration evaluating the effect of increasing amplitude on receiver equalization.
**Config 3: Loaded Long Cable + BP**

- Hitachi 10 meter 32AWG twisted-flat ribbon cable† with 25cm load spacing plus loaded 6-slot backplane.
- Waveforms captured @ 4Gs/s:

†supplied by Hitachi & Circuit Assembly
Config 3*, Ultra160†

*10m twisted-flat cable w/9 loads + loaded 6-slot backplane @ cp9

†Slide From Presentation T10/00-147r1

Conclusion: Failing Margin*

(*Increasing amplitude would make margin adequate)
Config 3*, Ultra320, No comp†

*10m twisted-flat cable w/9 loads + loaded 6-slot backplane @ cp9

‡Slide From Presentation T10/00-147r1

Conclusion: Failing Margin
Conclusion: Insufficient Margin
(Can't increase amplitude to improve margin)
Conclusion: Excellent Set-up Margin*  
(*Increased amplitude would make Hold margin adequate)
Conclusion: Excellent Margin

Data file: ribb10m/eq10mrib.dat

Config 3*, U320, Rx Eq @ 500mV

*10m twisted-flat cable w/9 loads + loaded 6-slot backplane @ cp9
Conclusion: Excellent Margin
U320 Margin vs RxEq Amplitude

10m ribbon cable, 9 loads + loaded
6-slot backplane @ cp9

Eye Opening Amplitude (mV)

- RxEq @ 720mV
- RxEq @ 500mV
- RxEq @ 400mV

U320 Setup eye mask

Setup Time (ns)

0 0.5 1.0 1.5 2.0 2.5 3.0

0 50 100 150 200 250 300 350 400
As predicted, increasing transmitter amplitude will increase margin when using receiver equalization.