Ultra320 SCSI into a Fully Populated 10-slot Backplane

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**Introduction**

- **We wanted to obtain measurements on additional standard “worst-case” system configurations.**
  - The system used to gather data in this presentation is from a major manufacturer.
  - This system has low backplane impedance resulting in greater than 50% attenuation @ 80 MHz.

- **Margins for this system were evaluated with the same techniques as used for our other Ultra320 data:**
  - The signals were measured to find the eye opening with ISI, reflections, and crosstalk including: amplitude errors, timing shift errors, and miscellaneous noise.
  - Transmitter driving voltage: +/- 400mV.
  - Transmitted Pattern: 2µs of “101010…” training pattern followed by 8µs of random data.
  - The equalizer input signals are captured differentially with a Tektronix TDS694C oscilloscope by probing at the backplane.
  - The equalizer output signal is generated by Spectre, simulating in transistor level models and using captured data as input stimulant.
Config 1: Long Cable + Backplane

- Hitachi 10 meter 32AWG twisted-flat ribbon cable† plus 10-slot backplane.
- Waveforms captured @ 4Gigasamples per second.

† supplied by Hitachi & Circuit Assembly
Test Schematic

50 Ω aggressor
XTALK source 1†

50 Ω random
data source*

50 Ω aggressor
XTALK source 2†

Cable + backplane configuration 4

Perfect terminators

Termination 100Ω,
located at end of back-plane

Differential probe on victim

* TEK 2041       † HP81130A

IC

Db1+ "Db1- Db0+ Db0- DbP1+ DbP1-"
Config 4, No Comp (raw signal)

*10m twisted-flat cable + loaded 10-slot backplane @ bp1
Conclusion: Failing Margin

(Increasing amplitude would still fail)
Config 4, RxEq (raw signal)

*10m twisted-flat cable + loaded 10-slot backplane @ bp1
*10m twisted-flat cable + loaded 10-slot backplane @ bp1

**Conclusion:** Excellent Margin
Margin vs Amplitude for Config 4

10m twisted-flat cable + loaded 10-slot backplane @ bp1

Eye Opening Amplitude (mV)

Setup Time (ns)

- Setup Time
- Equalizer Output
- Equalizer Input
- U320 Setup eye mask

Margin vs Amplitude for Config 4

- 10m twisted-flat cable + loaded
- 10-slot backplane @ bp1

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