
Backplane Characterization Methodology

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Two Main Methodologies

- Time Domain
 - Using TDR
- Frequency Domain
 - Using Network Analysis

Proposal

- Try using both and determine which gives us the most information
- Using a TDR (time domain), resolution is difficult if the DUT contains many elements (which is typical)
- Network Analyzers (frequency domain) do not handle differential signals (can do 4 port, treating each differential signal as 2 single-ended signals)

Goal of Proposal

- Characterize backplanes to determine which are 'good' and which are 'bad'
- If 'bad' – create model and simulate
- Determine the negative characteristics by viewing the output of the simulator
- Make changes to the model (knowing the relationship of the DUT to the model) to remove or mitigate the negative characteristics

Goal (continued)

- Re-simulate with new model determined in 4.
- If 'good' implement changes in DUT and go to #8.
- If 'bad' go to step # 3.
- Test new DUT – if 'good' –Done; if 'bad', go to step # 2.

Methodology (continued)

- This procedure allows design to progress without many iterations of hardware
- Hopefully during the development of this methodology, we can determine the characteristics needed for a 'good' backplane and specify

Network Analysis (frequency domain)

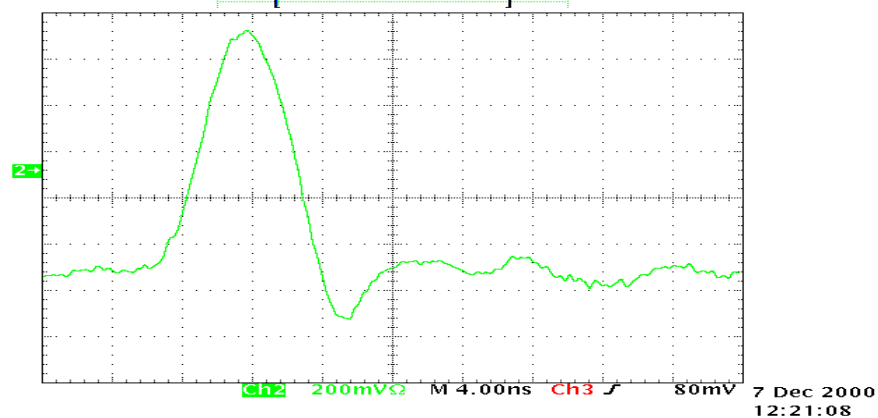
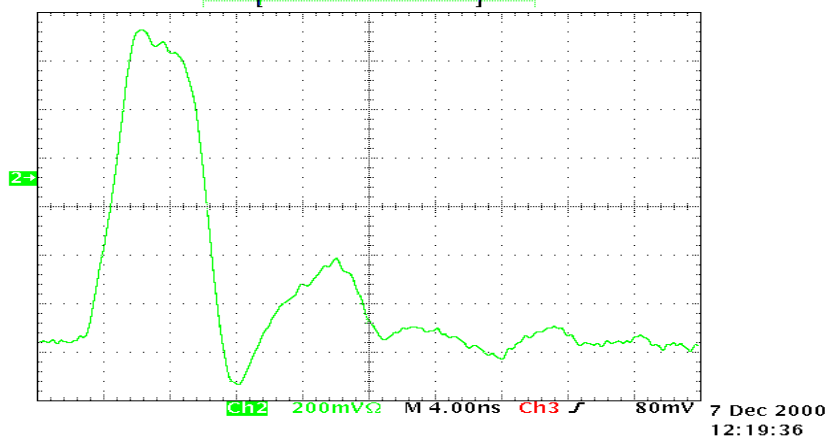
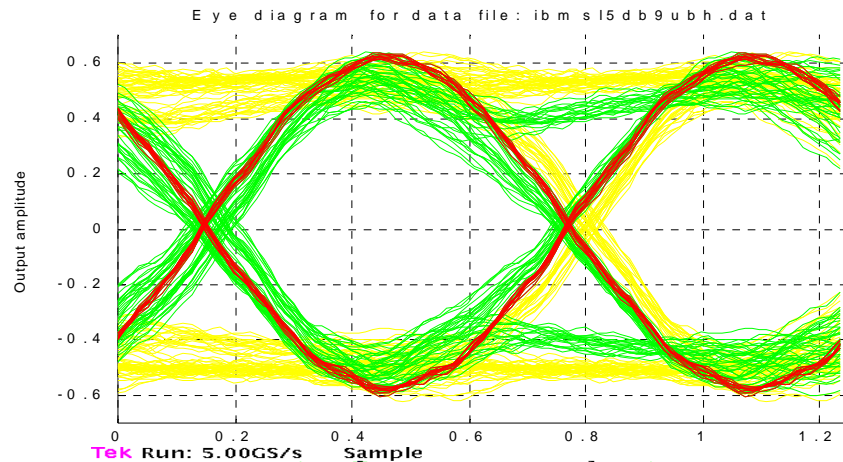
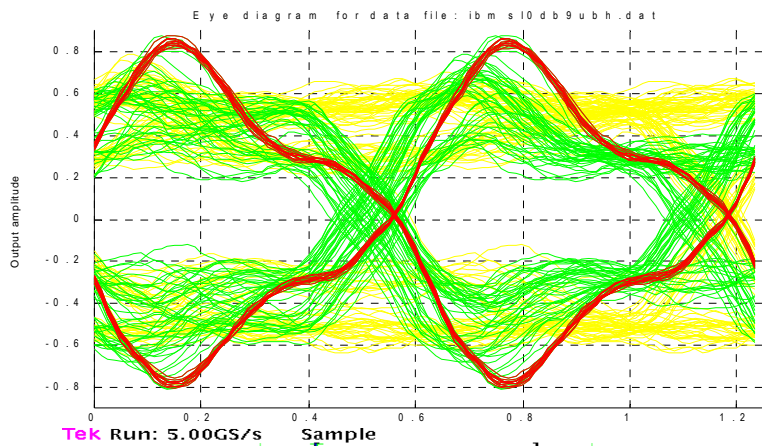
- Plan to start with 4 port, S-parameter characterization.
 - Determining model will be difficult as s-parameters are frequency dependent (need frequency dependent elements)
 - Can use non-freq. dependent elements over a small (?) range of frequencies
- Plan to force Larry Barnes to help solve drawbacks

TDR (time domain)

- Will probably have to disintegrate backplane into its components (or start with a simple – few elements-backplane)
 - Connectors
 - PCB with traces
 - Drives
- TDR and model each component separately
- Build system model using component models

Correlation

- We have done simple tests and seen correlation between TDR(?) data and eye patterns



Conclusions

- It is believed that this methodology can be developed
 - Either time domain
 - Or frequency domain
 - Or both
- In Six (6) months a methodology can be developed which can be correlated between companies
- After this further refinements will be developed if the methodology is easy to implement and useful