Eye Masks in IBIS

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Agenda

• Problem – Eye Masks are independent of IBIS models
• Proposal – Include Eye Mask data in IBIS models
• Examples
• Conclusion
Problem

• Eye diagrams can be used to validate clock and data meets:
  – Interface standards
  – Device specific requirements
• Eye masks are not tied to IBIS models today
  – They must be manually added to simulation results
  – This may delay eye mask checking until late in design flow
• IBIS does support voltage threshold, but there is no support of a time domain ‘threshold’
Proposal

- Eye mask data should be included in IBIS files
  - Design flows will be improved
- Eye mask data can represent either standard requirements (i.e. PCI Express) or device specific eye limits
  - IC companies can offer more value and differentiation in their IBIS models
Eye Masks in IBIS Models
Allows integration of device specific time and voltage limits

• SerDes Channel Analysis
  – Interface standard eye masks can be included in IBIS models for easy checking of interface compliance
  – SerDes vendors may want to “advertise” less stringent eye mask requirements in their IBIS models

• Common / Source Sync
  – The time ‘threshold’ limit can be sum of setup and hold time and other relevant elements
  – A device specific eye mask can be located at a time axis that equates to the clock / strobe edge
Example: HDMI SerDes Eye Mask

- HDMI eye mask
- HDMI TP2 eye mask
Example: Source Synchronous Signal Eye Mask

- Source synchronous signal eye mask are aligned with their strobe signal sampling time.
- The basic eye mask elements can be setup time, hold time and strobe jitter.
Example: Common Clock Signal Eye Mask

- Common clock signal eye mask should be located at time axis according to the driver’s clock edge.
Conclusion

• Eye masks are commonly used to validate that signals are compliant with standard interface requirements

• Including eye mask data in IBIS models will
  – Promote earlier use of eye masks in the design process allowing problems to be discovered earlier
  – Allow IC vendors to advertise their device-specific less-stringent eye mask requirements

• We would like to share our experience and promote this to the IBIS standard
Thanks