Eye Masks in IBIS

Meng, Yubao (yubao@cadence.com)
Cadence Shanghai SPB R&D Center

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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