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INVENTIVE

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

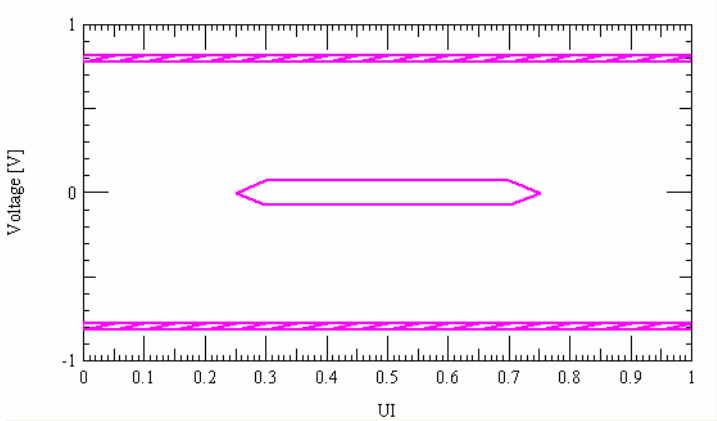
Eye Masks in IBIS Models

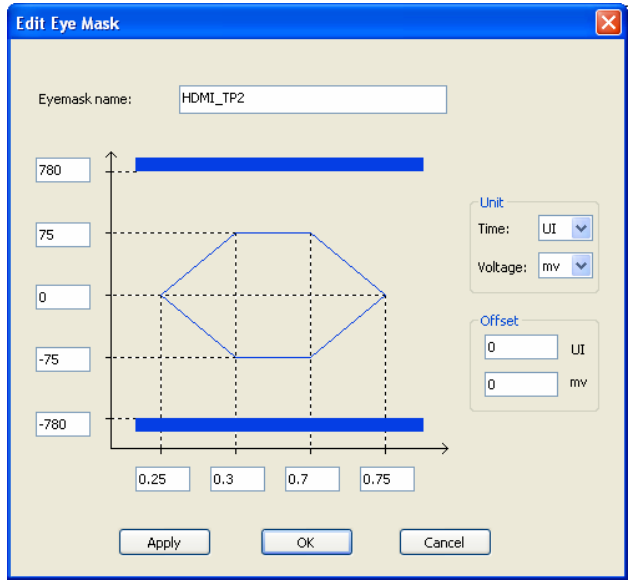
Allows integration of device specific time and voltage limits

- 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

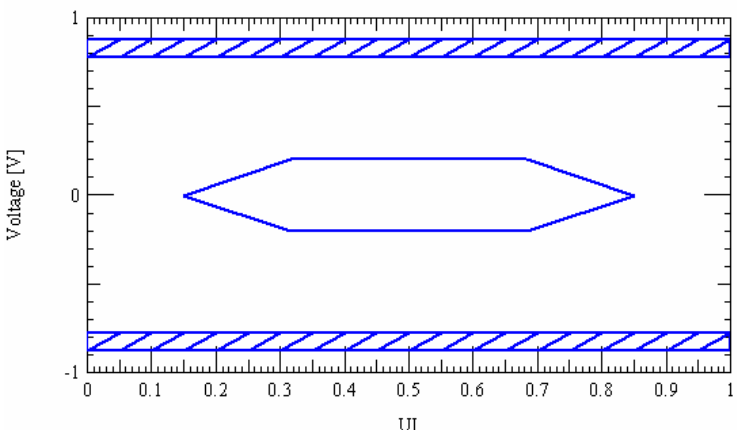
Example: HDMI SerDes Eye Mask

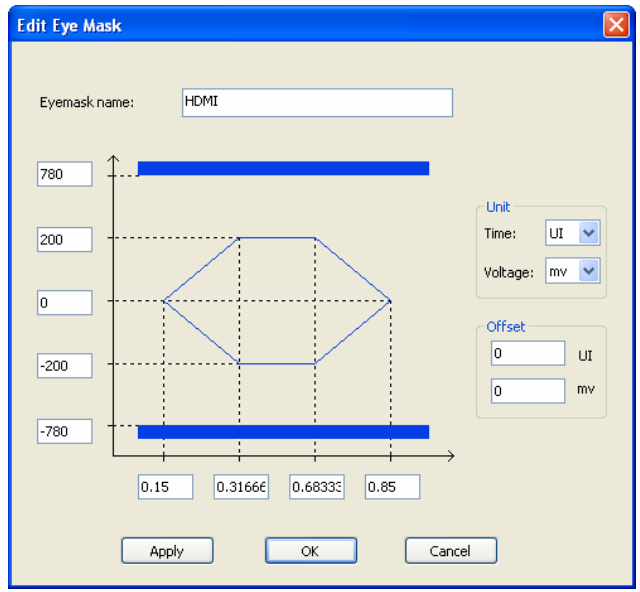
- HDMI eye mask





- HDMI TP2 eye mask





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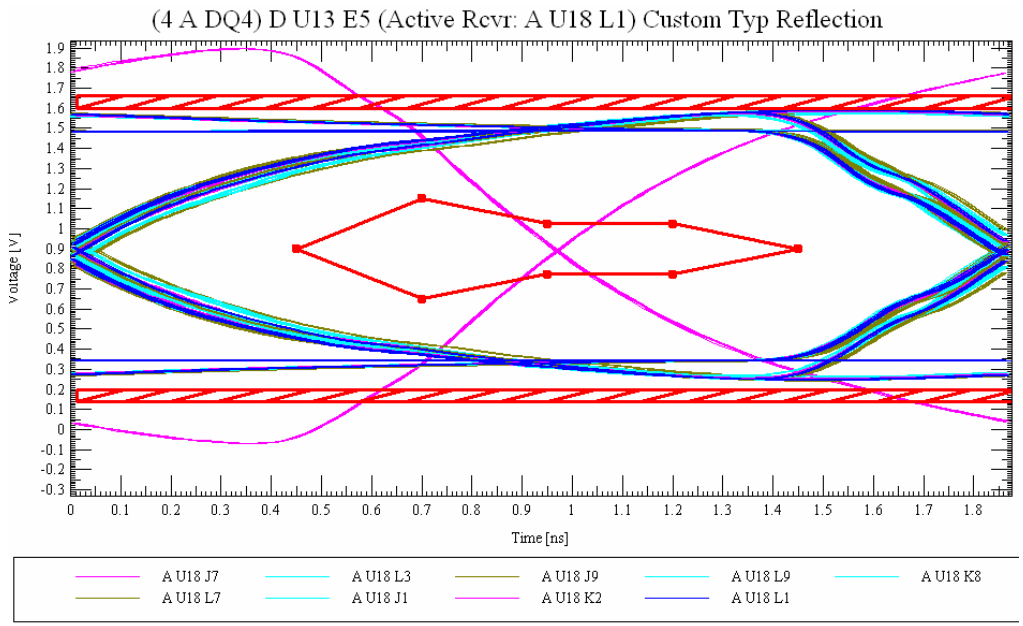
Example: Source Synchronous Signal Eye Mask

- 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



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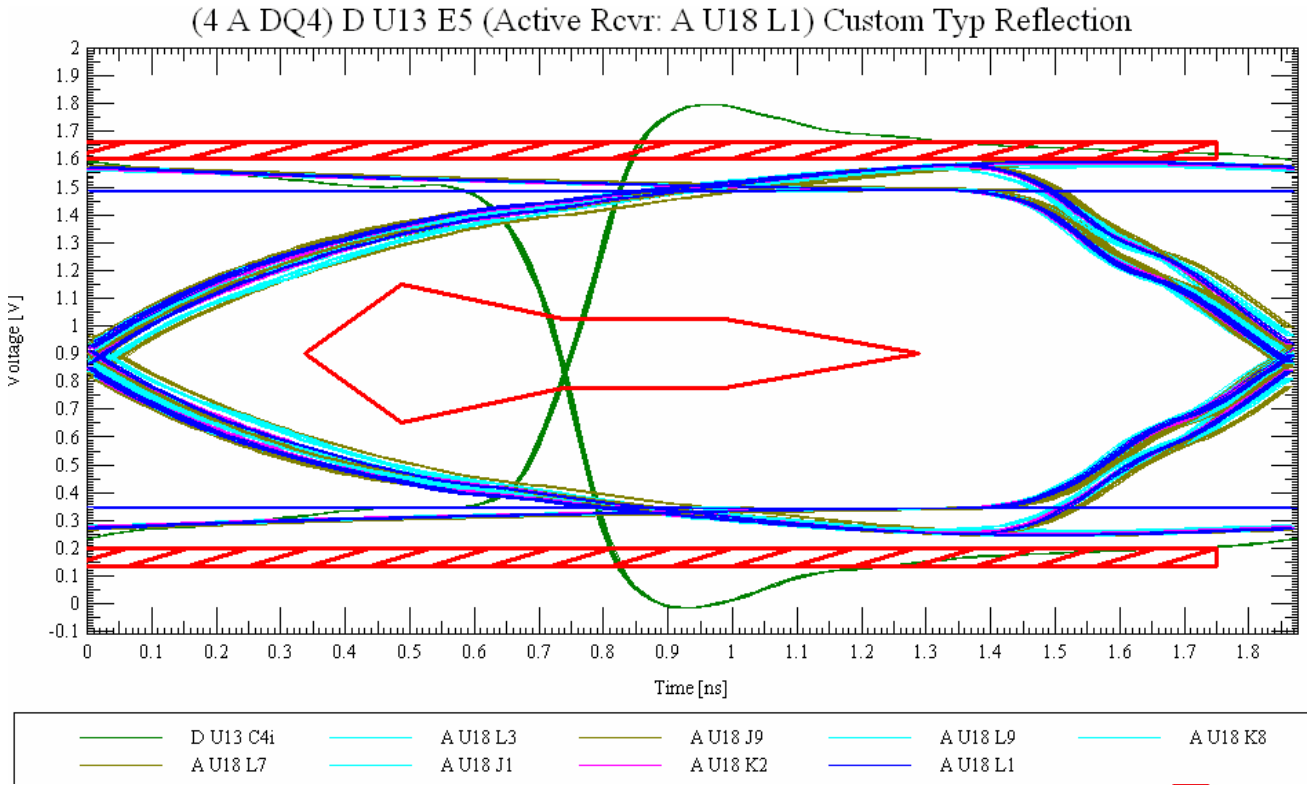
Example: Common Clock Signal Eye Mask

- Common clock signal eye mask should be located at time axis according the driver's clock edge



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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

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