Expectations for IBIS 7.1

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Agenda

• History of IBIS 7.1 Development
• Major and Minor Features
  • Complex C_comp Modeling
  • On-die Power Distribution Networks
  • EMD: Electrical Module Descriptions
  • Other Major Changes
• What Comes Next
IBIS 7.1 Development

• Editorial Task Group re-convened February 26, 2021, to assemble IBIS 7.1
  • Weekly meetings Wednesday, 8 AM US Pacific time
• Technical content closed with 13 BIRDs approved for inclusion on July 16
• Two additional BIRDs written by Editorial task group and approved by Open Forum votes on October 8 and 29, 2021
• Editorial work completed on October 27, 2021, and draft IBIS 7.1 document released for review
• Draft introduced at October 29, 2021, Open Forum meeting
• IBIS 7.1 draft available at https://ibis.org/ver7.1_wip
Major and Minor Features of 7.1

- **BIRD195.1:** Enabling [Rgnd] and [Rpower] Keywords for Input Models
- **BIRD197.7:** New AMI Reserved Parameter DC_Offset
- **BIRD198.3:** Keyword Additions for On-Die PDN (Power Distribution Network) Modeling
- **BIRD199:** Fix Rx_Receiver_Sensitivity Inconsistencies
- **BIRD200:** C_comp Model Using IBIS-ISS or Touchstone
- **BIRD202.3:** Electrical Descriptions of Modules
- **BIRD203:** Submodel Clarification
- **BIRD205:** New AMI Reserved Parameter for Sampling Position in AMI_Init Flow
- **BIRD206:** Clarification of text “transition time”
- **BIRD207:** New AMI Reserved Parameters Component_Name and Signal_Name
- **BIRD208:** Clock-Data Pin Relationship Keyword
- **BIRD209:** Make Clock Times Output Required for Clock Executable Models
- **BIRD212:** Clarification of PAM4_UpperThreshold, PAM4_CenterThreshold, PAM4_LowerThreshold
- **BIRD214:** Change “bit_time” to “symbol_time”
- **BIRD215:** Back-channel Statistical Optimization Editorial Update

Individual changes documented at https://ibis.org/birds/
Complex C_comp Modeling

- Modeling impedance using complex frequency- or time-dependent networks rather than single capacitors

This entire block replaces C_comp and its variants

The model can be a SPICE model or an S-parameter network
On-Die Power Distribution Networks

• A new set of keywords has been added to describe decoupling networks on the device die and to capture power supply noise effects, “especially in the high-frequency range”

PDN networks are simply described, and connect between signal names or bus labels (terminals) described as PDN Domains

This connects rails, not just pins

Variations are independent of [Model] typ/min/max corners

This is an alternative to Series and Interconnect Model keyword representations and can coexist with them
EMD: Electrical Module Descriptions

• A way to describe complex networks of devices and/or interconnects that can in turn be used as modules in other networks
  • Imagine a DIMM electrical model: a PCB and DRAM device which, together, can be used in multiple instances in a PCB system model

• The successor to EBD, the Electrical Board Description (EBD) format
  • EBD had many limitations on connectivity and electrical modeling capabilities

Four devices here are instances of a single IBIS component

The devices are combined on a substrate with its own interconnect description

The substate is a DIMM, which would be simulated in a larger system
Summary of Other Major Changes

• DC Offset
  • Expands support for single-ended interfaces (e.g., DDR) by communicating channel DC level to IBIS-AMI receivers

• Back-channel Statistical Optimization
  • Expands model-to-model training of equalization beyond bitstream simulation

• Sampling Position in AMI_Init Flow
  • Enables more model-level control of signal sampling in statistical IBIS-AMI simulations

• Expanding Architectural Descriptions, Including Clocking and Clock-Forwarding Support
  • Adding Component_Name and Signal_Name enables buffer-specific information to be passed into IBIS-AMI models at the component level
  • DQ/DQS GetWave support enables clock ticks to be used in data latching across models
  • Explicit links between clock and data pins permits tools to monitor and impose component latching relationships
What’s Next

• IBIS 7.1 Draft has been released for review
  • [https://ibis.org/ver7.1_wip](https://ibis.org/ver7.1_wip)
  • Second official Open Forum review will take place at November 20, 2021 meeting
  • Possible vote on IBIS 7.1 at December 10, 2021 Open Forum meeting
  • Member companies: watch for vote solicitation email to participate in voting

• IBISCHK 7.1.0 syntax parser will be ready for release at the same time as IBIS 7.1 approval!

Please review the draft IBIS 7.1 document – your feedback is gratefully accepted!