



# Expectations for IBIS 7.1

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Michael Mirmak  
Intel Corporation

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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 Taking Shape...

- 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
- Current Editorial work focused on
  - BCI and repeater analysis flows
  - Clarity and consistency of text
  - Delivery to the Open Forum for review and vote before Q4'21
- Documents and minutes available at [https://www.ibis.org/editorial\\_wip](https://www.ibis.org/editorial_wip)

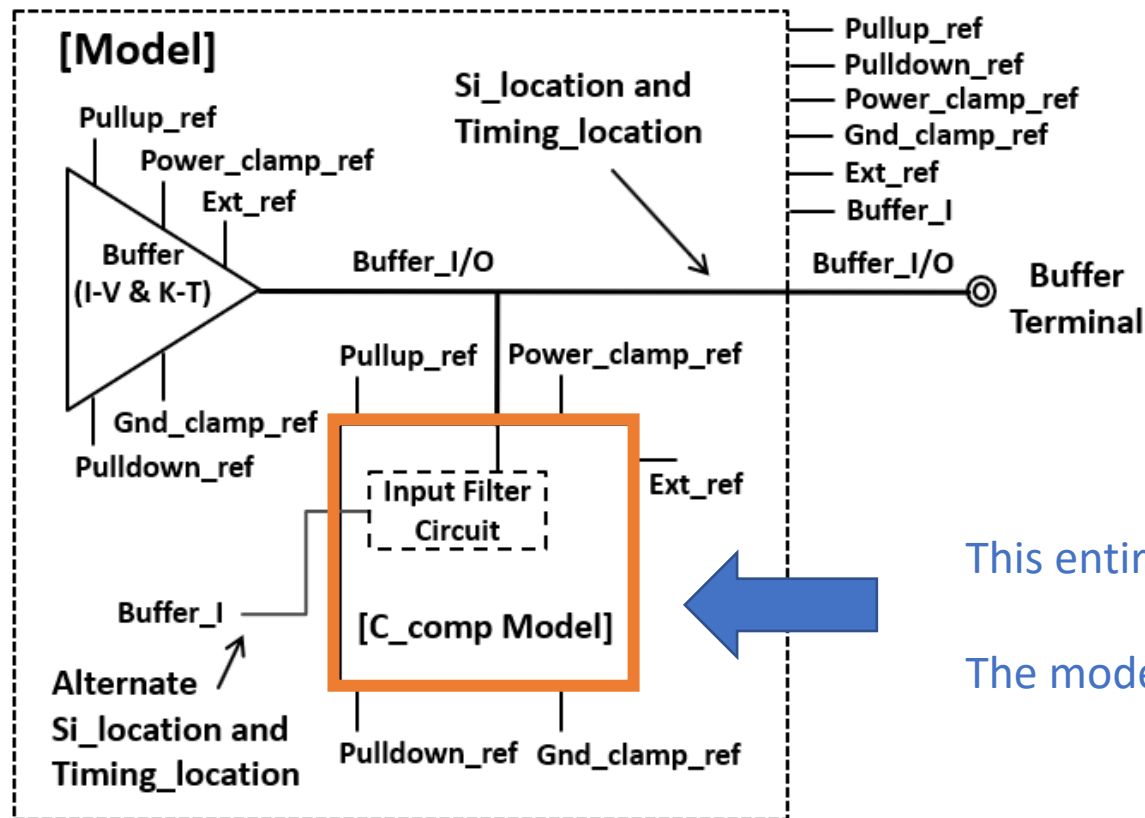
# Major and Minor Features of 7.1

- 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
- BIRD201.1: Back-channel Statistical Optimization
- 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

Individual changes documented at <http://ibis.org/birds/>

# Complex C\_comp Modeling

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

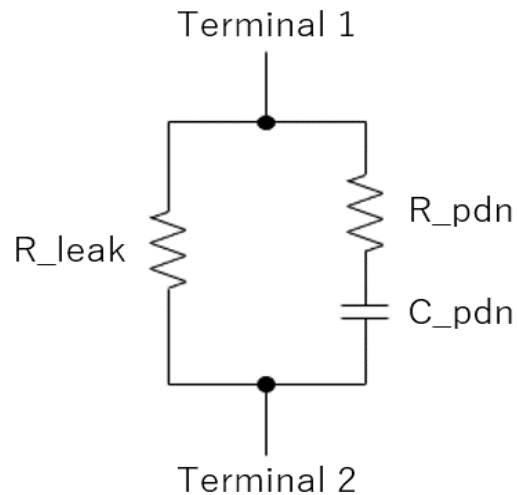


This entire block replaces C\_comp and its variants

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, 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

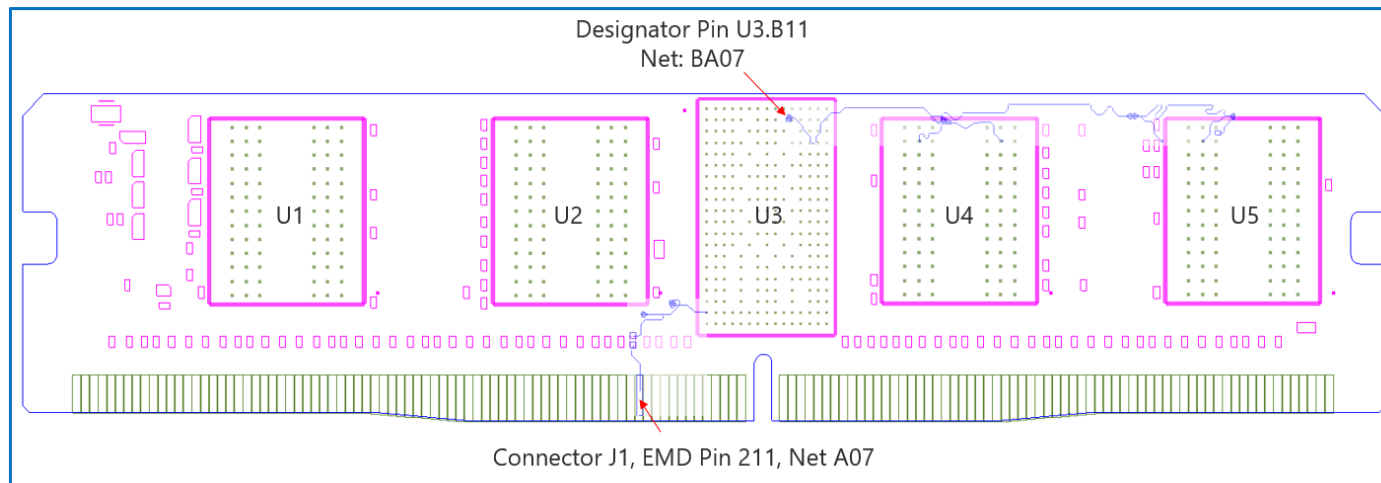
This connects rails, not just pins

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 Descriptions of Modules

- 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

- A more detailed overview of IBIS 7.1 will be presented at a future IBIS Summit
- Until then, IBIS Editorial and the Open Forum will be reviewing the document in preparation for approval

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