IBIS Chair’s Report

Randy Wolff
Micron Technology
Chair, IBIS Open Forum

DesignCon 2021 Virtual IBIS Summit
August 12, 2021
(Previously given August 12, 2021)
28 IBIS Members (Organization-based)
Organization

IBIS Officers June 2021- May 2022

Chair:  Randy Wolff, Micron Technology
Vice-Chair:  Lance Wang, Zuken USA
Secretary:  Mike LaBonte, MathWorks (SiSoft)
Treasurer:  Bob Ross, Teraspeed Labs
Librarian:  Zhiping Yang, Google (Waymo)
Postmaster:  Curtis Clark, ANSYS
Webmaster:  Steve Parker, Marvell
IBIS Meetings

• Weekly teleconferences
  • Quality task group (Tuesdays, 09:00 PT)
  • Advanced Technology Modeling (ATM) task group (Tuesdays, 12:00 PT)
  • Interconnect task group (Wednesdays, 08:00 PT)
    • Currently suspended as Editorial task group prepares IBIS 7.1 document
  • Editorial task group (Wednesdays, 08:00 PT)

• IBIS Open Forum teleconference every 3 weeks (Fridays, 08:00 PT)

• IBIS Summit meetings (USA and international)
  • DesignCon, IEEE SPI, IEEE EMC+SIPI, Shanghai, Taipei, Tokyo (JEITA-organized)

• Participants: ~323 in 2020
SAE ITC

• SAE Industry Technologies Consortia is the parent organization of the IBIS Open Forum
• IBIS is assisted by SAE employees José Godoy, Phyllis Gross, and Laurie Strom
• SAE ITC provides financial, legal, and other services
• https://www.sae-itc.com/
Task Groups

• Advanced Technology Modeling Task Group
  • Chair: Arpad Muranyi, Siemens EDA
  • https://ibis.org/atm_wip/
  • Develop non-interconnect technical BIRDs

• Editorial Task Group
  • Chair: Michael Mirmak, Intel
  • https://ibis.org/editorial_wip/
  • Produce IBIS specification documents

• Interconnect Task Group
  • Chair: Michael Mirmak, Intel
  • https://ibis.org/interconn_wip/
  • Develop on-die/package/module/connector interconnect modeling BIRDs

• Quality Task Group
  • Chair: Mike LaBonte, MathWorks (SiSoft)
  • https://ibis.org/quality_wip/
  • Oversee IBISCHK parser testing and development

BIRD = Buffer Issue Resolution Document
IBIS Milestones

I/O Buffer Information Specification

- 1993-1994 IBIS 1.0-2.1:
  - Behavioral buffer model (fast simulation)
  - Component pin map (easy EDA import)
- 1997-1999 IBIS 3.0-3.2:
  - Package models
  - Electrical Board Description (EBD)
- 2002-2006 IBIS 4.0-4.2:
  - Receiver models
  - AMS languages
- 2007-2012 IBIS 5.0-5.1:
  - IBIS-AMI SerDes models
  - Power-aware model
- 2013-2015 IBIS 6.0-6.1:
  - PAM4 multi-level signaling
  - Power delivery package models
- 2019 IBIS 7.0:
  - Back-channel time-domain support
  - Interconnect modeling using IBIS-ISS and Touchstone
- 2021 IBIS 7.1 (in progress)
  - DDRx IBIS-AMI support
  - Electrical Module Description (EMD)
  - IBIS-AMI back-channel statistical optimization

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Other Work

- 1995: ANSI/EIA-656 (IBIS 2.1 International standard)
- 1999: ANSI/EIA-656-A (IBIS 3.2 International standard)
- 2001: IEC 62014-1 (IBIS 3.2 International standard)
- 2003: Interconnect Model Specification (ICM 1.0)
- 2006: ANSI/EIA-656-B (IBIS 4.2 International standard)
- 2009: Touchstone 2.0
  - Official Touchstone donated from Agilent/Keysight
- 2011: IBIS-ISS 1.0 (Interconnect SPICE Subcircuit)
  - Subset of HSPICE
- IBISCHK: IBIS file syntax parser
  - Current version 7.0.2
  - Source code available for purchase
  - Compiled executables available free of charge
- TSCHK2: Touchstone 2.0 file syntax parser
  - Current version 2.0.1
  - Source code available for purchase
  - Compiled executables available free of charge
## Planning for IBIS Version 7.1

Official BIRD content for IBIS 7.1 based on Open Forum vote held July 16, 2021.

<table>
<thead>
<tr>
<th>BIRD ID</th>
<th>BIRD Title</th>
<th>Approval Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>195.1</td>
<td>Enabling [Rgnd] and [Rpower] Keywords for Input Models</td>
<td>August 31, 2018</td>
<td>IBIS-AMI</td>
</tr>
<tr>
<td>197.7</td>
<td>New AMI Reserved Parameter DC_Offset</td>
<td>February 21, 2020</td>
<td>IBIS-AMI (for DDRx)</td>
</tr>
<tr>
<td>198.3</td>
<td>Keyword Additions for On-Die PDN (Power Distribution Network) Modeling</td>
<td>August 7, 2020</td>
<td>Power Integrity</td>
</tr>
<tr>
<td>199</td>
<td>Fix Rx_Receiver_Sensitivity Inconsistencies</td>
<td>June 7, 2019</td>
<td>IBIS-AMI</td>
</tr>
<tr>
<td>200</td>
<td>C_comp Model Using IBIS-ISS or Touchstone</td>
<td>September 27, 2019</td>
<td>[Model] C_comp</td>
</tr>
<tr>
<td>200.1</td>
<td>Back-channel Statistical Optimization</td>
<td>July 17, 2020</td>
<td>IBIS-AMI</td>
</tr>
<tr>
<td>202.3</td>
<td>Electrical Descriptions of Modules</td>
<td>March 12, 2021</td>
<td>EMD (Next Gen EBD)</td>
</tr>
<tr>
<td>203</td>
<td>Submodel Clarification</td>
<td>April 24, 2020</td>
<td>Editorial</td>
</tr>
<tr>
<td>205</td>
<td>New AMI Reserved Parameter for Sampling Position in AMI_Init Flow</td>
<td>June 26, 2020</td>
<td>IBIS-AMI</td>
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<tr>
<td>206</td>
<td>Clarification of text &quot;transition time&quot;</td>
<td>September 18, 2020</td>
<td>Editorial</td>
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<tr>
<td>207</td>
<td>New AMI Reserved Parameters Component_Name and Signal_Name</td>
<td>October 9, 2020</td>
<td>IBIS-AMI (for DDRx)</td>
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<tr>
<td>208</td>
<td>Clock-Data Pin Relationship Keyword</td>
<td>January 8, 2021</td>
<td>IBIS clock/data relationship</td>
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<tr>
<td>209</td>
<td>Make Clock Times Output Required for Clock Executable Models</td>
<td>March 12, 2021</td>
<td>IBIS-AMI (for DDRx)</td>
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<tr>
<td>212</td>
<td>Clarification of PAM4_UpperThreshold, PAM4_CenterThreshold, PAM4_LowerThreshold</td>
<td>May 14, 2021</td>
<td>Editorial</td>
</tr>
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Planning for IBIS Version 7.1

Other BIRDs

<table>
<thead>
<tr>
<th>BIRD ID</th>
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<th>Expected Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>166.4</td>
<td>Resolving problems with Redriver Init Flow</td>
<td>To be rejected (in favor of BIRD211.x)</td>
</tr>
<tr>
<td>181.1</td>
<td>I-V Table Clarifications</td>
<td>Delayed until future IBIS version</td>
</tr>
<tr>
<td>190</td>
<td>Clarification for Redriver Flow</td>
<td>To be rejected (in favor of BIRD211.x)</td>
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<tr>
<td>204</td>
<td>DQ–DQS-GetWave-Flow for Clock Forwarding Modeling</td>
<td>Superseded by BIRD209</td>
</tr>
<tr>
<td>210</td>
<td>New Redriver AMI Flow</td>
<td>To be rejected (in favor of BIRD211.x)</td>
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<tr>
<td>211.x</td>
<td>IBIS AMI Reference Flow Improvements</td>
<td>Delayed until future IBIS version</td>
</tr>
<tr>
<td>213</td>
<td>Extending IBIS-AMI for PAMn Analysis</td>
<td>Delayed until future IBIS version</td>
</tr>
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What’s Next for IBIS?

• IBIS participants have broad experience in SI and PI with unique perspectives of model creators, EDA tool vendors, system architects, and system-level simulation

• IBIS Open Forum’s highly collaborative task groups are up for the challenge of addressing the SI and PI demands of new signaling technologies:
  • Expanded system-level perspective
    • Clock/data relationships, timing information, equalization training
  • PAMn (PAM3 duobinary, PAM5, etc.) including unique challenges of single-ended versions
  • Potential for IBIS to enable improved modeling/analysis of PDN
    • Voltage regulator models
    • Chip power models
Participation in IBIS

• The success of IBIS depends on active participation and volunteering

• Bringing your ideas and talents to IBIS
  • Task groups for technical discussions and document editing
  • IBIS email reflectors
  • Open Forum teleconferences for event planning and voting
  • Summit presentations
  • IBIS Board and task group volunteering

• Writing BIRDs – Buffer Issue Resolution Documents
  • Official method for submitting a proposed change to the IBIS specification
  • Many developed collaboratively in task groups
  • Discussed and voted on in Open Forum meetings
IBIS Website Resources

- IBIS Summits
- Task Group Info
- Spec documents
- BIRDS List
- Email support
- Syntax Parser
- Downloads
[Thank You]

IBIS Open Forum:
Web: https://www.ibis.org
Email: info@ibis.org

We welcome participation by all IBIS model makers, EDA tool vendors, IBIS model users, and interested parties.