# IBIS Open Forum Minutes

Meeting Date: **September 2, 2016**
Meeting Location: **Teleconference**

## VOTING MEMBERS AND 2016 PARTICIPANTS

| | |
|---|---|
| ANSYS | Curtis Clark, Toru Watanabe |
| Broadcom (Avago Technologies) | Bob Miller |
| Cadence Design Systems | Ken Willis, Brad Brim* |
| CST | Stefan Paret |
| Ericsson | Anders Ekholm, David Zhang, Zilwan Mahmod |
| GLOBALFOUNDRIES | Steve Parker |
| Huawei Technologies | (Jinjun Li) |
| IBM | Adge Hawes*, Luis Armenta* |
| Infineon Technologies AG | (Christian Sporrer) |
| Intel Corporation | Hsinho Wu*, Mohammad Bapi, Michael Mirmak*, Masahi Shimanouchi, Todd Bermensolo, Zao Liu, Gong Ouyang, Udy Shrivastava, Gianni Signorini, Richard Mellitz |
| IO Methodology | Lance Wang* |
| Keysight Technologies | Radek Biernacki*, Heidi Barnes, Jian Yang, Fangyi Rao, Stephen Slater, Pegah Alavi, Edwin Young |
| Maxim Integrated Products | Yan Liang*, Don Greer, Thinh Nguyen, Joe Engert, Hock Seon, Ahmed Gendy |
| Mentor Graphics | Arpad Muranyi*, Vladimir Dmitriev-Zdorov, John Angulo, Mikael Stahlberg |
| Micron Technology | Randy Wolff, Justin Butterfield* |
| Signal Integrity Software | Mike LaBonte*, Walter Katz*, Todd Westerhoff, Richard Allred |
| Synopsys | Ted Mido*, Kevin Li, Massimo Prando |
| Teraspeed Labs | Bob Ross* |
| Xilinx | (Raymond Anderson) |
| ZTE Corporation | (Shunlin Zhu) |
| Zuken | Michael Schaeder, Amir Wallrabenstein |

## OTHER PARTICIPANTS IN 2016

| | |
|---|---|
| Cisco Systems | Giuseppi Selli, Brian Baek |
| eASIC | David Banas |
| Fujitsu Advanced Technologies | Shogo Fujimori |
| Ghent University | Paolo Manfredi |
| H3C | Bin Cheng, Mao Jun |
| Hamburg University of Technology | Jan Preibisch, David Dahl |

| | |
|---|---|
| Independent | Carl Gabrielson |
| Institut Supérieur des Sciences Appliquées et de Technologie de Sousse | Wael Dghais |
| JEITA | Yosuke Kanamaru |
| John Baprawski, Inc. | John Baprawski |
| KEI Systems | Shinichi Maeda |
| Lattice Semiconductor | Dinh Tran, Maryam Shahbazi |
| Leading Edge | Pietro Vergine |
| MathWorks | Mike Mulligan, Corey Mathis |
| Monsoon Solutions | Nathan Hirsch |
| Northrup Grumman | Alex Golian |
| NXP | Jon Burnett |
| Politecnico di Torino | Claudio Siviero, Stefano Grivet-Talocia, Igor Simone Stievano |
| Rambus | John Yan |
| Raytheon | Joseph Aday |
| SAE International | (Logen Johnson) |
| SILABTECH | Biman Chattopadhyary |
| Signal Metrics | Ron Olisar |
| SiGuys | Donald Telian |
| Sony Corporation | Hiroaki Ammo |
| Sony LSI Design | Takashi Hasegawa |
| SPISim | Wei-hsing Huang |
| STMicroelectronics | Fabio Brina, Olivier Bayet |
| Technoprobe | Alberto Berizzi, Lorenzo Bernasconi, Simona Cucchi |
| Université de Bretagne Occidentale | Mihai Telescu |

In the list above, attendees at the meeting are indicated by *.  Principal members or other active members who have not attended are in parentheses. Participants who no longer are in the organization are in square brackets.


**UPCOMING MEETINGS**

The bridge numbers for future IBIS teleconferences are as follows:

| Date | Meeting Number | Meeting Password |
|---|---|---|
| September 23, 2016 | 205 475 958 | IBIS |

For teleconference dial-in information, use the password at the following website:

    https://ciscosales.webex.com/ciscosales/j.php?J=205475958

All teleconference meetings are 8:00 a.m. to 9:55 a.m. US Pacific Time.  Meeting agendas are typically distributed seven days before each Open Forum.  Minutes are typically distributed within seven days of the corresponding meeting.  When calling into the meeting, follow the

prompts to enter the meeting ID.  For new, local international dial-in numbers, please reference the bridge numbers provided by Cisco Systems at the following link:

http://www.cisco.com/web/about/doing_business/conferencing/index.html

NOTE: "AR" = Action Required.

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**INTRODUCTIONS AND MEETING QUORUM**

Mike LaBonte declared that a quorum was reached and the meeting could begin.

Justin Butterfield of Micron introduced himself.  He has been working on IBIS model development for 9 years.  Justin took minutes in the absence of Randy Wolff.


**CALL FOR PATENTS**

Mike LaBonte called for declaration of any patents or pending patents related to the IBIS 3.2, IBIS 4.2, IBIS 5.1, IBIS 6.1, Touchstone 2.0, IBIS-ISS 1.0 or ICM 1.1 specifications.  No patents were declared.


**REVIEW OF MINUTES AND ARS**

Mike LaBonte called for comments on the minutes of the August 12, 2016 IBIS Open Forum teleconference.  Brad Brim moved to approve the minutes.  Bob Ross seconded the motion. There were no objections.

Justin Butterfield reviewed ARs from the previous meeting.

1.  Randy Wolff to find a minutes taker for September 2 meeting [AR].
    Justin reported the AR as done.


**ANNOUNCEMENTS**, **CALL FOR ADDITIONAL AGENDA ITEMS**

Mike LaBonte noted new BIRDs have been added to the agenda since it was sent out.  The BIRDs up for discussion are BIRD181, BIRD182, BIRD183, BIRD184 and BIRD147.1.


**MEMBERSHIP STATUS AND TREASURER'S REPORT**

Bob Ross reported that we have 21 members.  Our totals remain at $21,416 for 2016.  Actual cash flow of $17,105 has been collected this year.  We are waiting for a renewal payment, Summit payments and a parser payment.

Bob noted that we have another parser license purchase pending and are waiting for payment from one member.  We expect some sponsorship money coming in.


**WEBSITE ADMINISTRATION**

Mike LaBonte reported that there have been a few small changes.  Michael Mirmak had found pages that used eda.org, and those have been corrected.  Old BIRD revisions have been deleted from the site.  Mike is working to include all BIRD revisions with links and dates to keep the historical information as much as possible.  He noted the $311 web hosting cost quoted last meeting is for the bulk of the services, but there would be a few additional fees in the final payment.  The actual updated number is $420 due to an added charge for backups.


**MAILING LIST ADMINISTRATION**
No update.


**LIBRARY UPDATE**
No update.


**INTERNATIONAL/EXTERNAL ACTIVITIES**
- Conferences
The IEEE conference on Electrical Performance of Electronic Packages and Systems (EPEPS) is in San Diego, CA October 23-26, 2016.  EPEPS sometimes includes specific IBIS content as well as general SI and PI content.

> http://www.epeps.org

The IEEE conference on Electrical Design of Advanced Packaging and Systems (EDAPS) is in Honolulu, HI December 14-16, 2016. EDAPS covers SI and PI issues, although IBIS does not affiliate with it.

> http://edaps2016.org/

- Press Update
None.

- Related standards
None.


**SUMMIT PLANNING AND STATUS**
- Asian IBIS Summit (Shanghai)
The meeting will take place November 11, 2016 at the Parkyard Hotel.  Lance Wang reported that everything is on schedule for the Shanghai Summit.  Huawei Technologies is the primary sponsor and additional sponsors include Xpeedic Technology, SPISim and ZTE Corporation.

- Asian IBIS Summit (Taipei)
The meeting will take place November 14, 2016 at the Sherwood Hotel.  Xpeedic Technology is a sponsor.

- Asian IBIS Summit (Tokyo)

The meeting will take place November 18, 2016.  This will be a half day meeting.  JEITA and IBIS are sponsors.

Bob Ross commented that other sponsors are pending and that announcements for the summits will go out next week.  Mike LaBonte called for papers and talks for these summits.

Sponsorship opportunities for all upcoming IBIS summits are available, with sponsors receiving free mentions in the minutes, agenda, and other announcements.  Contact the IBIS Board for further details.


**QUALITY TASK GROUP**
Mike LaBonte reported that the group is meeting on Tuesdays at 8:00 a.m. PT.  The group has discussed IBISCHK parser issues.

The IBISCHK6 user guide work in progress can be reviewed at:

> http://www.ibis.org/ibischk6/ibischk_6.1.1_UserGuide_wip1.pdf

The Quality Task Group checklist and other documentation can be found at:

> http://www.ibis.org/quality_wip/


**ADVANCED TECHNOLOGY MODELING TASK GROUP**
Arpad Muranyi reported that the group is meeting regularly on Tuesdays at 12:00 p.m. PT.  The group is discussing the new BIRDs and editorial changes as well as the new version of the back-channel BIRD.

Task group material can be found at:

> http://www.ibis.org/macromodel_wip/


**INTERCONNECT TASK GROUP**
Mike LaBonte reported that the group is meeting on Wednesdays at 8:00 a.m. PT.  The group is currently reviewing draft 39 and working on draft 40 of the Interconnect BIRD, and they are getting close to complete as most major issues have been decided.

Task group material can be found at:

> http://www.ibis.org/interconnect_wip/


**EDITORIAL TASK GROUP**
Mike LaBonte reported that the group has been meeting on Fridays at 8:00 a.m. PT on weeks the Open Forum teleconference is not held.  In the last meeting, it was agreed upon to assign

names to the new BIRDs and suspend further meetings until the BIRDs are complete and editorial work can resume.

Task group material can be found at:

http://www.ibis.org/editorial_wip/


**NEW ADMINISTRATIVE ISSUES**
- Second revision of IBIS Policies and Procedures
No update.

The document can be found at:

http://www.ibis.org/policies/

- EIASTD656B due for 5 year review
Mike LaBonte reported that the standard EIASTD656B (IBIS 4.2) requires a 5 year review.

Mike commented that he did not send out an email to solicit votes following our formal process. Thus, he recommended to not have a motion to vote to reaffirm until members have had a chance to vote via email.

Bob Ross moved to schedule the vote to reaffirm the standard EIASTD656B at the September 26, 2016 meeting after the email solicitation has been sent out.  Walter Katz seconded the motion.  There were no objections.


**BIRD181: I/V TABLE CLARIFICATIONS**
Mike LaBonte introduced the BIRD.  He noted that this BIRD was discussed in the editorial task group.  The BIRD adds clarifications for [Pulldown], [Pullup], [GND Clamp], and [POWER Clamp] tables.  No new keywords are introduced in the BIRD and no functional changes are proposed.  The format of the Vtable definition is changed to a common Spice-style notation with probe point and the reference.  The Buffer_I/O terminal convention is defined in the proposed text.  Also, additional detail has been added to the ECL model tables.

Radek Biernacki commented that because of the use of Buffer_IO the BIRD is not self-contained.  Mike noted that there is a phrase to introduce the Buffer_I/O terminal.  Radek stated that he still has concerns and that the Buffer_I/O terminal needs to be precisely defined.

Radek also recommended to refer to the [Pulldown]/[Pullup] structures as devices, as these relate to the direction of the current.  He also recommended to use the word "value" rather than the word "axis" in the list of the 8 criteria. Radek also suggested to add a simple example for the ECL buffer tables.

Walter Katz asked if we should also have the formulas for the ECL tables that are not listed, even though they are the same as above.  Bob Ross replied that we could either redefine the

formulas or note that they are the same as above in the text.

Mike and Bob took an AR to incorporate Radek's suggestions into the BIRD.


**BIRD182: POWER AND GND [PIN] SIGNAL NAME AS [PIN MAPPING] BUS LABEL**
Walter Katz introduced the BIRD.  It resolves two problems in [Pin Mapping] where the keyword can short powers, grounds or signals.  For instance, if you have two pins which are VDD and you give them the same bus label in [Pin Mapping], then you must give them the same signal name.  The second new rule is a simplification to make the default [Pin Mapping] the signal_name.  This is done to reduce the redundancy.

Radek Biernacki commented that these new rules are making the specification more restrictive, so there is some concern for backwards compatibility.  But he supports the changes.

Mike asked if we should change pin to [Pin].  Bob Ross and Walter commented that doing so would be a lot of changes throughout the document and did not think it was necessary.


**BIRD183: [MODEL DATA] MATRIX SUBPARAMETER TERMINOLOGY CORRECTION**
Bob Ross introduced the BIRD.  He mentioned that Michael Mirmak discovered the issue and that he formalized the change and wrote up the BIRD.  Bob noted that there is no functional change.  For the [Define Package Model] section, the Banded_matrix, Sparse_matrix, and Full_matrix should be denoted as arguments rather than subparameters.  These arguments are described as "format arguments" under the [Resistance Matrix], [Capacitance Matrix] and [Inductance Matrix] keyword descriptions.  The rule to use only one of these enumerated formats is also added in the BIRD.

Mike LaBonte asked if these will also be deleted from the Keyword Hierarchy tree.  Bob replied that they would need to be removed and that this change is detailed in the BIRD.


**BIRD184: MODEL NAME AND SIGNAL NAME RESTRICTIONS FOR POWER AND GND PINS**
Bob Ross introduced the BIRD.  The BIRD adds a new rule to [Pin Mapping].  If any pin has model_name POWER, then all other pins with the same signal_name must have POWER as their model_name.  The same applies to GND pins.  This is to prevent shorting POWER to GND.  The BIRD makes some other editorial changes as well.  The BIRD does not contain the uniqueness requirement for pin names detailed in BIRD180.  This was done to keep the issues separate.

Radek Biernacki suggested to change "any pin" in the rule to "a pin".  He also noted that there are backward compatibility implications, but he agrees with the changes.

Mike LaBonte asked if this implies any action for BIRD180.  Bob said that we might consider BIRD180 for IBIS 7.0.  BIRD180 clarifies the assumption of uniqueness, and that can be approved separately.

## BIRD147.1: BACK-CHANNEL SUPPORT

Walter Katz commented that the original BIRD was introduced in 2011, but no agreement could be made on the communication between the Rx and the Tx models. Walter credited Bob Miller with coming up with the idea to use file IO to handle the back-channel protocol. He noted that this method will work with existing EDA tools. The BIRD describes what the AMI_Init and AMI_GetWave need to do to support the protocol. Several new Reserved Parameters are added to the AMI section. The BCI_Protocol has to be agreed upon by the Rx and the Tx. It describes what files are read and written. BCI_ID defines the base file names to be used by the DLLs. BCI_State can be set to "Off" or "Training", and the AMI_GetWave calls can return such possible states as "Training", "Converged", "Failed" or "Error". BCI_GetWave_Block_UI defines the block size. BCI_Training_UI defines the number of UI to train the protocol as a convergence criteria. The BIRD defines flows both with and without repeaters. The BCI parameters can be Model_Specific parameters until this is officially implemented in the IBIS specification and EDA tools fully support it.

Bob Ross asked about the BCI_State, which is an InOut parameter, and what the default is. Walter replied that this parameter is required.

Mike LaBonte suggested that in the Table YY1, the parameters should be marked as required if BCI is used. Arpad Muranyi asked, in regards to Table YY1, if you have no training, which parameters are required. He pointed out that there are issues that need to be resolved with the table. Walter suggested to move the discussion offline.

Radek Biernacki suggested to add the length to the BCI_Training_UI as a parameter. He asked if the BCI_ID would be handled by the EDA tools correctly. Walter commented that once the BIRD is approved, the EDA tool would generate the string. Without support of the BIRD, the AMI file would have to define the parameters and the user can select them. But, there are methods to get it to work on existing tools.

Walter suggested that we not schedule any of these new BIRDs for votes until the next meeting.

Bob moved to formally remove the original BIRD147 from the discussion. Radek seconded. There were no objections.


## BIRD180: REQUIRE UNIQUE PIN NAMES IN [PIN]

Walter Katz move to un-table BIRD180. Bob Ross seconded. There were no objections.

Walter clarified that he is un-tabling BIRD180 so that we can discuss it with the other new BIRDs and possibly approve it with the other BIRDs.

Mike LaBonte asked about BIRD180 in regards to how it relates to BIRD184, if it has the same changes, and is it a superset. Bob noted that for BIRD180 there is an important distinction. The parser already checks and rejects cases where the [Pin] should not be the same.

Arpad Muranyi asked if that is technically a parser bug. He noted that there is a conflict with BIRD125. Walter commented that BIRD180 is required for a decision made in the Interconnect

task group that we would not have joins or splits in the IBIS package model.


**BIRD125.1: MAKE IBIS-ISS AVAILABLE FOR IBIS PACKAGE MODELING**
Walter Katz moved to un-table BIRD125.  Bob Ross seconded.  There were no objections.

Walter commented that BIRD125 competes with the Interconnect BIRD, and we should think about voting to reject it.  Arpad suggested that we vote on BIRD125 at the same time as the Interconnect BIRD, as this will allow it to be retained as a backup proposal to the Interconnect BIRD.  Walter commented that we would need a specific BIRD allowing two pins to have the same pin_name as a prerequisite to BIRD125.  Radek suggested that we can wait to decide this issue.

Mike clarified that the motion is to only un-table for discussion and not necessarily vote down.


**BIRD128.2: ALLOW AMI_PARAMETERS_OUT TO PASS AMI_PARAMETERS_IN DATA ON CALLS TO AMI_GETWAVE**
Radek Biernacki moved to un-table BIRD128.2.  Walter Katz seconded.  There were no objections.

Radek commented that this BIRD is no longer applicable for back-channel support.


**BIRD145.3: CASCADING IBIS I/O BUFFERS WITH [EXTERNAL CIRCUIT]S USING THE [MODEL CALL] KEYWORD**
Discussion was tabled.


**BIRD147.1: BACK-CHANNEL SUPPORT**
Discussion was tabled.


**BIRD158.3: AMI TOUCHSTONE ANALOG BUFFER MODELS**
Discussion was tabled.


**BIRD161.1: SUPPORTING INCOMPLETE AND BUFFER-ONLY [COMPONENT] DESCRIPTIONS**
Discussion was tabled.


**BIRD163: INSTANTIATING AND CONNECTING [EXTERNAL CIRCUIT] PACKAGE MODELS WITH [CIRCUIT CALL]**
Discussion was tabled.

**BIRD164: ALLOWING PACKAGE MODELS TO BE DEFINED IN [EXTERNAL CIRCUIT]**
Discussion was tabled.


**BIRD165: PARAMETER PASSING IMPROVEMENTS FOR [EXTERNAL CIRCUIT]S**
Discussion was tabled.


**BIRD166: RESOLVING PROBLEMS WITH REDRIVER INIT FLOW**
Discussion was tabled.


**IBISCHK6 PARSER AND BUG STATUS**
Bob Ross reported that the developer plans to release IBISCHK 6.1.3 sometime next week to fix all current bugs including BUG180.  Michael Mirmak and Bob are working on testing BUG179 and dealing with 32bit and 64bit executables.  They will also need to test the Mac OS executables.  Bob will check out IBISCHK 6.1.3 with current bugs.  The source code should be shipped out next week to parser licensees.

Bob reported that Michael Mirmak has submitted two new bugs that are still being processed.  The first is related to incorrect line numbers being reported for illegal characters in an AMI file.  The second is related to calling a DLL from a subdirectory, which works in the parser, but is prohibited by the specification.

Mike LaBonte suggested to get these bugs written up so that they can be formally discussed.


**NEW TECHNICAL ISSUES**
None.


**NEXT MEETING**
The next IBIS Open Forum teleconference meeting will be held September 23, 2016.  The following IBIS Open Forum teleconference meeting will tentatively be held October 14, 2016.

Radek Biernacki moved to adjourn.  Arpad Muranyi seconded the motion.


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**NOTES**

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This meeting was conducted in accordance with ANSI guidance.

All inquiries may be sent to info@ibis.org.  Examples of inquiries are:

- To obtain general information about IBIS.
- To ask specific questions for individual response.
- To subscribe to the official ibis@freelists.org and/or ibis-users@freelists.org email lists
  (formerly ibis@eda.org and ibis-users@eda.org).

- To subscribe to one of the task group email lists: ibis-macro@freelists.org, ibis-interconn@freelists.org, or ibis-quality@freelists.org.
- To inquire about joining the IBIS Open Forum as a voting Member.
- To purchase a license for the IBIS parser source code.
- To report bugs or request enhancements to the free software tools: ibischk6, tschk2, icmchk1, s2ibis, s2ibis2 and s2iplt.

The BUG Report Form for ibischk resides along with reported BUGs at:

http://www.ibis.org/bugs/ibischk/
http://www.ibis.org/ bugs/ibischk/bugform.txt

The BUG Report Form for tschk2 resides along with reported BUGs at:

http://www.ibis.org/bugs/tschk/
http://www.ibis.org/bugs/tschk/bugform.txt

The BUG Report Form for icmchk resides along with reported BUGs at:

http://www.ibis.org/bugs/icmchk/
http://www.ibis.org/bugs/icmchk/icm_bugform.txt

To report s2ibis, s2ibis2 and s2iplt bugs, use the Bug Report Forms which reside at:

http://www.ibis.org/bugs/s2ibis/bugs2i.txt
http://www.ibis.org/bugs/s2ibis2/bugs2i2.txt
http://www.ibis.org/bugs/s2iplt/bugsplt.txt

Information on IBIS technical contents, IBIS participants and actual IBIS models are available on the IBIS Home page:

http://www.ibis.org/

Check the IBIS file directory on ibis.org for more information on previous discussions and results:

http://www.ibis.org/directory.html

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## SAE STANDARDS BALLOT VOTING STATUS

| Organization | Interest Category | Standards Ballot Voting Status | July 1, 2016 | July 22, 2016 | August 12, 2016 | September 2, 2016 |
|---|---|---|---|---|---|---|
| ANSYS | User | Active | X | X | X | - |
| Broadcom Ltd. | Producer | Inactive | - | - | - | - |
| Cadence Design Systems | User | Active | X | X | X | X |
| CST | User | Inactive | - | - | - | - |
| Ericsson | Producer | Inactive | - | - | - | - |
| GLOBALFOUNDRIES | Producer | Inactive | X | - | - | - |
| Huawei Technologies | Producer | Inactive | - | - | - | - |
| Infineon Technologies AG | Producer | Inactive | - | - | - | - |
| IBM | Producer | Inactive | - | - | - | X |
| Intel Corp. | Producer | Active | X | X | X | X |
| IO Methodology | User | Inactive | - | - | - | X |
| Keysight Technologies | User | Active | X | X | X | X |
| Maxim Integrated Products | Producer | Active | - | X | X | X |
| Mentor Graphics | User | Active | X | X | X | X |
| Micron Technology | Producer | Active | X | X | X | X |
| Signal Integrity Software | User | Active | X | X | X | X |
| Synopsys | User | Active | - | X | X | X |
| Teraspeed Labs | General Interest | Active | X | X | X | X |
| Xilinx | Producer | Inactive | - | - | - | - |
| ZTE | User | Inactive | - | - | - | - |
| Zuken | User | Inactive | - | - | - | - |

Criteria for SAE member in good standing:
- Must attend two consecutive meetings to establish voting membership
- Membership dues current
- Must not miss two consecutive meetings

Interest categories associated with SAE standards ballot voting are:
- Users - members that utilize electronic equipment to provide services to an end user.
- Producers - members that supply electronic equipment.
- General Interest - members are neither producers nor users. This category includes, but is not limited to, government, regulatory agencies (state and federal), researchers, other organizations and associations, and/or consumers.