



IBIS Open Forum Minutes

Meeting Date: **May 22, 2015**

Meeting Location: **Teleconference**

VOTING MEMBERS AND 2015 PARTICIPANTS

Altera	[David Banas], Masashi Shimanouchi, Hsinho Wu*
ANSYS	(Steve Pytel), Curtis Clark*
Applied Simulation Technology	Fred Balistreri, Norio Matsui
Avago Technologies	Minh Quach, Leif Zweidinger
Cadence Design Systems	Brad Brim*, Joshua Luo, Ken Willis, Joy Li, Ambrish Varma
Cisco Systems	David Siadat, Rockwell Hsu, Bidyut Sen
Ericsson	Anders Ekholm
Huawei Technologies	Xiaoqing Dong
IBM	Adge Hawes*, Luis Armenta
Infineon Technologies AG	Christian Sporrer
Intel Corporation	Michael Mirmak, Todd Bermensolo, Nhan Phan
	Gianni Signorini
IO Methodology	Lance Wang*
Keysight Technologies	Radek Biernacki*, Pegah Alavi, Colin Warwick
	Jian Yang, Nicholas Tzou, Heidi Barnes, Dave Larson
	Kyla Thomas
Maxim Integrated Products	Mahbubul Bari, Don Greer*, Joe Engert, Joe Rayhawk*
Mentor Graphics	Arpad Muranyi*, Ed Bartlett, Vladimir Dmitriev-Zdorov
Micron Technology	Randy Wolff*
Qualcomm	Senthil Nagarathinam, Kevin Roselle
Signal Integrity Software	Mike LaBonte*, Walter Katz*, Todd Westerhoff
	Mike Steinberger
Synopsys	Ted Mido*, Rita Horner, William Lau, Scott Wedge
	Michael Zieglmeier, Joerg Schweden
Teraspeed Labs	Bob Ross*, Tom Dagostino
Toshiba	(Yasumasa Kondo)
Xilinx	(Raymond Anderson)
ZTE Corporation	(Min Huang), Tao Guo
Zuken	Michael Schaefer, Markus Buecker, Griff Derryberry
	Ralf Bruening

OTHER PARTICIPANTS IN 2015

Bayside Design	Elliot Nahas
Continental Automotive	Felix Goelden, Markus Bebendorf, Sebastian Groener
	Stefanie Schatt
CST	Stefan Paret, Matthias Troescher
Freescale	Jon Burnett
Galbi Research	Dave Galbi

Independent	Tim Wang Lee
Instituto de Telecomunicações	Wael Dghais*
KEI Systems	Shinichi Maeda
Lattice Semiconductor	Xu Jiang
Leading Edge	Pietro Vergine
Politecnico di Torino	Stefano Grivet-Talocia
Raytheon	Joseph Aday
SAE International	Chris Denham
Siemens AG	Boris Kogan, Michael Flint
Simberian	Yuriy Shlepnev
Technische Universität Hamburg-Harburg	Jan Preibisch
Vitesse	Siris Tsang
ZI Consulting	Iliya Zamek

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
June 12, 2015	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.

INTRODUCTIONS AND MEETING QUORUM

Randy Wolff declared that a quorum was reached and the meeting could begin. Mike LaBonte ran the meeting in Michael Mirmak's absence.

Wael Dghais introduced himself. He is starting his PhD work at the University of Aveiro, Institute of Telecommunications, in Portugal. He is working on blackbox behavioral modeling connected with IBIS algorithm generation and improvements. He works on a project with ST Microelectronics to enhance and solve issues in IBIS model generation in certain drivers and receivers. He has participated in the IBIS Summit at SPI multiple times.

Joe Rayhawk of Maxim Integrated Products introduced himself. He works on a tool at Maxim that creates IBIS files.

CALL FOR PATENTS

Mike LaBonte called for any patents or pending patents related to the IBIS 3.2, IBIS 4.2, IBIS 5.1, IBIS 6.0, Touchstone 2.0, IBIS-ISS 1.0 or ICM 1.1 specifications. No patents were declared.

REVIEW OF MINUTES AND ARS

Randy Wolff called for comments regarding the minutes of the May 1, 2015 IBIS Open Forum teleconference. The minutes were approved without changes.

Randy reviewed ARs from the previous meeting. These included:

1. Bob Ross will continue sending reminders to unpaid members about membership renewal.
Bob said this is done.
2. Mike LaBonte took an AR to investigate our options for moving to a more modern website.
Mike said this is done.
3. Michael Mirmak will send a call for officer election votes by email either May 8 or May 17.
Bob confirmed this is done.
4. Bob will update the status of BUG162 on the website.
Bob said this is done.

ANNOUNCEMENTS

None.

CALL FOR ADDITIONAL AGENDA ITEMS

Radek Biernacki asked for time to discuss a new BIRD, BIRD177.

MEMBERSHIP STATUS AND TREASURER'S REPORT

Bob Ross reported that we have 20 paid members so far this year. The treasury balance stands at \$61,239, and one parser sale has completed. Pending is payment for the upcoming Shanghai summit support. Some companies like to pay a combined invoice for membership dues and

Summit support. He has emailed 4 additional members to remind them of membership payment.

WEB PAGE AND MAILING LIST ADMINISTRATION

Mike LaBonte reported that he has researched updating our website services. He showed an updated report on our IT services including details of our website and email services. The document also contains a roadmap discussing social media, email needs, file storage needs and backup needs.

Mike noted that the eda.org email list has been reduced to just Bob Ross and Mike to check for any emails coming into the list. Since the migration, not a single legitimate email has been sent to the old lists.

LIBRARY UPDATE

No update.

INTERNATIONAL/EXTERNAL ACTIVITIES

- Conferences

The 24th Conference on Electrical Performance of Electronic Packaging (EPEPS) will be held October 25-28, 2015 in San Jose, California. There is usually some IBIS and/or signal integrity related material. More information is available at:

<http://www.epeps.org>

- Press Update

Mike LaBonte noted that Michael Mirmak sent out information about two papers mentioning IBIS. Cisco has published two IBIS-AMI-related papers:

“Design of package BGA pin-out for >25Gb/s high speed SerDes considering PCB via crosstalk”
Yao, Wei, Lim, Jane ; Zhang, Ji ; Tseng, Kenneth ; Qiu, Kelvin ; Brooks, Rick;
Cisco Systems, Inc., 170 West Tasman Dr., San Jose, CA 95134, USA;
Electromagnetic Compatibility and Signal Integrity, 2015 IEEE Symposium on; 15-21 March 2015; pp 111 – 116;ISBN: 978-1-4799-1992-5

<http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=7107669>

“QSFP28 connector footprint optimization of crosstalk and ILD_rms_dB for 25+ Gbps signaling”
Park, IL-Young; Rowlands, Michael ; Quach, Minh ; Zhang, Ji ; Tooyserkani, Pirooz ; Lim, Jane
Cisco Systems, Inc., San Jose, CA, 95134, USA
Electromagnetic Compatibility and Signal Integrity, 2015 IEEE Symposium on; 15-21 March 2015; pp 242-247;ISBN: 978-1-4799-1992-5

<http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=7107693>

ORGANIZATIONAL ACTIVITIES

- Officer Nominations

Radek Biernacki is acting as the returning officer for the elections. He noted the call for nominations was sent out about a week ago, and the nominating period is open through May 29. Bob Ross noted that Michael Mirmak is not running for Chair, so we will need nominations for Chair.

SUMMIT PLANNING AND STATUS

- European Summit at SPI Review

Randy Wolff reported that an IBIS Summit meeting was co-located with the SPI conference in Berlin, Germany on May 13, 2015. There were 17 people in attendance and 7 presentations. There was discussion of package modeling, via modeling, and simulation and modeling with IBIS power-aware models. There was also an ad-hoc discussion on improving participation in both the IBIS Summit and the SPI conference. Wael Dghais also commented that the meeting was successful. He noted that he would like to see more participation from European universities and industry participants. He expects several papers from his university for the Summit in 2017, which is to be held in Aveiro, Portugal. Wael also noted there was a paper on the Mpiolog modeling approach for power aware buffer modeling from Intel at the SPI conference. Bob Ross thanked the 5 co-sponsors, ANSYS, CST, Mentor Graphics Corporation, Synopsys and Zuken. Bob asked if he could recommend Zuken to handle sponsorship arrangements for next year. There were no objections. Bob mentioned an email from Michael Schaefer suggesting we discuss the possibility of having an IBIS tutorial before the meeting next year to attract more participation.

- EPEPS Summit Planning

EPEPS is taking place October 25-28, 2015 in San Jose, CA. October 28 would be the date for the Summit if it takes place. We will need to discuss at a later time if an IBIS Summit will be held at EPEPS. The website for Electrical Performance of Electronic Packages and Systems is:

<http://www.epeps.org/>

- Asian Summit Planning

Bob Ross noted that Summit dates for Shanghai, Taipei and Tokyo are being decided now. Lance Wang noted he is waiting for feedback on the Shanghai dates.

- DesignCon Summit Planning

Bob Ross noted that DesignCon planners have offered a meeting space for the morning of January 22, but not a full day so far.

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 they are discussing IBISCHK6.1 parser development. They are

also updating a parser development spreadsheet used by the developer for documentation. The group is meeting on Tuesdays at 8:00 a.m. PT.

The IBISCHK6 User Guide work in progress can be reviewed at:

http://www.eda.org/ibis/ibischk6/ibischk_6.0.0_UserGuide_wip1.pdf

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

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

ADVANCED TECHNOLOGY MODELING TASK GROUP

Arpad Muranyi reported that the group is meeting regularly on Tuesdays at 12:00 p.m. PT. They recently discussed the AMI directionality BIRD, and further feedback is needed. They have also discussed the use of ground references in the specification. Other discussion topics include backchannel and re-driver modeling.

Task group material can be found at:

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

INTERCONNECT TASK GROUP

Walter Katz reported that the group is meeting on Wednesdays at 8:00 a.m. PT. They have been discussing the use of ground in IBIS. This does not have an effect on the interconnect modeling BIRD. They will be going back to discussing the interconnect BIRD.

Task group material can be found at:

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

EDITORIAL TASK GROUP

Bob Ross reported that the group is meeting on Fridays at 8:00 a.m. PT, with the exception of the weeks when Open Forum meetings are held in the same time slot. He noted there will be some work to potentially merge in contents of BIRD176 and BIRD177. Mike LaBonte asked how long the editorial effort might continue. Bob noted that the work is being delayed due to the previously mentioned BIRDs.

NEW ADMINISTRATIVE ISSUES

Bob Ross noted that we received feedback from SAE on the approved Policies and Procedures document. We will have to address these items in a future revision.

Mike LaBonte showed a spreadsheet tracking the status of currently open BIRDs. He tried to track the last dates that each BIRD has been discussed in the Open Forum or in a task group.

Arpad Muranyi noted that some BIRDs will likely be automatically rejected once they are superseded by newer proposals.

BIRD176: POWER PIN PACKAGE MODELING

Randy Wolff introduced the BIRD. He described how it is common in package modeling to reduce the number of power and ground terminals by merging multiple pins connected to the same plane or fill structure into a single terminal. When using this data in an IBIS RLC matrix format, [Pin Mapping] data will not be consistent with the [Pin Numbers] list under [Define Package Model], as power and ground pins may be missing. BIRD176 was written to explain this situation and propose default methods for EDA software to handle the missing pins. Pins without model data due to merging are connected with implicit shorts. A new keyword [Merged Pins] is also introduced to explicitly define merged pin groups.

Bob Ross noted he had a reservation about a default statement in the BIRD, but after discussion with the BIRD authors, he felt that EDA tools can still do what they want and offer more complicated options if desired.

Arpad Muranyi asked if this BIRD only applied when [Pin Mapping] was present. Randy confirmed this is the case.

Mike LaBonte questioned if the parser could check for valid connections and issue an info statement for suspected problems. Radek Biernacki felt this was beyond the scope of the parser. Bob commented that this could be discussed as an IBISCHK discussion later on.

Walter Katz commented that he felt EDA software already knew what to do for hooking up power and ground to buffers, and this BIRD seemed overly complicated. Bob commented that he thought the BIRD went beyond handling simple cases.

Bob moved to vote on the BIRD in the next Open Forum teleconference. Randy seconded the motion. There were no objections.

BIRD175: EXTENDING IBIS-AMI FOR PAM4 ANALYSIS

Walter Katz presented some slides related to the BIRD. He showed that PAM4 has four signal levels. He noted that IBIS currently has a concept of bit_time, but PAM4 uses symbol_time. The BIRD also introduces descriptions of NRZ signaling and PAM4 signaling, allowing selection between the two analysis types using the Modulation parameter.

Walter will be posting a BIRD175.1 which makes changes to the eye offsets, introducing a PAM4_CenterEyeOffset parameter. He noted that the changes have been discussed and agreed upon between many members of the ATM task group.

Bob Ross moved to vote on the BIRD in the next Open Forum teleconference. Radek Biernacki seconded the motion. There were no objections.

Walter's presentation is available at:

Wael Dghais asked how the driver's multiple levels are handled by IBIS-AMI simulators. Walter Katz responded that in Spice, a step response between symbol level 0 and symbol level 3 is simulated, and that goes into creating the impulse response. So, this models the full swing for the Init flow. More can be done in GetWave, but as a practical matter models don't do more than this. Arpad Muranyi noted that it is clear in AMI now that for NRZ models you model the full swing of the Tx with equalization off for the channel analysis. He wondered if a statement is needed to be made similar to this for the PAM4 situation. Walter will look to see if this needs to be added to the BIRD175.1 revision.

BIRD177: [INITIAL DELAY] KEYWORD FOR SUBMODELS AND DRIVER SCHEDULES

Radek Biernacki introduced the BIRD. This originated from discussions in the Editorial task group about how to apply [Initial Delay] to models scheduled with [Driver Schedule] or to [Submodel]s. For [Driver Schedule], scheduled models could either inherit [Initial Delay] parameters from the top level model or use [Initial Delay] values local to each [Model]. The BIRD clarifies that [Initial Delay] values are always local to each [Model]. The BIRD also describes that [Initial Delay] can also be included in a [Submodel].

Curtis Clark commented on a minor editorial change. Radek will make the change before posting the BIRD.

Bob Ross commented that it might be good to add a note for [Submodel]s that I-T parameters are illegal, since [Composite Current] is not allowed in a [Submodel]. Radek commented that this is implied in an earlier statement in the BIRD.

Radek Biernacki moved to vote on the BIRD in the next Open Forum teleconference. Bob Ross seconded the motion. There were no objections.

BIRD125.1: MAKE IBIS-ISS AVAILABLE FOR IBIS PACKAGE MODELING

Discussion was tabled.

BIRD128.2: ALLOW AMI_PARAMETERS_OUT TO PASS AMI_PARAMETERS_IN DATA ON CALLS TO AMI_GETWAVE

Discussion was tabled.

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

Discussion was tabled.

BIRD147: BACK-CHANNEL SUPPORT

Discussion was tabled.

BIRD157: PARAMETERIZE [DRIVER SCHEDULE]

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 noted no new bugs.

Bob noted that the parser development is stalled, waiting for potential additions of BIRD176 and BIRD177. He expects the parser cost to increase due to the new checking requirements for the BIRDs and some new bugs.

NEW TECHNICAL ISSUES

Related to BIRD175, Arpad Muranyi noted that section 10.2.2.3.1 in the IBIS specification mentions how the impulse response should not include filtering effects such as equalization. He thought this could be an appropriate place to mention PAM4. Walter Katz did not think this was necessary.

NEXT MEETING

The next IBIS Open Forum teleconference meeting will be held June 12, 2015. Votes on BIRD175.1, BIRD176 and BIRD177 are scheduled. The following IBIS Open Forum teleconference meeting will be held July 10, 2015.

Arpad Muranyi moved to adjourn. Randy Wolff seconded the motion.

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NOTES

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This meeting was conducted in accordance with ANSI guidance.

The following e-mail addresses are used:

ibis-request@eda.org

To join, change, or drop from either or both:

IBIS Open Forum Reflector (ibis@eda.org)

IBIS Users' Group Reflector (ibis-users@eda.org)

State your request.

ibis-info@eda.org

To obtain general information about IBIS, to ask specific questions for individual response, and to inquire about joining the IBIS Open Forum as a full Member.

ibis@freelists.org (changed from ibis@eda.org, which has been deactivated)

To send a message to the general IBIS Open Forum Reflector. This is used mostly for IBIS Standardization business and future IBIS technical enhancements. Job posting information is not permitted.

ibis-users@freelists.org (changed from ibis-users@eda.org, which has been deactivated)

To send a message to the IBIS Users' Group Reflector. This is used mostly for IBIS clarification, current modeling issues, and general user concerns. Job posting information is not permitted.

ibis-bug@eda.org

To report ibischk parser BUGs as well as tschk2 parser BUGs. The BUG Report Form for ibischk resides along with reported BUGs at:

<http://www.eda.org/ibis/bugs/ibischk/>

<http://www.eda.org/ibis/bugs/ibischk/bugform.txt>

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

http://www.eda.org/ibis/tschk_bugs/

http://www.eda.org/ibis/tschk_bugs/bugform.txt

icm-bug@eda.org

To report icmchk1 parser BUGs. The BUG Report Form resides along with reported BUGs at:

http://www.eda.org/ibis/icm_bugs/

http://www.eda.org/ibis/icm_bugs/icm_bugform.txt

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

<http://www.eda.org/ibis/bugs/s2ibis/bugs2i.txt>
<http://www.eda.org/ibis/bugs/s2ibis2/bugs2i2.txt>
<http://www.eda.org/ibis/bugs/s2iplt/bugspl.txt>

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

<http://www.eda.org/ibis>

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

<http://www.eda.org/ibis/directory.html>

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IBIS – SAE STANDARDS BALLOT VOTING STATUS

Organization	Interest Category	Standards Ballot Voting Status	April 10, 2015	May 1, 2015	May 13, 2015	May 22, 2015
Altera	Producer	Active	X	X	-	X
ANSYS	User	Active	X	X	-	X
Applied Simulation Technology	User	Inactive	-	-	-	-
Avago Technologies	Producer	Inactive	-	-	-	-
Cadence Design Systems	User	Active	-	X	-	X
Cisco Systems	User	Inactive	-	-	-	-
Ericsson	Producer	Inactive	-	-	X	-
Huawei Technologies	Producer	Inactive	-	-	-	-
IBM	Producer	Active	X	X	-	X
Infineon Technologies AG	Producer	Inactive	-	-	X	-
Intel Corp.	Producer	Active	X	X	X	-
IO Methodology	User	Active	X	X	-	X
Keysight Technologies	User	Active	X	X	-	X
Maxim Integrated Products	Producer	Active	-	X	-	X
Mentor Graphics	User	Active	X	X	-	X
Micron Technology	Producer	Active	X	-	X	X
Qualcomm	Producer	Inactive	-	-	-	-
Signal Integrity Software	User	Active	X	X	-	X
Synopsys	User	Active	X	-	X	X
Teraspeed Labs	General Interest	Active	X	X	-	X
Toshiba	Producer	Inactive	-	-	-	-
Xilinx	Producer	Inactive	-	-	-	-
ZTE	User	Inactive	-	X	-	-
Zuken	User	Inactive	-	-	X	-

I/O Buffer Information Specification Committee (IBIS)

CRITERIA FOR 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 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.