IBIS Open Forum Minutes

Meeting Date: **November 1, 2024**
Meeting Location: **Teleconference**

VOTING MEMBERS AND 2024 PARTICIPANTS

Altair	(JuneSang Lee)
AMD (Xilinx)	(Bassam Mansour)
Analog Devices	Jermaine Lim-Abroguena, Toni Rose Racelis, Christine Bernal, Prachi Shukla, Aprille Hernandez-Loyola, Francis Ian Calubag, Marvin Sinues, Vincent Paul Sabillo, Esther Grace Falate, Keshav Mehrotra
Ansys	Curtis Clark*, Marco Occhiali
Ansys Japan	Satoshi Endo
Applied Simulation Technology	(Fred Balistreri)
Aurora System	(Dian Yang), Raj Raghuram
Broadcom	(Yunong Gan)
Cadence Design Systems	Kyle Lake, Ambrish Varma, Jared James, John Phillips, Kristoffer Skytte, Baolong Li
Celestica	(Sophia Feng)
Cisco Systems	(Stephen Scearce), Hong-Man Wu
Dassault Systemes	Stefan Paret, David Duque
GE Healthcare Technologies	(Balaji Sankarshanan)
Google	(Hanfeng Wang)
Huawei Technologies	(Hang (Paul) Yan)
Infineon Technologies AG	(Christian Sporrer)
Instituto de Telecomunicações	(Abdelgader Abdalla)
Intel Corporation	Michael Mirmak, Hsinho Wu*, Kinger Cai, Chi-te Chen, Sleiman Bou-sleiman
Keysight Technologies	Pegah Alavi, Ming Yan, David Banas, Fangyi Rao, HeeSoo Lee, Heidi Barnes
Marvell	Steven Parker, Shaowu Huang, Wei Zhang
MathWorks	Graham Kus*, Walter Katz*
Micron Technology	Justin Butterfield
MST EMC Lab	Chulsoon Hwang, Zhiping Yang*, Jiahuan Huang, Yifan Ding*, Zheben Peng, Xiangrui Su, DongHyan "Bill" Kim
SI-Clarity	Doug Burns*
Siemens EDA	Weston Beal*, Arpad Muranyi*, Randy Wolff*, Matt Leslie, Scott Wedge, Todd Westerhoff, Zhichao Deng
STMicroelectronics	Anil-Kumar Dwivedi, Bhupendra Singh, Harsh Saini, Hemant Kumar Gangwar, Manda Padma Sindhuja, Manish Bansal, Nitin Kumar, Olivier Bayet, Pawan Verma, Pranav Singh, Rahul Kumar, Raushan Kumar, Shivam Soni, Gaurav Goel, Manisha Bisht, Charul Sharma, Manish Bansal, Mihir Pratap
Synopsys	Ted Mido*, (Andy Tai), Luis Simoes, Pedro Monteiro, Luis Neves, António Eustáquio, Diogo Coelho, Nuno Lima, Alexandre Brito
Teraspeed Labs	(Tom Dagastino), [Bob Ross]
Waymo	(Feng Wang), [Ji Zhang]
ZTE Corporation	(Zhongmin Wei), (Shunlin Zhu)
Zuken	(Ralf Brüning), Markus Bücker
Zuken USA	Lance Wang

OTHER PARTICIPANTS IN 2024

Alphawave Semi	Adrien Auge, Todd Bermensolo
Anacom	Filipe Saraiva
Apple Inc.	Ying Cao
Applied Logix	Dan Chirpich
Ciena	Hugues Tournier, Kaisheng Hu
Hirel Logic	Jason Riddley
HRL Laboratories	John Carlson
Hitachi Ltd.	Yutaka Uematsu
IBM	Matteo Cocchini
Kandou	Sherman Chen
KEI Systems	Shinichi MaEDA
KT Smart Future-Creations	Keita Miyasato
Meta	Ashkan Hashemi, Himanshu Modi
Northrop Grumman Corp.	Will McCaffrey
Qualcomm	Scott Powers
Rivos	Yanshen Wang
Samsung Electronics	Jun-Bae Kim, Changsoo Yoon
SAE ITC	Tammy Patton, Rich Demary
Signal Edge Solutions	Benjamin Dannan
Si-Guys	Donald Telian
Socionext America	Futoshi Terasawa
Teraspeed Labs	[Bob Ross]
Toyobo Co.	Saki Kawano
University of Illinois Urbana-Champaign	Jose Schutt-Aine
UNIST	Jingook Kim
Zhejiang University	Ling Zhang

In the list above, attendees present at the meeting are indicated by "." Those submitting an email ballot for their member organization for a scheduled vote 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 connection information for future IBIS teleconferences is as follows:

Microsoft Teams meeting
Join on your computer or mobile app
Click here to join the meeting

Join with a video conferencing device
106010980@teams.bjn.vc
Video Conference ID: 114 666 897 5
Alternate VTC dialing instructions

Or call in (audio only)
+1 267-768-8015,554664847# United States, Philadelphia
Phone Conference ID: 554 664 847#
Find a local number | Reset PIN
Learn More | Meeting options

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.

NOTE: "AR" = Action Required.

INTRODUCTIONS AND MEETING QUORUM

Roll Call: Graham Kus announced a total of 7 organization members attending with quorum of 7 met.

CALL FOR PATENTS

Doug Burns ran the meeting due to absence of Lance Wang. Doug Burns called for declaration of any patents or pending patents related to the IBIS, IBIS-ISS, ICM, or Touchstone 2.0 specifications.

REVIEW OF MINUTES AND ARs

- August 9, 2024 IBIS Summit at IEEE EMC+SIPI 2024.
- August 23, 2024 IBIS Open Forum Teleconference.
- September 13, 2024 IBIS Open Forum Teleconference.

A motion to approve the above minutes was made by Randy Wolff. Graham Kus seconded the motion. There were no objections. The motion was approved.

- October 4, 2024 IBIS Open Forum Teleconference – not yet approved.

Lance Wang stated he would address broken recording links for August 9, 2024 IBIS Summit [AR].

Graham Kus reported that MathWorks related that they will offer the room for DesignCon 2025 summit.
Randy Wolff stated that DesignCon will kickoff planning soon.
Doug Burns thanked the MathWorks for the offer of the room.

ANNOUNCEMENTS, CALL FOR ADDITIONAL AGENDA ITEMS

Doug Burns called for any new announcements. No new agenda items.

MEMBERSHIP STATUS AND TREASURER'S REPORT
No updates from SAE ITC on many open items since the September 13

1 member renewal payment is still in progress (AMD) but may be completed by now. We have 28 members with a quorum of 7.

A TSCHK2 parser source code license purchase is completed, but the invoice payment has not been recorded yet ($1,000).

No information on actual expenses from SAE ITC to help us with setting membership costs and parser license costs for 2025.

A payment from Cadence for the Shanghai IBIS Summit ($500) was recorded.

3 payments from Empyrean, ANSYS, and Aurora System for the Shanghai Summit went directly to the hotel and are not recorded.

$13,755 Balance for 2024

$23,205 Adjusted Net Income for 2024 (adding the 2024 IBIS membership renewals received in 2023)

Doug Burns asked if there were any questions. There were none asked.

WEBSITE ADMINISTRATION

Graham Kus reported for Steve Parker is that there were uploads of the most recent minutes. Randy Wolff reported for Steve Parker that pages for previous summits have been added. There may be edits to create tables from the summits to update the tables for the presentations from the past few summits.

Michael Mirmak noticed there is some backlog for Github tickets particular for Task Groups and other updates, and asked if there were any updates on these documents?

Graham Kus took an AR to contact Steve Parker for an update on this [AR].

Doug Burns asked if there were additional questions. No questions were asked.

MAILING LIST

Curtis Clark reported there were no issues.

Doug Burns asked if there were additional questions. No questions were asked.

LIBRARY UPDATE
Zhiping Yang reported there are no inquiries or updates.

Doug Burns asked if there were additional questions. No questions were asked.

INTERNATIONAL/EXTERNAL ACTIVITIES

IEC 63055/IEEE 2401, JEITA "LPB:"

- Michael Mirmak reported no updates. Next IEEE DASC meeting is expected next week Thursday November 7, 2024.

Press Updates:

- No updates reported.

University Relations:

- No updates reported.

SUMMIT PLANNING AND REVIEW

Doug Burns reported on behalf of Lance Wang that the Asian summits were well-attended. Randy Wolff reported that the pages are uploaded for the Summits. The recordings are uploaded. There would have to be simple minutes for the recordings. Japan summit had live discussion, about topic of interconnect modelling and EMD and IBIS-AMI quality. That all went well. The online meeting for China was intended for local Chinese to use, not sure if anyone from US could use. Graham Kus took an action to create minutes for the summits [AR].

QUALITY TASK GROUP

Randy Wolff reported there will probably be a meeting next week Tuesday. The discussion has been putting together spec document for IBIS 8 parser. Mostly done, just needs review before sending to parser developer. Randy is waiting to see if there are any additional items that may need to be covered for example TS4 file checking, and other changes Editorial is looking at for PSIJ and most of the SPIM related BIRD for IBIS 8. Plan is to get that sent out soon for a quote to get an idea of what IBIS parser will cost next year.

Doug Burns asked for questions. None were asked.

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

https://IBIS.org/quality_wip/

ADVANCED TECHNOLOGY MODELING TASK GROUP

Arpad Muranyi reported we are meeting on Tuesdays at Noon Pacific time. In the last few meetings we have discussed the PSIJ from Yifan and Chulsoon, and submitted to here for more information for discussion. The other is Michael Mirmak's attempts to clarify and clean up spec on TS4 file and ramp and how they are related and some controversial statements in specification; that will have a BIRD soon, but not yet ready to go.

Doug Burns asked for questions. None were asked.

Note: Task group material can be found at:

https://IBIS.org/macromodel_wip/

INTERCONNECT TASK GROUP

Michael Mirmak reported the discussion has to do with port mapping for Touchstone 3. That has to do with the referencing being clear enough for EMD for IBIS interconnect purposes. There are major concerns about touchstone being unambiguous especially for automation. We had discussion with EMC experts on and offline and the goal is to assemble a Touchstone version 3 draft.

Doug Burns asked for questions. None were asked.

Note: Task group material can be found at:

https://IBIS.org/interconnect_wip/

EDITORIAL TASK GROUP

Michael Mirmak reported this is working with an IBIS 8 draft, which is draft 4. Most focus is on chapter 15, SPIM and PSIJ treatment that were approved some time back. It requires some consultation with authors to make sure text is clear and the keywords do not collide. We hope to have report for Open Forum by end of year or DesignCon summit 2025.

Doug Burns asked for questions. None were asked.

Note: Task group material can be found at:

https://IBIS.org/editorial_wip/

NEW ADMINISTRATIVE ISSUES

IBIS membership structure change discussions.

Doug Burns reported that we continue to work to resolve expenses relative to SAE ITC, in order to set the 2025 costs and budgets. Randy Wolff reported there were no new updates from SAE ITC since previous update. There was discussion that a future meeting may revisit this topic.

Doug reported on the IBIS Parser that the Statement of Work was being evaluated and stay tuned.

Doug asked for questions. None were asked.

ROLL CALL

Mid-meeting roll call: Graham Kus reported 7 member attendees meeting quorum requirements.

TECHNICAL DISCUSSION

None.

NEW AND REVISED IRDs

None.

IRDS ELIGIBLE FOR VOTE

None.

IRDS SCHEDULED FOR VOTE

None.

TABLED IRDS

BIRD220: Pre-driver PSIJ Sensitivity keyword.

Arpad Muranyi motioned to un-table the issue. Michael Mirmak seconded. There were no objections. The motion passed.

Doug Burns stated that this is un-tabled. It is now BIRD220.1

Yifan was recognized as joining. Yifan Ding reported on the update since last version was proposed. See BIRD for details.

Randy Wolff suggested that we discuss any editorial or subject items before it is approved

Arpad encouraged everyone to read it through and provide feedback including editorial.

Walter Katz asked, if Yifan had a list of EDA vendors or Users that would like this BIRD. Yifan stated she did not. Walter stated he represents an EDA vendor, and implementing this is not a trivial effort, so what customers will want these features, and what IC vendors will support generating these models?

Are there any, who want to, who can, and what users need these models in order to make the engineering designs to work?

Randy stated that he was originally at Micron and was originally added to this BIRD, but when he worked at that company it was interested in that. Especially for NAND devices. Modelling pre-driver effect created a significant difference between IBIS simulation results and transistor simulation results, leading to issues that IBIS models were not accurate enough.

Doug asked if Yifan could reach out to get clarification, perhaps to Justin Butterfield at Micron for comment.

Walter commented that he also noticed that Allaeddin Aydiner asked some questions as to alternative ways to implement this impairment, and thinks it would be a justification for why this BIRD is important for the industry: will IC vendors support it and will users want to implement it.

Randy suggested each of the EDA vendors should review this. Siemens EDA had some reviews with developers and had issues with previous version of this BIRD. Now that the BIRD is revised the equations are different so EDA vendors may need to get back to developers and difficulty to implement equations.

Zhiping Yang stated that this may be important for any high-speed link, and pre-driver can impact timing by the power noise. This is complicated but is very convincing to be useful to be closed gap with IBIS.

Walter stated his concern is that this is certainly a way to predict jitter in TD for IBIS models, however, most high speed links have equalization and other features such as statistical to analyze performance. So the real question is will this be a useful capability for designing high speed links.

Zhiping stated we do more in IBIS-AMI to include power effects. IBIS-AMI may need to do more to fix that problem.

Doug stated whom would see impact – IC vendors and EDA vendors per their thoughts.

Doug asked if there were additional questions – there were none.

Note: Link to BIRD details can be found at:

- Link: https://IBIS.org/BIRDs/BIRD220.docx

IBISCHK AND TSCHK PARSER AND BUG STATUS

Randy Wolff reported no new bugs to report. We are working on getting a quote for IBISCHK8.

Doug Burns asked if there were additional questions – there were none.

NEW TECHNICAL ISSUES

Zhiping Yang asked question to forum: do we see if IBIS-AMI can be used for Optical simulations?

Walter Katz stated his answer would be yes. Generating an impulse response may be a challenge- but some tool must generate the impulse response, then figure it out. 30km vs. 1m of glass. Once you have that information you can use IBIS-AMI and companies have done that. It would have to be an LTI system.

Randy Wolff shared a presentation about modelling optical links in IBIS-AMI

- Link: https://ibis.org/summits/feb12/gupta.pdf

Graham Kus mentioned OIF as a potentially interested standards body, as they work on the Optical region of Ethernet as opposed to IEEE 802.3 which is primary Electrical Ethernet.

Zhiping Yang shared presentation germane to the subject.

Walter stated based on slide 12, you can get Rx-Tx combination as repeater, but have to include effects of channel in TX or RX in pair models. He believes that the way it may being done.

There was additional discussion.

Walter: IBIS only thinks of up to the input model, and driver out- IBIS does not understand an analog driver- but it is during GetWave processing all very possible and doable.

Zhiping thanked Walter.

Doug asked if there was any more discussion.

Walter stated, that picture- if you wanted to drive it as a repeater, it has to have a TX and RX in one IBIS file- here you have 2 components and one is in New York and other in Boston so TX and RX cannot be same physically, but can be in an IBIS file.

Zhiping asked, what about a driver and receiver each model as a repeater, and the file is the channel? Then the SerDes electrical channel becomes 1 repeater and fiber and repeater? Would that be better approach?

Walter stated, it would have to be reviewed- considered in the past with these things. This issue is passing the IBIS parser. So create a component for the cable, that is an IBIS component that is 35km.

Zhiping stated, so you create this but sometimes people want to ask how or best practices.

Walter stated, how do you swap the optical into the RX… that is one of the problems. One thing you can do is have an S-parameter and pass in a file name to IBIS model, and it could use something is understand becomes part of the IBIS model- it becomes sometime that is the same directory, but comes in as a Touchstone file- is one method could be done. There are some pain points but it is workable.

Zhiping stated he is thinking about breaking down the portions shown in slide and how to be modelled in IBIS.

Walter stated IBIS does not understand the analog model- you cannot generate that in IBIS.

Zhiping – but in this case we have transmitter and or receiver.

Arpad Muranyi stated, what Walter seems to be saying with analog outputs is correct, but if you look at figure 32 in the spec on page 170 (showed screenshot) there are 2 external circuit models and they can be connected with a node together. This could also support analog signals, so if you really have to there might be a way. This might be a possibility.

Zhiping asked, in this analog buffer, this is the portion which can be used to model analog behavior for e to o and so forth?

Arpad stated, he never tried it but remember we had this internal node capability and it may also support analog signals, not just the digital indicated on this picture. You may do research.

Zhiping thanked Arpad.

Walter stated, one more comment – IBIS-AMI does not care about how impulse is generated and the waveforms- for the analog section. You can generate that any way you want. One way is to use Standard-Out (STD OUT) IBIS IO drivers. You can use anything out would to generate those channel responses.

Doug Burns asked if there were any other comments. None were made.

NEXT MEETING AGENDA AND SCHEDULING

Doug Burns stated the next IBIS Open Forum meeting would be held as a teleconference meeting on November 22, 2024. The following meeting would be held December 13, 2024. Doug asked if there were any concerns. None were raised.

Arpad Muranyi motioned to adjourn. Doug Burns seconded the motion. The meeting adjourned.

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NOTES

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This meeting was conducted in accordance with SAE ITC guidelines.

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 or unsubscribe from the official IBIS@freelists.org and/or IBIS-users@freelists.org email lists (formerly IBIS@EDA.org and IBIS-users@EDA.org):
  - https://www.freelists.org/list/IBIS
  - https://www.freelists.org/list/IBIS-users
- To subscribe to or unsubscribe from one of the Task Group email lists: IBIS-macro@freelists.org, IBIS-interconn@freelists.org, IBIS-editorial@freelists.org, or IBIS-quality@freelists.org:
  - https://www.freelists.org/list/IBIS-macro
  - https://www.freelists.org/list/IBIS-interconn
  - https://www.freelists.org/list/IBIS-editorial
  - https://www.freelists.org/list/IBIS-quality
- 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: IBISchk7, tschk2, icmchk1, s2IBIS, s2IBIS2 and s2iplt.

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

https://IBIS.org/bugs/IBISchk/
https://IBIS.org/ bugs/IBISchk/bugform.txt

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

https://IBIS.org/bugs/tschk/
https://IBIS.org/bugs/tschk/bugform.txt

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

https://IBIS.org/bugs/icmchk/
https://IBIS.org/bugs/icmchk/icm_bugform.txt

To report s2IBIS, s2IBIS2 and s2iplt bugs, use the Bug Report Forms which reside at:

https://IBIS.org/bugs/s2IBIS/bugs2i.txt
https://IBIS.org/bugs/s2IBIS2/bugs2i2.txt
https://IBIS.org/bugs/s2iplt/bugsplt.txt

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

https://IBIS.org/

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

https://IBIS.org/directory.html

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SAE STANDARDS BALLOT VOTING STATUS (attendee X; absent -)

Organization	Interest Category	Standards Ballot Voting Status	Aug 9, 2024	Aug 23, 2024	Sept 13, 2024	Oct 4, 2024	Nov 1, 2024
Altair	User	Inactive	-	-	-	-	-
AMD (Xilinx)	Producer	Inactive	-	-	-	-	-
Analog Devices	Producer	Inactive	X	-	-	-	-
Ansys	User	Active	X	X	X	X	X
Applied Simulation Technology	User	Inactive	-	-	-	-	-
Aurora System	User	Inactive	-	-	-	-	-
Broadcom Ltd.	Producer	Inactive	-	-	-	-	-
Cadence Design Systems	User	Active	X	X	X	X	-
Celestica	User	Inactive	-	-	-	-	-
Cisco Systems	User	Inactive	-	-	-	-	-
Dassault Systems	User	Inactive	-	-	-	-	-
GE Healthcare Technologies	User	Inactive	-	-	-	-	-
Google	User	Inactive	-	-	-	-	-
Huawei Technologies	Producer	Inactive	-	-	-	-	-
Infineon Technologies AG	Producer	Inactive	-	-	-	-	-
Intel Corp.	Producer	Active	X	X	X	X	X
Keysight Technologies	User	Inactive	-	-	-	-	-
Marvell	Producer	Inactive	X	X	-	-	-
MathWorks	User	Active	X	X	X	X	X
Micron Technology	Producer	Inactive	-	-	-	-	-
MST EMC Lab	User	Inactive	X	-	-	-	X
SI-Clarity	User	Active	X	X	X	X	X
Siemens EDA	User	Active	X	X	X	X	X
STMicroelectronics	Producer	Inactive	X	-	-	-	-
Synopsys	User	Active	X	X	X	X	X
ZTE Corp.	User	Inactive	-	-	-	-	-
Zuken	User	Active	X	X	X	X	-

= Temporarily not a voting member

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 (voting by email counts as attendance)

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.