



IBIS Open Forum Minutes

Meeting Date: **October 30, 2020**

Meeting Location: **Teleconference**

VOTING MEMBERS AND 2020 PARTICIPANTS

ANSYS	Curtis Clark*, Wei-hsing Huang, Marko Marin Shai Sayfan-Altman, Zilwan Mahmod, Baolong Li Usman Saeed
Applied Simulation Technology	(Fred Balistreri)
Broadcom	James Church, Jim Antonellis
Cadence Design Systems	Zhen Mu*, Ambrish Varma, Jared James Kumar Keshavan, Ken Willis, Suomin Cui
Cisco Systems	Stephen Scearce, Hong Wu, Han Gao
Dassault Systemes (CST)	Stefan Paret
Ericsson	[Anders Ekholm], Sungjoo Yu, Thomas Ahlstrom
Google	Zhiping Yang*, Shuai Jin, Zhenxue Xu, Hanfeng Wang Songping Wu, Yimajian Yan
Huawei Technologies	(Hang (Paul) Yan)
IBM	[Michael Cohen], Greg Edlund
Infineon Technologies AG	(Christian Sporrer)
Instituto de Telecomunicações	(Abdelgader Abdalla)
Intel Corporation	Hsinho Wu*, Michael Mirmak*, Adrien Auge Fernando Mendoza, Taeyoung Kim, Wendem Beyene Oleg Mikulchenko, Nhan Phan, Ifiok Umoh Subas Bastola, Kingler Cai
Keysight Technologies	Radek Biernacki*, Hee-Soo Lee, Todd Bermensolo Graham Riley, Pegah Alavi, Fangyi Rao Stephen Slater
Marvell	Steve Parker*, Johann Nittmann, Shaowu Huang
Maxim Integrated	Joe Engert, Charles Ganal, Dzung Tran, Yan Liang Tushar Pandey*
Mentor, A Siemens Business	Arpad Muranyi*, Raj Raghuram, Todd Westerhoff Weston Beal
Micron Technology	Randy Wolff*, Justin Butterfield, Larry Smith Vijay Kanagachalam
MST EMC Lab	Chulsoon Hwang, Anfeng Huang, Bo Pu, Jiayi He Yin Sun
NXP	John Burnett
SerDesDesign.com	John Baprawski
SiSoft (MathWorks)	Mike LaBonte*, Walter Katz, Graham Kus
Synopsys	Ted Mido*, Andy Tai

Teraspeed Labs
Xilinx
ZTE Corporation
Zuken
Zuken USA

Bob Ross*
Ravindra Gali
(Shunlin Zhu)
Michael Schäder, Kazunari Koga
Lance Wang*

OTHER PARTICIPANTS IN 2020

Accton	Tariq Abou-Jeyab
Achronix Semiconductor	Hansel Dsilva
Amazon Lab126	John Yan
Apollo Giken Co.	Satoshi Endo
Apple	Jin Shi, Jun Xu
Aurora Innovation	Jianming Li
ARRL (IEEE EMC)	Ed Hare
Christie Digital Systems	Mingchang Wang
Ciena	Kaisheng Hu
De Montfort University (IEEE EMC)	Alistair Duffy
Exponential Failure Analysis Associates (IEEE EMC)	Vignesh Rajamani
ETS-Lindgren	Janet O'Neil
Facebook	Xin Chang
Kandou Bus	Sherman Chen
KEI Systems	Shinichi Maeda
Kioxia Corporation	Yasuo Otsuka
Lemonade Social Media	Rachel Norrod
OmniVision	Sirius Tsang
Qualcomm	Kevin Roselle, Sunil Gupta, Yi Cao
Renesas	Genichi Tanaka
RITA Electronics	Takahide Nozaki
Rockwell Automation	Meilin Wu
SAE ITC	Jose Godoy
Samsung	Wonsuk Choi
San Jose State University	Vincent Tam
Seagate	Preetesh Rathod, Alex Tain, Karthik Chandrasekar Emmanuel Atta
Signal Metrics	Ron Olisar
Silvaco Japan Co.	Yoshiharu Furui
SK Hynix Memory Solutions	Jongchul Shin, Alex Lee, James Yu
Socionext	Matsumura Motoaki, Shinichiro Ikeda Takafumi Shimada
SPISim	[Wei-hsing Huang]
Teradyne	Dongmei Han, Edward Pulscher, Sheri Zhuang Tomoo Tashiro, Paul Carlin, Tao Wang
University of Florida	Shuo Wang

Unaffiliated

Colin Brench

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 connection information for future IBIS teleconferences is as follows:

<https://tinyurl.com/IBISOFridayTeams>

Join Microsoft Teams Meeting

Conference ID: 803 509 041#

[Local numbers](#) | [Learn more about Teams](#) | [Meeting options](#)

Join with a video conferencing device

106010980@teams.bjn.vc VTC Conference ID: 1143484747

[Alternate VTC dialing instructions](#)

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

Curtis Clark declared that a quorum was reached.

Tushar Pandey of Maxim Integrated introduced himself. He leads the IBIS modeling group that services all business units within Maxim Integrated. His group has experience with many design types requiring traditional IBIS modeling, and they are now working with AMI modeling for SerDes devices.

CALL FOR PATENTS

Randy Wolff called for declaration of any patents or pending patents related to the IBIS, IBIS-ISS, ICM, or Touchstone 2.0 specifications. No patents were declared.

REVIEW OF MINUTES AND ARS

Randy Wolff called for comments on the minutes of the October 9, 2020 IBIS Open Forum teleconference. Radek Biernacki moved to approve the minutes. Mike LaBonte seconded the motion. There were no objections.

Randy reviewed ARs from the previous meeting.

1. Steve Parker to update status of BIRD206 on the IBIS BIRDS page [AR].
Steve reported that this had been done.
2. Randy Wolff to update BIRD207 accepted date and send to Steve Parker for posting [AR].
Randy reported that this had been done.
3. Steve Parker to update status of BIRD207 on the IBIS BIRDS page [AR].
Steve reported that this had been done.
4. Randy Wolff to send an email to the Open Forum announcing the Librarian special election nominations and voting [AR].
Randy reported that this had been done.

ANNOUNCEMENTS, CALL FOR ADDITIONAL AGENDA ITEMS

Randy Wolff noted that a new BIRD, BIRD201.1, had been submitted and would be discussed.

MEMBERSHIP STATUS AND TREASURER'S REPORT

Bob Ross reported that we have 27 members. The quorum for meetings is 7. We have \$28,785 cash flow for 2020 and a \$29,135 adjusted balance for 2020. These figures are unchanged from the previous meeting. Bob noted that the only expected upcoming payment is for \$350 to reimburse Mike LaBonte for the bluehost webhosting payment. He said there is a possibility that the adjusted balance might be updated at a later date, as one of the income items might be moved to next year as an accounting adjustment.

WEBSITE ADMINISTRATION

Steve Parker reported that he had formally renewed the ibis.org domain name for another year, which is included in our bluehost package. Steve reported that the new BIRD202.1 had been posted. The website was up to date with respect to ATM and Quality task group minutes and documents. Updates had been posted to the Interconnect task group work archive page. BIRD206 and BIRD207 had been updated, virtual summit pages had been updated, the ibischk banner at the top of the home page now points to ibischk7.0.2, and the Librarian information had been changed to Zhiping Yang. Steve noted that the bluehost passwords had not been updated in several years. He said he plans to change them and will schedule it and provide updates to others who login so there will be no disruptions.

MAILING LIST ADMINISTRATION

Mike LaBonte reported that mailing lists were generally operating smoothly. One account was returning a message saying it was rejecting messages as spam, but the user reported that they were receiving the messages. Mike said it may be a bad diagnostic.

LIBRARY UPDATE

Zhiping Yang reported that he had reviewed the script and the library page update procedures with the previous Librarian Anders Ekholm. He said he had successfully run the script. While reviewing its output report he had noticed some broken links, and he will investigate.

INTERNATIONAL/EXTERNAL ACTIVITIES

- Conferences

IEEE EMC + SIPI Symposium 2021 (was planned for May 13-15, Raleigh, NC – now virtual with timing TBD)

Randy Wolff noted that we have been tracking this one for a potential IBIS summit. Zhiping Yang reported that IEEE was now strongly suggesting that all Q2 2021 conferences change to virtual. IEEE EMC+SIPI had approved combining Raleigh and Glasgow into one virtual conference. The timing will now follow the Glasgow schedule, July-August, but the exact timing is to be decided, as several people had suggested reducing the total length of the virtual conference.

- Press Update

None.

- Related standards

None.

SUMMIT PLANNING AND STATUS

- Asia Summits

Japan (November 13, 2020):

The summit is held in conjunction with JEITA and will occur on Friday morning from 9 a.m. until noon local time to allow for overlap with Thursday evening hours in the US. Bob Ross reported that we have 6 presentations scheduled, and we are expecting all of them to be pre-recorded in .mp4 format. Randy Wolff and Bob said the whole summit will be recorded, and afterward we will host the recording and the individual presentation videos on the IBIS website.

Bob said we expect a good turnout. He noted that most of the participants come in via JEITA, and we may need to ask them about advertising the summit and recording registrations. Lance Wang said he had forwarded the summit registrations he had received to JEITA.

China (November 20, 2020):

The summit will occur on Friday from 9 a.m. until 1 p.m. local time to allow for overlap with Thursday evening hours in the US. Bob and Randy said we are not planning any pre-recorded presentations for this summit. Presentations will be live via Webex. Randy said we are still checking on the details of Webex hosting for this summit. Bob said we have 6 presentations scheduled and the possibility of two additional presentations. Bob and Randy said we plan to record this summit.

QUALITY TASK GROUP

Mike LaBonte reported that the group is meeting on Tuesdays at 8:00 a.m. PT. They are currently discussing how to check .iss files included by IBIS files, and they are capturing their proposal in a BUG214 (enhancement). (further discussion in the ibischk section below)

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 meets on Tuesdays at 12:00 p.m. PT. The group had recently renewed discussions about issues with the current AMI flow for redrivers. PI modeling in IBIS, a topic proposed by Zhiping Yang, was also on the table. Randy Wolff had given a presentation on a new single-ended PAM4 signaling technology and possible IBIS modeling enhancements to support it.

Task group material can be found at:

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

INTERCONNECT TASK GROUP

Michael Mirmak reported that the group meets at 8:00 a.m. PT on Wednesdays. He noted that the group had recently finished up work on BIRD202.1 and submitted it to the Open Forum. He said it contained revisions based on feedback received from the Open Forum. Michael thanked Randy Wolff for leading recent meetings and the final editorial push.

Task group material can be found at:

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

EDITORIAL TASK GROUP

Michael Mirmak reported the task group remains suspended.

Task group material can be found at:

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

CHINA REGIONAL FORUM

Lance Wang reported that he had sent an email to the CRF mailing list announcing the China IBIS summit. Because it is virtual, he thought people were waiting until the last minute to register. He said he would email members of a few key organizations in the CRF and ask them to help encourage people to register. Randy Wolff said that during the summit we may ask these key members to send us lists of attendees from their organizations.

China Regional Forum material can be found at:

http://www.ibis.org/china_forum/

NEW ADMINISTRATIVE ISSUES

- IBIS Librarian

Randy Wolff reported that he had sent out the call for nominations and then the call for votes according to the timeline decided upon at the last meeting. Curtis Clark, who served as the returning officer, reported that no one other than Zhiping Yang had been nominated. Curtis reported that eleven organizations submitted votes for Librarian, and all eleven had voted for Zhiping. Zhiping is the new Librarian. Randy thanked Zhiping for agreeing to serve. Curtis noted that anyone who voted should have received a reply acknowledging their vote.

- 2021 Membership Dues

Bob Ross said our current cash flow for the year is approximately \$28,000. We still expect SAE's bill for hosting, staff, and other services they provide, and this is typically around \$10,000. Randy Wolff noted that SAE had recently switched to Teams for hosting meetings, and we aren't sure about the costs. Bob said we are net positive roughly \$18,000 this year, but we have uncertainty about on-site summits and sponsorships next year. Bob said he saw no need to raise dues for next year. Randy said SAE has not told us that we need to raise more money.

Bob moved to set dues for 2021 at \$900 for a full membership (same as the rate for 2020), with a vote to occur at the next meeting. Radek Biernacki seconded the motion. There were no objections. Randy to send an email announcing the vote [AR].

Zhiping Yang asked about PI companies and how to encourage participation and membership. He asked if he should privately invite them to attend meetings and contribute technically. Bob and Arpad Muranyi said that participation is free to anyone, and membership confers voting rights. Bob and Randy noted that membership also gets an organization listed on the home page, meeting minutes, etc. Bob said that we often lose one or two member companies a year because of mergers and acquisitions, and it is good to replenish the supply of member organizations. Zhiping asked what the peak membership count had been. Randy and Bob said it had peaked around the year 2000. Bob said it peaked at 35 members when several connector companies had joined while we were working on a connector specification. That specification hadn't been widely adopted, and some connector companies had gone in different directions.

BIRD202.1: ELECTRICAL DESCRIPTIONS OF MODULES

Randy Wolff said BIRD202 had first been introduced right before DesignCon. This new version contains significant updates, large revisions to some sections, and new keywords. In addition, it contains some examples of EMD applied to real-life scenarios. Arpad Muranyi said he thought the changes were primarily textual and logistical, and that there were not large conceptual changes.

Randy reviewed the new keywords. [EMD Parts] and [EMD Designator List] are used to list components in the EMD. [Voltage List] is an informational keyword about various voltage sources on the module. Michael Mirmak said the [Voltage List] keyword harkens back to the older RAIL specification in that we are now trying to document expectations not just behavior. So, it's attempting to allow the user/tool to make sure you're getting the right rail voltage. We are trying to document a more complete description of the module. Randy said most other

keywords were unchanged, and some clarification of usage rules had been added.

Randy said there is a new RDIMM example that is useful for demonstrating the syntax. There are other examples for concepts like crosstalk modeling. Randy to send an email announcing that BIRD202.1 had been submitted [AR].

BIRD208: CLOCK-DATA PIN RELATIONSHIP KEYWORD

Michael Mirmak said he had received no comments, suggestions, or corrections. He said there will likely be another BIRD coming to document the types of timing relationships, but this BIRD208 is stand-alone and can be approved by itself. Bob Ross asked how soon the timing relationships could be proposed. Michael said writing the new BIRD would be easy, but agreeing on all the details and getting it approved could take a long time. He said BIRD208 simply alerts the tool or user to the existence of the clocking relationship between two pins. It doesn't provide any detail on the type (e.g., setup and hold, clock to out, clock skew). The syntax for specifying those relationships will be complicated and will take time to work out.

Arpad Muranyi asked if this BIRD208 is useful without the details to be provided in a future BIRD. Michael said it is. He said the primary objective is to alert the tool that a buffer or pin relies on another pin via a clocking relationship. He said IBIS currently has buffer models with I/O connections. However, in the DDR5 scenario (e.g., BIRD204 and BIRD207), we are saying we have a buffer structure that requires data and clock connections. Randy Wolff agreed and added that in his experience setting up DDR5 simulations in various tools, he thought tools could already use this information to automate the DQS to DQ relationship set-up. Bob noted that the currently allowed value in the third column, "Unspecified", means the EDA tool is responsible for setting up the relationship, likely with user intervention. Michael agreed and said that in the case of Randy's example the tool could prompt the user to remind them that a relationship exists and may need to be defined before the simulation can proceed. Eventually (future BIRD) "Unspecified" will be accompanied by other values that define the type of relationship. However, "Unspecified" will still be available to indicate that the IBIS specification doesn't provide this information at this time. Arpad agreed and said he had asked his question to get this explanation on the record. He didn't want people to see "Unspecified" and assume that BIRD208 in its current form was not useful. Tushar Pandey agreed that BIRD208 could be very useful and said he could see using it to document a receiver's dependency on a PLL.

Bob noted that using BIRD208 is entirely optional for the model maker. He reiterated that a model released using BIRD208 might need to be updated at a future time if the timing relationship is to be specified. He said the RAIL specification might be a good reference for future discussions on defining the actual timing relationships. Though it was currently hidden, the RAIL specification web page is available at: <https://ibis.org/rail/>

Randy and Bob said we could consider adding it to the emerging specifications list to make it visible.

BIRD166.4: RESOLVING PROBLEMS WITH REDRIVER INIT FLOW

Discussion was tabled.

BIRD181.1: I-V TABLE CLARIFICATIONS

Discussion was tabled.

BIRD190: CLARIFICATION FOR REDRIVER FLOW

Discussion was tabled.

IBISCHK PARSER AND BUG STATUS

Bob Ross said there were no new parser BUGs to report. The Interconnect task group is working on a proposal and BUG214 report (enhancement) to add IBIS-ISS checking to the ibischk parser. Bob said that in scoping the project they'd also been considering checking the syntax of parameter passing to IBIS-ISS subcircuits. Randy Wolff said if the IBIS file is specifying parameters to be passed to the subcircuit, the plan is to make sure the parameter name appears on the subcircuit definition line. We would be checking for consistency, and the parameter has to appear on the subcircuit line.

Bob said that for the multi-lingual models for [External Model] and [External Circuit] the specification states that the parameter must exist on the subcircuit line itself. Randy said the question is whether they should consider extending the proposed parameter passing checks to the multi-lingual models as well. Mike and Randy said they were leaning toward only doing it for Interconnect Model syntax. Bob and Arpad Muranyi argued in favor of supporting it for multi-lingual models as well, since the parameter passing syntax is identical. Bob noted that we will have the same parameter passing syntax for EMD models (BIRD202.1) and Randy's enhanced C_comp models (BIRD200). Bob said he thought it should be a separate BUG (enhancement) if we want to add it for multi-lingual. He also noted that we will ultimately want to test the linkage to included Touchstone files as well.

NEW TECHNICAL ISSUES

- Port Ordering in Touchstone files

Steve Parker said he had run into an issue in merging methodologies from Marvell and Avera Semiconductor after the acquisition. For .s4p files, one organization had assumed a different port ordering than the other. Steve asked if this was an issue of industry best practice.

Randy Wolff asked if the issue was specific to IBIS-AMI models. Arpad Muranyi and Michael Mirmak said if the specific issue was the buffer analog impedance modeling for an AMI model (BIRD158, BIRD194), then the port ordering is well defined by the specification. Steve said his question was a more general question and not specific to AMI modeling at all.

Randy said the general question was the subject of endless si-list threads. Michael said that Touchstone 2.0 has the keyword pair Begin Information and End Information, which could document exactly the type of port ordering information Steve asked about. However, opinions fall into two distinct camps. One says that Touchstone files should be self-contained, and port ordering information should be provided by an explicit keyword that defines inputs and outputs. The other side says that S-parameter information is a general class of data files, not just for interconnect modeling, and putting in data regarding port ordering and usage is totally inappropriate. This side thinks a higher level wrapper should be placed around the S-

parameters to provide this information. Michael said input from Steve's combined organization would be welcome in these discussions.

Bob noted that there had been a port reordering proposal that allowed for combination of single-ended and mixed mode constructs in one file. He agreed that Touchstone has never been restricted to interconnect elements and could even be used for active elements, i.e., no requirement for passivity. Bob said questions of odd-on-the-left even-on-the-right port ordering had come out of some of Eric Bogatin's presentations, and this system of ordering made it easier to extend the port count without completely redoing the port ordering.

Radek agreed with Bob and Michael. He said other usages of S-parameter data were not necessarily related to near end and far end concepts. Port reordering makes sense for certain applications, but people weren't sure it should be part of Touchstone itself. He said the Begin Info – End Info keywords are not really parseable for useful information. He said there had been a push in the past few years to add port naming information as well, but Touchstone 2.0 doesn't do it. Arpad commented that port ordering is primarily an issue when you have a point-to-point interconnect with a starting point and ending point for each port pair, but if you are describing a power plane, for example, with various splits and ports for different chips and VRMs then port ordering has no real meaning in terms of physical location or geometry. Steve thanked everyone for their comments.

NEXT MEETING

The next IBIS Open Forum teleconference meeting will be held on December 4, 2020. The following teleconference meeting is tentatively scheduled for January 8, 2021.

Arpad Muranyi moved to adjourn. Mike LaBonte 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 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	August 28, 2020	September 18, 2020	October 09, 2020	October 30, 2020
ANSYS	User	Active	X	X	X	X
Applied Simulation Technology	User	Inactive	-	-	-	-
Broadcom Ltd.	Producer	Inactive	-	-	-	-
Cadence Design Systems	User	Active	X	X	X	X
Cisco Systems	User	Inactive	X	-	-	-
Dassault Systemes	User	Inactive	-	-	-	-
Ericsson	Producer	Inactive	-	-	-	-
Google	User	Active	X	X	X	X
Huawei Technologies	Producer	Inactive	-	-	-	-
Infineon Technologies AG	Producer	Inactive	-	-	-	-
Instituto de Telecomunicações	User	Inactive	-	-	-	-
IBM	Producer	Inactive	-	-	-	-
Intel Corp.	Producer	Active	X	X	X	X
Keysight Technologies	User	Active	-	X	X	X
Marvell	Producer	Active	X	X	-	X
Maxim Integrated	Producer	Inactive	-	-	-	X
Mentor, A Siemens Business	User	Active	X	X	X	X
Micron Technology	Producer	Active	X	X	X	X
MST EMC Lab	User	Inactive	X	-	-	-
NXP	Producer	Inactive	X	-	-	-
SerDesDesign.com	User	Inactive	-	-	-	-
SiSoft	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 Corp.	User	Inactive	-	-	-	-
Zuken	User	Active	X	X	X	X

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.