IBIS Open Forum Minutes

Meeting Date: **October 7, 2011**
Meeting Location: **Teleconference**

VOTING MEMBERS AND 2011 PARTICIPANTS

Agilent	Radek Biernacki, Fangyi Rao, Amolak Badesha
Altera	Hui Fu, Zhuyuan Liu, Julia Nekrylova, David Banas*
AMD	Nam Nguyen*
Ansys (Ansoft)	Samuel Martens
Apple Computer	(Matt Herndon)
Applied Simulation Technology	Norio Matsui
Cadence Design Systems	Terry Jernberg, Ambrish Varma, Dennis Nagle, Martin Biehl, Yukio Masuko
Cisco Systems	[Syed Huq], [Mike LaBonte], Luis Boluna, Ashwin Vasudevan, Zhiping Yang
Ericsson	Anders Ekholm
Freescale	(Jon Burnett)
Green Streak Programs	Lynne Green
Huawei Technologies	Xiaoqing Dong
IBM	Adge Hawes*, Greg Edlund
Infineon Technologies AG	(Christian Sporrer)
Intel Corporation	Michael Mirmak*, Udy Shrivastava, Heather Monigan
IO Methodology	Lance Wang*
LSI	Brian Burdick*
Mentor Graphics	Arpad Muranyi*, Ed Bartlett, Vladimir Dmitriev-Zdorov, Steve Kaufer, Chuck Ferry
Micron Technology	Randy Wolff*, Andrea Spiezia, Roberto Izzi, Aniello Viscardi, Giovanni Guerra, Francesco Madonna, Giuseppe Fusillo
Nokia Siemens Networks GmbH	Eckhard Lenski*
QLogic	David Choe, James Zhou
Signal Integrity Software	Walter Katz*, Todd Westerhoff, Mike Steinberger, Barry Katz, Mike LaBonte*
Sigrity	Raymond Chen, Kumar Keshavan, Yingxin Sun
Synopsys	Andy Tai, Ted Mido, Scott Wedge
Teraspeed Consulting Group	Bob Ross*, Kellee Crisafulli, Tom Dagostino, Scott McMorrow
Texas Instruments (National Semiconductor - merged with TI)	Casey Morrison, Alfred Chong [Hsinho Wu], Pegah Alavi, John Goldie
Toshiba	(Tetsuya Endo)
Xilinx	(Raymond Anderson)
ZTE	Bi Yi
Zuken	(Michael Schaeder)

OTHER PARTICIPANTS IN 2011

AET	Mikio Kiyono
Arrow Electronics	Ian Dodd
Avago	Weiping He, Minh Quach, Sari Tocco
Bayside Design	Elliot Nahas
Broadcom	Mohammad Ali
CST	Martin Schauer
Exar Corporation	Helen Nguyen
Granite River Labs	Johnson Tan, Mike Engbretson, Quintin Anderson
High Speed Design Center	Ben Chia
ICT-Lanto	Steven Wong
JEITA	Atsushi Ishikawa
KEI Systems	Shinichi Maeda
Maxim Integrated Products	Hassan Rafat
Mindspeed	Jeff Li, Lyn Wang
NetLogic	Ryan Coutts, Antonis Orphanou
Oracle	Gustav Blando
Politecnico di Torino	Igor Stievano, Stefano Grivet-Talocia
Pristine Signals	AbdulRahman (Abbey) Rafiq
Renesas Electronics	Takuji Komeda
Samsung Electronics	Il Seong
Siemens	Manfred Maurer
Simberian	Yuriy Shlepnev
ST Microelectronics	Fabio Brina, Alan Smith
TechAmerica	(Chris Denham)
Thales Communication	Alexandre Amedeo, Cyrip Chastang
University of Illinois	Jose Schutt-Aine
University of L'Aquila	Danilo di Febo
Vitesse Semiconductor	Siris Tsang
Independent	Yoichi Niioka, [Mike LaBonte]

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
October 28, 2011	205 475 958	IBIS
November 15, 2011	Asian IBIS Summit – Shanghai – no teleconference	
November 18, 2011	Asian IBIS Summit – Yokohama – no teleconference	
November 21, 2011	Asian IBIS Summit – Taipei – no teleconference	

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 AM to 9:55 AM 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
No new participants.

CALL FOR PATENTS
Michael Mirmak called for any patents or pending patents related to the IBIS 3.2, IBIS 4.2, IBIS 5.0, Touchstone 2.0 or ICM 1.1 specifications. No patents were declared.

REVIEW OF MINUTES AND ARS
Randy Wolff called for comments regarding the minutes of the September 16, 2011 IBIS Open Forum teleconference. The minutes were approved without changes.

MEMBERSHIP STATUS AND TREASURER'S REPORT
Bob Ross reported that he has received no updates from TechAmerica but has asked for another update. We have roughly 31 members, but we are still tracking down some membership payments. He noted that National Semiconductor and TI merged, so National Semiconductor should be removed as a voting member.

WEB PAGE UPDATES
Mike LaBonte reported that the main update in the last three weeks was to the roster page with many updates. Altera was also added to the poster page. He collected email addresses on the roster page and sent test emails to each person to verify if the emails were still active. He is updating the roster page on a daily basis to get the contacts current.

Bob Ross noted that Mike's affiliation has officially changed to be with SiSoft.

MAILING LIST ADMINISTRATION
Mike LaBonte reported that everything is going ok.

MODEL LIBRARY UPDATE
No update.

MISCELLANY/ANNOUNCEMENTS
None.

OPENS FOR NEW ISSUES
Bob Ross noted that BIRD144 and BIRD145 need to be introduced. He would also like IBIS-ISS to be introduced earlier in the agenda in case it needs more discussion time. He also requested 10-15 minutes of time to discuss IBIS BUGs and the parser update.

Bob moved to move all the items up for vote to the beginning of the agenda. There was a second. There were no objections.

INTERNATIONAL/EXTERNAL ACTIVITIES
- P1735 Encryption
No update. The IEEE Study Group on Encryption web reflector archives are found at:

   http://www.eda-stds.org/ip-encrypt/hm/

- VHDL-AMS Table-Driven Models
Arpad Muranyi noted that there were no meetings since the last teleconference. More information can be found at:

   http://www.eda.org/twiki/bin/view.cgi/P10761/ProjectsArea#Table_driven_Modeling_Champion_J

- Conferences
EPEPS (Electrical Performance of Electronic Packaging and Systems) will be held October 23-26 in San Jose, California but will not feature an official IBIS presence. The program has been released. More information can be found at:

   http://epeps.ece.illinois.edu/

EMCCompo2011, the 8th International Workshop on Electromagnetic Compatibility of Integrated Circuits, will be held in Dubrovnik, Croatia, November 6-9, 2011. More information can be found at:

   http://www.emccompo2011.org

EDAPS (Electrical Design of Advanced Packaging & Systems) will be held December 12-14 in Hangzhou, PRC. More information can be found at:

Official IBIS participation is not planned for any of the events above, though individual papers and discussion on IBIS are encouraged. These are events with refereed submissions, with deadlines either pending or already passed.

- Press Update
None.

IEC APPROVAL ACTIVITIES

Randy Wolff reported that he and Michael Mirmak have held several meetings with Stan Krolikoski, Dennis Brophy and Chris Denham concerning IEEE DASC standardization of IBIS. The calls were meant to clarify the IEEE/ANSI/IEC relationship and address any concerns that TechAmerica had with the process. Chris Denham questioned the need for going through IEEE for IEC approval when a path already exists for going from ANSI to the IEC. Randy contacted Victor Berman, the new Technical Advisor to TC93, the working group in IEC that would be handling IEC approval of IBIS. Victor confirmed that TC93 has held its yearly meeting, and we would not have a chance to bring the IBIS specification before the committee until August of 2012. We would also need to attend meetings in person for the approval process to go anywhere. We have decided that the ANSI to IEC route is too slow and unpredictable, so we are moving forward with the IEEE DASC to IEC path. Michael Mirmak presented an overview of IBIS at the DASC meeting yesterday, and this was the first step before the DASC will vote on accepting the PAR and forming a working group to begin the IEEE approval process for IBIS. Once approved by IEEE, the IEC approval will be very easy due to the dual logo process between IEEE and IEC.

Michael thanked IBIS officers for calling into the DASC meeting. He also noted that the DASC is well aware of IBIS and welcoming of IBIS into the IEEE realm.

TECHAMERICA UPDATE

Michael Mirmak reported that the schedule for 2012 events and meetings has been announced.

KAVI members' login is at:

http://workspace.techamerica.org/apps/org/workgroup/ibis-members

SUMMIT STATUS

- Asian IBIS Summit – Shanghai

The Shanghai IBIS Summit is scheduled for Tuesday, November 15 at the Parkyard Hotel. Bob Ross noted that we are near closing out the program with about 12 presentations scheduled. They need to be finalized by October 17. The third announcement went out. Sponsors include Huawei Technologies, Agilent Technologies, Ansys, Cadence Design Systems, Intel Corp., IO Methodology, Sigrity, Synopsys, ZTE Corporation and others to be determined.

- Asian IBIS Summit –Yokohama

The meeting is November 18 in Yokohama and corresponds with a JEITA conference. The meeting may run from 1:30pm to 6:00pm. Bob Ross noted that 8-10 presentations are planned. The second announcement has gone out.

- Asian IBIS Summit – Taipei
The meeting is scheduled for November 21. Bob Ross noted that there is room for more presentations. Agilent is no longer a sponsor of this meeting. The second announcement has gone out. There are 6 sponsors including Avant Technology (IO Methodology), Cadence, Foxconn Technology Group, Intel Corporation, Sigrity, Synopsys and others to be determined.

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

QUALITY TASK GROUP
Mike LaBonte reported that he is pleased that BIRD142 has passed that includes changes to [Test Data] and [Test Load]. Most discussion in the group has been on the list of check items for AMI models. The group is meeting on Tuesdays at 8:00AM PDT.

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

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

MODEL REVIEW TASK GROUP
No update.

ADVANCED TECHNOLOGY MODELING TASK GROUP
Arpad Muranyi reported that the group is working on finalizing some of the BIRDs which are targeted for IBIS 5.1 to make sure the Editorial task group is not held back with their work.

Task group material can be found at:

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

EDITORIAL TASK GROUP
Michael Mirmak reported that meetings have been irregular. The group has settled on a general structure for IBIS 5.1 due to the latest BIRD approvals. The next meeting is immediately following this teleconference.

The current IBIS 5.0 reformatting documentation can be reviewed at the following new location:

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

The old link is being maintained, to avoid breaking existing references:

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

NEW ADMINISTRATIVE ISSUES
None.

BIRD143.1: CORRECTING THE RULES FOR AMI_CLOSE
Arpad Muranyi noted that he has not received any additional comments on the BIRD. Arpad moved to vote on approval of the BIRD. Bob Ross seconded the motion. There were no objections.

The vote passed with the following vote tally:

Altera – yes
AMD – yes
IBM – yes
Intel – yes
IO Methodology – yes
LSI – yes
Mentor – yes
Micron – yes
Nokia Siemens Networks – yes
SiSoft – yes
Teraspeed – yes

Anders Ekholm or Ericsson joined after the voted and noted an abstention.

TSIRD3: CLARIFY S-PARAMETER DEFINITION
There were no additional comments. Bob Ross moved to vote on approval of the TSIRD. Randy Wolff seconded the motion. There were no objections.

The vote passed with the following vote tally:

Altera – abstain
AMD – abstain
IBM – yes
Intel – yes
IO Methodology – yes
LSI – abstain
Mentor – yes
Micron – yes
Nokia Siemens Networks – yes

SiSoft – yes
Teraspeed – yes

Anders Ekholm or Ericsson joined after the voted and noted an abstention.

IBIS-ISS SPECIFICATION DRAFT 1.5 REVIEW
Arpad Muranyi made a comment that he would like to change the title to "IBIS Interconnect SPICE Subcircuit Specification" instead of "Subcircuits". Bob Ross noted that he was neutral on this change. Michael Mirmak added that "Specification" is also not part of the abbreviation IBIS-ISS. Walter Katz thought that we could remove the word "Subcircuits" from the title. Arpad did not think this would be appropriate. Arpad suggested we move the word "Specification" to the second line on the title page.

Arpad moved to change the word "Subcircuits" to "Subcircuit" in the title as well as on page 5. Bob Ross seconded. There were no objections.

Bob moved to change page 5 to read "IBIS Interconnect SPICE Subcircuit (IBIS-ISS) Specification" and to change the title to match as "IBIS Interconnect SPICE Subcircuit (IBIS-ISS)" with "Specification" on the second line.

Bob moved to vote on approval of the IBIS-ISS specification. Arpad Muranyi seconded the motion. There were no objections.

The vote passed with the following vote tally:

Altera – abstain
AMD – yes
Ericsson – yes
IBM – yes
Intel – yes
IO Methodology – yes
LSI – yes
Mentor – yes
Micron – yes
Nokia Siemens Networks – yes
SiSoft – yes
Teraspeed – yes

Arpad noted that he feels that this was a historical moment because this is the first official SPICE specification. Bob noted that there will be an official document issued with today's date. Michael added that the revision will be 1.0 and an announcement will need to go out to the SI-related reflectors.

IBISCHK5 BUG STATUS
Bob Ross reported that he would like to close out BUG104 as "Not a Bug". BIRD142 changes

the hierarchy of [Test Data], so this negates BUG104. Bob took the AR to add explanatory text to the BUG report describing why it is no longer a BUG. Mike LaBonte added that he emailed Tim Coyle, the BUG author, to let him know that the BUG status was changing. There were no objections to the changes to BUG104.

Bob reported that he received a parser revision that fixes BUG122. This is in version 5.0.7 of the parser. The parser now properly accounts for Vref in [Model Spec] when checking for models driving through the Vref threshold. The BUG will be changed to "Closed" status.

BUG129 is also fixed in version 5.0.7 of the parser. This fixes a problem where the I-t waveform data had to be at the exact same time points as the V-t waveform data. This deprecates the error to a caution for the IBIS 5.0 specification. The check will be removed entirely for the IBIS 5.1 parser. The BUG will be changed to "Closed" status.

There were no objections to releasing the 5.0.7 parser. This starts the process of creating the executables and distributing the source code to parser purchasers.

BIRD127.2: IBIS-AMI TYPOGRAPHICAL CORRECTIONS
Arpad Muranyi noted that the BIRD was discussed in the last ATM task group meeting. He will be making changes to the BIRD and issuing a BIRD127.3 version.

BIRD133: MODEL CORNER C_COMP
Bob Ross noted that there have been no changes. Arpad Muranyi commented over the reflectors about changing the BIRD to create 5 corners in the IBIS specification. Bob prefers to leave the BIRD as-is. Arpad noted that BIRD140 is somewhat related to this BIRD. The outcome of discussions on both BIRDs may dictate that either BIRD133 or BIRD140 change to be consistent.

BIRD140: FORMAT CORNER AND RANGE CLARIFICATION FOR IBIS-AMI
Arpad Muranyi noted that there were extensive discussions over email and at the last ATM meeting. Some suggestions for changes were made, and Arpad plans to make changes to address the comments.

BIRD144: ADD TOUCHSTONE TO [EXTERNAL MODEL] AND [EXTERNAL CIRCUIT] AS A SUPPORTED LANGUAGE
Bob Ross introduced the BIRD. The proposal is to add a direct call to a Touchstone file to be supported under the Language subparameter of the [External Model] and [External Circuit] keywords. Adge Hawes added that this is a way of specifying Touchstone files in IBIS instead of in an AMI related file. Arpad Muranyi questioned if there is a need for this mechanism instead of using Touchstone through an IBIS-ISS connection. Adge felt that this was a case of parallel development. He knows that this will be brought up at the Asian Summits, and it might be best to discuss it there. Arpad might start discussion on the reflector since he will not be attending the Asian Summits. Bob added that there may be a technical need to connect to Touchstone since it is an existing specification and some tools may support this sooner than

support for IBIS-ISS. Walter Katz added that there are four proposals on the table for doing analog modeling, and he felt this BIRD should be added to the list of tabled BIRDs.

BIRD145: INSTANTIATION OF IBIS I/O BUFFERS IN AN [EXTERNAL CIRCUIT] USING THE [MODEL CALL] KEYWORD
Bob Ross introduced the BIRD. The BIRD allows an [External Circuit] to exist in between a [Model] and the package connection. This BIRD may be an alternate proposal for other BIRDs. This BIRD adds the [Model Call] keyword. Walter Katz added that he felt this BIRD should be added to the list of tabled BIRDs.

BIRD116: ADD IBIS-ISS TO [EXTERNAL MODEL] AND [EXTERNAL CIRCUIT] AS A SUPPORTED LANGUAGE
Discussion was tabled.

BIRD117.3: PARAMETERIZE A_TO_D AND D_TO_A CONVERTERS
Discussion was tabled.

BIRD118.2: ANALOG PARAMETER ASSIGNMENTS
Discussion was tabled.

BIRD121.1: IBIS-AMI NEW RESERVED PARAMETERS FOR DATA MANAGEMENT
Discussion was tabled.

BIRD122: IBIS-AMI NEW RESERVED PARAMETERS FOR ANALOG MODELING
Discussion was tabled.

BIRD123.1: IBIS-AMI NEW RESERVED PARAMETERS FOR JITTER/NOISE
Discussion was tabled.

BIRD124: IBIS-AMI NEW RESERVED PARAMETERS FOR DEPENDENCY TABLES
Discussion was tabled.

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

BIRD128: ALLOW AMI_PARAMETERS_OUT TO PASS AMI_PARAMETERS_IN DATA ON

CALLS TO AMI_GETWAVE
Discussion was tabled.

BIRD129: ADD "POLARITY" ARGUMENT TO D_TO_A CONVERTERS
Discussion was tabled.

BIRD 131: IBIS-AMI REPEATERS
Discussion was tabled.

NEW TECHNICAL ISSUES
Michael Mirmak noted that he received an enhancement request related to the TSCHK parser. He did not have time before this meeting to write up a BUG, but one should be filed before the next meeting.

Michael also noted that we now need to discuss development of a parser for IBIS-ISS. Bob Ross suggested we need to start a bidding process. Arpad wondered if tool vendors that support SPICE already would be willing to donate some code. Walter asked what the purpose of the parser is, either to validate that the file is legal or that all the syntax is correct. Most tools already support IBIS-ISS in general for detailed SPICE model parsing. Bob noted that development of a detailed parser is likely to be expensive. Michael will add this topic as a regular agenda item for future meetings.

Michael also showed a spreadsheet tracking all the pending BIRDs and whether they are each targeted for IBIS 5.1 or IBIS 5.2. Arpad Muranyi added that there is a potential for one more BIRD for IBIS 5.1 that is being discussed in the ATM meeting. Bob requested that BIRD133 be considered for IBIS 5.1 depending on timing of its approval/rejection.

Bob Ross noted that there is a spreadsheet documenting the IBISCHK parser changes. He will update this document and post it soon.

NEXT MEETING
The next IBIS Open Forum teleconference will be held October 28, 2011 from 8:00 to 10:00 AM US Pacific Time. The Asian IBIS Summit – Shanghai will be held November 15, 2011. The Asian IBIS Summit – Yokohama will be held November 18, 2011. The Asian IBIS Summit – Taipei will be held November 21, 2011. The following IBIS Open Forum teleconference will be held December 2. Arpad Muranyi moved to adjourn. Mike LaBonte seconded. There were no objections.

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NOTES

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This meeting was conducted in accordance with the TechAmerica Legal Guides and
TechAmerica Manual of Organization and Procedure.

The following e-mail addresses are used:

majordomo@eda.org
In the body, for the IBIS Open Forum Reflector:
subscribe ibis <your e-mail address>

In the body, for the IBIS Users' Group Reflector:
subscribe ibis-users <your e-mail address>

Help and other commands:
help

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 EIA-IBIS Open Forum as a full Member.

ibis@eda.org

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@eda.org

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/bugsplt.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

To create an account on the TechAmerica KAVI workspace, check out:

http://workspace.techamerica.org/kwspub/join/

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IBIS CURRENT MEMBER VOTING STATUS

I/O Buffer Information Specification Committee (IBIS)

Organization	Interest Category	Standards Ballot Voting Status	August 5, 2011	August 26, 2011	September 16, 2011	October 7, 2011
Advanced Micro Devices	Producer	Active	X	-	X	X
Agilent Technologies	User	Active	X	X	X	-
Altera	Producer	Active	-	-	X	X
Ansys	User	Inactive	-	-	-	-
Apple Computer	User	Inactive	-	-	-	-
Applied Simulation Technology	User	Inactive	-	-	-	-
Cadence Design Systems	User	Inactive	-	-	-	-
Cisco Systems	User	Inactive	X	-	-	-
Ericsson	Producer	Inactive	-	-	X	-
Freescale	Producer	Inactive	-	-	-	-
Green Streak Programs	General Interest	Inactive	-	-	-	-
Huawei Technologies	Producer	Inactive	-	-	-	-
IBM	Producer	Active	X	X	X	X
Infineon Technologies AG	Producer	Inactive	-	-	-	-
Intel Corp.	Producer	Active	X	X	X	X
IO Methodology	User	Active	-	-	X	X
LSI	Producer	Active	X	X	-	X
Mentor Graphics	User	Active	X	X	X	X
Micron Technology	Producer	Active	X	X	X	X
Nokia Siemens Networks	Producer	Active	X	X	-	X
QLogic	Producer	Inactive	-	-	-	-
Signal Integrity Software	User	Active	X	X	X	X
Sigrity	User	Inactive	-	-	-	-
Synopsys	User	Inactive	-	-	-	-
Teraspeed Consulting	General Interest	Active	X	X	X	X
Texas Instruments	Producer	Inactive	-	-	-	-
Toshiba	Producer	Inactive	-	-	-	-
Xilinx	Producer	Inactive	-	-	-	-
ZTE	User	Inactive	-	X	-	-
Zuken	User	Inactive	-	-	-	-

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 TECHAMERICA BALLOT VOTING ARE:
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- 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.