

IBIS Open Forum Minutes

Meeting Date: **July 15, 2011**

Meeting Location: **Teleconference**

VOTING MEMBERS AND 2011 PARTICIPANTS

Agilent	Radek Biernacki*, Fangyi Rao, Amolak Badesha
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
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
National Semiconductor	Hsinho Wu, Pegah Alavi, John Goldie
Nokia Siemens Networks GmbH	Eckhard Lenski
Signal Integrity Software	Walter Katz*, Todd Westerhoff, Mike Steinberger, Barry Katz
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	Casey Morrison, Alfred Chong
Toshiba	(Tetsuya Endo)
Xilinx	(Raymond Anderson)
ZTE	(Huang Min)
Zuken	(Michael Schaefer)

OTHER PARTICIPANTS IN 2011

AET	Mikio Kiyono
Altera	Hui Fu, Zhuyuan Liu, Julia Nekrylova
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
QLogic	David Choe
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

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
August 5, 2011	202 789 739	IBIS

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

<https://cisco.webex.com/cisco/j.php?J=202789739>

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 June 7, 2011 IBIS Summit at DAC and the June 24, 2011 IBIS Open Forum teleconference. Bob Ross commented on the June 24 minutes. He noted that Toshiba was listed as a voting member in the voting status table and should not have been. The June 7 minutes were approved without changes and the June 24 minutes were approved with the noted change.

MEMBERSHIP STATUS AND TREASURER'S REPORT

Bob Ross reported that Toshiba and Ansys have been restated as voting members. There are 29 members now. We have not received a treasurer's report in the last few weeks, so only 18 members have officially paid until we have a new report. Michael Mirmak inquired whether we should contact higher-ups in TechAmerica to raise concerns with the slow response from accounting. Bob noted he is getting no response to inquiries of membership payments as well as no response to requests to issue invoices. Bob plans to compile a list of unanswered questions and send them to Phyllis Call and also cc: Michael so that Michael can raise the issue with Chris Denham if needed.

WEB PAGE UPDATES

Mike LaBonte reported that he made an addition to the free tools page – IBIS Validator from IO Methodology. Both the poster page and the roster page were updated. The events page was also updated with the latest information on the Asian IBIS Summits. The Summits page was also updated with the latest presentation documents.

MAILING LIST ADMINISTRATION

Mike LaBonte reported that the list has gotten busier with usual problems cropping up.

MODEL LIBRARY UPDATE

No update.

MISCELLANY/ANNOUNCEMENTS

None.

OPENS FOR NEW ISSUES

Michael Mirmak noted that many new BIRDS were added to the agenda today and IBIS-ISS revision 1.5 was added to the agenda for review. Bob Ross requested a discussion on IBIS priorities if time is available.

INTERNATIONAL/EXTERNAL ACTIVITIES

- DASC

Michael Mirmak noted that there is no meeting this month. The next DASC meeting will be held on August 4. Some TechAmerica folks may attend. This will be an opportunity to ask Dennis Brophy how we get prioritization of our standard for IEC approval.

The DASC file and e-mail archive may be found at:

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

- 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 was no meeting 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 event will take place too close to the IBIS Summits planned for Asia.

More information can be found at:

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

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

<http://www.edaps2011.org>

EMCCompo2011, the 8th International Workshop on Electromagnetic Compatibility of Integrated Circuits, will be held in Dubrovnik, Croatia, November 6-9, 2011. Organizers of the event have contacted the IBIS Open Forum to see if there is interest in having a tutorial session on IBIS. More information can be found at:

<http://www.emccompo2011.org>

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

Bob Ross noted that EDN included an article mentioning fast and slow PVT related to C_comp in its June 23 edition on page 22. The article is "Signal Integrity and Characteristic Impedance" by Bonnie Baker and is linked at:

http://www.edn.com/article/518558-Signal_integrity_and_characteristic_impedance.php

IEC APPROVAL ACTIVITIES

Randy Wolff reported that he hopes to advance the IEC approval process by attending the DASC meeting on Thursday, August 4, 2011. The DASC will discuss how IEEE and international standardization through IEC work, with presentations by Dennis Brophy and Victor Berman. The meeting should be an ideal time to raise IEC process issues.

TECHAMERICA UPDATE

Michael Mirmak reported that TechAmerica's full board and members were updated online. Chris Denham updated him that an IBIS LinkedIn account is being established. Discussions on the financial reserve clarified that it is not a separate account but just a line item carried over from year-to-year. Michael also received a privacy policy related to web data. It is not clear if this applies to meeting sign-in lists. There is a plan to accept credit card payments for membership payments. There were minor edits to the TechAmerica policies and procedures document after the ANSI audit. Bob Ross noted that we will still have to debate with TechAmerica on the correct value for our reserve at the end of the year.

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. The event is carrying over 9 sponsors of the previous 12. Sponsors include Huawei Technologies, Agilent Technologies, Ansoft, Cadence Design Systems, Cybernet Systems, Intel Corp., IO Methodology, Mentor Graphics, SiSoft, Sigrity, Synopsys, ZTE Corporation and others to be determined.

- Asian IBIS Summit – Tokyo/Yokohama

The meeting is tentatively being scheduled for November 17 in Yokohama to correspond with a JEITA conference. The meeting may run from 1:30pm to 6:00pm.

- Asian IBIS Summit – Taipei

Bob Ross reported that a deposit for a meeting room at the Sherwood has gone through. The meeting is scheduled for November 21. Cadence is a new sponsor. There are now 7 sponsors including Agilent Technologies, Avant Technology (IO Methodology), Foxconn Technology Group, Intel Corporation, Sigrity, Synopsys and others to be determined.

Announcements will start going out in August for all the Summits.

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.

IBIS QUALITY TASK GROUP

Mike LaBonte reported that at the last meeting Greg Edlund discussed a list of 22 items that could be checked with AMI models. Not many could be checked with ibischk, as many were related to documentation needs. The group is continuing to work with ideas on [Test Data] and [Test Load] improvements. The group meets on Tuesdays at 8:00AM Pacific time.

Michael Mirmak added that task group chairs should consider using KAVI for calendar items and documentation. Bob Ross added that the Quality task group could try this out but should continue to use the normal reflector messages for scheduling.

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

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

IBIS MODEL REVIEW TASK GROUP

No update.

ADVANCED TECHNOLOGY MODELING TASK GROUP

Arpad Muranyi reported that the group is continuing discussion on backchannel modeling and analog modeling proposals for AMI.

Task group material can be found at:

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

INTERCONNECT TASK GROUP

Michael Mirmak reported that the group has been discussing finishing Touchstone 2.1. There has also been discussion on temporarily reassigning the Interconnect task group efforts towards IBIS 5.1 close-out.

Task group material can be found at:

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

IBIS EDITORIAL TASK GROUP

Michael Mirmak reported that Bob Ross prepared a list of items to review. There have been discussions offline of the proper procedure for preparing IBIS 5.1. The TechAmerica writer emailed that he considered his work complete, but at our request he will work on a section 10 re-format and will start the work in the beginning of August.

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

Bob Ross brought up the issue that there is limited manpower to finish IBIS 5.1. We may need to shift priorities such as using the Interconnect task group time slot for IBIS Editorial task group purposes and suspending Interconnect task group work for some time. He felt that IBIS 5.1 has moved to the highest priority of the committee. Michael Mirmak noted that more volunteers are needed to join the editorial committee and their help would be appreciated.

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

Arpad Muranyi and Walter Katz moved that BIRDS 116-118, 121-124, 128, 129 and 131 be tabled. Mike LaBonte seconded the motion. No objections were raised.

BIRD117.3: PARAMETERIZE A_TO_D AND D_TO_A CONVERTERS

Tabled.

BIRD118.2: ANALOG PARAMETER ASSIGNMENTS

Tabled.

BIRD121: IBIS-AMI NEW RESERVED PARAMETERS FOR DATA MANAGEMENT

Tabled.

BIRD122: IBIS-AMI NEW RESERVED PARAMETERS FOR ANALOG MODELING

Tabled.

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

Tabled.

BIRD124: IBIS-AMI NEW RESERVED PARAMETERS FOR DEPENDENCY TABLES

Tabled.

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

Arpad Muranyi summarized that he changed a couple of words (noted by **) to be able to insert power and ground paths between the supply nodes of [Model] or [External Model] and the pins listed under the [Pin] keyword using the existing [Pin Mapping] keyword and the IBIS-ISS package modeling scheme proposed in this BIRD. Walter Katz noted that we must decide who generates the package model versus the on-die parasitics model and how to handle them. This is an ongoing discussion. Arpad noted that the ATM task group is discussing the package modeling topics in more detail now.

BIRD127.1: IBIS-AMI TYPOGRAPHICAL CORRECTIONS

Arpad Muranyi reported that he has not received any comments on this BIRD yet. He noted a discrepancy between this BIRD and BIRD137. BIRD127.1 says that strings must be passed in and out every time, and other discussion on string passing in and out of the DLL has leaned towards allowing null strings. So, this BIRD will need to be revised to make the string passing optional or allow null strings. He noted that he did not think that BIRD135 and BIRD137 require any changes related to this string passing issue.

Bob Ross noted that he would like to see more description of parameter syntax with exceptions for table definitions. Radek Biernacki added that he thought some changes to the language describing Boolean were needed. Arpad moved to keep the BIRD open for further discussion. Bob seconded. There were no objections.

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

Tabled.

BIRD129: ADD “POLARITY” ARGUMENT TO D_TO_A CONVERTERS

Tabled.

BIRD 131: IBIS-AMI REPEATERS

Tabled.

BIRD132: CLARIFICATION OF THE TABLE FORMATION FOR IBIS_AMI

Bob Ross reported that no changes have been made. He would like to wait to see if any other changes are needed before bringing it up for a vote. Arpad Muranyi felt that there were not any interactions between this BIRD and any other BIRD, so it could be ready for a vote soon. Arpad moved to schedule a vote at the next meeting. Bob seconded. There were no objections.

BIRD133: MODEL CORNER C_COMP

Radek Biernacki felt that a fresh discussion of corner definitions would be useful and perhaps needed to be defined in a cookbook. Bob Ross noted that the purpose of the BIRD is to remove an inconsistency in IBIS where C_comp is aligned with PVT min/max definitions in IBIS. Radek noted that this BIRD does not deal with capacitance in the terminator model. Walter Katz noted that C_comp needs to be solved and he hoped that new analog modeling BIRDs would help with this too. Arpad Muranyi asked if the new [C Comp Corner] must have the same values as the C_comp value, just in a different order. Bob said that it does not require the same values, and the [C Comp Corner] is expected to override the existing C_comp values. Michael Mirmak asked if it would be more useful to have a corner remapping definition for all parameters. Aren't we just trying to associate all the columns of one keyword with another keyword? Maybe a listing of mappings for all keywords could take care of this. Walter noted that he previously introduced the idea of having a model corner section. Radek suggested an expansion of the BIRD to add more corner cases. Bob noted that this would be a major change to IBIS. Arpad felt that this was not necessary at this time. Bob did not like the idea of remapping all the parameters. Lance Wang added that Bob's solution fixes a major issue that helps solve correlation issues and keeps the change simple.

Mike LaBonte moved to end discussion on the BIRD for this meeting. Bob seconded. There were no objections.

BIRD135: ADD BOOLEAN TO BNF FOR IBIS-AMI

Arpad Muranyi noted an offline comment by Mike LaBonte to improve the definition for true and false. Arpad noted that the intent of the BIRD was not to define Boolean, so its definition should be handled in a separate BIRD. Bob Ross felt that Booleans must be defined as 1 or 0 and it should be fixed in this BIRD. Mike disagreed, seeing this as an interpretive language and not a typed language such as C. Radek Biernacki noted that we keep confusing the different domains – binary and the AMI language. Everything passed from the EDA tool to the DLL is in strings, and there is nothing wrong with using True or False in a string. Arpad commented that he could remove the “(True or False)” in the BIRD to remove confusion. Walter Katz also felt

that the existing specification could only be interpreted as requiring True and False and not 0/1 in the string, and all existing models use True and False.

Arpad moved to table the discussion. Bob seconded. There were no objections.

BIRD136: DEFINING RELATIONSHIPS BETWEEN TYPE AND FORMAT

Bob Ross moved to table the discussion. Radek Biernacki seconded. There were no objections.

BIRD137: AMI_PARAMETERS_IN, AMI_PARAMETERS_OUT, MSG CLARIFICATIONS

Arpad Muranyi received a comment from Radek Biernacki on the definition of “empty string.” Radek felt that empty string was not needed, but if it was included there should be a simple definition added of what an empty string is. Arpad noted that the ATM committee collectively wanted to be able to pass null pointers or empty strings. Arpad preferred to have a definitions section where everything is defined, so empty string should be added to descriptions on page 140.

Bob Ross moved to table the BIRD. Arpad seconded. There were no objections.

BIRD138: IBIS-AMI SECTION 6C TABLES UPDATE

No discussion due to time constraints.

BIRD139: RESERVED_PARAMETERS ORDER

No discussion due to time constraints.

BIRD140: FORMAT CORNER AND RANGE CLARIFICATION FOR IBIS-AMI

No discussion due to time constraints.

BIRD141: [COMPOSITE CURRENT] CLARIFICATIONS

No discussion due to time constraints.

BIRD142: CLARIFICATIONS OF [TEST DATA] AND [TEST LOAD] SCOPING

No discussion due to time constraints.

BIRD143: CORRECTING THE RULES FOR AMI_CLOSE

No discussion due to time constraints.

IBISCHK5 BUG STATUS

No discussion due to time constraints.

IBIS-ISS SPECIFICATION DRAFT 1.5 REVIEW

No discussion due to time constraints.

The IBIS-ISS draft 1.5 specification is available at:

http://www.eda.org/ibis/ibis-iss_wip/

NEW TECHNICAL ISSUES

No discussion due to time constraints.

NEXT MEETING

The next IBIS Open Forum teleconference will be held August 5, 2011 from 8:00 to 10:00 AM US Pacific Time. A vote on BIRD132 is scheduled. Mike LaBonte moved to adjourn and Nam Nguyen seconded.

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	June 3, 2011	June 7, 2011	June 24, 2011	July 15, 2011
Advanced Micro Devices	Producer	Active	X	-	X	X
Agilent Technologies	User	Active	X	X	X	X
Ansys	User	Inactive	-	-	-	-
Apple Computer	User	Inactive	-	-	-	-
Applied Simulation Technology	User	Inactive	-	-	-	-
Cadence Design Systems	User	Active	-	X	X	-
Cisco Systems	User	Active	X	X	-	X
Ericsson	Producer	Inactive	X	X	-	-
Freescale	Producer	Inactive	-	-	-	-
Green Streak Programs	General Interest	Inactive	-	-	-	-
Huawei Technologies	Producer	Inactive	-	-	-	-
IBM	Producer	Active	X	-	X	-
Infineon Technologies AG	Producer	Inactive	-	-	-	-
Intel Corp.	Producer	Active	X	X	X	X
IO Methodology	User	Active	X	X	X	X
LSI	Producer	Inactive	X	-	-	-
Mentor Graphics	User	Active	X	X	X	X
Micron Technology	Producer	Inactive	X	-	-	X
National Semiconductor	Producer	Inactive	-	-	-	-
Nokia Siemens Networks	Producer	Active	X	-	X	-
Signal Integrity Software	User	Active	X	X	X	X
Sigrity	User	Inactive	-	X	-	-
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	-	-	-	-
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:

- 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.