

# IBIS Chair's Report

Lance Wang

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Zuken USA

Chair, IBIS Open Forum

European Hybrid IBIS Summit with IEEE SPI 2024

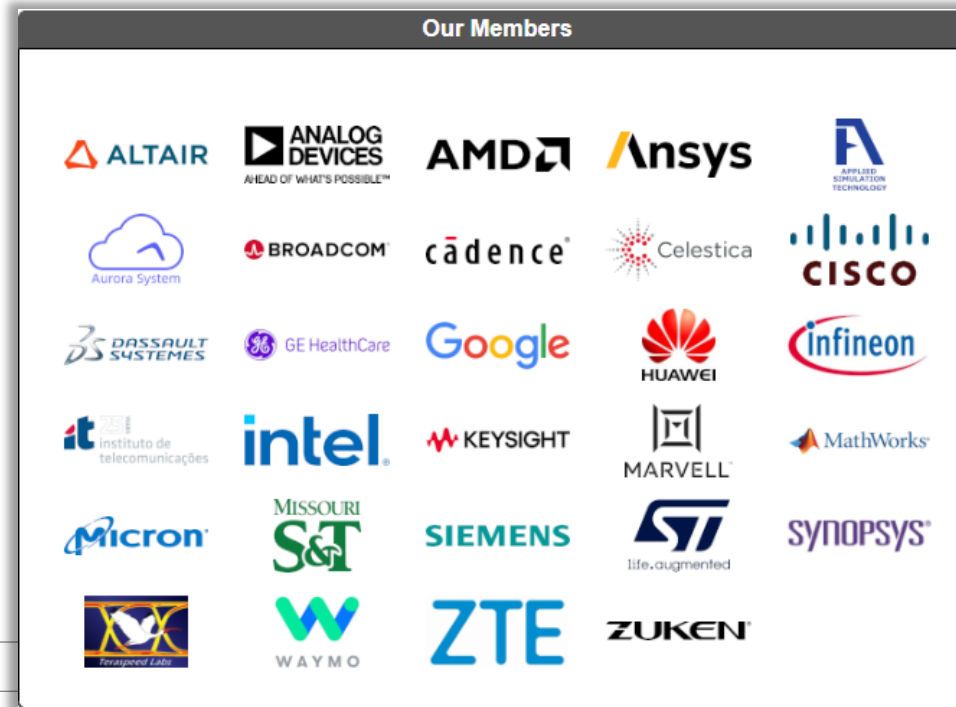
Lisbon, Portugal

May 15, 2024

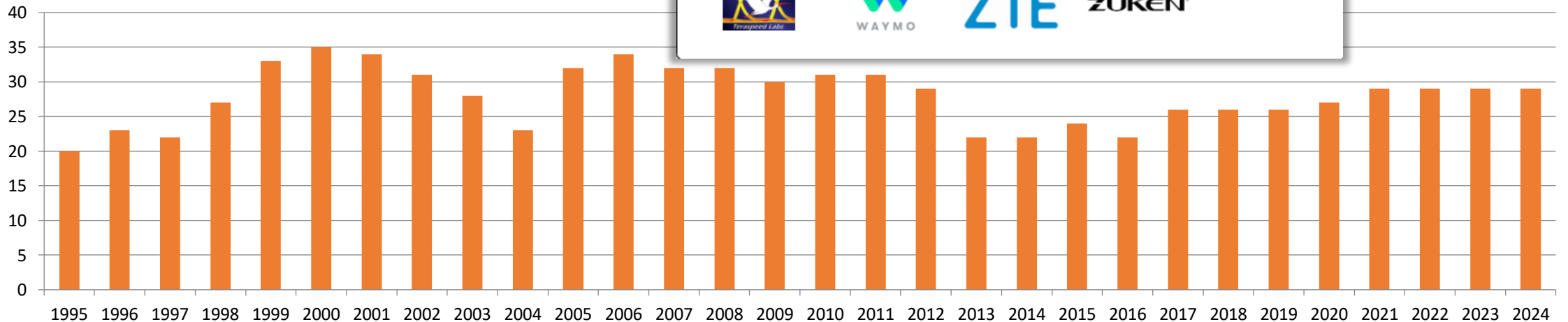


An SAE Industry Technologies Consortia Program

# 29 IBIS Members (Organization-based)



Number of Members by Year



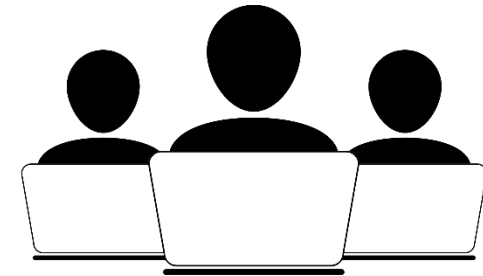
# IBIS Officers June 2023- May 2024



Chair: *Lance Wang, Zuken USA*  
Vice-Chair: *Randy Wolff, Siemens EDA*  
Secretary: *Graham Kus, MathWorks*  
Treasurer: *[Bob Ross], Teraspeed Labs*  
Librarian: *Zhiping Yang, MST*  
Postmaster: *Curtis Clark, ANSYS*  
Webmaster: *Steve Parker, Marvell*

- University Relations: *Chulsoon Hwang, MST*
- IEEE DASC IBIS Liaison: *Michael Mirmak, Intel*

Elected

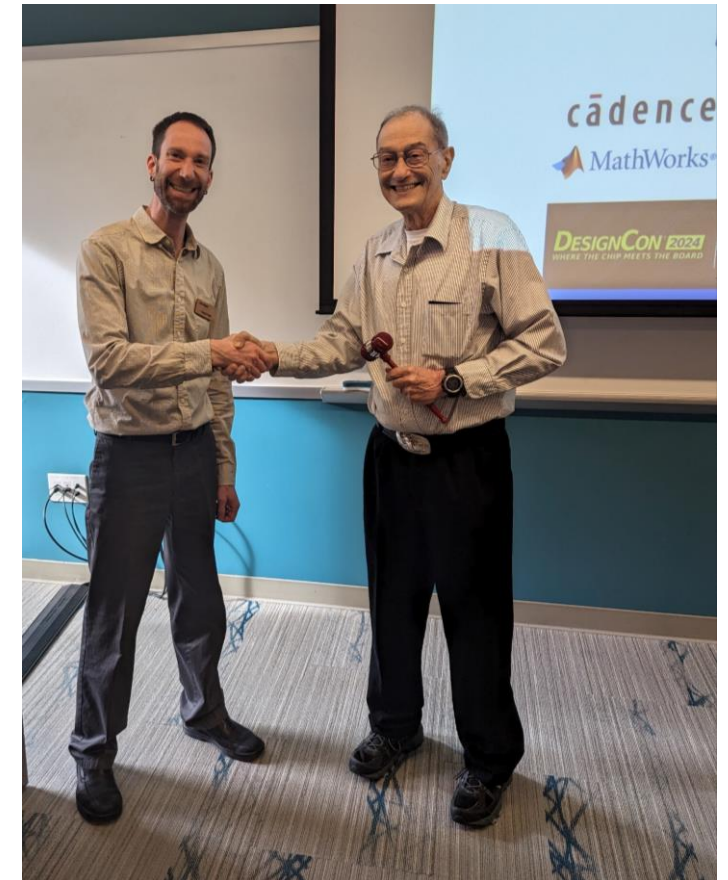


Appointed

# Bob Ross



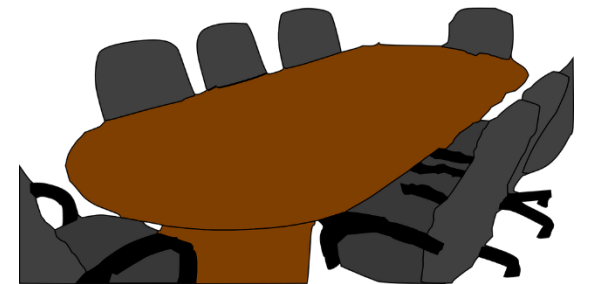
- Longtime IBIS member and officer, Bob Ross, passed away in March of 2024
- IBIS Open Forum was honored to present Bob with an honorary Chair's gavel at the 2024 DesignCon IBIS Summit for his multiple decades of outstanding service and dedication to IBIS
- Served as IBIS Chair 1997-2001
  - Also, Postmaster, Treasurer, Quality task group Chair
- IBIS Open Forum is exploring options to establish a Bob Ross student scholarship fund



# IBIS Meetings



- Weekly teleconferences
  - Quality task group (Tuesdays, 09:00 PT)
  - Advanced Technology Modeling (ATM) task group (Tuesdays, 12:00 PT)
  - Interconnect task group (Wednesdays, 08:00 PT)
  - Editorial task group (Suspended)
- IBIS Open Forum teleconference every 3 weeks (Fridays, 08:00 PT)
- IBIS Summit meetings (USA and international)
  - DesignCon, IEEE SPI, IEEE EMC+SIPI, Shanghai, Tokyo (JEITA-organized)
- Participants: ~290 in 2023 (~280 in 2022)



# SAE ITC



- SAE Industry Technologies Consortia is the parent organization of the IBIS Open Forum
- IBIS is assisted by SAE employees Tammy Patton, Phyllis Gross, and Rich Demary
- SAE ITC provides financial, legal, and other services
- <https://www.sae-itc.com/>



# Task Groups



- Advanced Technology Modeling Task Group
  - Chair: Arpad Muranyi, Siemens EDA
  - [https://ibis.org/atm\\_wip/](https://ibis.org/atm_wip/)
  - Develop non-interconnect technical BIRDs
- Editorial Task Group
  - Chair: Michael Mirmak, Intel
  - [https://ibis.org/editorial\\_wip/](https://ibis.org/editorial_wip/)
  - Produce IBIS specification documents
- Interconnect Task Group
  - Chair: Michael Mirmak, Intel
  - [https://ibis.org/interconn\\_wip/](https://ibis.org/interconn_wip/)
  - Develop on-die/package/module/connector interconnect modeling BIRDs
- Quality Task Group
  - Acting Chair: Randy Wolff, Siemens EDA
  - [https://ibis.org/quality\\_wip/](https://ibis.org/quality_wip/)
  - Oversee IBISCHK parser testing and development



BIRD = Buffer Issue Resolution Document

# IBIS Milestones



## I/O Buffer Information Specification

## Other Work

- 1993-1994 **IBIS 1.0-2.1:**
  - Behavioral buffer model (fast simulation)
  - Component pin map (easy EDA import)
- 1997-1999 **IBIS 3.0-3.2:**
  - Package models
  - Electrical Board Description (EBD)
- 2002-2006 **IBIS 4.0-4.2:**
  - Receiver models
  - AMS languages
- 2007-2012 **IBIS 5.0-5.1:**
  - IBIS-AMI SerDes models
  - Power-aware model
- 2013-2015 **IBIS 6.0-6.1:**
  - PAM4 multi-level signaling
  - Power delivery package models
- 2019 **IBIS 7.0:**
  - Back-channel time-domain support
  - Interconnect modeling using IBIS-ISS and Touchstone
- 2021 **IBIS 7.1:**
  - DDRx IBIS-AMI support
  - Electrical Module Description (EMD)
  - IBIS-AMI back-channel statistical optimization
- 2023 **IBIS 7.2:**
  - Redriver simulation flow fixes
  - PAMn IBIS-AMI support
- 1995: **ANSI/EIA-656 (IBIS 2.1 International standard)**
- 1999: **ANSI/EIA-656-A (IBIS 3.2 International standard)**
- 2001: **IEC 62014-1 (IBIS 3.2 International standard)**
- 2003: **Interconnect Model Specification (ICM 1.0)**
- 2006: **ANSI/EIA-656-B (IBIS 4.2 International standard)**
- 2009: **Touchstone 2.0**
  - Official Touchstone donated from Agilent/Keysight
- 2011: **IBIS-ISS 1.0 (Interconnect SPICE Subcircuit)**
  - Subset of HSPICE
- 2024: **Touchstone 2.1**
  - Clarify S-parameter Definition
  - [End] Keyword Corrections and Other Editorial Changes
  - Per Port Reference Resistance on the Option Line
  - Clarify File Extension Rule for Touchstone 1.0 and 1.1 Files
- **IBISCHK:** IBIS file syntax parser
  - Current version 7.2.1
  - Source code available for purchase
  - Compiled executables available free of charge
- **TSCHK2:** Touchstone 2.1 file syntax parser
  - Current version 2.1.0
  - Source code available for purchase
  - Compiled executables available free of charge





## Buffer Issue Resolution Documents (BIRD)

To submit a BIRD to the IBIS Open Forum, please use the [BIRD Template, Rev. 1.3](#).

ID#	Issue Title	Requester	Date Submitted	Date Accepted	Supporting Version
231	<a href="#">Clarifications on AMI Block Concepts</a>	Michael Mirmak, Intel Corporation	March 26, 2024		
230.1	<a href="#">Adding a Definitions Section to IBIS</a>	Michael Mirmak, Intel Corporation	March 19, 2024; April 30, 2024		
230	<a href="#">Adding a Definitions Section to IBIS</a>	Michael Mirmak, Intel Corporation	March 19, 2024		
229.1	<a href="#">AMI Test Data Support</a>	Michael Mirmak, Intel Corp.	December 19, 2023, February 13, 2024	April 19, 2024	
228	<a href="#">Pin Name Field Extension</a>	Michael Mirmak, Intel Corporation	December 5, 2023	January 26, 2024	
227	<a href="#">AMI Ignore Block Feature</a>	Alaeddin A. Aydiner, Sai Zhou, Intel Corp.	November 14, 2023	January 5, 2024	
226	<a href="#">PSIJ Sensitivity</a>	Kinger Cai, Fern Nee Tan, Chi-te Chen, Michael Mirmak, Intel Corp.	August 8, 2023	December 8, 2023	
225	<a href="#">Clarification for bus_label rules</a>	Arpad Muranyi, Weston Beal, Randy Wolff, Siemens EDA	July 11, 2023	September 15, 2023	
224	<a href="#">New AMI Reserved Parameters for Ts4file port order</a>	Liwei Zhao, Intel Corp.; Michael Mirmak, Intel Corp.	April 25, 2023	June 23, 2023	
223.1	<a href="#">Add support for SPIM in IBIS</a>	Kinger Cai, Chi-te Chen, Intel Corp.	March 7, 2023, September 12, 2023	July 14, 2023 (223); November 17, 2023 (223.1)	
222	<a href="#">Clock Times Clarifications</a>	Arpad Muranyi, Siemens EDA	November 8, 2022	December 9, 2022	7.2
221	<a href="#">AMI_parameters_in Clarification</a>	Michael Mirmak, Intel Corp.	October 26, 2022	December 9, 2022	7.2
220	<a href="#">Pre-driver PSIJ Sensitivity Keyword</a>	Yifan Ding, Chulsoon Hwang, Missouri S&T; Zhiping Yang, Waymo; Randy Wolff, Micron Technology	October 20, 2022		
219.1	<a href="#">AMI Parameter Root Name Clarifications</a>	Michael Mirmak, Intel Corp.	March 29, 2022, May 3, 2022	August 12, 2022	7.2
218	<a href="#">Designator Pin List Relaxation</a>	Arpad Muranyi, Siemens EDA	March 2, 2022	April 22, 2022	7.2



## Touchstone Issue Resolution Documents (TSIRD)

To submit an TSIRD to the IBIS Open Forum, please use the [TSIRD Template Rev. 1.0](#).

ID#	Issue Title	Requestor	Date Submitted	Date Accepted	Supported Version	Formats
8	Option line changes	Arpad Muranyi, Siemens EDA	March 20 2023	Pending Vote		<a href="#">(DOC)</a>
7.1	Standardized Pole-Residue Representation of Touchstone Data	Arpad Muranyi, Siemens EDA	February 14, 2024; May 7, 2024	Pending Vote		<a href="#">(DOC)</a>
7	Standardized Pole-Residue Representation of Touchstone Data	Arpad Muranyi, Siemens EDA	February 14, 2024	Pending Vote		<a href="#">(DOC)</a>
6	Clarify File Extension Rule for Touchstone 1.0 and 1.1 Files	Bob Ross, Teraspeed Labs; Arpad Muranyi, Siemens EDA	July 5, 2023	September 15, 2023	2.1	<a href="#">(DOC)</a>
5.1	Per Port Reference Resistance on the Option Line	Arpad Muranyi, Randy Wolff, Siemens EDA; Bob Ross, Teraspeed Labs	June 14, 2023; July 5, 2023	September 15, 2023	2.1	<a href="#">(DOC)</a>
4.1	[End] Keyword Corrections and Other Editorial Changes	Michael Mirmak, Intel Corp.	March 2, 2022 , July 20, 2022	September 9, 2022	2.1	<a href="#">(DOC)</a>
3	Clarify S-parameter Definition	Radek Biernacki, Agilent Technologies; Michael Mirmak, Intel	July 20, 2011 ,	October 7, 2011	2.1	<a href="#">(DOC)</a>
2.1	Binary Format Support	Michael Mirmak, Intel Corp. for Interconnect Task Group	June 9, 2010 , July 14, 2010	August 20, 2010		<a href="#">(DOC)</a>
1.1	Sparse Matrix Mapping	Bob Ross, Teraspeed Consulting Group for Interconnect Task Group	February 26, 2010, April 23, 2010	April 23, 2010		<a href="#">(DOC)</a>

# IBISCHK 7.2.1 Development



- The latest parser was delivered on December 21, 2023

- Covers 6 BUG fixes (BUG 239 and BUG 241-245)
  - <https://ibis.org/bugs/ibischk/>

## IBISCHK Parser Issue Reports (BUGs)

To find out how to submit a bug to the IBIS Open Forum, please read the document [bugform.txt](#).

ID#	Title	Requester	Date Submitted	Severity	Priority	Status	Date Closed	Supported Version
249	<a href="#">Memory leaks caused by algmod.c, ami.c and cmn.c</a>	Michael Mirmak, Intel Corporation	March 28, 2024	ANNOYING	LOW	OPEN		
248	<a href="#">Crash Caused by iassert macro and abort()</a>	Michael Mirmak, Intel Corporation	March 19, 2024	FATAL	MEDIUM	OPEN		
247	<a href="#">Changing BOOL from Type Enum to Int</a>	Michael Mirmak, Intel Corporation	March 19, 2024	ENHANCEMENT	LOW	OPEN		
246	<a href="#">Clarification on Slash Characters and Parser Usage</a>	Michael Mirmak, Intel Corporation	December 22, 2023	MODERATE	MEDIUM	OPEN		
245	<a href="#">Has Platform Issue Message in IBIS-AMI Checking Not Clear</a>	Weston Beal, Siemens EDA	June 13, 2023	MODERATE	LOW	CLOSED	December 8, 2023	7.2.1
244	<a href="#">False IBIS Ver Compatibility Error for EMD and IBIS File Checking</a>	Randy Wolff, Arpad Muranyi; Siemens EDA	June 14, 2023	MODERATE	MEDIUM	CLOSED	December 8, 2023	7.2.1
243	<a href="#">Remove Make File Warning Messages During Compilations</a>	Graham Kus, MathWorks; Michael Schaefer, Zuken; Curtis Clark, Ansys; Bob Ross, Teraspeed Labs	May 30, 2023	ANNOYING	LOW	CLOSED	December 8, 2023	7.2.1
242	<a href="#">Change Caution to Error for Illegal NC as signal_type and Change Message</a>	Randy Wolff, Siemens	May 28, 2023	SEVERE	MEDIUM	CLOSED	December 8, 2023	7.2.1
241	<a href="#">Remove or Revise EMD Warning for Legal signal_name, signal_type Combinations</a>	Randy Wolff, Siemens	May 26, 2023	SEVERE	MEDIUM	CLOSED	December 8, 2023	7.2.1
240	<a href="#">Parser Crashes When [Interconnect Model Group] Name is Missing</a>	Arpad Muranyi, Siemens EDA	March 3, 2023	SEVERE	HIGH	CLOSED	April 21, 2023	7.2.0
239	<a href="#">No Message for Unreferenced [Interconnect Model Set]s</a>	Michael Mirmak, Intel Corp.	March 3, 2023	ENHANCEMENT	LOW	CLOSED	December 8, 2023	7.2.1



# TSCHK 2.1.0 Development

## TSCHK Parser Issue Reports (BUGs)

ID#	Title	Requester	Date Submitted	Severity	Priority	Status	Date Closed
6	<a href="#">TSCHK2 Parser Security Improvements</a>	Michael Mirmak	September 19, 2022	MODERATE	MEDIUM	CLOSED	April 19, 2024
5	<a href="#">Code Change for Faster File Reading</a>	Michael Schaefer, Zuken	June 20, 2022	ENHANCEMENT	LOW	CLOSED	April 19, 2024
4	<a href="#">Same [Reference] Values Permitted when Converting to Touchstone 1</a>	Randy Wolff, Micron Technology	January 15, 2021	ENHANCEMENT	LOW	CLOSED	August 12, 2021
3	<a href="#">Canonical Mode Adds Spaces, Significantly Increases File Size</a>	Michael Mirmak, Intel Corporation	March 20, 2014	ENHANCEMENT	LOW	CLOSED	August 12, 2021
2	<a href="#">Crash With Illegal Mixed-Mode Data Combinations</a>	Arpad Muranyi and Vladimir Dmitriev-Zdorov, Mentor Graphics Corp.	Sept. 18, 2012	SEVERE	MEDIUM	CLOSED	August 12, 2021
1	<a href="#">Vague Option Error Message</a>	Michael Mirmak, Intel Corp.	October 7, 2011	ANNOYING	LOW	CLOSED	August 12, 2021

- New parser is delivered on April 19, 2024
- Covers 2 BUG fixes (BUG 5 and BUG 6)
  - <https://ibis.org/bugs/tschk/>

# Recent and Future Developments in IBIS?

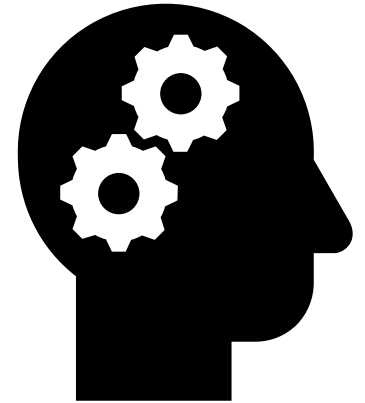


- IBIS Open Forum's task groups are discussing these topics:
  - Expanded system-level perspective
    - Clock/data relationships, timing information, equalization training
  - Power Integrity focused modeling
    - Chip-level Standard Power Integrity Model (SPIM, BIRD223 accepted on July 14, 2023)
    - Improved Power Supply Induced Jitter modeling (PSIJ, BIRD226 accepted on Dec. 8, 2023, and BIRD220 is pending approval)
    - Voltage regulator, diode, and inductor models
  - Multi-level analog buffer modeling
  - Interconnect Modeling
    - Touchstone 2.1 expansions, adds per-port reference resistances on the option line
    - Touchstone 3.0 with Pole/Residue and port mapping support
    - IBIS-ISS expansions
  - Quality and Testing
    - AMI Test Data Support (BIRD229.1)
  - Specification Clarification
    - Adding a Definitions Section to IBIS (BIRD230)
    - Clarifications on AMI Block Concepts (BIRD231)
- What else should we be looking at? Bring your ideas!

# Participation in IBIS



- The success of IBIS depends on active participation and volunteering
- Bringing your ideas and talents to IBIS
  - Task groups for technical discussions and document editing
  - IBIS email reflectors
  - Open Forum teleconferences for event planning and voting
  - Summit presentations
  - IBIS Board and task group volunteering
  - Writing BIRDs – Buffer Issue Resolution Documents
    - Official method for submitting a proposed change to the IBIS specification
    - Many developed collaboratively in task groups
    - Discussed and voted on in Open Forum meetings





# IBIS Website Resources



IBIS Summits →

Task Group Info →

Member FAQ →

Spec documents →

\*IRDs →

Email support →

Syntax Parser  
Downloads →

**Welcome to the IBIS Open Forum**

**NEW** [TSCHK2.1.0 parser](#) is released and available for free executable download

**NEW** [Touchstone 2.1 Specification](#) is approved and available for download

**Our Specifications**

I/O Buffer Information Specification	<a href="#">(IBIS 7.2)</a> <a href="#">(SAE/EIA-STD-656-B)</a> <a href="#">(IEC-62014-1)</a>
IBIS Interconnect Modeling Specification	<a href="#">(ICM 1.1)</a> <a href="#">(SAE/GEIA-STD-0001)</a>
IBIS Interconnect SPICE Subcircuit Specification	<a href="#">(IBIS-ISS 1.0)</a>
Touchstone® File Format Specification	<a href="#">(Touchstone 2.1)</a>

**Our Members**

ALTAIR | ANALOG DEVICES | AMD | Ansys | APPLIED SIMULATION TECHNOLOGY  
 AURORA SYSTEM | BROADCOM | cadence | Celestica | CISCO  
 DASSAULT SYSTEMES | GE Healthcare | Google | HUAWEI | infineon  
 instituto de telecomunicacoes | intel | KEYSIGHT | MARVELL | MathWorks  
 Micron | MISSOURI S&T | SIEMENS | ST | SYNOPSYS  
 Waymo | ZTE | ZUKEN

The IBIS Open Forum is the industry organization responsible for the management of the [IBIS specifications and standards](#) including IBIS, IBIS-AMI, IBIS-ISS, ICM, and Touchstone. The Open Forum meets every three weeks by teleconference. Membership is open to all interested companies. If you are interested in joining the IBIS Open Forum, please contact the [IBIS Open Forum Chair](#) or [any of the IBIS Officers](#).



[Thank You]



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IBIS Open Forum:

Web: <https://ibis.org>

Email: [info@ibis.org](mailto:info@ibis.org)

We welcome participation  
by all IBIS model makers,  
EDA tool vendors, IBIS model  
users, and interested parties.