Micro-Mechanical-Universal-Switches
Industry Connections Activity Initiation Document (ICAID)
Version: 1.0, 4 March 2021
IC21-002-01 Approved by IESS SMDC 22 March 2021

Instructions

- Instructions on how to fill out this form are shown in red. It is recommended to leave the instructions in the final document and simply add the requested information where indicated.
- Shaded Text indicates a placeholder that should be replaced with information specific to this ICAID, and the shading removed.
- Completed forms, in Word format, or any questions should be sent to the IEEE Standards Association (IEEE SA) Industry Connections Committee (ICCom) Administrator at the following address: industryconnections@ieee.org.
- The version number above, along with the date, may be used by the submitter to distinguish successive updates of this document. A separate, unique Industry Connections (IC) Activity Number will be assigned when the document is submitted to the ICCom Administrator.

1. Contact
Provide the name and contact information of the primary contact person for this IC activity. Affiliation is any entity that provides the person financial or other substantive support, for which the person may feel an obligation. If necessary, a second/alternate contact person's information may also be provided.

Name: Chris Giovanniello
Email Address: chris.giovanniello@menlomicro.com
Employer: Menlo Microsystems, Inc.
Affiliation: Menlo Microsystems, Inc.

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

2. Participation and Voting Model
Specify whether this activity will be entity-based (participants are entities, which may have multiple representatives, one-entity-one-vote), or individual-based (participants represent themselves, one-person-one-vote).

The activity will be "Entity-Based".

3. Purpose

3.1 Motivation and Goal
Briefly explain the context and motivation for starting this IC activity, and the overall purpose or goal to be accomplished.

The fundamental concept of an electronic switch or relay has been around since the dawn of electricity, and even before. The methods for switching electric signals or electric current has been split between electromechnical devices (electromechanical relays or EMRs) and more recently solid-state or semiconductor devices. In the past 30 years, the technology area of micro-electro-mechanical-systems (MEMS) switches has primarily focused on some very specific niche applications, almost exclusively developed for radio frequency (RF) communications use cases.

This ICAID is intended to build on other similar work done in the RF MEMS industry which attempted to define standards for RF MEMS switches in areas like naming conventions and terminology, testing methods, reliability definitions, specifications definitions, architectures, and extend those same concepts into all the new use cases which can be explored in the realm of a micro-mechanical-universal-switch, (MMUS). The ICAID will initially focus on education/outreach on the MMUS concept and to educate through white papers, workshops and other similar methods, in order to build a cross-industry coalition of partners that can jointly define a family of standards that will help to facilitiate the deployment of MMUS device across numerous end markets.

3.2 Related Work
Provide a brief comparison of this activity to existing, related efforts or standards of which you are aware (industry associations, consortia, standardization activities, etc.).

Previous efforts to define MEMS switch standards were done exclusively for RF MEMS applications. These can be found under IEC 62047 Series – "Micro-Electromechanical Devices – MEMS", and more specifically, IEC 62047-5 Ed. 1.0 b:2011 "Semiconductor devices - Micro-electromechanical devices - Part 5: RF MEMS switches". There are potentially other areas related to MEMS switches or RF MEMS switches that would need to be researched regarding standards.

3.3 Previously Published Material
Provide a list of any known previously published material intended for inclusion in the proposed deliverables of this activity.

TBD as a part of initial activities

3.4 Potential Markets Served
Indicate the main beneficiaries of this work, and what the potential impact might be.

The worldwide market for all the potential applications for MMUS-based products is well in excess of $20B, larger than the entire MEMS industry today. This includes the worldwide market for solid-state and electromechanical switches and relays that are used across all electronic systems, ranging from aerospace & defense, medical equipment, industrial and

home automation, lighting and controls, test & measurement, [IMMEDIATE MARKETS VS. LONGER TERM MARKETS]

3.5 How will the activity benefit the IEEE, society, or humanity?

This IC group will both refresh and extend upon an existing set of standards around RF MEMS switches which was developed almost 10 years ago, but has not been broadly used due to limited commercial activity for MEMS swiches. Standards, guides and recommended practices will be very beneficial to stakeholders, particularly to help drive consensus towards a common approach. Also, given the almost universal and worldwide applications of electronic switches and relays, having a family of standards will help define and facilitate the deployment.

4. Estimated Timeframe
Indicate approximately how long you expect this activity to operate to achieve its proposed results (e.g., time to completion of all deliverables).

Expected Completion Date: 03/2023

IC activities are chartered for two years at a time. Activities are eligible for extension upon request and review by ICCom and the responsible committee of the IEEE SA Board of Governors. Should an extension be required, please notify the ICCom Administrator prior to the two-year mark.

5. Proposed Deliverables
Outline the anticipated deliverables and output from this IC activity, such as documents (e.g., white papers, reports), proposals for standards, conferences and workshops, databases, computer code, etc., and indicate the expected timeframe for each.

The deliverables for this IC activity are expected to include:
-standards gap analysis
-standards roadmap
-white papers
-educational webinars
-enabling/facilitating the PAR process

5.1 Open Source Software Development
Indicate whether this IC Activity will develop or incorporate open source software in the deliverables. All contributions of open source software for use in Industry Connections activities shall be accompanied by an approved IEEE Contributor License Agreement (CLA) appropriate for the open source license under which the Work Product will be made available. CLAs, once accepted, are irrevocable. Industry Connections Activities shall comply with the IEEE SA open source policies and procedures and use the IEEE SA open source platform for development of open source software. Information on IEEE SA Open can be found at https://saopen.ieee.org/.

Will the activity develop or incorporate open source software (either normatively or informatively) in the deliverables?: No

6. Funding Requirements

Outline any contracted services or other expenses that are currently anticipated, beyond the basic support services provided to all IC activities. Indicate how those funds are expected to be obtained (e.g., through participant fees, sponsorships, government or other grants, etc.). Activities needing substantial funding may require additional reviews and approvals beyond ICCom.

This activity does not anticipate requiring any funded services beyond the basic services provided by Industry Connections. Based on activity progress and needs during that period, longer term funding requirements will be discussed and evaluated by the group. A revised ICAID will be submitted for approval if it is found that additional funded services are necessary for the activity to accomplish its objectives.

7. Management and Procedures

7.1 Activity Oversight Committee

Indicate whether an IEEE committee of some form (e.g., a Standards committee) has agreed to oversee this activity and its procedures.

Has an IEEE committee agreed to oversee this activity?: No

If yes, indicate the IEEE committee's name and its chair's contact information.

IEEE Committee Name: Committee Name
Chair's Name: Full Name
Chair's Email Address: who@where

Additional IEEE committee information, if any. Please indicate if you are including a letter of support from the IEEE Committee that will oversee this activity.

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

7.2 Activity Management

If no Activity Oversight Committee has been identified in 7.1 above, indicate how this activity will manage itself on a day-to-day basis (e.g., executive committee, officers, etc).

The activity will be managed by an executive committee as defined in the activity's policies and procedures.

7.3 Procedures

Indicate what documented procedures will be used to guide the operations of this activity; either (a) modified baseline *Industry Connections Activity Policies and*

Procedures, (b) Standards Committee policies and procedures accepted by the IEEE SA Standards

Board, or (c) Working Group policies and procedures accepted by the Working Group's Standards Committee. If option (a) is chosen, then ICCom review and approval of the P&P is required. If option (b) or (c) is chosen, then ICCom approval of the use of the P&P is required.

The activity will follow the baseline Industry Connections Activity Policies and Procedures (P&P).

8. Participants

8.1 Stakeholder Communities
Indicate the stakeholder communities (the types of companies or other entities, or the different groups of individuals) that are expected to be interested in this IC activity, and will be invited to participate.

MEMS industry, as well as academia and researchers involved in RF MEMS

8.2 Expected Number of Participants
Indicate the approximate number of entities (if entity-based) or individuals (if individual-based) expected to be actively involved in this activity.

10-15

8.3 Initial Participants
Provide a number of the entities or individuals that will be participating from the outset. It is recommended there be at least three initial participants for an entity-based activity, or five initial participants (each with a different affiliation) for an individual-based activity.

Use the following table for an entity-based activity:

Entity	Primary Contact	Additional Representatives
Menlo Microsystems, Inc	Chris Giovanniello	Chris Keimel
Queens University	Dr. Yan-Fei Liu	
Corning	TBD	TBD