"Call for Participation" Pb-free Component & Board Finish Reliability Project

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APEX 2007

Background

Surface Finishes for Pb-Free Assembly Project

- Completed Phase 1 Surface Project
- Reported on Last Year at this Forum
- Phase II
  - A comprehensive test plan was developed,
  - Daisy-chain test packages (BGA, CSP, QFP, etc.) were fabricated and delivered
  - Time-zero component characterization (cross-section, X-ray, CSAM, co planarity, etc.) of these components was completed
  - Extensive low/high speed solder ball shear and pull testing was also completed.
    Thermal cycle and monotonic bend test board designs are available for
    fabrication
- Leadership Change in August 2006, Richard Coyle, Alcatel-Lucent technologies, serving as Interim Project Chair
- Many attempts to obtain PCB test panels through full or partial in-kind contributions, all were unsuccessful – included reduced project scope

Background

Surface Finishes for Pb-Free Assembly Project Accomplishments

- **During iNEMI's Technical Committee (TC) November 29, 2006 meeting, a recommendation was made to end the Surface Finishes for Pb-Free Assembly Project, the TC agreed to end the project**

- **The TC requested the development of a new project "Statement of Work" and "Project Statement" – where contributions already made should be recognized in establishing the new "Project Statement"**

- **The iNEMI Pb-free Component & Board Finish Reliability Project SOW reflects the deletion of the ATC portion of the program. This is aligned with the recommendation of the remaining Project Core Team.**

  That deletion reduces the number of PCB test panels and the cost from ~$65K to ~$45K

Pb-free Component & Board Finish Reliability Project

- **Will build on results from iNEMI's Phase 1: Surface Finishes for Pb-Free Assembly Project**

- **Pb-free Surface Finish Project**

Objective:

Evaluate the effects of alternative surface finishes for circuit boards and package substrates on Pb-free solder joint reliability during accelerated stress testing

Scope of work:

To conduct comparative four-point bend testing, drop testing and board-level thermal cycling of Pb-free components assembled on test boards, as well as comparative solder ball shear/pull testing on BGA and CSP components.

The test packages include BGA, CSP and QFP devices, manufactured in a variety of Pb-free surface finishes. OSP and immersion Ag surface finishes are being evaluated for the circuit boards. Sn3Ag0.5Cu solder paste has been selected for the component attachment

iNEMI Pb-free Component & Board Finish Reliability Project

Revised Scope of Work:

- **Comparative reliability testing will be conducted on Pb-free components assembled on test boards**
- **Test board assemblies will be configured to evaluate multiple component surface finishes and 2 circuit board surface finishes**
- **Due to funding constraints, the reliability testing will be limited to mechanical testing**
- **Mechanical testing will consist of 4-point monotonic bend testing (IPC/JEDEC-9702) and drop testing. Component characterization for BGA devices will also include solder ball shear and pull testing**
- **The component surface finishes to be evaluated are listed below: Electrolytic Ni/Au, Electroless Ni/Au (ENIG), SnAgCu solder over Cu Matte Sn over Cu, Matte Sn over Ni/Cu, Au/Pd/Ni, SnBi over Cu**

iNEMI Pb-free Component and Board Finish Reliability Project

APEX 2007 Meeting

Location: Room 519 Convention Center

Time: 3:30p.m. – 5:30 p.m.

Concluding Remarks

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Bifurcation of Pb-Free Activities

- Consumer Products
  - Optimize Processes and Materials
  - Reduce Cost
  - Increase Yield and Throughput
- High-Reliability Products
  - Taking the Pb exemption has changed the risk profile for High Reliability producers.
  - The components supply chain has rapidly converted to RoHS compliant offerings (Pb-free) with little motivation to continue to produce SnPb product.
  - Activities are underway to provide the industry with better understanding of Pb-free risks in high-reliability applications
  - Initiatives are being developed to understand and resolve risks

Upcoming Meetings

- iNEMI Pb-free Component and Board Finish Reliability Project
  - Location: APEX 2007, Room 519 Convention Center
  - Time: 3:30p.m. – 5:30 p.m.
- IPC-iNEMI Reliability Summit
  - Friday February 23, 2007. 8:30-4:30
  - Location: APEX 2007, Room 404AB, Convention Center

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