Project flowchart

WP-A SUBSTRATE MATERIAL SELECTION, CIRCUIT DESIGN AND TEST SPECIFICATION

1. Review current 'state of art' and adjust material selection if necessary (substrates and solder alloys).
2. Define necessary test structures.
3. Design and layout flexible circuit boards.
4. Detailed specification of reliability testing regime.

WP-B SUBSTRATE EVALUATION USING THERMAL PROCESSES

1. Produce appropriate flexible circuits in agreed substrate materials (e.g. LCP, PI, PEN, PET).
2. Develop required processing conditions (e.g. thermal profile, etc.) for lead and lead free solder using convection re-flow, vapour phase re-flow and wave solder processes.
3. Process samples through each condition (no solder).
4. Analyse effect of thermal processing on mechanical properties.
5. Analyse effect of thermal processing on electrical properties.
6. Analyse effect of thermal processing on moisture sensitivity.

WP-C OPTIMISATION OF SUBSTRATE MATERIALS FOR THERMAL PROCESSES

1. Review results of WP-B
2. Use knowledge gained to optimise substrate materials.

WP-D EVALUATION OF OPTIMISED SUBSTRATE MATERIALS

1. Produce appropriate flexible circuits in optimised substrate materials.
2. Process samples through each condition.
3. Analyse effect of thermal processing on mechanical properties, electrical and moisture properties.
4. Select most promising candidates for component placement evaluation.

WP-E ASSEMBLY EVALUATION USING THERMAL PROCESSES

1. Specify and procure representative components based on end user needs (e.g. BGA, flip-chip, chip & wire bond, active and passive surface mount, through hole, TAB structures).
2. Assemble sample circuits through each condition using lead and lead free solders.
3. Characterise process window and yield.

WP-F ASSEMBLY EVALUATION USING ALTERNATIVE PROCESSES

1. Specify and procure representative components based on end user needs.
2. Optimise processing conditions for electrically conductive adhesive and anisotropic conductive tape and localised laser re-flow.
3. Assemble sample circuits.
4. Characterise process window and yield.

WP-G INVESTIGATION OF LIFE PERFORMANCE AND RELIABILITY

1. Subject sample circuits to reliability testing regime (e.g. HAST, thermal shock, thermal cycling, component sheer strength, damp heat, vibration, etc.)
2. Failures investigation to understand the root cause using a physics of failure approach.
3. Characterisation and comparison of failure modes across different material combinations and assembly methods.

WP-H DEVELOPMENT OF LIFE PREDICTION TOOLS

1. Comparison of selected lead free solders and alternative assembly process with established lead based solder.
2. Combine pre-existing data with this new information and knowledge to develop improved tools for predicting circuit life for particular substrate materials and lead free material combinations, the assembly processes used and intended application.

WP-I CAPTURE AND EMBEDDING OF ACQUIRED KNOWLEDGE

1. Ensure the capture, dissemination and use of all knowledge gained during the project for the benefit of partners.