iNEMI Solder Paste Deposition Project

Speaker Name: Shoukai Zhang

Venue: Shanghai

Date: Jan. 15th 2008

Advancing manufacturing technology

Background

- As the different volume requirements of solder paste for different components (such as 0201 and CCGA) on the same board, the step stencil is desirable to solve this problem; and the design guideline of the keep-out distance in IPC 7525 is not applicable for the high-density layout of PCB, therefore, it needs to be researched thoroughly;
- A new solution of solder paste deposition should be found if this problem could not be solved by the step stencil;
- The project will be carried out in two phases as follow:
  - Phase 1: research on the step stencil;
  - Phase 2: investigation on the new depositing technologies.
- A new design guideline of step stencil or a new depositing technology will be concluded for this project.

Scope of Phase 1

- **Phase 1 — research on the step stencil（2008.02 ~ 2008.12）**
  - **Purpose:**
    - ✓ Attempting to reduce the keep-out distance to 1.0mm for step up/down stencils when the thicknesses of steps are 0.03mm and 0.06mm;
    - ✓ Deducing the calculation formulas of the keep-out distance of step stencils.
  - **Strategy:**
    - ✓ Filtrating the layout of PCBs by former printing experiments and Designing the final ones to assembly;
    - ✓ The assembly results will be inspected following IPC-610D by the aspects of joints, so the dummy and the daisy-chain for reliability test are not needed;
    - ✓ Confirming the acceptance of DPMO and the calculation of defects for it decides the samples in later experiments.

Scope of Phase 1

– **The selections of PCBs and components :**

✓ PCBs :

PCB code	PCB length (mm)	PCB width (mm)	PCB thickness (mm)	Surface finish
1	321~366.7	220~280	1.6/2.0/2.5	HASL/I-Sn/OSP
2	≤100	≤50	0.8/1. 0	OSP

✓ Components :

Component code		Component type	Pitch (mm)	Body size (mm)	PCB code
Miniature and fine pitch components	1	0201	/	0.6*0.3	1 and 2
	2	0402	/	1.0*0.5	1 and 2
	3	CSP	0.4~0.5	4.0*3.2 7.0*7.0	1 and 2
	4	QFP	0.4~0.5	16*16	1 and 2
Large components	5	Castle-like	2.0	20.3*14.8	1 and 2
	6	Shielding box	/	45*32	1 and 2
	7	BTB Connector	0.8	21.8*6.6	Only 1
	8	CCGA	1.27	33*33	Only 1

Tasks in Phase 1

Task description	Task owners recommended	Task deadline
Task1 - Proposing the project	HUAWEI	completed
Task2 - Finding and confirming project members and resources		0802
Task3 - Fulfilling general experimental scheme		0804
Task4 - Designing experimental PCBs		0805
Task5 - Preparing materials		0806
Task6 - Filtrating the printing experiment		0808
Task7 - The secondary assembly experiment		0810
Task8 - Evaluating conclusions		0812

Budget of Phase 1

Materials	Budget
PCBs	RMB 100,000
Step stencils	RMB 80,000
Components	RMB 100,000
Solder paste	RMB 20,000
Total	RMB 300,000

Scope of Phase 2

- **Phase 2 — investigation on the new depositing technologies （2008.06 ~ 2009.12）**
  - **Purpose:**
    - ✓ **Promote the research on new technologies of solder paste deposition;**
  - **Strategy:**
    - ✓ **Phase 2 depends on the results of phase 1, and if the research in phase 1 obtains good solutions, task 3 in phase 2 pauses, otherwise, phase 2 continues.**

Tasks in Phase 2

Task description	Task owners recommended	Task deadline
Task1 - Investigating relative research in other companies		0809
Task2 - Evaluating the potential solutions and the possibility of developing integrated functional equipments		0810
Task3 - Developing the general scheme if obtain a better technology or method		0812
Task4 - Beginning the cooperative research		0906
Task5 - Evaluating and improving the research results by testing experiment		0910
Task6 - Evaluating conclusions of the research		0912

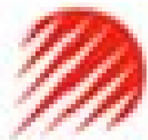
Resources Needed in Research

Participants recommended	Resources needed
Printer suppliers	Printer & Inkjet printer & Engineers
Inspector suppliers	3D-SPI & Engineers
Stencil manufacturers	Step stencils
PCB manufacturers	PCBs
Components suppliers	Components
Solder paste suppliers	Solder paste
OEMs and EMS`	SMT lines & engineers

- **Resources which cannot be supplied by project participants need iNEMI's TC ask help from its members.**

Companies Interested in Project

Alcatel·Lucent



CELESTICA

Email contacts:

Haley Fu

haley.fu@inemi.org

+86 21 5835 3839