



LEADOUT update

SMART Group was represented at the recent two day LEADOUT General Assembly at the INASMET facility in Spain.

The Strategic Objectives of LEADOUT are to provide support to European SMEs to implement a Soldering Technology aimed at the following strategic objectives:

- Developing low cost lead-free soldering processing to enable SMEs to meet the requirements of new EU Directives (WEEE and RoHS);
- Establishment of process quality standards to assist SMEs to rapidly convert to lead-free soldering, reducing defect rates, improving product reliability and increase European Competitiveness;
- Improve Health and Safety awareness and Pollution Prevention.

Project Overview

The project consortium is large and broad in scope, including a core group of 16 SMEs from all sections of the supply chain - PCB manufacturers and assemblers, testing and design companies and solder paste and equipment suppliers - as well as having four research institutes and 11 industrial associations. A range of dissemination activities such as e-learning packages, seminars and industrial association events are planned and some are already underway.

Technical Approach

The LEADOUT project has three primary approaches to assist SMEs to make the transition to lead-free soldering:

- **Process Management:** The identification and implementation of process best practice within the production chain. This will be supported by benchmarking of process yields of SME project partners through the PPM (parts per million) survey.
- **Joint Reliability:** Assessment of the suitability of low cost soldering systems and qualification of processes using appropriate accelerated reliability regimes.
- **Environmental Assessment:** Workplace and environmental impact aspects of lead-free soldering technology will be determined together with a full industrial Life Cycle Analysis.

SMART Group are proud to be a member partner in LEADOUT.



Lead-Free *Reality*

SMART Group Launch New Lead-Free Initiative

In the run-up to July 1st 2006 SMART Group has launched a series of 'Lead-Free Reality' Roadshows, designed to help SME's in the electronics industry make the change to lead-free soldering and also to improve their process yields in the assembly of printed circuit boards. It will also enable them to compete with competitors effectively.

Initially three dates have been announced, 13th December 2005 in Manchester, 17th January 2006 Middlesbrough, 11th April 2006 High Wycombe. The aim of this 'Lead-Free Reality Roadshow' is to take a series of practical workshops to these three venues, supported by a tabletop exhibition. Each venue will have separate topics:

Siemens Manchester

'Selection & Evaluation of Lead-Free Solder Finishes'
'Lead-Free Inspection & Quality Control in Assembly'

TWI Middlesbrough

'Lead-Free Design for Assembly & Manufacture'
'Zero Defect Lead-Free Reflow Soldering & Profiling'

Buckinghamshire Chilterns University College, High Wycombe

'Hand Soldering, De-soldering & Rework with Lead-Free'
'Wave Soldering with Lead-Free Alloys'

Cost to attend at each separate venue is £75 + VAT for SMART Group members and £125 for non members.

The full programme and booking details can be found on:
www.smartgroup.org/reality/lfreality.pdf

These events are supported by
LEADOUT
A European Quality & Technology Network.



SMART Group launches 80page Lead-Free Experience3 report

What is the SMART Group Lead-Free Experience?

The Lead-Free Experience3 was set up by the SMART Group with support from LEADOUT, a European wide lead-free project, supported by the EU, to assist small and medium volume producers. The feature was staged at Nepcon Electronics in Brighton, England. The Experience provided an ideal opportunity for engineers to have hands-on experience with all aspects of lead-free materials and production equipment. It was also the opportunity to see what is the current process experience on soldering, inspection, component requirements, printed board design/specification and product reliability. This was the third year this project had been held and has provided unique support to companies implementing lead-free technology to meet the requirements of WEEE & RoHS.

Engineers were able to see and use production equipment using lead-free alternative alloys for surface mount and through hole terminations. They were able to witness many of the issues raised by what is the most significant change in our industry for years. Engineers also provided board designs, process issues for discussion and had all their questions answered as part of a unique Lead-Free Experience. The Experience Report covers: Printed board design, Lead-Free Component testing, PCB solder finishes, Stencil printing, Soldering materials, Wavesoldering, Convection and Vapour phase reflow, Optical inspection, X-ray inspection Microsection examination and Lead-Free Process defects.

Bob Willis, SMART Group Technical Director, has produced an exceptional aid to our industry and the SMART Group is proud to launch this report, offering it free to download on:
www.smartgroup.org/experience/experience%20report%202005.pdf

RoHS Compliance & LEADOUT Seminar



Venue: **Citywest Hotel, Saggart, Co. Dublin, Ireland**

Date: **Thursday, 22nd Sept 2005**

This SMART event was focused on RoHS compliance with particular emphasis on understanding the legislation. Two of the speakers introduced papers, which described the requirements under the Restriction of Hazardous Substances (RoHS) directive and associated Irish implementing regulations, to include substances elimination, exemptions and enforcement. On a more practical note other speakers introduced papers that were implementation based. This seminar was part of the LEADOUT project, its aim is to provide support for engineers faced with the implementation of lead-free manufacture.

Vincent Sinnott, SMART Ireland Chairman, welcomed the group to City West for this seminar.

Meeting the RoHS Obligations

Dorothy Maxwell, Policy Dept, Enterprise, Ireland

Whilst most of us are preoccupied with removing lead from our soldering processes, the RoHS and WEEE Directives go further than that and it is important to understand the implications of their impact and transition to national and EU law. This presentation summarised the Directives and how producers can implement. Dorothy detailed funding available from Enterprise Ireland for eligible companies in their transition to RoHS.

Scope of Application of RoHS Directive

Brendan O'Neill, Senior Adviser, DoEHLG

This paper added an emphasis of whether particular products, product ranges, spare parts and certain specified applications fall within the scope of the Directive. This attracted plenty of questions as delegates were interested in whether certain aspects of the legislation covered their situations.

Lead Out Project

Vincent Sinnott, Smart Group Ireland, Chairman

Vincent briefly described current state of the LEADOUT program and the relevant funding provided by the EU to finance this project. Presentation showed participating companies and their progress so far.

Lead-Free Developments Worldwide

Jason Davis, Heraeus Materials

Jason's paper detailed the characterisation of a solder paste and effects in a lead-free world. Defects during screen-printing, placement and reflow were examined and put into perspective compared to current leaded processes. Slides showing benchmark testing on solder paste vehicle were shown and described in detail.

The RoHS Directive, Practical Effects of Implementation

John Hegarty, Intel Ireland

John's paper was well received by all delegates. It was an interesting mix between background of RoHS and practical implementation. John went into detail on the practical elements of engineering, solder paste deposition, wave soldering, rework and repair. Emphasis was put on starting a lead-free roadmap and putting it into action. Also detailed was implications on material handling from components to PCB materials and relevant marking conventions from component manufacturers.

PCB Materials Technology for a Lead-Free Environment - Towards a Rapid Implementation for RoHS Compliance

Neil Chilton, Circatex Ltd

Neil's presentation showed that the electronics industry needs a better understanding of the interaction between extreme assembly environments and PCB materials. Of particular concern is the effect on FR4 substrate materials in Pb-free assembly environments and the interaction on product lifecycle reliability. Neil showed advanced analysis methods such as Interconnect Stress Test (IST), coupled with traditional materials analysis techniques to determine the effects of Pb-free assembly. Traditional PCB materials such as NiAu, OSP and Pb free HASL can be used on the FR4 laminate and will be compatible with lead-free processing but the need for higher Tg laminates will need to be investigated to push technology forward.

Brendan Neary & Ian Farrell

SMART Group Ireland Technical Committee

SMART free forum hits quarter of a million emails

The SMART Group's email based technical forum, *smart-e-link*, continues to grow. In the last quarter it has generated over a quarter of a million emails amongst its membership. Response to this email communication system is a production engineer's dream, it is an immediate channel to answer production challenges.

But don't be put off - that equates to just a few messages per day to each of its many hundreds of subscribers. Its success is based on a simple idea - a commercial free forum where technical issues can be aired and discussed amongst a sympathetic group of engineering peers. And, it's free.

Over 15 countries participate, with the USA and UK the major subscribers.

Last month, not surprisingly, saw many questions on WEEE and RoHS Legislation. Many Lead-Free questions have embraced: alloys, printed circuit boards & finishes, production & inspection methods, reliability issues, components including BGA's, etc.

As an example: a request was posted for the name of an analysis company to carry out extensive checks on QFP leads that will not solder - there were 8 responses and resulted in a satisfied member.

A lively debate followed after a question was posted on the problems of reliability and contamination of the solder pot when converting to lead-free.

SMART Group members can search the archives of questions on the SMART Group website: www.smartgroup.com

Good Luck to Katherine Barry

SMART Group sends best wishes to Katherine on the impending birth of her baby and would like to sincerely thank her for all her hard work for SMART Group Ireland. We also welcome Liz Casey into the position.



New Product

Printed Circuit Board Design
& Lead-Free Defect Guide
Available from SMART Group £99 + VAT

DIARY 2005

Nov 1st

'All You Ever Wanted To Know About Lead-Free', Wycombe FC Conference Centre

December 1st

'Manufacturing Process – The Transition to Lead-Free Inspection, Process Control and Defect Elimination', Cork, Ireland

December 13th

'Lead-Free Reality Road Show', Manchester

DIARY 2006

January 17th

'Lead-Free Reality Road Show', Middlesbrough

January 19th

'Wave Soldering Workshop', Soldertec, St Albans

April 11th

'Lead-Free Reality Road Show', High Wycombe

May 9-11th

Nepcon Electronics, NEC, Birmingham

July 1st

Lead-Free Implementation Day !!!

SMART GROUP TEST SEMINAR



Held at Aeroflex, Stevenage - Thursday 6th October 2005

The SMART Group had never run a truly Test-based seminar before this event despite the incorporation of TISA into the Smart Group in 2004 and so there was a slight 'experimental' atmosphere.

It is widely known throughout our industry that huge benefits can be made by considering and implementing the functions of Design For Manufacturing and Design For Test. A good many companies are now using DFM techniques - thanks in no small part to the activities of the SMART Group - but I believe that not enough companies utilise DFT effectively.

Many companies are aware of the MDT side of test, the use of AOI, ICT or X-Ray etc, but most could benefit from the use of advanced programming of devices using Boundary Scan or Built-In-Self-Test (BIST).

The format for the seminar was therefore established as firstly a description of all the possibilities of test clearly presented by Bernard Sutton of Bernard Sutton Consultancy. There are many possibilities of test strategy and Bernard pointed out the salient advantages and disadvantages of each.

Secondly, a description of the users' view of how to implement DFT, particularly BIST, was presented by Mohammed Ali of EADS Astrium, the Inmarsat manufacturer, and Neil Roberts of British Aerospace Systems who make sophisticated radar systems. It was clear that both had suffered some pain at some point in the implementation of DFT but both were able to present a clear summary of the common sense approach they had adopted and how their respective companies are gaining from the experience.

All forms of test provide information on which a judgement can be made on whether the manufacturing process is correct, or a supplier has a batch problem, or the whole design is just too close to its process limits to run efficiently. Therefore, data collection and dissemination is vital to allow the correct decision to be made and Nigel Adams of Aeroflex described a practical approach to collecting and presenting data quickly and effectively.

The final speaker was Bob Page who runs Reliability Plus. He specialises in product lifetime proving, an often ignored strategy. A number of strategies were described but the focus was on HALT/HASS technology and the enormous benefits that can be won by determining in advance just how a particular product will perform during its life even before any have been sold.

Aeroflex then hosted tours of their facilities to see not only the range of test equipment available to solve particular problems but also the test strategies that Aeroflex themselves employ to maximise efficiency and produce a customer-focussed portfolio.

A maximum audience of 30 delegates attended the seminar and it was clear from the questions that many companies have a need to learn and implement more in order to gain the maximum benefits from test.

With thanks to Aeroflex for hosting the day. Smart Group were delighted to organise this event.

Peter Grundy