

Electronics Manufacture and Test

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**Test Services Guide
– updated for 2005**

**What's
happening
at Southern
Electronics?**

COVER STORY

**Pb-free – Dolby
makes a noise**

SOUND planning prepares the way for Pb-free

While others have buried their heads in the sand, Dolby Laboratories has taken a proactive approach to the challenges presented by the lead-free legislation. Tim Fryer went to see what Dolby is doing, and why.

Superficially, the obvious reason for Dolby's proactive approach is that next year we will have legislation that we all need to adhere to. However, the majority of industry has dragged its feet, hoped it would never happen, or waited for someone else to argue about the legislation, clarify the issues and prove the lead-free process. Our Business Barometer this month (see p27) shows that the number of companies anticipating launching their first lead-free product has risen to 40% (from 24% three months ago). While this is positive, it still leaves 60% who will not have launched a single Pb-free product by June,

leaving them a year to have completely transferred all of their processes and products to Pb-free. These are the sort of companies who may be as concerned about how RoHS will be enforced, as the legislation itself.

Dolby Labs

Although a household name, many people do not know what Dolby does. 'Dolby creates technologies that intensify and enhance the entertainment experience,' claims the company literature, and has 'been instrumental in defining high-quality audio and surround sound in cinema, broadcast, home audio systems, cars, DVDs, headphones, games, TVs and PCs.' Having started out providing analogue noise reduction, the digital era is offering new opportunities, but still as an 'ingredient' that adds value to an OEM's product. The majority of the Group's turnover comes from licensed technology rather than its own products – there are over a billion products carrying a Dolby licence.

However, there is still a fair amount of in-house production primarily for cinema sound processors both in the UK and USA. The Swindon site produces in the region of 100 boards

a day. Each Cinema Processor CP650 product has six boards, the main control card including 15 BGAs, 1000 SMT components and 5500 via holes. Roughly every year a major new product is passing through the pilot/pre-production/product release cycle, resulting in, on average, the introduction of 500 new components annually – a major consideration when looking to transition to lead-free.

Dolby started looking at lead-free three years ago. Chris James, Engineering Services Manager at Dolby, commented: "At a political level the industry was badly represented. We needed to follow the Japanese example and tackle the issue in bite-sized chunks instead of using a sledgehammer to crack a nut. Politicians didn't understand the impact of removing lead from solder, or that the environmental benefit of doing so is negligible. This is why the industry has been so cynical."

Ray Dolby, founder of the company, lives by the theory of 'technical excellence at all times'. With this in mind, and accepting the inevitability of the legislation being introduced at some stage, Dolby committed to preparing itself for life after lead.

"We have a better understanding of the process having worked it through," claimed Nigel Burt, Production Engineering Manager. "There are so many things to consider. People who think they can drop in new paste and components into a new process will have problems. They are being naive. There is no doubt that lead-free will work in the long term, it is the transition period that is the difficult one and we didn't want to be in the position of making sub-standard goods for two years while it settled down."

Dolby's Digital Cinema System



The initial problems were two-fold. Three years ago there were limited options for lead-free paste and components, some having lead times of several months and large minimum order quantities, so conducting trials was very difficult. The other problem was that having an HQ in San Francisco meant that products made and sold to US customers were not under the same legislative requirements to change to lead free, and US management and staff had to be educated on the necessary changes required in the UK.

But after many seminars, a visit from the Envirowise DesignTrack team, and a collaborative project with NPL, Dolby has put itself at the forefront of bringing lead-free to reality. Burt said: "It has cost a lot of time, energy and emotion to get this far. Fortunately our company has recognised the importance of this work and supplied the necessary resources."

The NPL/DTI studio project is titled: "Measuring the reliability of electronics assemblies during the transition period to lead-free soldering". Its main objectives are firstly to provide a test method and data to measure the reliability of electronics

assemblies where lead-free soldered joints may be contaminated with low levels of lead during the transition period to lead-free soldering. The second objective is to improve industry confidence during this period in the reliability of assemblies utilising the new lead-free components with tin-lead solder. The project should be concluded in the early summer.

Most obvious differences at Dolby are apparent in the equipment used. The company's single SMT line included a five zone reflow oven that did not provide the process control required for the new, higher temperature process. Dolby has replaced it recently with a seven zone oven from Heller, which was chosen partly because it had a similar footprint to the old oven – and space was tight. A new wave solder machine will also be bought as soon as the first lead-free products come on-line. While this will prevent contamination during the transition period, Dolby will keep a flow solder machine for leaded soldering until all current products are ready to switchover to lead-free. Some of the systems still being used today are over 20 years old and it is Dolby's pledge to

support all of the products it has ever made for as long as it can do so. "We think that under the legislation that we can still build lead-based PCBs to support products in the field," said Burt. A new Vitronics Soltec selective soldering system also has two solder pots – one for standard solder and one for lead-free.

Equipment changes are the obvious visible effect of the change to lead-free, but there are other considerations of significance. "Lead-free has had a huge impact in terms of component management, traceability, CAD/CAM and so on," said Burt. "We have spent as much time talking about these issues as process ones. But what is proving to be the main problem for industry is proving compliance. The current lack of standard tests makes checking for compliance difficult. A paper trail to compliance is the only practicable solution for most companies at present."

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