

DfR Solutions

reliability designed, reliability delivered

DfR Solutions Newsletter March/April 2008

In This Issue

World-Renowned Expert in Vibration and Shock to Present at DfR Solutions

Wayne Tustin of the Equipment Reliability Institute, a well known expert in vibration and shock for over 50 years (!), will be presenting his inclusive and popular three-day course "[Random Vibration and Shock Testing, ESS, HALT & HASS](#)" at DfR Solutions. Take advantage of this opportunity to learn from Wayne on the East Coast.

DfR is Hiring!

Due to the increased demand for our services, we need to add technical staff members. If you are interested in applying, see details [below](#).

RoHS 2 Moves Forward (Run For Your Lives!)

The [Öko-Institut in Norway](#), tasked by the European Union to expand the materials covered by RoHS, has just identified [46 new substances](#) for regulation. The list is impressive. It includes: Nickel (as in nickel plating), Beryllium (as in copper-beryllium alloys), Gallium Arsenide (say good-bye to cell phones), Liquid Crystals (do you really need a display?) and Rosin (as in rosin flux). Tetrabromobisphenol-A (TBBPA) was not included, due to its [recent approval](#) by the EU. With only one week to provide input (March 28th), this round of new restrictions is moving ahead quickly. The final result remains to be seen, but future electronics may have to be made from clay, rocks and paper.

Preventing Moisture in Hermetic Packages

Hermetic packages for semiconductor devices are typically ceramic housing sealed using glass or metal seals. Hermetic sealing is used to prevent the entry of undesirable chemicals that could damage sensitive integrated circuits. One relatively benign chemical, moisture, is especially damaging in a hermetic environment, even in very small or trace amounts. Click [here](#) to learn the best industry practices and how you can avoid this all too common problem. For more information, please contact [John McNulty](#).

Are solid-state drives (SSD) ready for prime time?

The electronics industry, and the consumer they sell to, have been anticipating the introduction of true solid state drives for several years. But [recent reports](#) indicating a field failure rate in excess of 30% suggest ensuring SSD reliability might be harder than it looks. While the root-cause has not yet been reported, concerns with this technology are well known. They include high package densities (creating stresses in 1st and 2nd level interconnects) and die designs that are now very susceptible to single event and multiple event upsets (SEU and MEU). For more information on how to do a better job of qualifying new technologies, please contact [Bob Esser](#).

Know Your Environment, Know Your Reliability

Temperature variation in uncontrolled environments is driven by diurnal cycling (rise and fall of the sun). As such, the statistics of temperatures in uncontrolled environments can be determined through an assessment of climatic data and an understanding of temperature rise within an enclosed structure. Click [here](#) for more. For more information on defining use environments accurately, please contact [Jim McLeish](#).

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How to Assemble One or More Pb-Free Components in an SnPb Process?

One of the constraining issues being experienced by DfR customers producing low volume / high complexity (LVHC) is the transition to Pb-free ball grid arrays (BGAs). A number of solutions to this problem have been proposed, such as re-balling and mixed assembly. An interesting alternative is off-line assembly using automated and increasingly turn-key solder machines. One impressive example is the Spark 400 from [BeamWorks](#). By accepting tapes and reels, using lasers to limit the area subjected elevated temperature, and incorporating CAD data to automate paste dispensing, placement, and soldering, this tool has the opportunity to effectively manage the introduction of Pb-free components in LVHC applications. For more information on this tool, click [here](#).

Guest Article: REACH Wake Up Call

Environmental regulation and restrictions did not stop with RoHS. The biggest and most ominous is the REACH legislation. With major impacts expected in six months (June 1, 2008), and most electronic manufacturers still unclear of their responsibilities (or the consequences), potential problems and unforeseen costs await. In this insightful [article](#), Bill Oberlin of Design Chain Associates provides some insights into how to prepare your company for this paradigm changing legislation.

Be Careful How You Solder Those Connectors

Which component is most likely to whisker? Would you guess your connectors? Why? There are many assumptions. Almost all connectors are fabricated with phosphor bronze, which is known to induce much longer tin whiskers than pure copper. Usually, this is not really a risk as the female connection will physically envelop each pin on the connection side, while the solder side will be coated with solder after passing through the wave. Everything okay, right?

Except reliability often becomes a problem with the outliers, not standard processes. And the outlier in this case is rework. If a connector is replaced or must be assembled by hand, it is highly likely that solder will not fully coat the tin plating, resulting in an elevated whisker risk. Be aware. If you are using tin-plated phosphor bronze connectors, make sure they are coated with solder under all process conditions. Additional questions about at-risk components? Please contact [Bob Esser](#) or [Gerd Fischer](#).

Underfill Isn't Just for Ball Grid Arrays

Have you ever opened a portable music device? If you opened one a few generations back, you might have been surprised to see some glop under the memory components. That glop was underfill and was used to improve the reliability of chip-scale packaged memory devices with Alloy 42 leadframes. This is just one of many innovative techniques to improve solder joint reliability. Others include use of sacrificial corner balls or corner staking. For more information on these techniques and their effectiveness, please contact [Nathan Blattau](#).

Service of the Month: Design Reviews – 20% Off

Will your product meet expectations? The bottom line is you can't afford an unreliable design. However, determining whether your design is a reliable can be extremely difficult since failure can be induced by multiple drivers. DfR Solutions can help identify potential problems during the design phase, *before* product qualification – saving you time and money. We have the knowledge-based tools and expertise to conduct an overview of evolving designs, evaluate the performance requirements of your product, find any design weaknesses, and provide you with solutions. Give us a call for a Design Review today, and save 20% off this service. Call us at (301) 474-0607 or you can send us an [email](#).

DfR News

DfR is Now On the GSA Schedule

If you belong to a government agency and have been interested in our services, now is your chance. Our prices and expertise have been certified as government approved. For more information, please contact [Bob Esser](#).

Upcoming Events

IPC Printed Circuits Expo / APEX (Las Vegas, NV: March 30 - April 3, 2008)

DfR Solutions will teach the courses "Understanding Failure and Root-Cause Analysis in Lead Free Electronics" and "True Design for Reliability: Understanding What Is and What Is Not DfR." For more information, please visit the [IPC website](#).

IPC Designer's Council Meeting (Sterling, VA: April 8, 2008)

[Craig Hillman](#) will present "The Reality of Pb-Free Reliability" at the IPC Designer's Council Meeting on April 8 at EIT in Sterling, VA. For more information, please contact [Angela Lawson](#) or [Michael Reagan](#).

Embedded Systems Conference (San Jose, CA: April 16, 2008)

[Nathan Blattau](#) and [Craig Hillman](#) will present "Common Hardware Mistakes by Embedded System Designers." This extended presentation will guide designers, both electrical and mechanical, on errors in component selection, component placement, and board layout that lead to field failures and the actions necessary to prevent them. For more information visit the ESC [website](#), or contact [Angela Lawson](#).

DfR Solutions in the San Francisco Bay Area (April 16-17, 2008)

[Craig Hillman](#) will be presenting to a number of companies in the San Francisco Bay area in mid-April on a variety of topics (Pb-free, design-for-reliability, supplier assurance, physics of failure, etc.). If you are interested in having Dr. Hillman speak to your company on one of these topics or on how DfR Solutions' integrated use of Physics of Failure and Best Practices can help you satisfy your customer and improve your bottom line, please contact [Angela Lawson](#).

DfR in Boston, MA (late April, 2008)

DfR Solutions will be visiting companies in the Boston area in late April. If you and your associates are interested in an onsite visit and or presentation, please contact [Angela Lawson](#).

Craig Hillman in Denver, CO (May 7-9, 2008)

[Craig Hillman](#) will be presenting to a number of companies in the Denver area in early May on a variety of topics (Pb-free, design-for-reliability, supplier assurance, physics of failure, etc.). If you are interested in having Dr. Hillman speak to your company on one of these topics or on how DfR Solutions' integrated use of Physics of Failure and Best Practices can help you satisfy your customer and improve your bottom line, please contact [Angela Lawson](#).

SMTA Conference on International Soldering & Reliability Conference (Toronto, ONT: May 13, 2008)

[Craig Hillman](#) will present "The Reality of Pb-Free Reliability" course at SMTA's International Soldering & Reliability Conference. To register for the conference visit the SMTA [website](#). For more information on Dr. Hillman's presentation, contact [Angela Lawson](#).

Craig Hillman in Toronto, ONT (May 12-14, 2008)

[Craig Hillman](#) will be visiting companies in Toronto May 14-16 and will be available for other interested companies in the area. If you would like Craig to make a presentation on such topics as Pb-free, design-for-reliability assessments, and supplier assurance please contact [Angela Lawson](#). He will also be available to arrange an hour-long meeting to show you how DfR Solutions' integrated use of Physics of Failure and Best Practices can help you satisfy your customer and improve your bottom line.

Wayne Tustin at DfR Solutions (College Park, MD: May 13-15, 2008)

Wayne Tustin will teach his popular short course "Random Vibration and Shock Testing, ESS, HALT & HASS" at DfR Solutions in College Park, MD. Wayne has been involved in vibration and shock measurement and testing since 1948. This specialized course will give you information on vibration and shock testing you can use immediately. Enroll now for this great opportunity to see Wayne in the Washington DC area. For more details and reservations, please click [here](#).

DfR in Cleveland (May 27-28, 2008)

[Craig Hillman](#) in Cleveland, OH May 27th – 28th. If your company is located in Cleveland and you would like to meet with Craig, please contact [Angela Lawson](#). He will be available to make a presentation at your company, or for a meeting.

LEAP Meeting (Immenstaad, Germany: April 9-10, 2008)

DfR's technical sales representative for Germany, Austria and Switzerland, [Klaus Hagen](#), will attend the LEAP meeting in Immenstaad, Germany April 9th and 10th. If you would like to meet with Klaus during the event, please contact [him](#).

IPC National Electronics Week (London, England: June 17-19, 2008)

[Craig Hillman](#) will teach two courses during the IPC's new event, *National Electronics Week*. "Understanding Failure and Root-Cause Analysis in Lead-Free Electronics" will be presented on Thursday, June 19, and "True Design for Reliability: Understanding What is, and What is Not DfR" will be presented on June 19. For more information on the event, visit the IPC [website](#).

DfR Solutions to Co-Sponsor Lead Free Webcast June 24, 2008

DfR will co-sponsor *Military & Avionics Electronics* magazine's webcast on Lead Free June 24. Watch for more details in our next newsletter!

SMTA 2008 (Orlando, FL: August 17-21, 2008)

[Craig Hillman](#) will present "Understanding Failure and Root-Cause Analysis in Lead-Free Electronics" at SMTA 2008. [Joelle Arnold](#), technical staff member at DfR, will collaborate with Nihon Superior to present "Reliability Testing of Nickel-Modified SnCu and SAC305: Accelerated Thermal Cycling" and "Reliability Testing of Nickel-Modified SnCu and SAC305: Vibration and Shock." For more information on the conference, visit the SMTA [website](#).

DfR in East Texas (Mid September)

DfR Solutions will be visiting companies in East Texas (Dallas, Austin, and Houston) in mid-September. If you and your associates are interested in an onsite visit and or presentation, please contact [Angela Lawson](#).

DfR in Milwaukee, WI (Mid October)

DfR Solutions will be visiting companies in the Milwaukee area in mid-September. If you and your associates are interested in an onsite visit and or presentation, please contact [Angela Lawson](#).

Employment

DfR Solutions is currently looking to hire two additional members of technical staff. The first position is for an Electrical Engineer with approximately 3-6 years of industrial experience. This candidate will assist in the design and development of test and measurement equipment, perform circuit and component stress analyses for customers, and provide general support on a wide range of electrical and other issues. Experience in power and analog design is desirable. All resumes should be sent to askdfr@dfrsolutions.com

The second position is for Experts in the following areas: Integrated Circuit (IC) Design, IC Fabrication, IC Packaging, Solid State Drive (SSD) Technology, Display Technology, Battery Technology, Printed Circuit Board (PCB) Fabrication, Power Electronics Design. Desirable candidates will have an advanced degree and 7+ years of experience. Those candidates with exceptionally strong backgrounds and an existing customer base may be provided the opportunity to work from home. All resumes should be sent to askdfr@dfrsolutions.com

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Our patented lead-free solder SN100C is based on a unique formulation of tin, copper, nickel and germanium that delivers cost-effectively high performance in production and reliability in service. SN100C matches the performance of the tin-lead solder it replaces in delivering smooth, bright, crack-free fillets and high first pass yield. And its combination of strength and ductility ensure superior performance in high strain conditions such as vibration. Visit our [website](#) for more information.

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