

# DfR Solutions

reliability designed, reliability delivered

## DfR Solutions Newsletter July/August 2008

### Special Green Edition!

The emergence of global environmentalism continues to drive a shift in industry thinking and consumer values. Buying "green" is a growing trend as consumer consciousness expands from highly energy-efficient cars to purchasing electronics that reduce waste and toxic by-products. Grass roots programs are joining global environmental initiatives such as RoHS Legislation and the EPA's READ to radically change both consumer buying habits and electronics manufacturing decisions. It is crucial that companies not only be aware of current environmental regulations, but also assess the evolution of this trend. In this issue, we will look at how "green electronics" is changing the industry and how it may affect you. We are also here to help you with your specific questions and concerns. Feel free to take advantage of DfR's "Open Door" policy and contact us for a free [consultation](#).

**Breaking News: DfR now has HALT!** Read all about it in [DfR News](#).

### RoHS 2 Keeps Evolving

What a wild ride it has been. The Öko-Institut, tasked by the EU for recommending changes to the existing RoHS, initially recommended adding [46 new substances](#). Through a mysterious process these 44 have been reduced and modified to 9. Want to know more? Click [here](#) for our opinion on this amusing development. For more information, please contact [Craig Hillman](#).

### Houston, We Have a Problem: Tin Whisker Lengths Get Longer

DfR recently assisted a customer with field failures occurring due to tin whiskers. The findings of the investigation were very disturbing. We observed what seems to be one of the longest whiskers ever measured on a mitigated tin plating over copper. For more information on this discovery and how this has changed DfR's position on tin whiskers, click [here](#). For assistance with tin whiskers, please contact [Gerd Fischer](#).

### The Next Reliability Challenge: Green Energy

Green power is looking to be the next new growth industry, but its widespread adoption is not only limited by cost, but also by concerns about its reliability. The availability of power on the grid must be high (+99.9%), [warranties exceed 20-25 years](#), and the use environments can be extreme. This is especially true for solar panels, which can experience temperatures above 70C, below -40C, deltas of +40C per day, wind-driven vibration, and rain. It is even more challenging when the nominal MTBF of power supplies is 100K to 300K hours. What to do? DfR offers a powerful suite of techniques and best practices, from design reviews and component engineering to test plan implementation and quality focus training, to ensure saving the environment does not risk your power. For more information, please contact [Bob Esser](#).

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## Current Status of Solid State Drive (SSD) Reliability

With increasing improvements in memory density, from [256 Mb in 2000 to 64 Gb in 2008](#), computers with solid state drives have become a reality. One of the benefits touted in switching from hard disk drive (HDD) to SSD, in addition to weight and power savings, has been an improvement in reliability. However, as shown in this insightful [presentation](#) by [John McNulty](#), this is a broad assumption that may not be true now and may get worse in the future.

## IPC vs. RoHS: Round 2

Partially due to the dissatisfaction of some of its members to its response to RoHS 1, IPC has taken a more aggressive stance on the newest round of proposed regulations. Round 1 was a scathing [critique](#) of the Öko-Institut. Round 2 was a meeting with EU commissioners on June 18 to respond to the Öko-Institut recommendations. The result? The attendance was sparse (around 30 people), but quality might be more important than quantity. IPC's presentation sounded too much like an infomercial, but Goodman of ERA Technology provided a very strong [presentation](#) on the effect of banning organo-halogen compounds on electronics. He made some very good points, but did fail to acknowledge that Dell, Sony, Apple, HP, etc. are in the process of removing these chemicals from their supply chains. Hopefully, the outcome of this meeting is that the EU takes a breather on some of these material restrictions, but this remains to be seen.

## RoHS Enforcement Picks Up Speed

The EU authorities have un-holstered their XRF guns and are not afraid to use them. A [recent sweep](#) across Scandinavian countries identified RoHS violations in 15% of the short lifecycle products surveyed (22 out of 152). Major problem areas? Flame retardant in plastics and lead in solder. After 24 months, this seems to be part of an increasing enforcement effort across the EU. This could get interesting as the holiday season approaches.

## Hollow Fiber Measurement Technique

Laminate manufacturing in the electronics industry consists of four fundamental steps: conversion of raw materials into molten glass, fiber drawing, fabric weaving, and resin coating. If the molten glass contains a sufficient level of impurities, air bubbles may become trapped inside the fibers while being drawn through the bushing. This [white paper](#) addresses how to detect these hollow fibers before they become a reliability issue. For hollow fiber measurements or other PCB QA techniques, please contact [Tom Johnston](#) or [Seth Binfield](#).

## DfR News

### DfR Now Has HALT!

DfR has acquired a Qualmark Typhoon HALT chamber. By teaming with [Qualmark](#), a leader in HALT technology, DfR has a unique ability to combine HALT with failure analysis to provide true design improvement. Send us your products to take full advantage of this comprehensive design robustness process. For more information, please contact [Bob Esser](#).

### DfR in East Asia

DfR senior staff members, in collaboration with ATCB have been visiting China and Taiwan over the past three weeks, from June 29 to July 19. In giving presentations to, and meeting with over 30 companies and organizations (including Quanta, Huawei, Flextronics, Dell, etc.), DfR has found a strong local interest in our capability and services. We have responded by emphasizing our "open door" policy, rapid response times and strong customer focus. If you would like us to visit your company and learn how we can reduce costs, speed up production, and improve your market position through our best practices, please contact [John McNulty](#) or our local partners (China – [Jerry Lee](#); Taiwan – [Major Chen](#)).

### DfR Solutions & Paumanok Publications Announce Partnership

DfR Solutions and Paumanok Publications announced that the two companies have created a partnership to offer teardown reports and analysis that will focus on the passive electronic component content in a variety of electronic subassemblies and devices. The first project is the teardown of two multi-core computer microprocessors - the AMD Phenom 9500 and the Intel Core 2 Quad Q6600 - with an emphasis upon the capacitor and resistor solutions that make them operate efficiently and effectively. For the full press release, please click [here](#). For more information on Paumanok Publications, please visit their [website](#).

### **DfR Welcomes Robert Manzanares as Member of Technical Staff**

DfR is proud to announce the hiring of Robert Manzanares as a Member of Technical Staff. Robert helps enhance DfR's existing capabilities with his expertise in schematic capture, SPICE simulation, and PC board layout. Robert also has extensive experience in electro-optical sensor design and fabrication as well as mobile and fixed-location communication products for military, government, and commercial applications. Robert will be focusing on fixture development and mechanical and electrical design activities. He can be reached at [rmanzanares@dfrsolutions.com](mailto:rmanzanares@dfrsolutions.com).

### **Upcoming Events**

#### **Ops Ala Carte Webinar on Root Cause Analysis (Everywhere, July 23)**

[Jim McLeish](#) will present ***Understanding the Motivation and Basics of Root-Cause Analysis*** from 12pm to 2pm EDT. To take part in this free webinar, please reserve your seat [now](#). For more information, please contact him at [jmcleish@dfrsolutions.com](mailto:jmcleish@dfrsolutions.com).

#### **Design for Testability and for Built-In Self Test (Boston, July 28-30)**

DfR Solutions' partner organization, Advanced Test Engineering (ATE), will be presenting this valuable seminar on DfT. For more information, please contact [Louis Ungar](#) or go to [www.besttest.com/Courses/00001-DFTBIST.cfm](http://www.besttest.com/Courses/00001-DFTBIST.cfm).

#### **IDEMA Reliability Symposium (Santa Clara, CA: July 31)**

John McNulty will participate in the IDEMA Reliability Symposium on July 31. For more information please contact him at [JMcNulty@DfRSolutions.com](mailto:JMcNulty@DfRSolutions.com).

#### **DfR Solutions in Albuquerque, NM (August 12-13)**

If your company is located in the Albuquerque area and you are interested in a visit or brief presentation on a number of topics (failure avoidance, supply chain benchmarking, Pb-free, opto-electronics, MEMS, component packaging, etc.), please contact [John McNulty](#).

#### **DfR Solutions in Tucson, AZ (August 12-13)**

DfR will be in the Tucson area in mid-August to visit clients. If your company would like to be added to our list for a visit or brief presentation on a variety of topics (failure avoidance, supply chain benchmarking, Pb-free, opto-electronics, MEMS, component packaging, etc.), please contact [Clayton Bonn](#).

#### **DfR Solutions in Phoenix, AZ (August 14)**

DfR staff will be extending their trip to Arizona to visit the Phoenix. If your company is located in the area, and you are interested in a visit or brief presentation on a variety of topics (failure avoidance, supply chain benchmarking, Pb-free, opto-electronics, MEMS, component packaging, etc.), please contact [Craig Hillman](#).

#### **SMTAI 2008 (Orlando, FL: August 17-21)**

DfR Solutions will have a strong presence at this important conference (for more information, visit the [SMTA website](#).)

- [Craig Hillman](#) will present two seminars: ***Selecting a Lead-Free Solution for High Reliability Applications (Industrial, Telecom, Automotive, Medical, Military, and Avionics)*** and ***Next Generation Technologies in Electronic Packaging and Production (NEW!)***
- [Joelle Arnold](#), in collaboration with Nihon Superior, will present two papers: ***Reliability Testing of Nickel-Modified SnCu and SAC305: Accelerated Thermal Cycling and Reliability Testing of Nickel-Modified SnCu*** and ***SAC305: Vibration and Shock***.

### **SMTA Capital Chapter Vendor Day (Laurel, MD: September 4)**

Craig Hillman will present "Affects of REACH on the Electronics Industry". For more information, please contact [Angela Lawson](#) or click [here](#) to register

### **IEEE Reliability – Boston Chapter (Boston, MA: September 10)**

Craig Hillman will sit on a panel of experts to discuss what RoHS has meant to the electronics industry and what the future holds. For more information, please contact [Gene Bridgers](#).

### **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](#).

### **Lead Free Electronics in Aerospace (LEAP) Meeting (Melbourne, FL: September 16-17)**

[Nathan Blattau](#) will be attending the LEAP meeting and presenting DfR's latest findings on tin whisker-induced field failures.

### **DfR in Central Florida (Mid-September)**

DfR Solutions will be visiting companies in Central Florida (Tampa, Orlando, etc.) in mid-September. If you and your associates are interested in an onsite visit and/or presentation, please contact [Nathan Blattau](#).

### **IPC Midwest Technical Conference (Chicago, IL: September 24-25)**

DfR Solutions will have a strong presence at this important conference (for more information, visit the IPC [website](#))

- [Craig Hillman](#) will present two seminars: ***Reality of Pb-Free Reliability*** and ***Next Generation Technologies in Electronic Packaging and Production (NEW!)***
- [Gerd Fischer](#) and [Nathan Blattau](#) will present the paper A Pb-free Reliability Model for BGAs

### **DfR in Milwaukee, WI (Mid October)**

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

### **IEEE Accelerated Stress Testing and Reliability (Portland, OR: October 1-3)**

[John McNulty](#) will be attending the IEEE ASTR and visiting companies in the Portland area. If you and your associates are interested in an onsite visit and/or presentation, please contact [Ed Dodd](#).

### **SAE Convergence (Detroit, MI: October 20-22)**

DfR Solutions will exhibit at Convergence 2008. Stop by and visit us at Booth #1328! For more information on the conference, visit the [SAE website](#) or contact [Jim McLeish](#).

### **CARTS Europe (Helsinki, Finland: October 20-23)**

In collaboration with Dennis Zogbi of Paumanok Publications, DfR will present on our latest teardown of the AMD Phenom 9500 and the Intel Core 2 Quad Q6600. If your company is in Northern or Western Europe and are interested in an onsite visit and/or presentation, please contact [Craig Hillman](#).

### **SMTA Nutmeg Vendor Day (Southbury, CT: October 21)**

[Craig Hillman](#) will highlight some of the most recent concerns regarding the reliability of leadfree components and assemblies.

**SMTA Long Island Academy (Hauppauge, NY: October 22-23)**

DfR Solutions will present a half-day version of *The Reality of Pb-free Reliability*. For more information, please visit the [SMTA website](#).

**Embedded Systems Conference (Boston, MA: October 26-30)**

[Craig Hillman](#) will present *Common Hardware Mistakes by Embedded System Designers*. For more information, please visit the [ESC Website](#).

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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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