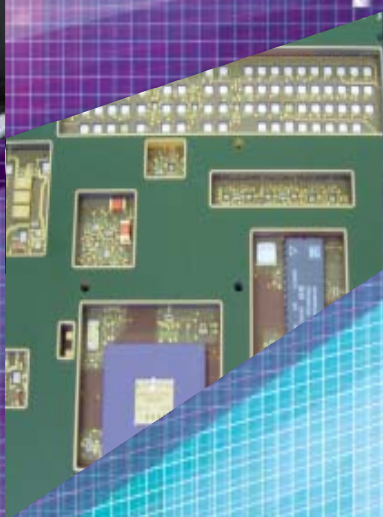
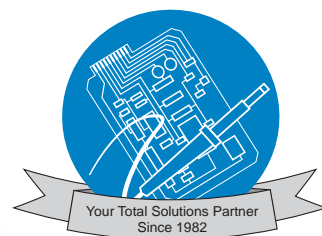


# SOLDERING TECHNOLOGY NEWS



## INSIDE THIS ISSUE:

- Dave's World
- Training Services Schedule
- Training Materials: Lead Free Evaluation Resource
- Engineering Services: Strain Gage Testing
- Sales & Distribution: Smart Tweezers
- Training Services: Rework vs. Repair
- Division Highlights: Engineering Services

# DAVE'S WORLD



Great pieces of writing always have a theme to hold them together. This article doesn't, but here's some of what has happened in the past two months.

Jason Gjesvold and I attended the Pan Pacific Conference in Koloa, Hawaii. Jason presented a paper updating our progress on IC/DT and I cheered him on. The Conference is always one of the best technical conferences you will find anywhere and this year was no exception. The location is one of the best you'll find anywhere and this year at Poipu Bay on Kauai was also no exception. The Pan Pac brings together a list of highly competent speakers and attendees from all over the world and then gives them the perfect atmosphere to exchange ideas. If you have the opportunity to attend in the future, I can't recommend it highly enough. A bonus this year was the ice storm in the southeastern

My only complaint with her is the lack of appropriateness of her last name for someone in sales. The legendary law firm of Dewey, Cheatham, and Howe always comes to mind. Seriously, I think you'll like the team we have with Christina working along with Sissie, Angela, and Julia. Christina has been in training for a while to be able to answer your questions and input orders so give her a call and buy something and see how she's doing.

I mentioned several issues ago that we were looking for a new building so we could have a little more floor space. We still haven't built the building but we are adding 1600 ft<sup>2</sup> next door adjacent to our training center. (This is known as our Northern Regional Office, which is across the parking lot from our World Headquarters.) This additional space will allow us to

US which caused most flights on our return date to be cancelled resulting in actually being stuck on Kauai for another day in paradise. I told the airline representative I spoke with that if they didn't get me out of there within a couple of months I was going to be upset.

Seven of us from STI attended the Apex Show in Anaheim, California in late February. This year's show was a good one with seemingly happy exhibitors and attendees, which is a really good combination. For me, the best part of any show is getting to see so many old and new friends in one location and APEX was no exception. I thought the other highlight of the week was Burt Rutan's Keynote speech at the end of the conference.

A new Customer Service Representative, Christina Cheatham, recently joined us and hopefully you've already spoken to her or will soon.

move some offices around and expand our Analytical and Engineering Labs and add a clean room.

I told you in the previous issue that Mike Bevel's Naval Reserve Unit has been activated. (Mike is one of our instructors.) He has finished his training and is currently winging his way to Iraq.

Please note the new photo from the Valentine's Father/Daughter Dance.

As always, I'd love to hear from you.

*David E. Raby*

David Raby

President/CEO

draby@solderingtech.com

# TRAINING SERVICES 2005 SCHEDULE

MADISON ALABAMA

## APRIL

- April 18-19: IPC-A-610 Certified IPC Trainer (CIT) Recertification
- April 18-21: MSFC/NASA - STD - 8739.1 Staking and Conformal Coating Certification
- April 20-21: IPC J-STD-001 Certified IPC Trainer (CIT) Recertification
- April 25-28: IPC/WHMA - A - 620 CIT Certification

## MAY

- **May 02-06: IPC-A-610D CIT Certification.....NEW**
- May 16-17: IPC Rework/Repair and Modification CIT Recertification

## JUNE

- June 06-09: IPC/WHMA-A-620 CIT Certification
- June 13-17: IPC Rework/Repair and Modification CIT Certification Program
- June 20-21: IPC-A-610 CIT Recertification

TO CHECK OUT OUR SCHEDULE FOR THE NEW IPC-A-610D AND J-STD-001D CLASSES OR TO REGISTER FOR CLASSES VISIT OUR WEBSITE AT [WWW.SOLDERINGTECH.COM](http://WWW.SOLDERINGTECH.COM) OR CALL 1-800-767-4919.



Ann Duncan  
Training Coordinator

## COME SEE US AT:

Trade Show	Start Date	End Date	Location	Booth #
Atlanta SMTA Expo	April 21, 2005	April 21, 2005	Duluth, GA	TBD
Assembly Technology Expo	September 27, 2005	September 29, 2005	Rosemont, IL	5334
Defense Manufacturing Conference	November 29, 2005	December 01, 2005	Orlando, FL	TBD

## TRAINING MATERIALS

**LEAD FREE EVALUATION RESOURCE  
EASY - INEXPENSIVE - ENLIGHTENING**

**BY MEL PARRISH  
DIRECTOR OF TRAINING MATERIALS**



The STI Soldering Skill Evaluation Kit is intended to allow assessment of an individual's capability to identify components, place components, accomplish manual lead form, observe polarity, and use assembly tools. In addition, soldering skills can be demonstrated along with cleaning and inspection for acceptability. Turns out that this is an excellent resource for Lead Free capability assessment also. What happens now with the implementation of Lead Free practices? The skill sets are slightly different. The demands for tool performance and inspection assessment are increased. Will our operators be able to use their current tools to accomplish quality solder connections?

This kit allows an inexpensive quick assessment of not only personal skills but the capability of soldering processes tools and materials. It makes an informed response possible to the common question "What's different with Lead Free" and the information can be based upon first hand experience. The kit contains a mix of both SMT, Through Hole and Wire Attachments. Complete Lead Free versions of the inexpensive evaluation kit will be available by mid-April and they offer a terrific opportunity to check out Lead Free soldering without an expensive investment. To get more information or to purchase these kits please contact Mel Parrish at 256-705-5530 or our Customer Service Representatives at 800-858-0604.

**Note: The newly released IPC-A-610 Revision D and J-STD-001 Revision D are on the shelf ready to ship!**

# ENGINEERING SERVICES

## Strain Gage Testing

BY MARK MCMEEN  
VP OF ENGINEERING SERVICES



Do you know what level of applied strain your printed circuit board assembly realizes in your manufacturing and test process?

and package types due to their location on a particular design.

This type of test evaluation allows process engineers the ability to assess strain across the board and the effect on a particular component in a certain location. This is valuable information needed for designing a circuit card assembly that needs to survive in an operating environment for 5 to 10 years. Strain pathways across the circuit card can be so localized that even standard chip style components can be fractured at their solder interface. To this end, strain gage testing allows the design engineer and process engineer the ability to assess component location as well as process

Strain gage testing has been around for years and used on specific applications to understand the applied strain and strain rates applied to printed circuit board assemblies from different manufacturing processes, in-circuit and functional test fixtures, and final assembly operations. Today a renewed interest is stirring among component manufacturers and OEM's as well as contract



electronic manufacturers due to the increase use of BGA's,  $\mu$  BGA's and Chip Scale Packages. These types of packaging formats with their reduced rigid solder interconnects are now susceptible to applied strain at these interfaces to the printed circuit card pads or to the component interface. Fracturing of the interconnect to the pad or even in some cases the pads are lifting from printed circuit card surface themselves is the catastrophic failure. These defects are now common due to the density and shrink factor of these types of packages and the reduction in interconnect material.

related stress and strain due to manufacturing processes.

Component suppliers and final end use customers are starting to set limits on the amount of strain and strain rate levels seen on their components and final assemblies. This is placing emphasis back onto the designer and process engineer to understand their processes and part location to insure products meet their warranty and useful life periods. With this renewed interest and emphasis comes the need for the industry to determine limits and test protocols that are standardized to insure repeatability and consistency from manufacturer to end user.

Strain gage testing is the method of choice for quantitative analysis for evaluating the amount of strain that is being applied to these interconnects

Continued on page 5

# ENGINEERING SERVICES (CONT.)

## Strain Gage Testing

STI's Analytical Lab has taken a lead role in strain gage testing and data evaluation of applied strain and strain rate on printed circuit card assemblies. STI has also spent considerable time evaluating the effects of strain pathways due to the natural stiffening of certain areas of the card due to connector placement and large ball grid array packages and heat sink attachment devices.

These types of components have a large stiffening effect on a circuit card and thus strain pathways around them setup thus creating high strain levels on certain other components in that strain pathway or corridor. The following are STI guidelines on micro strain levels used to evaluate a standard .062 thick circuit card assembly.

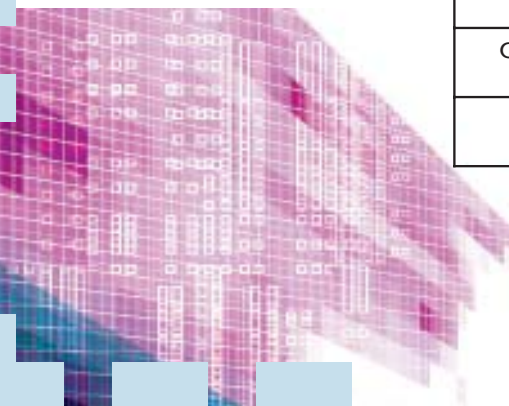
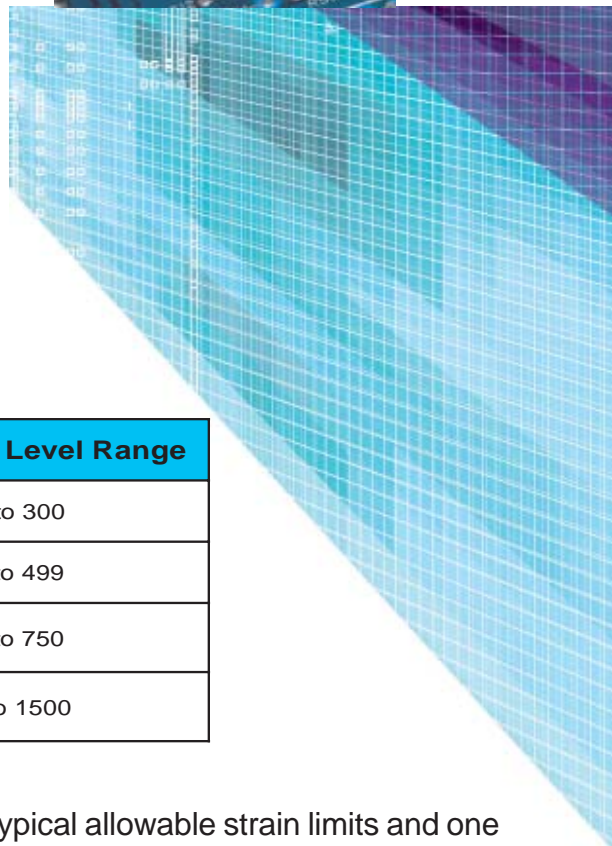
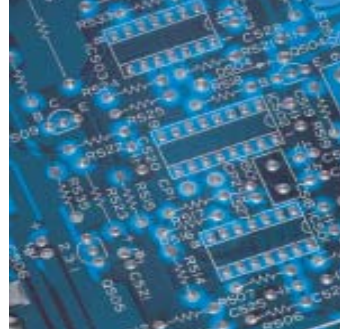
Description*	Micro-Strain Level Range
Nominal Target	100 to 300
High Acceptable	301 to 499
Out of Tolerance - Needs Validation Testing	500 to 750
Out of Specification - Corrective Action	751 to 1500

The above micro strain range are typical allowable strain limits and one must consider strain rate into the equation if the time is a significant time period. The strain level should be reduced if the assembly is going to stay an extended period of time at an elevated strain level.

### \*DEFINITION OF DESCRIPTION:

1. Nominal Target is the objective operating range and strain level.
2. High Acceptable is the allowable upper limit strain level at a measured process.
3. Out of Tolerance is a danger threshold range that requires an engineer to validate and understand the cause of the strain and perform long-term life testing to insure those components can withstand the micro strain level for the expected life of the product.
4. Out of Specification is a condition that jeopardizes the assembly and the assembly's ability to survive the expected life or warranty period. This condition warrants a corrective action and evaluation to understand the applied strain root cause and warrants a corrective action to lower the applied strain level.

Do you know what strain level your assembly is subjected to? Please call or email Mark McMeen any comments or questions you might have concerning this article to 256-705-5515 or [mmcmeen@solderingtech.com](mailto:mmcmeen@solderingtech.com). To obtain a copy of the complete paper visit our web site at [www.solderingtech.com](http://www.solderingtech.com).



# SALES & DISTRIBUTION

## ST-1 SMART TWEEZERS

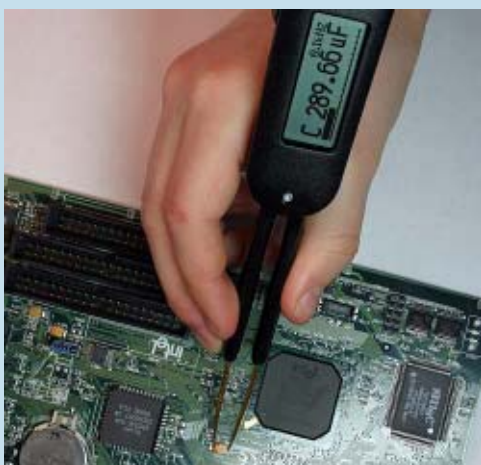


The “Smart Tweezer” is an exciting answer to the old problem of testing and troubleshooting SMD components. With the use of only one hand this light weight unit will quickly evaluate all types of SMD components.

### Overview

Smart Tweezers combines an R-L-C meter in a pair of tweezers. It has a unique mechanical and electronic design that incorporates a built-in direct precision SMD probe designed for component evaluation on the production line,

PCB debugging, component impedance testing, and sorting SMD components. The integrated SMD probe and measurement head, combined with automatic recognition of measurement mode (R, C, and L) and the range of measurement, allows the operator to focus on the component under test. As a result, the testing, sorting and evaluation of components becomes more efficient and cost effective. Smart Tweezers performs fully automatic auto range measurement for resistance, inductance and capacitance. Most measurement functions also have a manual mode, selected by using the jog dial button, which comes in handy when you need to measure a specific parameter or need better accuracy.



A bar graph also provides an analog indication of the measured input. Smart Tweezers is able to measure voltage. In the AUTO MODE, it measures DC voltage from 100uV to 800mV. In the TRACE MODE, it shows an oscilloscope like picture of AC voltage. The Smart Tweezer is also designed to measure continuity. The beeper sounds for resistance readings below threshold, or to indicate a momentary open circuit.

### **Durable Probes**

Tweezer tips are made of gold-plated non-magnetic stainless steel.

### **Ergonomic Design and Convenient Controls**

Smart Tweezers features a JOG DIAL button to choose modifiers for a selected function or change the setting. Rotate the JOG DIAL button to choose from a list of functions, then press to activate this function and see it appear on the display.

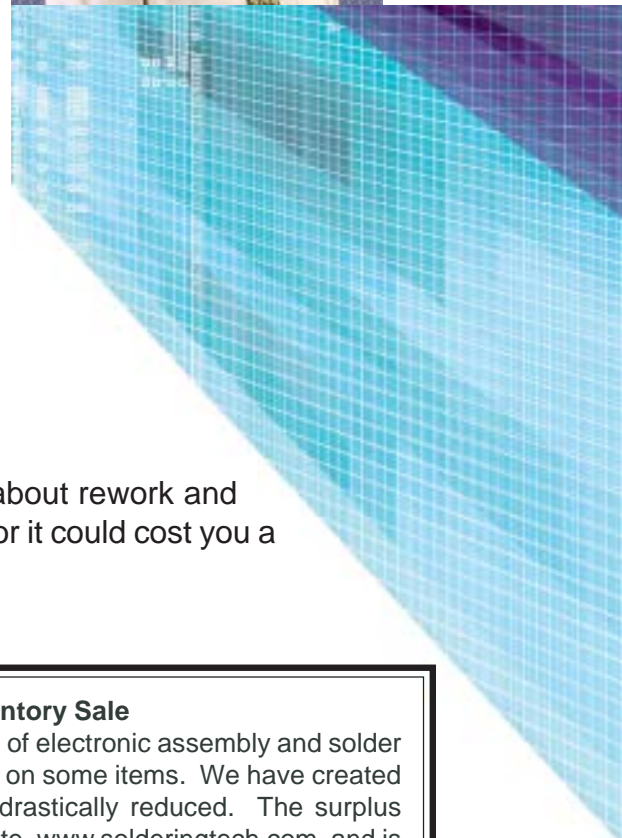
Please contact one of our sales staff for demos and pricing at 800-858-0604.

# TRAINING SERVICES

FRANK HONYOTSKI, MASTER IPC TRAINER (MIT)

## Rework vs. Repair

Some companies call rework operations repair. Why does it matter you ask? Well, every company has some rework that needs to be performed on product that does not comply. Rework is when a defective article is reprocessed in the same or equivalent manner as the original article. An article that has been reworked will match the drawing just like the same article that was manufactured with no defects. When a repair is performed it means that the article is made to function the same as the original but it will not match the drawing. Some examples are pad replacement, burnt boards, and jumper wires put in place to restore a conductor that was cut by accident. Every company has rework but if you tell your customers that you have a lot of repairs to do it looks very bad. An excessive amount of repair usually means that the company does not have a handle on process control. The next time you talk to a customer about rework and repair make sure that you use the proper terms or it could cost you a customer.



### Surplus Inventory Sale

STI, as one of the largest distributors of electronic assembly and solder supplies, occasionally has overstock on some items. We have created a surplus inventory list with prices drastically reduced. The surplus inventory list is available at our website, [www.solderingtech.com](http://www.solderingtech.com), and is updated monthly. Please call (256) 461-9191 and ask for Sales or (800) 858-0604. Quantities are limited so don't delay.



STI is your one stop shop for over 100 manufacturer's. Here's a few! For a complete listing visit our web site at [www.solderingtech.com](http://www.solderingtech.com)





*Soldering Technology International, Inc.*

102 Tribble Drive  
Madison, AL 35758  
Phone: 256-461-9191  
Fax: 256-461-9566

PRSR STD  
US Postage  
**PAID**  
Huntsville, AL  
Permit # 4

## ADDRESS SERVICE REQUESTED

STI IS ALSO A RESOURCE FOR TRAINING  
MATERIALS, ENGINEERING SERVICES,  
AND PRODUCT DISTRIBUTION  
VISIT [WWW.SOLDERINGTECH.COM](http://WWW.SOLDERINGTECH.COM)

## Division Highlights

*By: Mark T. McMeen, VP of Engineering Services*



You might be asking yourself right now, Soldering Technology International (STI) has an Engineering Service Division? A lot of people know STI for Training Services, Training Kits and Materials, and Distribution. Engineering Services has always been a part of STI with Jim D. Raby providing the engineering service and consultation himself. Over the last four years, this area of the business has changed and grown considerably with the addition of engineers and state of the art analytical tools and process equipment.

Engineering Services now encompasses a full analytical and failure analysis laboratory with the latest tools from SEM/EDS, FTIR, IC, RTX, Micro Strain Gages and Solderability to Environmental Test Chambers. This lab is capable of full failure and construction analysis as well as product/component validation. The Prototype and Development Laboratory has added the latest in surface mount process equipment to wire bonding for chip on board applications. This lab specializes in Micro BGA work and finepitch high-density applications as well as the repair and rework of these types of assemblies. The combination of these two labs has been instrumental in the development of Imbedded Component/Die Technology, this technology enables both active and passive components and bare die to be imbedded inside an organic circuit board such as FR-4. Contract Engineering Service is also available within Engineering Services where a project or program requiring a specific engineering discipline can be contracted for a specific period of time. We can provide this engineering support on a contract basis to meet your customer specific engineering requirement.

STI's Engineering Service Division has a well-trained staff of engineers and technicians available and the equipment necessary to meet your engineering challenges. Current projects include lead free implementation/validation, micro strain gage testing, standard failure analysis and construction analysis, and prototype development of new products and processes. You can reach me at [mmcmeen@solderingtech.com](mailto:mmcmeen@solderingtech.com) or 256-705-5515 if you have any suggestions, comments or need assistance with your engineering requirements. STI'S ENGINEERING DIVISION employees are ready to serve your engineering needs; we look forward to serving you in the near future.