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DAVE'S WORLD

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<u>2011 – LOOKING BACK WHILE GLANCING FORWARD</u> BY: DAVE RABY

NEWS

electronics

As we celebrate our 29th birthday at STI, I look back on this past year and am amazed at how quickly it all happened. It has been quite a year. I don't know if it's just me getting older, being busier or exactly why but this year didn't seem to take long to come and go.

My year started in style in Glendale, Arizona watching Auburn University win its first football National Championship in my lifetime. I returned home the following morning to 10 inches of snow which isn't something north Alabama is prepared for. As a result, STI was shut down for 2 days. We had a few other small weather issues through the winter but then April 27th was a day none of us here will ever forget. That's the day tornadoes ripped across north Alabama killing hundreds of people and destroying homes and businesses along the way. STI and all of our employees and immediate families were spared. We did however have one employee that lost their home and one that their home had significant damage. Just about all of us knew one or more people who did not make it through that day and we are constantly reminded of them as the rebuilding process in the area continues and will for a long time. STI was closed (no electricity) for 5 days because of the storms and then gradually came back up

as power was restored. Luckily, the remainder of the year has been much quieter weather wise but any time it gets cloudy I keep a close eye out my Doppler window.

Our Training Department had another productive year with the release of the IPC/WHMA-A-620-AS Space Applications Electronic Hardware Addendum (nice ring to it!). Pat Scott and her crew wrote the lesson plan for the specification and taught two beta classes in Madison to begin certifying other trainers. We also held regularly scheduled classes in Florida and Texas in addition to our Madison location. Of course, half of our training is always done on the road in customer facilities. Watch for at least two new (non-certification) courses we have coming out in 2012.

Our Engineering Services Department just keeps growing. Our customer base continues to diversify as do our capabilities. This year we added a selective solder machine for manufacturing and a vibration table for our analytical lab. We added three isolation cages so we can tune and test products without electrical interference. We won our 3rd Global Technology Award in Munich last month for our Micro Coil Spring Array technology which was developed by NASA and is a very cool replacement for columns on column grid arrays. In 2012, we'll be adding another certification to go along with our ISO-9001-2008.

Our Distribution Department continues to evolve and expand. Our multiple business units and unique structure of our distribution business allows for our customers to be exposed to multiple employees within STI. I'm always happy when I hear that one of our customers has engaged with our sales team for product pricing and availability, our fulfillment team for delivery, and our engineering team for advice on using the product. I believe this is truly what separates STI as the best resource for consumable items. Our e-commerce capabilities will continue to expand and offer you more ways to interface with us in 2012.

Our core team continues to stay together as we have for many years but we continue to add to the team. This year we added 19 people which give us more talent and depth to better serve our customers.





<u>2011 – LOOKING BACK WHILE GLANCING FORWARD</u> (CONTINUED)

We have always believed in supporting our industry and our people do too. This year, Ray Cirimele worked with IPC to complete some of their training videos and Frank Honyotski spoke to SMTA chapter meetings in Dallas, Kansas City, and Melbourne. Mel Parrish is serving as the chairman of the IPC's Technical Activity Executive Council which is the committee that provides guidance for IPC activities and all of the IPC technical committees and task groups. Mark McMeen was a speaker at an IPC event in Minneapolis on Flex Circuits and Casey Cooper spoke at the Pan Pacific Expo in Hawaii on a modified SIR test program we created for evaluating conformal coatings in harsh environments and then gave the same presentation to an SMTA group in Huntsville.

We've had our best year of sales ever and I can't even begin to tell you how much we appreciate your confidence and support. Thank you again and please let me know if you have any comments or questions.



P.S. You can follow us on Twitter (daveraby) or Facebook (STI Electronics) to keep up with our latest news.

WHY STI'S TRAINING SERVICES DEPT. IS THE BEST SHOW IN TOWN BY: PAT SCOTT

You can't seem to open a newspaper or listen to the news without hearing something about the economy. As you all know the economy has been a challenge for most companies (STI Included) for a number of years now. Keeping this in mind STI has made it a point not to increase course costs for the past several years in an attempt to make your training dollars go farther. We intend to keep our costs the same for FY 2012. Additionally, we will continue to offer a 10% discount for those of you who attend multiple classes with us. Along with reasonable prices, STI affords you a training experience that is second to none. In order to keep ourselves and our customers well informed, we stay involved with key industry organizations, i.e. IPC. We stay involved by actively participating in the Standards Development and Technical Training Committee meetings for IPC/WHMA-A-620, IPC-A-610, IPC-A-600, IPC-7711/7721 and J-STD-001. STI also holds key leadership positions for IPC committees for both the TAEC Technical Activities Executive Committee and Product Assurance Committee.

Along with staying involved in meetings, STI has developed many courses for the IPC as well as several custom courses for various other customers. Our curriculum development staff is the best around. We have technical writing experience coupled with real life experience in manufacturing commercial electronics as well as military applications. We currently have on staff five full time instructors of various backgrounds. We have three instructors who have experience in the Navy's 2M (Miniature/Micro Miniature Electronics Repair) program. One of these instructors has the distinction of being the only currently certified civilian instructor for the program. We also have two instructors with backgrounds that lie heavily within the commercial electronics world ranging from machine operation to product repair. At STI we pair our knowledgeable instructors with spacious classrooms that are fully equipped to meet and exceed your training needs in cable harness fabrication, rework/ repair, discrimination skills, etc. Pair this with the Southern Hospitality of the area and you will find yourself able to relax and learn in a stress free environment.

So, if you are looking for a training center that can provide you with unmatched affordability as well as quality then look no further than STI Electronics.

Pat South

TRAINING SERVICES



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TRAINING SCHEDULE





TO REGISTER FOR A COURSE OR FOR ADDITIONAL INFORMATION GO TO WWW.STIELECTRONICSINC.COM OR E-MAIL US AT TRAINING@STIELECTRONICSINC.COM.

WINTER 2011

MONTH	DATE	CLASS	LOCATION
JANUARY	02-06	IPC J-STD-001E "Requirements for Soldered Electrical and Electronic Assemblies" - Certified IPC Application Specialist (CIS) Certification	Madison, AL
	04-06	IPC-A-600H "Acceptability of Printed Boards" Certified IPC Trainer (CIT) Certification/ Recertification	Madison, AL
	04-05	BGA Rework/Repair	Madison, AL
	05-06	IPC-7711B/7721B Rework, "Modification and Repair of Electronic Assemblies" Certified IPC Trainer (CIT) Recertification	Madison, AL
	09-10	IPC-A-610E "Acceptability of Electronic Assemblies" Certified IPC Trainer (CIT) Recertification	Madison, AL
	09-13	IPC J-STD-001 "Requirements for Soldered Electrical and Electronic Assemblies" Certified IPC Trainer (CIT) Certification	Madison, AL
	11-12	IPC J-STD-001 "Requirements for Soldered Electrical and Electronic Assemblies" Certified IPC Trainer (CIT Recertification)	Madison, AL
	13	IPC J-STD-001ES, Space Application Addendum to J-STD-001E	Madison, AL
	16-19	IPC-A-610E "Acceptability of Electronic Assemblies" Certified IPC Trainer (CIT) Certification	Madison, AL
	16-20	IPC-7711B/7721B Rework, "Modification and Repair of Electronic Assemblies" Certified IPC Trainer (CIT) Certification	Madison, AL
FEBRUARY	06-08	IPC-A-610E "Acceptability of Electronic Assemblies" - Certified IPC Application Specialist(CIS) Certification	Madison, AL
	13-16	IPC/WHMA-A-620 "Requirements and Acceptance for Cable and Wire Harness Assemblies" Certified IPC Trainer (CIT) Certification	Madison, AL
	13-17	IPC J-STD-001 "Requirements for Soldered Electrical and Electronic Assemblies" Certified IPC Trainer (CIT) Certification	Madison, AL



TECH WEAR STATIC CONTROL GARMENTS **BY: KELLI KING**

Tech Wear static control garments protect your sensitive micro-electronic products from ESD (electrostatic discharge) generated by simple human movement during the manufacturing process.

Those few volts are too tiny to even approach the scale of human perception, but can destroy costly components, or worse, cause unseen latent damage, which can get to the consumer and ultimately damage your product reliability and reputation.

An operator wearing a comfortable, ground

SPECIAL THANKS

Dottie Grantham and I recently got the opportunity to combine inside and outside sales efforts for the AL/TN region. After being involved with inside sales for several years, we have really enjoyed getting to meet so many of you in person and finally put a name to a face! I want to thank Julia Adamczyk, Inside Sales, for holding down the fort and enabling us to go out and visit with our customers. As always, we are here for you and look forward to seeing all of you in 2012.

TRAINING MATERIALS NOW AVAILABLE THROUGH STI'S E-STORE **BY: MEL PARRISH**

By the time this newsletter is published, Training Materials products will be available online through our website. Hopefully that should make things easier for you, our valued customers, to find support for your training projects from STI Training Resources. As always, I am available as well as your favorite Customer Service Representatives for any questions you may have or any special requests. Please let me know your thoughts so we can continue to improve the site.

On the IPC front, my term as IPC TAEC Chair is drawing to a close after two years. I wonder where that time has gone. We have had some accomplishments but the progress is slow. That effort will belong to another to press on for the 2012-13 term. On the good side, I'll get to sit at the award luncheons with my many close IPC friends rather than at the head table where I need to act nice and not spill my food. I am sure we will

all miss Denny McGuirk and all that he brought to IPC.

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The essential IPC Standards such as IPC J-STD-001 and IPC-A-610 are once again in the process of revision. If you have any pressing issues or new technology you would like to have the committee consider, please let us know. If you need help with a submission, please contact me here at STI.

Having gone through the holidays in distant places far from friends and family, my best wishes go out to the military service men and women and their families during this holiday season. You have our respect and gratitude for your sacrifices on our behalf.

May the holidays be filled with good friends, family and comfort of a blessed season.

SALES



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TRAINING MATERIALS



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Our feature Training Materials item of the month is our very popular STI Wire Holder. Mention this article to STI Customer Service during the publication release month and receive a 10% discount.

ENGINEERING SERVICES



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<u>NO CLEAN FLUX ACTIVATION – HAVE ALL FLUX RESIDUES BEEN CATALYZED?</u> BY: MARK MCMEEN

In the past 3 months STI's Analytical Lab has been asked to review 3 separate No Clean Flux Residue issues. During the analytical process we always ask the client if they can ensure that all areas exposed to touch up operations have seen adequate heat and dwell time to activate or catalyze all flux residues. The answer is always, "It is No Clean so why do I need to be concerned with any flux residue?" In all three cases the assembly failed for voltage leakage or intermittent signal quality due to conductive ionic residue between fine pitch leads. In one instance the residue had grown a dendrite between leads and the second instance was due to wave solder flux overspray and touch up of No Clean Flux residing on the topside of a sensitive fine pitch component in an RF net. The next obvious question is "Why is a No Clean residue not benign after processing?" The answer is not a simple, single answer but a multi-variable process sequence. No Clean Fluxes need to see adequate heat (correct temperature) and adeguate dwell time to properly catalyze and form a benign residue. The most asked question once a problem arises with No Clean Flux chemistries is, "Why has it not been activated?"

The normal answer usually depends on the responses to the following questions; what was the temperature of the soldering iron and dwell time or wave solder preheat temperatures and dwell time on the topside? What's normally overlooked is the flux volume/amount present and where it is located. The volume/amount goes toward the amount of heat/temperature needed and the amount of dwell time needed to properly catalyze the flux residue present. Most No Clean Fluxes are low solids concentrations, which by its nature mean less volume/amount of ionics present in the flux residue. The flux residue for most No Clean Flux is lower in volume/amount present which aids in decreasing the activation time to catalyze. The issue also assumes the No Clean Flux is low in ionics due to the low volume as to not have enough present to initiate a problem even if the flux has not properly catalyzed. The issue is then those touch up or secondary operations whereby technicians have to solder temperature sensitive parts such as battery devices, sensors, post connectors, wires or wire wound magnetics. There are lots of opportunities for secondary soldering applications. Thus, there is an opportunity for No Clean Flux residues to run away from the heat source and under adjacent components or devices. Given the right environment, a leakage pathway for voltage or signals will be created. Due to this potential problem, STI has been asked to create a test plan to capture and better define activation times and temperatures for No Clean Fluxes for critical applications for various clients. These clients represent military, medical and industrial applications and all have the same objective and question, "What can I do, short of cleaning, to address this potential problem?" Facts and data are necessary to better understand the different variables influencing these failure opportunities. STI has a three fold test plan to help clients understand their unique board geometries and component designs to better quantify the effects of certain No Clean Fluxes on their specific applications and component sets. Each design has it vulnerabilities and sensitive circuits. The best way to quantify the effect is to understand the impact of their processing techniques and material sets in a quantifiable test format on their electronic assembly. The test plan needs to address all sources of ionic contamination from the No Clean Flux residue, components and the bare printed circuit board. The following test plan captures all of these sources of ionic contamination. Naturally we spend time on the flux residue itself because it has multiple variables that influence its performance.

STI LAB HAS A THREE FOLD TEST PLAN

1. What are the ionics present in the chosen No Clean cored wire solder or wave solder flux based on specific volume / amount present on cleaned coupons? Varying solder iron temperature settings that are required for the specific temperature sensitive parts being used also impacts the amount of residue and ionics present. The amount of flux needed to solder also has an impact depending on the size and surface area of component leads being soldered. (Heat drives flux residue away from the heat zone and



<u>NO CLEAN FLUX ACTIVATION – HAVE ALL FLUX RESIDUES BEEN CATALYZED?</u> (CONTINUED)

soldered area.) This is what leads to residues running under nearby components not in the initial soldered objective area. This gives us a base line of the ionics present and what the best way is to address these ionics.

2. What temperature and dwell time is needed to properly catalyze these unactivated residues if one cannot post wash these assemblies or cannot clean locally? Some local cleaning techniques only cut the concentration present by further spreading the residue across a larger area. Some clients use this as an acceptable way of addressing the ionic issue. The bigger question, again, is what temperature and dwell time will properly catalyze the flux residue? To this end, STI is conducting for clients a temperature and dwell time study to properly quantify the parameters and process techniques to ensure understanding of the activation temperature and dwell time needed to properly catalyze the flux residue to a benign state. The following post process heating sources are to be used in the study Hot Air, Reflow Ovens, Autoclave and Bake-Out Ovens. The idea is to ensure that adequate temperature and dwell time reach all of the areas where unactivated flux residue could reside.

3. The final test is a full ion chromatography of the board assembly. This is to ensure that the final assembly is in a cleanliness state that meets the customer's expectation. There is a con to this approach because this assumes the board is clean coming in from the board house and the components are clean as well. STI performs component and bare board ion chromatography to set the baseline on each of the major sub components to an electronic assembly. In general they are usually clean enough and not a problem, but it should be tested because we find them dirty and a source of ionics from time to time. It is important to separate and test all variables independently before a test is performed on a full electronic assembly so the source of ionic contamination can be isolated. The idea is to quantify all of the sources of ionic contamination. That is why it is good to base line the bare PCB, components and the flux itself, as well as the processes that are used to solder and apply them.

4. Wave solder fluxes are quantified the same way as above to ensure all variables are understood as well as identifying which material sets or processes lead to unactivated flux residue. Flux overspray can have the same negative impact as non-catalyzed flux from No Clean cored wire solder or an excessive amount of liquid touch up flux. That is why touch up flux pens are popular, to help control the amount/volume of touch up flux that is used during the secondary soldering operations.

As you can see, a disciplined/multi-variable test approach must be used to capture the data and facts necessary to understand how and where unactivated flux may reside and how best to catalyze these fluxes on electronic hardware. Do you know your activation temperature and dwell time necessary to ensure catalyzation of your No Clean Flux chemistries? SMT paste does not fall in this category because proper reflow temperature and dwell time is achieved through the complete assembly process. However, secondary soldering or touch up is the main culprit and it's difficult to know if all of the flux is being activated during these operations. No Clean flux is a necessary evil and one that if used properly works great. It is those times when situations lead to improper temperature and dwell time, and the unknown volume/amount present at those critical locations, where the right environment leads to voltage leakage and intermittent signal integrity. As the board density increases, component sizes shrink and pitch decreases space between leads, the potential for ionic contamination from non-catalyzed No Clean flux becomes a concern and thus one needs the data and facts on how best to solve this problem.

Please email if you have any questions or comments to Mark McMeen (V.P. of Engineering) mmcmeen@stielectronicsinc.com or 256-705-5515.

ENGINEERING SERVICES

For the sake of the trees, STI will send out future newsletters in electronic format only. If you would like to continue to receive the newsletter, please send your email address to info@stielectronicsinc.com or go to our web address at www.stielectronicsinc. com and sign up.



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DIANA'S VIEW



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As 2011 draws to a close, I wanted to take a moment and thank all of our customers and friends for all of their support and confidence they place in STI and the products and services we offer. I can assure you that we have plans for improvement and expansion in 2012 as we look for ways to better serve our customers.

Also, in the next few issues, I wanted to take a moment and introduce you to some of our staff that you normally don't see or hear from in our newsletters but that make up an integral part of STI. In this issue I would like to introduce you to Donna



Taylor. Donna is STI's receptionist and has been employed with STI for 12 years. Those of you who have called our main direct number or passed through our doors can attest to Donna's professionalism and southern charm. Donna is always willing to go the extra mile to ensure that her customers (both internal and external) receive the best customer service and always with a smile. Also as a secured facility. I am confident and assured that Donna does her absolute best to ensure that STI's security policies and procedures are followed to the letter. In today's economy, some companies choose to eliminate their receptionist position and allow their phones to be answered through an automated system or customers received by a phone and a call list. STI wants each ring of the phone or opening of STI's front door to be a warm, friendly, professional and helpful experience and no one fits that bill better than Donna.

Wishing each and every one of you a very Merry Christmas and a Happy, Prosperous, Healthy New Year! We look forward to seeing you all in 2012.

Sincerely, Diana

