



The logo for sti electronics features the word "sti" in a large, bold, blue sans-serif font. Above the letter "i" is a circular icon containing a stylized circuit board. Below "sti" is a horizontal line with a small circle at its left end. Underneath this line, the word "electronics" is written in a smaller, white, lowercase sans-serif font. To the right of the "sti" text, the word "NEWS" is written in a large, white, uppercase sans-serif font.

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## DAVE'S WORLD



### CONTACT INFORMATION:

**DAVE RABY**

**PRESIDENT/CEO**

**DRABY@STIELECTRONICSINC.COM**

## 2012 SPRING BY: DAVE RABY

I was recently asked what has changed the most at STI since we started 29+ years ago. I thought through the obvious answers—Alabama instead of California, reserved parking places, two Coke machines, multiple computers (instead of one TRS 80), and all of the communications advances that have made the world a much smaller place. I still remember having our telex service read to me our daily message from a supplier in Switzerland via phone that they had “just purchased a facsimile machine and perhaps we should look into getting one also.” I also think of the things that haven’t changed. We still support the electronics assembly industry, the industry has changed, the technology has changed, and the people have changed but helping you deliver a quality product to your customer is still what we do. We are still a family company and the family is still together. We’ve added new family members. We’ve gotten older and hopefully we’ve gotten wiser.

I think our biggest change started in the summer of 2000. When STI began in 1982, Jim Raby was our technical guy and pretty much all of our technical knowledge. He was it. Over the years we had some very good people, mostly instructors that were very good at what they did but Jim was the one you had to see or talk with when you had an issue. We had no complaints with this other than there were only a certain number of people that Jim could see or talk with, and that made growing our business a challenge. In 1996, based on work Jim had done, we began a contract for Greg Schmidt of Westinghouse (now Northrop Grumman) in Huntsville that caused us to have to go out and hire some good technical people to work on the project. In 1998 and 1999, in large part to this contract, we made the INC 500 list for the first two times as one of the fastest growing businesses in the United States. By the summer of 2000, the contract required us to expand our capabilities and hire some very good people. We knew the contract would end relatively soon (2 years?) so our job was to figure out how to hang on to these people at that point. The contract went great, very good people performing at a very high level and accomplishing all that the customer wanted and more. When it did end, we started plugging people into positions that had never existed before and hoping we could generate enough business to hang on. It turns

out, when you have the right people with loads of technical knowledge offering services that are needed, things can work out ok.

If you’ve been reading our newsletter for a couple of years, perhaps you noticed a couple of years ago we had several 10th Anniversaries in a relatively short period of time which of course came from people hired in the summer of 2000 and if you work with the technical side of our business, the names will be very familiar. Mark McMeen, VP of Engineering, started then. So did Mel Parrish, our Director of Training Materials (and knower of all things related to specifications). So did Mel Scott, our Director of Quality. Mel also brought along Pat Scott who is our Director of Training Services. All of those people were hired directly because of that contract and are still with us today. We also brought in Jason Gjesvold who started our Failure Analysis Lab before moving on to another company—but creating that spot allowed us to then bring in Marietta Lemieux who does a great job as our analytical expert to companies around the world. Indirectly because of this, we also were somehow (that’s a whole other story) able to hire Casey Cooper who has done a wonderful job with our Microelectronics area. These people I’ve named are not alone, as they’ve been successful, they’ve brought in additional very smart people to work in their area and helped shape STI into the company it is today.

So going back to the original question, what has changed the most at STI in the past 29+ years? I believe it is our level and depth of talent and technical knowledge. We used to have one person who could answer your technical questions (and he’s still the one some people want to talk with and all of us sometimes refer questions to) but now we have many people covering many more subjects but all are available to help you build your product better. Having said that, the first Coke machine was a pretty big deal too.

You probably noticed the photo for this article is different than the one we normally use. Mama Grace, my Grandmother and Jim’s Mother, passed away in December at the age of 98. She was never directly involved with STI but definitely very important in our family values and how we treat people and consequently the way we do business. We miss her.

## 2012 SPRING (CONTINUED)

Thank you for your support and please let me know how we can serve you better.

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



## TRAINING NEWS

BY: PAT SCOTT

For those of you who were not able to attend the Standards Development Meetings at APEX here are some highlights:

- A synergy meeting was held for the J-STD-001F and IPC-A-610F to continue to make sure that both documents stay aligned.

- J-STD-001 Handbook Task Group – This task group celebrated the publication of Revision E of the IPC-HDBK-001, Handbook and Guide to Supplement J-STD-001.



- Wire Harness Acceptability Task Group – This group is in final preparation of Revision B of the IPC/WHMA-A-620. During APEX this Task Group addressed all of the IPC/WHMA-A-620B compiled comments and the Revision B Document should be sent out for ballot soon.

**NOTE:** If you are a balloting member, it's important for the success of the revision that you take time to review the document or sections of the document that apply to you.

- Repair Training Technical Task Group – This training technical task group reviews comments and suggestions for updating the IPC rework and repair course. This was a brief meeting to discuss a comment to split the repair portion of the CIT course out into its own separate class. After discussion those in attendance voted to reject the comment because there were strong opinions that a CIT should be able to do all rework/repair projects required.

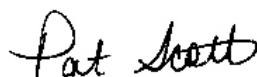
- 620 Technical Training Task Group – This task group was asked to review the hands-on work instructions currently available for IPC/WHMA-A-620A to determine if they are being used and if people even know they exist. Some in attendance didn't know that the hands-on instructions existed and others stated that they knew they existed but they use their own hands-on training. So for those of you who didn't know they existed you can find the optional hands-on course materials at: <http://www.ipc.org/ContentPage.aspx?pageid=IPC-WHMA-A-620>

You can use the training materials as is or use them as building blocks of information to help you construct your own curriculum.

- The task group also met with the Space Electronics Assemblies IPC/WHMA-A-620 Addendum task group to discuss the 620AS Beta course and the status of the 620AS CIT and CIS Courses. Here is what was discussed:

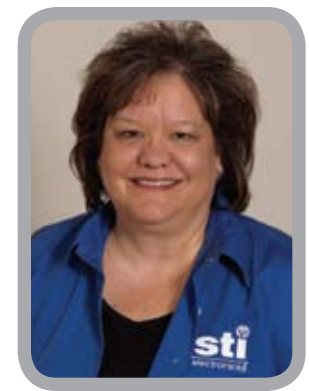
- 1 Alpha Class was run for STI's Trainers October 10-14, 2011.
- 2 Beta Courses were run for Current MIT's and CIT's, November 7-11, 2011 and February 20-24, 2011.
  - From the Beta Courses conducted by STI we now have the committee approved written exams and documentation package (drawings, wire list, work instructions, grading sheets, etc.).
  - A required tool listing is being finalized and will be available soon.

Thanks for taking the time to read this article. Hopefully the information was helpful. If you have any questions please feel free to email me at [pスコット@stielelectronicsinc.com](mailto:pスコット@stielelectronicsinc.com) or call me at 256-705-5528.



## DAVE'S WORLD

## TRAINING SERVICES



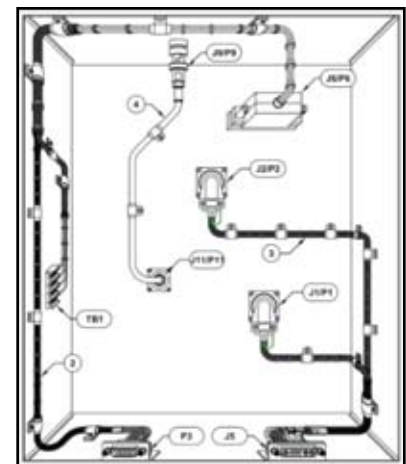
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**MASTER ASSEMBLY VIEW**

## TRAINING SCHEDULE



TO REGISTER FOR A COURSE OR FOR  
ADDITIONAL INFORMATION GO TO  
[WWW.STIELECTRONICSINC.COM](http://WWW.STIELECTRONICSINC.COM)  
OR E-MAIL US AT  
[TRAINING@STIELECTRONICSINC.COM](mailto:TRAINING@STIELECTRONICSINC.COM).

## SUMMER 2012

MONTH	DATE	CLASS	LOCATION
JULY	09 - 10	IPC/WHMA-A-620 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	09 - 13	IPC J-STD-001 Certified IPC Application Specialist Certification Program (Modules 1-5)	Madison, AL
	11 - 12	IPC Rework/Repair and Modification Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	16 - 20	IPC J-STD-001 Certified IPC Trainer (CIT) Certification Program	Madison, AL
	23 - 24	IPC-A-610 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	25 - 26	IPC J-STD-001 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	27	J-STD-001ES Update, Space Application Addendum to J-STD-001E	Madison, AL
AUGUST	06 - 10	IPC J-STD-001 Certified IPC Trainer (CIT) Certification Program	Madison, AL
	08 - 10	IPC-A-600 Certified IPC Trainer (CIT) Certification Program	Madison, AL
	13 - 14	IPC/WHMA-A-620 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	15 -16	IPC-7711/7721 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	20 - 23	IPC/WHMA-A-620 Certified IPC Trainer (CIT) Certification Program	Madison, AL
	20 - 21	IPC-A-610 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	22 - 23	IPC J-STD-001 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	24	J-STD-001ES Update, Space Application Addendum to J-STD-001E	Madison, AL
	27 - 31	IPC-7711/7721 Certified IPC Application Specialist (CIS) Certification Program	Madison, AL
SEPT.	10-11	IPC-A-610 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	12-13	IPC J-STD-001 Certified IPC Application Specialist Recertification Program (Modules 1-5)	Madison, AL

**SEE PAGE 10 FOR CLASSES IN CALIFORNIA, TEXAS AND OKLAHOMA.**

# Affordable Auditing – New EOS/ESD Audit Kits from 3M

## 3M Makes ANSI/ESD S20.20 Compliance Easier and More Affordable

3M™ EOS/ESD Audit Kits offer companies an effective way to detect ESD events and help prevent component failures. These tools help allow businesses to be more competitive in the marketplace by reducing losses due to ESD and EOS.

3M Audit Kits provide some of the most comprehensive portable instruments available. This equipment goes beyond making the test measurements defined in ANSI/ESD S20.20,

and detecting harmful energy/EOS levels identified by IPC-A-610E. 3M instruments capture real data affecting your products versus only verifying whether or not precautionary materials are functioning properly.

**Confirm that your ANSI/ESD S20.20 program and protective products are working properly by using innovative, affordable instruments, monitors and testers from 3M.**

**NOTE: 3M™ EOS/ESD Audit Carrying Case 753 is also available separately!**

### Measures/Detects:

- Work Surfaces and Flooring Resistance
- Electrostatic Fields
- Air Ionizer Static Decay Rate and Ion Balance
- Integrity of Facility and Equipment Ground
- ESD Events
- Electrostatic Overstress (EOS)
- Electromagnetic Interference (EMI)



### 3M™ EOS/ESD Audit Kit 751 contains:

3M™ Work Surface Tester 701C  
3M™ Field Meter 718C  
3M™ Air Ionizer Test Kit with charge plate and charger 718A  
3M™ Ground Pro Ground Integrity Meter CTM051  
3M™ ESD Pro ESD Events Indicator CTM082  
3M™ Iron Man Plus EOS Monitor CTC331-WW  
3M™ Dual Conductor Wrist Strap  
3M™ Single Conductor Wrist Strap  
3M™ Instrumentation User Guides  
Heavy Duty Molded Carrying Case with Handle and Wheels

Suggested List: \$4,995

### 3M™ EOS/ESD Audit Kit 752 contains:

3M™ Work Surface Tester 701C  
3M™ Field Meter 718C  
3M™ Air Ionizer Test Kit with Charge Plate and Charger 718A  
3M™ Ground Pro Ground Integrity Meter CTM051  
3M™ EM Eye Meter CTM048-2128  
3M™ Iron Man Plus EOS Monitor CTC331-WW  
3M™ Dual Conductor Wrist Strap  
3M™ Single Conductor Wrist Strap  
3M™ Instrumentation User Guides  
Heavy Duty Molded Carrying Case with Handle and Wheels

Suggested List: \$8,350

**3M**

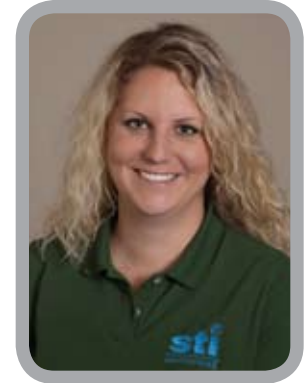
Electronic Solutions Division  
Static Control Products  
926 JR Industrial Drive  
Sanford, NC 27332-9733  
Toll-Free: 866-722-3736  
International: 919-718-0000  
Email: 3Mstaticinfo@mmm.com  
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You Can Do More With...

**3M**

## SALES



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**INSIDE SALES MANAGER**

**800-858-0604**

**SALES@STIELECTRONICSINC.COM**



**As Dottie transitions to Outside Sales covering AL, MS, TN, and GA, joining us in welcoming Cortney Wright as STI's new Inside Sales Representative!**

## MICROELECTRONICS LAB



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**ELECTRICAL ENGINEERING MANAGER**

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**CCOOPER@STIELECTRONICSINC.COM**

## MICROELECTRONICS LABORATORY CAPABILITIES BY: CASEY COOPER

Today's advanced microelectronics demand manufacturing with highly precise assembly equipment located within a highly controlled assembly environment, i.e. temperature, humidity, and particle contamination. In response to these requirements, STI installed an ISO Class 6 (Class 1,000) cleanroom environment in which to perform research and development (R&D) in the area of microelectronics in addition to supporting low-to-mid volume manufacturing of semiconductor packages/assemblies. STI's Microelectronics Laboratory is equipped for back-end processing of microelectronics, from component-level packaging to system-level assembly, within its tightly controlled cleanroom environment.

Because a cleanroom environment is critical when manufacturing and assembling high reliability electronic systems, STI invested a significant amount of resources into both designing and equipping the Microelectronics Lab. This investment is reflected in the low concentration of airborne particles and tightly controlled temperature and humidity environment within which the high-accuracy assembly equipment operates, all critical aspects to controlling manufacturing processes and minimizing yield loss.

erties if temperature, humidity, and pressure are left uncontrolled.

- **Particulate Contaminates** – Although STI's cleanroom was designed and certified at ISO Class 6 requirements, the cleanroom operates near Class 100 based on STI's continuous monitoring of airborne particles at work surfaces using a particle counter. This reduction in particulates within the assembly environment dramatically reduces opportunity for process defects, typically seen during interconnect formation such as ultrasonic or thermosonic bonding.

- **ESD** – With the use of static dissipative coveralls, boots, and flooring, the risk of generating ESD during the manufacturing process is dramatically reduced. STI further combats ESD by the installation of pulsed-DC ionizers over all FFUs in order to discharge ESD generated by the high velocity airflow in order to meet the ISO Class 6 air change over requirements. Lastly, all workstations and assembly equipment include ground straps for dissipation of static when in direct contact with devices and assemblies.

- **Corrosion/Oxidation** – All assembly materials are stored in dry nitrogen cabinets upon receipt in order to minimize oxidation prior to assembly. Ion-free, particulate-free gloves are used to handle materials and devices to ensure contaminate free surfaces and prevent formation of corrosive elements on bond surfaces.

- **Temp/Humidity Control** – Assembly materials such as die attach adhesives, underfills, and encapsulants can have different flow characteristics due to changes in viscosity if the operating environment of temperature and humidity is not regulated. STI utilizes a building control system to modulate temperature to  $70^{\circ} \pm 2^{\circ}\text{F}$  and relative humidity to  $45\% \pm 5\%$  to ensure process control.

### STI'S CLEANROOM ASSEMBLY BENEFITS

Typically, all microelectronic assemblies are manufactured in a clean environment meeting a minimum ISO Class 7 (Class 10,000) rating in order to produce high yield of these types of devices. Unpackaged semiconductor devices are highly susceptible to damage during the assembly process due to a number of factors including particulate contaminants, ESD damage, corrosion, etc. In addition, assembly materials are vulnerable to fluctuations in materials prop-

### STI'S CLEANROOM ASSEMBLY EQUIPMENT

STI's Microelectronics Lab is equipped for component-level and system-level assembly from

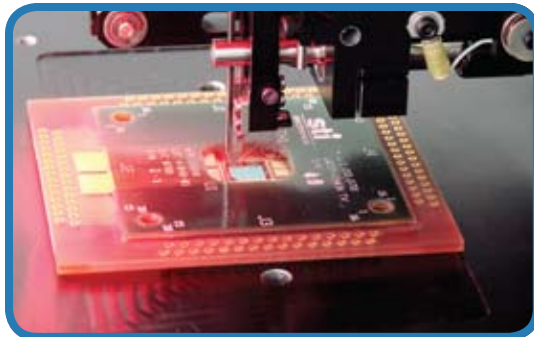


## MICROELECTRONICS LABORATORY CAPABILITIES (CONTINUED)

die attach through encapsulation. The lab is certified in accordance with ISO 9001:2008 requirements where quality control is implemented in the earliest phases of a program beginning with project planning, product design (as required), process development, manufacturing and assembly, and testing/verification documentation. Assembly capabilities include surface modifications, die attach, ultrasonic wire bonding, thermosonic wire bonding, encapsulation, testing, etc. Assembly materials and process parameters are quantified using a bond tester to evaluate shear strengths and pull strengths.

- **Surface Modification** – The dual-channel plasma etch is used to improve wettability of die attach and encapsulant materials to the devices and substrates as well as remove oxides from metallic interconnects prior to bonding. STI uses customized recipes consisting of gas ratios and RF energy to ensure optimal results are obtained.

- **Die Attach** – STI utilizes a sophisticated dispenser/ die bonder/ AOI machine for low-volume dispense accuracy and repeatability in addition to  $\pm 10\mu\text{m}$  component placement. The additional automatic optical inspection (AOI) feature provides real time statistical data for placement accuracy and alignment. Component handling options include waffle pack and gel-pak for bare die and direct chip attach (flip chip) assemblies.



- **Ultrasonic Wire Bonding** – Wire bonds are created with a fully automatic ultrasonic wedge bonder utilizing aluminum wire over a wide diameter range for low and high current applica-

tions. STI uses 30um diameter aluminum/1% silicon wire for typical low-current applications.

- **Thermosonic Wire Bonding** – STI's thermosonic bonder is used for deep access and RF applications requiring gold wire as the interconnect. The hybrid bonder is capable of both thermosonic wedge bonding as well as thomosonic ball bonding.



- **Encapsulation** – STI's automated volumetric dispenser is used to apply dam and fill, underfill, cavity-fill encapsulants to protect the vulnerable bond wires and die of semiconductor packages and assemblies. Parameters are tightly controlled to ensure that a consistent volume of material is dispensed with each application.

- **Bond Testing** – Material qualification and process control are accomplished via a wire pull/ die shear tester coupled with high-magnification visual inspection.

- **Electrical Testing** – STI offers customized test protocols as well as performs testing in compliance with various EIA/JEDEC, IEC, AEC, ASTM, IPC, and MIL standards. Test services included electrical testing (component-level, system-level, HIPOT, SIR, etc), environmental testing (vibration, thermal shock, moisture resistance, temperature cycle, humidity, etc), and mechanical testing (strain gage testing, bond strength, solder ball shear, etc).

## MICROELECTRONICS LAB



## ANALYTICAL LAB



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## ANALYTICAL LABORATORY CAPABILITIES BY: MARIETTA LEMIEUX

At STI's solution based Analytical Laboratory we provide our national and international customers a broad range of analytical laboratory techniques, laboratory instrumentation and testing methods, to evaluate electronic assemblies, printed-circuit-boards (PCBs), printed-wiring-boards (PWBs) and electronic components. We provide important analysis information needed for failure analysis, trouble-shooting, research, quality control and many other requirements.

### ANALYTICAL LABORATORY SERVICES WOULD INCLUDE:

- Materials analysis
- Contamination testing
- Root cause failure analysis
- Quality control
- Product development
- Chemical testing
- Accelerated life testing

### WE WILL WORK CLOSELY WITH YOU TO:

- Define your objective
- Recommend specific testing methods and analyses protocol depending on the needs of the customer
- Provide high-quality results and analysis
- Define solutions based on analysis findings
- Obtain results in a timely fashion



### SOME EXAMPLES OF LABORATORY EQUIPMENT WE HAVE AVAILABLE TO US:

- SEM – Scanning Electron microscope; an imaging tool to evaluate samples at high magnification.
- EDS – Energy Dispersive Spectroscopy; to perform elemental analysis and detect any elements (carbon and above) on the periodic table of elements.
- X-ray; simulated 3D investigation of voiding, solder bridges, ball collapse, gold wire-bonds and plated-through-hole vias.
- FTIR – Fourier Transform InfraRed Spectroscopy; Organic contamination testing.
- Ion Chromatography; Quantitative analysis of anions/cations/weak organic acids on virgin PCBs and/or PWBs.
- Wetting balance testing; to determine wetting force of leaded and non-leaded components.
- XRF testing; to determine plating thickness of varying types of plating finishes currently found on printed-circuit-boards.
- Environmental testing; thermal shock testing, temperature/humidity testing, vibration testing and physical shock testing.

Our personnel are experienced professionals with the capabilities to assist customers with any of their analytical needs.





## TRAINING MATERIALS UPDATES/MIXED TECHNOLOGY KIT

BY: MEL PARRISH

It's springtime in Alabama and everything is awakening with the New Year and turning green. The events of last spring with the tornados that hit the Huntsville area are still with us and we all take the sirens seriously when the warnings go off. We are trusting that this year will be better, and safer for the Alabama folks as well as other areas of the Midwest.

Apex 2012 was a busy time for many of us that were in attendance. Key events were the work on a new Revision F for IPC-A-610 and J-STD-001. Additionally, IPC-6012 and IPC-A-600 are under revision. Typical cycle for most of these documents is about four to five years and if we look at the current IPC-A-610E the publication date is 2010. So somewhere around 2015 we should have a new publication complete and available for use. Any concerns or additions that you would like to see in the new version, now is the time to get them in for committee consideration. You can certainly send them to me or directly to IPC for inclusion in the considered comments.

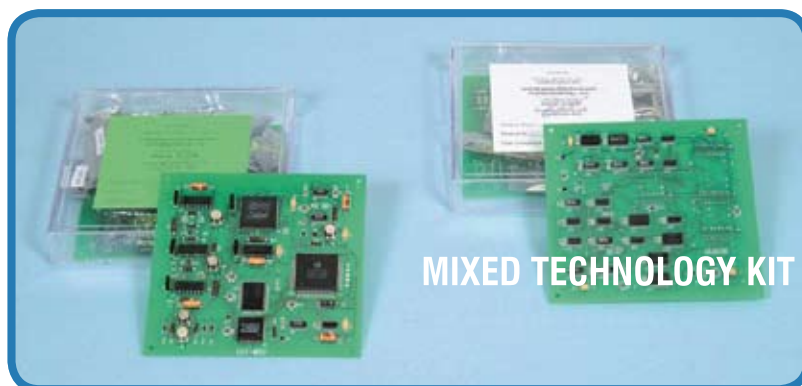
At long last the IPC-AJ-820A is released. The publication is titled "Assembly and Joining Handbook." As the title describes it is intended to be non regulatory in nature. It is a discussion of various topics covering the fabrication of Electronics from start to finish that reads like a textbook for Electronic Production. It is an accumulation of a great deal of information by various members of the IPC technical community and represents a significant effort and achievement that spans some 7-8 years in development. As I recall the revision was initiated around 2004-2005. The handbook does not directly support nor is it tied to another source document but should be on the reading/reference list for all of the industry populace. I have my copy! If you would like a copy please contact us here at STI.

After two exciting and eventful years I have turned over the gavel of TAEC Chair to the very capable hands of Doug Pauls. I hope Doug has a good time with the office and I'm very certain he will make the meetings much more exciting that mine. Barring any significant issues like production classification of hardware or voids in BGA attachments it should be fun. I will be continuing participation as a TAEC Member and General Chair for the IPC Product Assurance Committee.

Training meetings at APEX involved the 620 Cable and Harness program as well as the 7711 Rework and Repair. Significant discussion in the 7711 group was in support of an additional level of training involving Repair practices for electronics. Still in the talking stage we feel that there is a need for this additional level of training in selected industry segments such as military depot, warrantee and repair facilities. I'd like to have your thoughts.

Training Materials department here at STI is progressing well with the common training resources to support training programs. My favorite among these is the Mixed Technology Kit that has a very representative layout as well as a representative sampling of components that might well be experienced by employees in today's production environments. As always we are offering a discount of 10% with the mention of this article during the STI Newsletter release month. Get your request in as soon as possible.

Best regards,  
Mel



MIXED TECHNOLOGY KIT

## TRAINING MATERIALS



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## TRAINING COURSES IN CALIFORNIA, TEXAS AND OKLAHOMA

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OR E-MAIL US AT  
[TRAINING@STIELECTRONICSINC.COM](mailto:TRAINING@STIELECTRONICSINC.COM).

MONTH	DATE	CLASS	LOCATION
AUGUST	27-31	IPC J-STD-001 Certified IPC Application Specialist Recertification Program (Modules 1-5)	Houston, TX
SEPTEMBER	10-14	IPC J-STD-001 Certified IPC Trainer (CIT) Certification Program	Valencia, CA
	17-21	IPC J-STD-001 Certified IPC Application Specialist Recertification Program (Modules 1-5)	Broken Arrow, OK
OCTOBER	15-18	IPC-A-610 Certified IPC Trainer (CIT) Certification Program	Valencia, CA
NOVEMBER	12-16	IPC-7711/7721 Certified IPC Trainer (CIT) Certification Program	Valencia, CA

Note: 10% discount for multiple attendees.

### DIANA'S VIEW



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### DIANA BRADFORD, VICE PRESIDENT, OPERATIONS/TRAINING RESOURCES

STI prides itself on many things but one specifically that I would like to take a moment to share with you is the STI campus. As you all know, STI built a new facility 3 years ago because we were literally bursting at the seams in our previous location. We moved into the new building December 2009 and shortly thereafter hired Pablo Ortiz. Pablo was hired as a custodian and to handle any light maintenance as needed. Pablo is a great individual, a joy to work with and I have to say almost solely responsible for the building looking as new today as it did three years ago. No small feat considering the STI facility sits on approximately 7 acres and has approximately 54,000 square feet under roof not to mention the 60+ employees and a multitude of visitors that pass through the doors on a daily basis. STI visitors and customers are always commenting on how clean and neat everything appears. They are astounded

that we have been in the building as long as we have and we owe all the compliments and comments to Pablo. Pablo is a tremendous asset to STI and we look forward to many more years with him being part of the STI family.

Sincerely,  
Diana



**PABLO ORTIZ**