

The logo for sti electronics inc. features the word "sti" in a large, bold, blue sans-serif font. Above the dot of the "i" is a circular icon containing a stylized circuit board. To the right of "sti" is the word "NEWS" in a white, bold, sans-serif font. Below "sti" is a thin horizontal line, and below that is the word "electronics" in a smaller, white, sans-serif font, followed by "inc." with a registered trademark symbol.

# sti<sup>®</sup> NEWS

electronics<sup>inc.®</sup>

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## DAVE'S WORLD



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## DIVERSITY IS GOOD, RIGHT?

Saying STI is unique is a gross understatement. We provide a tremendous value and service doing a combination of things that no one else offers. We sell products and services from Work Benches to Failure Analysis, IPC Training Programs to Microelectronics Manufacturing Solutions (Clean Room), Training Materials to Highly Specialized/Custom Manufacturing, and Micro-Torque Tools to Dummy Components. We've invested heavily in people, equipment and structure to be the absolute best in all that we do. Having experts in each of the areas mentioned above is our core strength that allows us to provide engineered solutions to your needs and/or challenges. STI's diversity is what truly allows us to be "Your Total Solutions Partner", not only providing a product or service but a total solution to you and your organization. STI's diversity is also what allows us to outshine our competition in every way possible. However, many of our customers know us only as a training provider or distributor or possibly for failure analysis. Our challenge and goal is for all of our customers to be aware of STI's diversity and use it as a benefit and extension of their internal staff and capabilities.

To help our customers and the world recognize the diversity of our capabilities, STI has recently hired Harold Breen as our new corporate manager of Business Development and Sales. This is a new position for STI and we are excited to have Harold join our team in this capacity. Our outside sales staff, Brandon, Cliff, Jack and Jason are excited to have a multifaceted company at their disposal and will be sharing with you on their next visit to your facility how STI can help you meet your challenges with STI's solutions. Our inside sales team, Sissie, Dottie, Julia and Kelli with Sissie as manager, will still be providing the great customer service you've come to expect. Angela is still your inside contact for Engineering Services and Ann is still your primary contact for Training Services.

As with most organizations, the employees of STI are our greatest assets. By the time you read this, we will have 16 people that have been with STI more than 10 years and 2 more hitting that milestone in the next few months.

All have their unique talents that make them critical to the success of STI. I'd love to tell you about each of them (an entire newsletter??) but let me start with the two I work closest with and depend on the most, STI's two Vice Presidents, Diana Bradford and Mark McMeen.

Diana is our VP of Operations and Training Resources. Diana handles the day to day operations regarding people, facilities and IT in addition to training services (classes & lesson plans), training materials (kits & dummy parts) and anything I or anyone else can think to dump on her. She's also over inside sales and our warehouse staff. In all of her spare time from the above, she listens (or pretends) to all of my ideas and explains why 99% of them won't work (most of the time I've figured that out by the time I've said the idea out loud) and her toughest job is trying to make me seem smarter than I really am along with editing what I say and write to hopefully keep me out of jail. She also makes sure I show up in all the right places to take credit for the great things she, Mark, and others do. She's been at STI for almost 13 years.

Mark is our VP of Engineering Services. That means he handles all of our labs (manufacturing, analytical, failure analysis, and microelectronics) along with any other technical issues that arise from his or any other areas. With the addition of Harold to our staff, Mark now has the outside sales staff working for him through Harold. A quick rough calculation shows that the Engineering Services area has grown approximately 3,500% in the 10 years Mark has been on board. Mark is the one who helps me answer questions involving technical issues (or questions that just have big words and sound like they might be technical) and invites me to meet with customers but is always scared I might say something. He was smart enough when we designed the building to have his office a very long walk (and a security door) from mine but he still gets many of my bright ideas just like Diana.

Those two are the top of our team. It's rare that I have any kind of business conversation without mentioning at least one of the two and

STI would not be where it is without them.

Thank you for all of your support. It is very much appreciated. Let me know if there is anything STI (or I) can ever do to assist you. (I'll take it serious but don't be offended if I forward it to Diana or Mark.) Also, don't forget to follow us on Twitter ([www.twitter.com/](http://www.twitter.com/)

daveraby) or Facebook (STI Electronics).

*David E. Raby*

P.S. On a completely unrelated note, I too would like to thank Ron Artest's psychiatrist.

## IPC-A-610 AND J-STD-001 UPDATES

BY: PAT SCOTT

Starting in late August, STI's Training Services Department will be offering both the J-STD-001E and IPC-A-610E courses. STI has been fortunate to be the developer of these programs for the IPC. Although we develop the curriculum the IPC Training and Certification committees provide the guidance. Once the curriculum is developed Beta courses are conducted. The experienced committee chairs, MIT's and CIT's who attended these courses provide valuable input. This input is then used to update/correct the curriculum prior to print. The last Beta class, IPC-A-610E CIS Certification course was held in Madison, AL the first week of July.

So why choose STI as your training provider? STI's competitive pricing, experienced staff and continued involvement in industry associations set us apart. STI has been an IPC Training Center for many years:

TRAINING TYPE	SINCE
IPC-A-610 Training Center	1997
IPC-A-600 Training Center	1998
J-STD-001 Training Center	1999
IPC-7711/7721 Training Center	1999
IPC/WHMA -A -620 Training Center	2003

We are committed to maintaining a technical edge by attending and participating in the IPC Technical Committee meetings. We have also been instrumental in the development of the following curriculum for IPC:

- J-STD-001 (C, D & E)
- IPC-A-610 (D & E)
- IPC-7711/7721B
- IPC/WHMA-A-620

The instructor staff is comprised of 5 full time MITs/CITs that have a tremendous amount of experience. They are committed to offering the best quality training. We want our customers leaving a training class knowing that we have provided them with everything needed to be successful with their training initiatives at their home facilities.

For those of you who have attended classes at STI, we appreciate you choosing us as your training provider and we look forward to seeing you in future classes. Please feel free to call me at 256-705-5528 or e-mail at [psscott@stielectronicsinc.com](mailto:psscott@stielectronicsinc.com) if you have any questions or if you want a quote for on-site training.

## TRAINING SERVICES



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**[PSCOTT@STIELECTRONICSINC.COM](mailto:PSCOTT@STIELECTRONICSINC.COM)**

DATE	TRADE SHOW EVENT	LOCATION
August 16 - 19	Space and Missile Defense Conference and Exhibition	Von Braun Center Huntsville, AL
September 13 - 17	2010 National SBIR Beyond Phase II Conference and Technology Showcase	JW Marriot San Antonio Hill Country San Antonio, TX
October 24 - 28	SMTAI	Swan & Dolphin Resort - Orlando, FL
November 29 - December 2	DMC 2010	The Venetian - Las Vegas, NV
May 12, 2011	Huntsville SMTA Vendor Day	Von Braun Center - Huntsville, AL

## ENGINEERING LAB



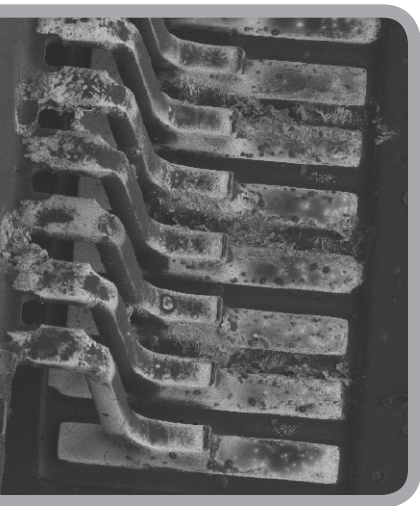
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## ACCELERATED SIR TEST PROTOCOL FOR HIGH-REL ELECTRONICS LIFE RELIABILITY TESTING BY: CASEY COOPER

STI's materials qualification test protocol utilizing a modification to standard SIR test procedures offers an accelerated method to qualify assembly materials and processes for high reliability (hi-rel) electronics hardware operating in harsh environments. The deadly combination of heat and moisture (humidity), electrical potential (voltage bias), and ionic contamination (residue) is enough to create electrochemical failures (dendritic growth), thus producing dielectric failure and current leakage – both of which result in degradation in performance, if not complete failure, of the electronics assembly.

Improper selection of assembly materials for the operating environment of hi-rel electronics hardware can result in field failure returns which are unacceptable for mission-critical/life-critical assemblies. These types of early life failures lead to high warranty reserves which affect long-term profitability. Therefore, comprehensive test protocols are necessary to ensure that the electronics hardware will meet performance requirements in all operating environments with the specified materials set. In order to meet time to market (TTM) objectives, manufacturing/process engineers need a low cost, quick-turn, and effective test protocol with which to screen materials for more comprehensive testing (expensive, long-lead time). With faster data sampling rates and a more aggressive test environment (moisture in addition to temperature cycling), STI's accelerated SIR test protocol is designed to provide just that with a cost-efficient, quick-turn evaluation of both assembly materials and manufacturing processes through industry standard SIR testing (captured every 24hrs) and STI's supplementary voltage monitor testing (captured every 60 seconds).

Application of a bias voltage and aggressive test environment conditions are utilized to intensify the effect of humidity and temperature cycling to determine if the assembly materials, e.g. conformal coating, and manufacturing processes, e.g. residues, will result in current leakage and/or dielectric breakdown between conductors. Due to the nature of electrochemical failure mechanisms such as metal migration and/or dendritic growth to form and then "blow" almost as quickly as they

were formed, test methods are used to capture and preserve these formations such as the addition of current limiting resistors and, perhaps most importantly, the increase in data sampling frequency as implemented in STI's accelerated SIR test protocol. Similar to standard SIR test protocols, insulation resistance measurements are logged at the end of each cycle (every 24 hours). However, voltage monitoring data (using the current limiting resistors) is sampled every 60 seconds --- a 20X improvement over standard SIR data capture rates --- thus providing greater opportunities to capture electrochemical degradation, i.e. dendritic growth. The increased data sampling rates better equip the manufacturing/process engineer with the necessary data to make materials and process parameter selections.

Because SIR test results are dependant on the design and manufacturing of the test vehicle, STI offers customized test board designs in addition to those available commercially from IPC and IEC. To accurately test and evaluate assembly materials and manufacturing processes using STI's accelerated test protocol, it is important to select a component set representative in package style (e.g. BGA, QFP, TSOP, SMD, etc), lead/pin count, and pitch in addition to substrate design (e.g. laminate, solder mask, conductor finish, conductor width/spacing, etc) as it is acknowledged in the electronics community that SIR data is dependant on the geometries and test patterns being evaluated. With years of experience in performing SIR, STI is well equipped to provide the recommendations and guidance to design and manufacture evaluation test vehicles. STI is also able to provide turn-key SIR test services, including test vehicle assembly services utilizing STI's contract manufacturing and prototype lab. STI stocks and distributes dummy components with internal daisy-chain patterns for use on custom or standard test vehicles.

As an ISO 9001:2008 certified laboratory, STI ensures the integrity of every test performed. Quality control is implemented through regular test equipment and environmental chamber maintenance and calibration. High-temperature, shielded cabling is used to minimize stray current leakage and EMI noise during testing. Chamber environments are monitored and recorded continuously

throughout the life of the test to ensure 100% conformance to the test protocol standards.

Once testing commences, STI provides daily cumulative SIR updates and voltage monitoring plots for quick comparison of multiple test samples and data assessment. SIR testing is performed in accordance with IPC-TM-650 by applying a test voltage (100V unless otherwise specified) and measuring the insulation resistance (Acceptable  $> 1 \times 10^8 \Omega$ ) between test patterns. Voltage monitoring data is logged via a data acquisition unit and reported through a multi-axis data plot of time (typically 24hr/test cycle), test environment, and insulation resistance (voltage drop across resistor) for each component/test pattern.

Selecting the right test protocol(s) is critical to fully characterize material sets and manufacturing process parameters. Selecting an accelerated test protocol, such as the Accelerated SIR Test Protocol devised by STI, enables engineers to quickly and efficiently evaluate the performance of the materials and/or manufacturing process parameters to prevent electrochemical failure mechanisms such as dielectric failure, current leakage, corrosion, metal migration, and/or dendritic growth. Faster evaluation test protocols translate to quicker time to market (TTM) and prevention of high warranty return rates of electronics hardware.

If you would like more information on STI's Accelerated SIR Test services, please contact Casey Cooper, Electrical Engineering Manager, at [ccooper@stielectronicsinc.com](mailto:ccooper@stielectronicsinc.com) or 256-705-5511.

## THE NEW GOLD STANDARD IN SOLDERING SYSTEMS

PACE has been dedicated to providing customers with the most cost-effective, productivity-enhancing solutions for all their soldering, rework, repair, training and application support needs. Now, in celebration of over 50 years of service to the electronics industry Pace proudly introduces the gold anniversary edition WJS 100 Soldering System.

The WJS 100 features all the advanced process control technology you have grown to expect from PACE but now with nearly twice the maximum power output to make easy work of your most challenging, high-thermal-mass or high-volume soldering applications.

Integral to the WJS 100 solution is a special range of gold-end tip-heater cartridges\* uniquely engineered to deliver maximum heat through-put to the work and increase productivity while allowing you to solder at safer, lower temperatures—even with lead-free solder.

The WJS 100 is fully programmable, loaded with features, and incorporates PACS's exclusive IntelliHeat™ Control Technology. The WJS 100 comes standard with a special anniversary edition of PACE's renowned TD-100 Thermo-Drive® Handpiece, considered by many to be the most comfortable soldering handle available. But don't take our word for it. Try one today!



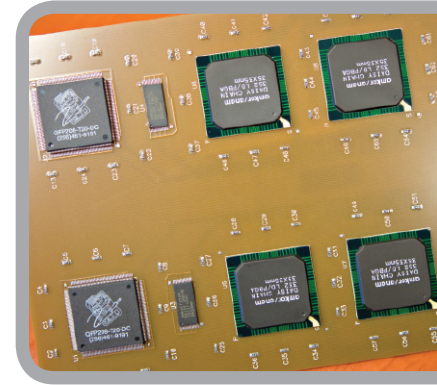
WJS100 System with TD100 Thermo Drive Soldering Handpiece and Standard Cubby  
Part# 8007-0558, Price Each \$329.00

### FEATURES

- PACE's Exclusive IntelliHeat™ Control Technology.
- Fully Programmable, digital processor, LED display and keypad.
- Password Lockout guarantees your process integrity.
- Temp Setback and Auto-Off helps to maximize tip life and saves on power costs.
- Definable Operating Temperature Range via "Hi" and "Lo" Setting.
- Nearly twice the maximum power output increases productivity at safer, lower temperatures—even on the heaviest loads.
- Lower Cost of Ownership

**To receive a quote or order your Pace System today (part number 710-8500) contact us at [sales@stielectronicsinc.com](mailto:sales@stielectronicsinc.com) or (800) 858-0604.**

## ENGINEERING LAB



## ELECTRONIC SALES & DISTRIBUTION



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## 2010 TRAINING SCHEDULE



### AUGUST/SEPTEMBER/OCTOBER 2010

MONTH	DATE	CLASS	LOCATION
August	9-10	IPC Rework/Repair and Modification Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	11-12	IPC/WHMA-A-620 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	16-20	IPC J-STD-001 Certified IPC Trainer (CIT) Certification Program	Madison, AL
	23-26	IPC-A-610 Certified IPC Trainer (CIT) Certification Program	Madison, AL
	30-31	IPC-A-610 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	30-03	IPC J-STD-001 Certified IPC Trainer (CIT) Certification Program	Madison, AL
September	01-02	IPC J-STD-001 Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	03	J-STD-001DS Update, Space Application Addendum to J-STD-001D	Madison, AL
	20-24	IPC Rework/Repair and Modification Certified IPC Trainer (CIT) Certification Program	Madison, AL
	27-30	IPC/WHMA-A-620 Certified IPC Trainer (CIT) Certification Program	Madison, AL
October	04-08	IPC J-STD-001 Certified IPC Trainer (CIT) Certification Program	Madison, AL
	11-12	IPC Rework/Repair and Modification Certified IPC Trainer (CIT) Recertification Program	Madison, AL
	11-14	IPC-A-610 Certified IPC Trainer (CIT) Certification Program	Madison, AL
	13-14	IPC/WHMA-A-620 Certified IPC Trainer (CIT) Recertification Program	Madison, AL

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).

## CHANGES IN THE J-STD-001E, CIT TRAINING MATERIALS

BY: MEL PARRISH

Brush up on your terminal soldering skills. During the last training meeting at APEX the committee recommended additional hand solder for terminals to be added for the 001E Beta training project. Historically the CIT students were only required to complete the Gold Cup and Turret terminals when they attended training. The requirements now include the gold cup, bifurcated, turret, and a choice of either the pierced or hook terminal. These are the five terminal types incorporated in the Operator Training (CISs) and the committee felt that the Instructors (CITs) needed to demonstrate their skill as well. With previous training editions, time was too constrained to include the other terminals.

Fortunately these requirements match the standard Operator Terminal Kit (405-1022 tin/lead and 405-1028 lead free) content which has five of each of the terminal types in addition to the wire necessary for skill development and evaluation. STI ensures that all of their suppliers adhere to strict fabricating and plating requirements. STI also sells gold cups, turret, bifurcated, pierced and hook terminals in bulk quantities in either tin/lead or lead free finishes. For a complete listing please go to our website [www.stielectronicsinc.com](http://www.stielectronicsinc.com) or request a copy of our catalog at [info@stielectronicsinc.com](mailto:info@stielectronicsinc.com).

**IPC-A-610E is published and in stock.**

**Some of the content changes for the revised standard are:**

- New flex circuitry criteria: flex stiffeners, soldering flex to flex, flex to PCBs, damage
- New SMT lead damage criteria
- Grouped component damage from installation with the component damage criteria in Chapter 9
- Expanded criteria for through-hole and SMT connector attachment
- Expanded press-fit pin criteria
- Major changes in lead-free criteria for hot tear and fillet lifting
- New criteria for depanelization, three-termination chip components and package on package

### J-STD-001E

There have also been upgrades in the companion document, J-STD-001E, Requirements for Soldered Electrical and Electronic Assemblies. It provides material and process requirements for producing soldered electrical and electronic assemblies, aiding those who set up manufacturing processes. Additional pages and 14 new photos help these specialists move into production quickly. Documents are on the shelf. Order yours today (part # 225-0001).

We have free component ID posters and Lead Free Sample Kits available. If you would like to receive either or both, send an email to [mparrish@stielectronicsinc.com](mailto:mparrish@stielectronicsinc.com) and include your complete mailing and contact information. The Lead Free Sample Kits cannot be sent to a PO Box or overseas location.

**Translations of the documents are underway and new Certification Training Programs are in development. Call us today to order your copy of the IPC-A-610E (part number 225-0003).**

### FEATURED KIT

Our featured kit for this edition is the **Mixed Technology Training Kit** (part # 405-1002 tin/lead or 405-1074 lead free). This is my favorite solder training kit. It has a realistic component layout across the board with a good component sampling to test and develop good soldering and inspection skills, for both SMT and Through Hole. Some companies have elected to have us create a custom kit using this board with great success. Mention this article and receive a 10% discount on your Mixed Kit project for orders placed in August or September.

## TRAINING MATERIALS



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## JIM'S CORNER



### JIM D. RABY, PE, TECHNICAL DIRECTOR

There are lots of things that one thinks of as they get older. Such as what papers are in what box, and which ones should you share and pass on to the young people that are to take your place in the workplace. The next question is deciding what to just throw away. As clean as one keeps their office and desk, they still have things that are important for those who are to follow.

In my case, I have passed on the photos that were in the first military and IPC specifications. Photography was not the best during those days but they are still historic files. The same is true with test data that began in 1958 to support Army and 1960 to support NASA specifications. I have kept that test data and used it through the 1960's and 70's to support such specifications as ABMA-PDS-1, NASA MSFC Proc 158, NPC-200-1, WS-6536 in addition to IPC-Std-815 which led to the existing IPC J-STD-001. Thankfully photography is better today and new photos have been taken and replaced the old photos that I had. The test data in most cases has never been re-done, and as a result in cases where my data was not popular, data and requirements were brought about by popular vote that appeased the crowd. I do not believe that

a requirement can be voted on. If test data supports a requirement then it must be a good requirement. I'll pass my old test data on to the people of STI's technical group in case they need background support. I think I will even ask them to update the data (in their spare time of course).

It is important that one also pass on the things that helped them to be successful in their days even if they were not job related. I have introduced my son David to fishing, which can reduce stress and give one some talking and/or bragging rights. He already plays golf and I had nothing to do with that. However, we did play thru the sprinkler system while we were at China Lake. It was quite an unpleasant surprise to learn that they used reclaimed water.

In writing this I must tell you that I'm not about to retire, but just thinking of the things that I must do before that time comes.

Jim D. Raby  
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