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DAVE'S WORLD



CONTACT INFORMATION:

DAVE RABY

PRESIDENT/CEO

DRABY@STIELECTRONICSINC.COM



CELEBRATING 30 YEARS BY: DAVE RABY

On December 3, 1982, Ronald Reagan was President of the United States, the prime interest rate was 11.50% (down from 20% a little over a year earlier), "Truly" by Lionel Ritchie was the #1 song in the US, and Cleveland, Ohio, proving itself to be ahead of the curve on global warming, recorded its highest ever December temperature reading of 77° F. Also on that date, paperwork was filed in Huntsville, Alabama to incorporate Soldering Technology International, Incorporated (later changed to STI Electronics, Inc.). Even though Mom & Dad were living in Ridgecrest, California at the time, I was living in Huntsville and Alabama was home so it seemed like the place to start. Dad & I had "real" jobs at the time so Mom ran the company while we worked part time. Dad became full time in late 1984 and I made the jump in early 1985 and as someone who must have been famous said one time, "the rest is history".

When we started, we didn't think about still being around 30 years later. It wasn't that we thought we'd fail, that never crossed our minds, we just had so many short term things we had to get done that thinking 30 years out was almost the same as a million. 30 years from today seems a little closer but still not quite real. It has been great watching the technology grow. If you were around then, you remember when 50 mils was considered fine pitch and you re-

member when through hole technology would be completely gone within 5 years. We had lead; we had Freon; and North America was pretty much an island, life was good. Watching (and participating in) the growth of the technology has been great but by far the best part has been the people we have worked with. ployees, customers, suppliers and the extremely important category of "others" have meant and continue to mean so much to all of us. We talk a lot about our industry being small group but it really is amazing how over the years how many people have moved between those categories. We've also lost many friends and we think of them regularly and are always reminded to cherish this time.

I always struggle writing a column like this because we look back and it sounds like our time is finished. It certainly isn't. The past 30 years have been great but they are our past. They've earned us a reputation and they've put us in position for the future but they guarantee nothing. 2012 by many measures has not been our best year but we are now much better positioned for the future than we have ever been. We added 13 talented people in 2012 and our customer base which has always been heavily military has become much more commercial and internationally oriented. The transition hasn't been as smooth or swift as I would have liked





CELEBRATING 30 YEARS (CONTINUED)

and we still aren't "there" yet but I'm really excited about where we are headed. If there is anything I've learned in 30 years it is this is a journey and "there" is a moving target that we may never reach but the continual pursuit puts us near where we need to be. I can't thank you enough for your support over the past 30 years and I hope you will join us for many more. As always, please let me know how we can serve you better.

Please follow us on twitter (@daveraby) or facebook (STI Electronics) for more up to date STI information.

I'm also starting a blog in the New Year that will be posted on our website. Think of it as a shorter but more frequent version of Dave's World that can be about what is going on at STI or in our industry or in our world. Updates will be sporadic so check STI's website often.

Thank you again for your support and I wish you a Merry Christmas and Happy Holiday Season.





INTRODUCING NEW INSTRUCTOR BY: PAT SCOTT

STI Electronics, Inc's Training Services Department, announces the employment of Kim Mason as its newest Instructor.



As a professional avionics technician, instructor and leader transitioning from the U.S. Navy, Kim is a highly motivated, dedicated and proven leader. He brings 20 years of honorable military service and is an expert in all aspects of aviation maintenance and curriculum development.

Kim is an experienced supervisor and trainer, and has specialized in quality assurance for the Navy. He also specializes in micro-miniature electronic repair and has taught courses on the subject for the Naval Aviation Technical Training Unit (2M). Kim currently is pursuing his FCC license for elements one and three, and has received numerous distinctive military awards.

Since joining STI Electronics in November 2012 Kim has obtained the following Instructor certifications:

- J-STD-001E CIT Certification
- IPC-A-610E CIT Certification
- IPC-7711/7721 CIT Certification
- IPC-A-600 CIT Certification
- IPC/WHMA-A-620 CIT Certification

STI is very fortunate to have Kim on our instructor staff.

Training News:

STI's 2013 Course Schedule Now Available. IPC/WHMA-A-620B CIT Certification Course Beta will be conducted January 21-24, 2013, at STI Electronics, Madison, AL.

IPC/WHMA-A-620B CIS Certification Beta will be conducted February 26-28, 2013, at STI Electronics, Madison, AL.

Note: To register for either of these courses visit our website at www.stielectronicsinc.com.

STI is pleased to feature the following article written by Ray Cirimele, Master IPC Trainer and Curriculum Developer.

Flux for Heat Transfer: Fact or Fiction?

Many times we accept things as true because

someone we trusted told us it was so. As an example, we may have some documents or work instructions that include the application of flux for the component removal processes. Someone may have told us that the use of flux "assists in the transfer of heat from the heat source to the item being soldered". At some point in our lives many of us were told of the existence of a jolly fat man with a white beard who would

TRAINING SERVICES



CONTACT INFORMATION:
PAT SCOTT
DIRECTOR OF TRAINING SERVICES
256-705-5528
PSCOTT@STIELECTRONICSINC.COM

TO VIEW OUR SCHEDULE OR TO FIND A CLASS NEAR YOU GO TO STI'S 2013 TRAINING SCHEDULE







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

deliver toys to us if we were good children. Just as with the jolly fat man, there comes a time in our lives when we question the validity of claims that we previously accepted as truth.

This article will attempt to provide a logical dissention from the previously held assumption that flux aids in the transfer of heat during the hand soldering operation. The physical characteristics of flux will be examined to determine if the statement "flux aids in heat transfer" is fact or fiction.

To create an acceptable solder connection, we need to be able to heat all components (land, solder, and termination) to a temperature high enough to allow solder to flow and wet the surfaces creating an intermetallic bond. In hand soldering operations this has normally been accomplished by a heat (or solder) bridge. Of course, even when selecting a soldering iron tip with the largest surface area possible for the junction of the materials to be soldered, the heat transfer point can be greatly increased in surface area by the addition of another media (solder) at the bridge point. A properly formed heat bridge can double the contact area between the iron tip and the materials to be soldered which will allow for the heat of the soldering iron to be transferred to the connection more quickly and efficiently. If soldering iron tips were made of some type of "spongy" material that would conform to all the shapes of the connection area, it would eliminate the need for a heat bridge. In the meantime, it is necessary to continue to use a heat bridge to ensure proper transfer of heat.

Just as there are materials that are good electrical conductors and poor electrical conductors, there are also materials that are good thermal conductors and some that are poor thermal conductors. It just so happens that most metals that are good electrical conductors are also good thermal conductors. The unit of measurement for thermal conductivity is W/(m·K) (watts per kelvin-meter). The thermal conductivity of Sn63Pb37 solder is approximately 50 W/(m·K). The thermal conductivity of SAC305 solder is

approximately 60 W/(m·K). The thermal conductivity of flux is a little more difficult to nail down. This is because there are a huge variety of fluxes on the market in many different compositions. If a standard low residue (no-clean) flux is evaluated, the carrier component (typically alcohol) makes up anywhere from 95% to 98% of the liquid flux. This leaves room for a few percent flux solids. Those solids are usually some type of Weak Organic Acid (WOA) and some other "magic" ingredients. Knowing this makes it easy to look up the thermal conductivity of the individual components of a typical low residue flux. The thermal conductivity of the alcohol is 0.17 W/(m·K). Most acids fall well below the 1.00 W/(m·K) level for thermal conductivity. It appears that flux has almost no significant thermal conductivity. Even if the alcohol carrier had a much greater thermal conductivity, it has evaporated long before the soldering iron tip actually gets to make contact with the elements of the connection.

SUMMARY

While flux is an essential component for obtaining an acceptable solder connection, it does not seem to be up to the task of aiding in the transfer of heat as well as solder does. What does this mean? Use solder for a heat bridge, not flux. Use flux to obtain good wetting. Flux does remove surface oxides and these oxides are poor thermal conductors. In cases of badly oxidized surfaces, the flux will removes the oxides which will allow the heat bridge to work. There will still be some readers out there who will not let go of long held beliefs without additional evidence. For those people, keep waiting by the chimney on December 25th.

Thanks for taking the time to read this article. We'll be featuring other articles from different instructors this next year.

Happy Holiday!







NEW STI BGA AND FINE PITCH PROCESS AND TRAINING KITS BY: MEL PARRISH

All of the STI BGA Kits are NEW. Due to obsolescence of some BGA component types that were used in the BGA Kits, we used the opportunity to expand and update all of our BGA kits. The new kits add additional component types such as MLF and QFN components on a BGA package side. In addition the kits are upgraded for QFP components types and they incorporate smaller 01005 capacitor and resistor chips. The board finish is now ENIG eliminating planarity issues common with HASL finish boards and fine pitch components. Our boards were proofed by the STI Training Services staff for component fit and location with excellent results. To receive additional information and a list of the components on the all new STI BGA Kits, please contact Mel Parrish in the STI Training Materials Department.

STI Training Materials has a policy of same day shipping with the exception of custom kits and very large orders. However, we recently experienced delays in delivery of assembled 7711 boards required for Rework Repair Training Kits. For those impacted by this delay, we certainly apologize but our assembled board production is up to full speed now. Again, please accept my apologies for any delay you may have experi-

enced and please be assured that this has been corrected for future reference.

Remember you can place your orders for STI Training Materials on line from our web site. www.stielectronicsinc.com or contact your friendly STI Customer Service Representative toll free at 800-858-0604.

The 2012 holiday season is rapidly approaching once again. Reflecting on the past year, we are truly blessed with many dear friends in the electronics industry. We hope to maintain that approach to business and please let us know if there is anything that we can do to support you in your training efforts. Please accept our wishes for a blessed and festive family filled Christmas season.



TRAINING MATERIALS



CONTACT INFORMATION:
MEL PARRISH
DIRECTOR OF TRAINING MATERIALS
256-705-5530
MPARRISH@STIELECTRONICSINC.COM

2012 YEAR END REVIEW- ENGINEERING / MANUFACTURING DEPARTMENT BY: MARK MCMEEN

STI Electronics, Inc. Engineering / Manufacturing Division has added lots of new capabilities and services in 2012 with a number of firsts. In the manufacturing lab - AJ Orames and staff have doubled our test and integration and box build work cells for a couple of new customers. Also, the analytical lab is on pace for a good year sales wise and have added vibration testing to their capability and service offerings. If you need vibration testing in 2013 call Marietta Lemieux for a competitive quote. Design Engineering - Casey Cooper and staff have been busy this year helping customers with their board layouts and component selections on new designs to meet form fit and function. And last but not least the Microelectronics Lab has performed a couple new development contracts utilizing the class 1000 cleanroom and equipment sets. All in all, STI had a good year in view of all the financial uncertainty and global slowdown experienced in 2012. We look forward to a better 2013 as the uncertainty on both U.S.

and global economic outlook and performance improves.

There has been lots of uncertainty in the U.S. markets and a general slowdown globally but we continue to be optimistic as we continue to expand our capabilities in manufacturing of electronic assemblies as well as microelectronic assemblies. STI Engineering / Manufacturing is positioning itself for continued growth by offering greater capacity and monthly volume output as well as offering better engineering solutions for our customer base. Growth is about expanding ones capability and quality and STI is making the financial commitments necessary to grow our customer base with better manufacturing capabilities. We look forward to 2013 and the opportunity to show off our new equipment sets and new process improvements. We appreciate the support over the years and we look forward to meeting your expectations of the future.

ENGINEERING SERVICES



MARK MCMEEN

VP OF ENGINEERING

256-705-5515

MMCMEEN@STIELECTRONICSINC.COM



2012 YEAR END REVIEW- ENGINEERING / MANUFACTURING DEPARTMENT (CONTINUED)

Thanks again for a good 2012 and we look forward to serving your needs in 2013 and showing off our new capabilities. Please feel free to call and come by and see how our staff and departments can better serve your needs in 2013. Each of our Department Managers and their staff members are here to serve your needs because we believe in the slogan: Service and Quality is long remembered after price is forgotten. We want to be remembered for excellent customer service and providing the right prod-

uct everytime. SEE YOU IN 2013 AND THANKS FOR SUPPORTING STI ELECTRONICS.

mmcmeen@stielectronicsinc.com or 256-705-

Mark McMeen Vice President Engineering & Manufacturing Services Please email if you have any questions or comments to Mark McMeen (V.P. of Engineering)

MICROELECTRONICS LAB



CONTACT INFORMATION:
CASEY H. COOPER
ELECTRICAL ENGINEERING MANAGER
256-705-5511
CCOOPER@STIELECTRONICSINC.COM

STI'S IC/DT® PACKAGING TECHNOLOGY BY: CASEY H. COOPER

Throughout this year, we discussed STI's capabilities to support the packaging design, assembly process development, and manufacturing of advanced microelectronic assemblies within STI's ISO Class 6 (Class 1,000) cleanroom facility. This article will delineate the design methodology and packaging process of STI's patented packaging technology that was developed to address current design limitations that are driven not by circuit design capabilities but by an inability to reliably package these circuits within the space constraints and meet key performance requirements.

As system designers continue to integrate more capabilities into a single system, packaging engineers are tasked with the responsibility to ensure reliable electrical, mechanical, and thermal performance in the fielded environment. Innovative packaging techniques are required in order to meet the increasing form, fit, and function requirements of this industry without compromising reliability and robustness. One type of such packaging technology integrates bare die of both actives and passives into package designs such as a Multichip Module (MCM), System-in-Package (SiP), Chip-on-Board (COB), Wafer Level Packaging (WLP), and/or Integrated Passive Devices (IPD). However, STI developed and patented an emerging systemlevel packaging technology coined Imbedded Component/Die Technology (IC/DT®), which imbeds actives and passives in cavities within the printed circuit board (PCB) to achieve high reliability within the smallest form and fit package obtainable.

STI's IC/DT® Packaging Technology

STI developed its patented packaging technology, Imbedded Component/Die Technology (IC/DT®), to integrate multiple subsystems within an electronics assembly into a single, advanced, high-density assembly. IC/DT® enables the manufacturing and assembly of smaller, lighter, and more technologically advanced high density CCAs through imbedding unpackaged components in a 3-D laminate substrate with integrated thermal management. STI's IC/ DT® packaging approach addresses miniaturization, thermal management, performance, reliability, and system capability requirements through innovative design guidelines and materials selection in order to meet form, fit, and function requirements.

Miniaturization and weight reduction required for electronics systems is achieved as IC/DT® utilizes unpackaged components for design with the smallest form and fit factor available. Component geometries can be reduced up to 85% through the removal of external lead frames, package substrates, and overmold encapsulants. Imbedded device types include bare die (face-up), bumped die or flip chip (face-down), thin film passives, and thick film passives. Multiple device types can be imbedded within the same cavity to integrate complex circuits with high performance requirements. This advanced capability enables the integration of multiple subsystems, such as integrating daughter cards into a motherboard CCA within the current CCA form factor, and leads to reductions in pitch between CCAs in the chassis.



STI'S IC/DT® PACKAGING TECHNOLOGY (CONTINUED)

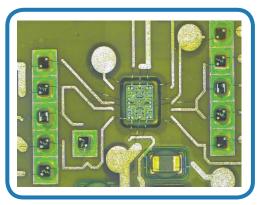
Very flexible light-weight interconnects, wire bonds, are utilized during operation in demanding thermal and mechanical environments such as high temperature, vibration, and/or mechanical shock. A mass savings is achieved by using wire bonds rather than solder because of the decreased volume of material per connection, as well as the lower density of standard wire bond materials compared to eutectic (Sn63/Pb37) solder. In addition to a mass savings, the IC/DT® concept distributes the applied stress in contrast to a soldered connection, which localizes the applied stress, producing a more robust and rugged electronics assembly for reliable use in harsh environments.

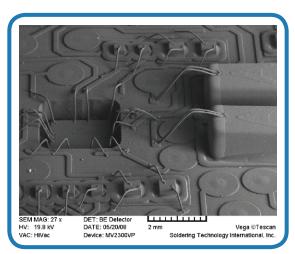
Conventionally, a high power CCA would dissipate heat through convection or radiation from the component and substrate surfaces, often including package-level heat sinks or cooling fans. However, advanced applications inhibit the use of active cooling devices such as large, finned heat sinks and fans. Therefore, IC/DT®

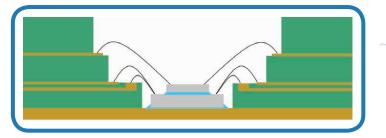
provides a solution through relying on passive cooling via conduction from the backside of the bare die to a single, central cooling core to remove heat from high power devices and to evenly distribute the thermal energy along the interface. Through creative thermal management, die junction temperatures (TJ) are reduced which increases the performance and longevity of the electronic components and further increases system-level reliability.

IC/DT® improves long-term signal reliability by eliminating unnecessary failure opportunities and utilizing reliable electrical interconnects. All first level component packaging is eliminated thus reducing two to four possible modes of electrical failures associated with component-level packaging. Through multiple subsystem integration, failure-prone connectors and wiring assemblies are eliminated which lead to an increase in long-term reliability of the electronics system.









SALES PURITAN AND PURSWAB PRODUCT INTRODUCTION BY: KELLI S. KING



CONTACT INFORMATION:

KELLI KING

INSIDE SALES MANAGER

256-705-5541

SALES@STIELECTRONICSINC.COM



COUNT ON PURITAN® AND PURSWAB® PRODUCTS TO DELIVER EXACTLY WHAT YOU NEED.

See below for an overview of Puritan's and PurSwab's wide array of product categories. If you don't see the applicator you need, please contact us, and we'll custom-design one to meet your requirements.



Puritan



Puritan uses only cotton grown in the U.S. We card and coil our own high-quality, USP-grade cotton fiber to ensure consistency of the formed cotton tip on each and every applicator. Select from a variety of applicator sizes, tip shapes, and shaft materials to meet medical and diagnostic needs. Our non-sterile products are available in autoclayable bags for sterile applications.

POLYESTER-TIPPED APPLICATORS

Synthetic applicator tips are made of medical-grade polyester that we card ourselves. They're non-absorbent and contain no fatty acids or latent sugars, making them ideal in laboratory settings and for inclusion in many diagnostic kits.

RAYON-TIPPED APPLICATORS

Ideal for diagnostic specimen collection, wound treatment, and application of medicines. Tips are made from the finest USP grades of rayon fiber, which we card in our Guilford facility.

CALGISWAB® CALCIUM ALGINATE-TIPPED APPLICATORS

These speciality applicators are tipped with calcium alginate fiber, an organic material derived from seaweed, carded in Puritan's facility to assure conformance with medical device specifications. Calgiswab applicators are available in a variety of tip sizes and shaft materials and dimensions. Commonly used for specimen collection in pediatrics, E.N.T., asymptomatic GC, public health microbiology, ophthalmology, food pathology, and other areas where fine tips, flexible shafts, or biodegradable fibers are desirable.

FOAM-TIPPED APPLICATORS

These sterile applicators are ideal for a variety of clinical and DNA applications. Tips are made of medical-grade foam. Available in a range of shapes and shaft materials.

WOUND MEASUREMENT DEVICES

The soft foam-tipped applicator is flexible to conform to wound shape and features a metric rule for easy measuring. Perfect for forensics, emergency rooms, long-term care, and more. Available in sterile or non-sterile.

POPULE® SELF-SATURATING SWABS

Only Puritan can offer you the convenience of swab and solution in one neat unit — and it's non-glass for safety. Specify one of our standard solutions or let us know what you need. Our Popules can be filled with virtually any type of liquid.

TRANSPORT TUBE AND CAP-SHURE® APPLICATORS

Each of our transport tube applicators has a sterile, rigid tube that protects the swab and keeps it dry before and after sampling, plus there's a label on the tube for easy identification. The swab can be secured in the handle end or simply placed in the tube. Polyester-tipped applicators in transport tubes are available in single and double packs, and foam-tipped applicators are available in single packs. Other fibers can be custom ordered.

Our cotton-tipped Cap-Shure applicators are well-suited for forensic or clinical use. The Cap-Shure swab comes with either a wooden or plastic handle. The aerated cap allows the sample to air dry and protects it from contamination. It's ideal for collecting minute samples at crime scenes or for use as a buccal swab anytime PCR will be used.

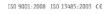
TONGUE DEPRESSORS

Puritan tongue depressors come in plain, wrapped, flavored, and sterile styles. Tongue depressors can serve many functions, from a clinical diagnostic aid to a stirrer for liquid medicines. Customized imprinting and packaging available for some styles.



[see other side for additional products]

Phone: 800-858-0604
electronics Web: www.stielectronicsinc.com





PURITAN AND PURSWAB PRODUCT INTRODUCTION (CONTINUED)





Choose the right size and shape for your applications. Utilize for specimen transfer, as mixing rods, for laboratory applications, and other general-purpose functions. Made with straight-cut ends.

CUTICLE/ORANGE STICKS

Single- and double-bevel ends offer plenty of choices to suit a variety of needs. Excellent for long-term care an opdiatry practices. Good as an all-purpose stick in most types of clinical, diagnostic, and forensic settings, as well as electronics and beauty applications.

MEDICAL SPOONS

Count on the consistent quality of our medical spoons. Excellent as an aid in dispensing wet medication mixtures. Also very useful for general purposes in healthcare and industrial environments.

CYTOLOGY COLLECTION DEVICES

Puritan cytology products are made to maximize cell collection, while enhancing patient comfort. The Puritan CerviSoft* offers gentle specimen sampling for Pap smear tests.

OB/GYN AND PROCTOSCOPIC APPLICATORS

No one has a more complete line of standard and specialty applicators than Puritan. Count on our OB/GYN and proctoscopic applicators for consistent quality and dependable performance.

CERVICAL SCRAPERS

For many years, healthcare professionals have been relying on Puritan for standard wooden cell collection devices, such as cervical scrapers. Along with our more recently developed cytology collection devices, we offer the clinician a complete line of single-use wooden products.



MICROFIBER-TIPPED APPLICATORS

Soft, finely woven, lint-free microfiber cloth effectively traps small particles and is low in NVRs. The twisted pole tip, specifically designed for fiber optics, is thermally affixed to the shaft without contaminating adhesives and can be easily spun during the cleaning process. Microfiber is excellent for optics and lenses.

POLYESTER-TIPPED APPLICATORS

Non-abrasive, lint-free polyester provides good wearresistance. These applicators can be used with deionized water, isopropyl alcohol, or solvents. Our laundered polyester is low in NVRs and particle generation.

FOAM-TIPPED APPLICATORS

Soft, lint-free foam tips feature reticulated open cells for superior entrapment of small particles. Most styles are thermally bonded to the shaft, using no contaminating adhesives. Our new glass-filled polypropylene handles provide extra rigidity.

Be sure to visit www.puritanmedproducts.com for detailed information about the Puritan, PurSwab and PurFlock lines of products. For pricing or to place an order, please contact your distributor or call Puritan at 800-321-2313.







FLOCK TIPPED APPLICATORS

Used to collect cell samples, the tips are comprised of Medical-Grade fibers and are currently available in standard, mini, and ultra-fine tip sizes, sterile and non-sterile versions. Plus, you can quickly snap off the tips using our scored handles. Best of all, our flocked swabs carry the same quality you've come to expect when purchasing Puritan products.



Puritan Medical Products Company LLC, Guilford, Maine 04443-0149 USA An affiliate of Hardwood Products Company LLC

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Phone: 800-858-0604 Fax: 888-650-3006

Hours: Monday - Friday 7 am-5 pm CST

Mail: STI Electronics, Inc.

261 Palmer Rd Madison, AL 35758

Email: sales@stielectronicsinc.com Web: www.stielectronicsinc.com

S10 STI 10/12



For the sake of the trees, STI newsletters will all be issued in electronic format only. To sign up for the newsletter, updates and information from STI, send your email address to info@stielectronicsinc.com or go to our web site at www.stielectronicsinc.com to opt in to our database.

ANALYTICAL LAB



CONTACT INFORMATION:

MARIETTA LEMIEUX
ANALYTICAL LAB MANAGER
256-705-5531
MLEMIEUX@STIELECTRONICSINC.COM

EOS / ELECTRICAL OVER-STRESS BY: MARIETTA LEMIEUX

Electrical Over-Stress (EOS)

EOS / electrical over-stress, is caused by a voltage spike applied to the system that causes damage at the component or board level, resulting in component or hardware failure.

Unlike Electrostatic Discharge / ESD, EOS is caused by connection to a signal source, load, power supply or other circuitry that creates the voltage/current condition. Such an event usually lasts from microseconds to seconds, while ESD occurs within pico- to nanoseconds. The damage as a result of EOS is typically not visible at the external package level because the damage will occur at the transistor level / die level.

Failures as a result of EOS can be classified as thermally-induced, electromigration-related and electric field-related failures.

Signs of EOS include:

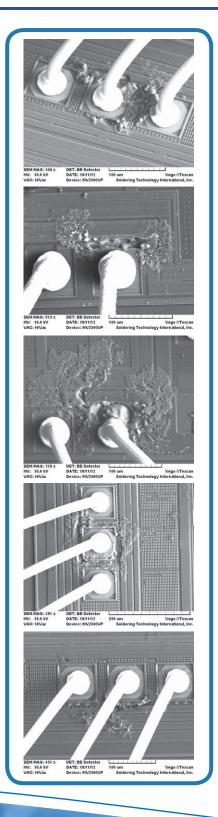
- Blown metal lines thermal damage
- Molten damage high power consumption
- Electrostatic Discharge (ESD) is a subset of EOS – the impact is similar to blown metal lines

Example of causes of EOS:

- Incorrect power source, orientation or voltage can cause a surge too large for the hardware to handle
- Improper handling of electronic hardware which can lead to electrical degradation
- Presence of excessive moisture, which can result in electrical leakage and result in shorts
- Hi-pot testing can cause EOS through surges and power spikes while testing

Ways to prevent EOS:

- Properly setup power systems prior to connecting hardware
- Use of proper ESD measures
- Properly prepare work areas of conductive surfaces
- Ensure work areas are moisture-free







DIANA BRADFORD

VICE PRESIDENT, OPERATIONS/TRAINING RESOURCES

As 2012 comes to a close, I want to take a few moments and thank all of our customers, vendors, employees and friends for a wonderful year. Yes, we experienced challenges just as everyone else did but we are blessed and look forward to a great 2013. As always, STI is constantly looking for ways to improve and better serve our industry and customers. Any ideas, suggestions and/or comments are greatly appreciated and given the utmost consideration.

I want to take a moment and focus the rest of this article on STI's world-renown Training Services Department. The leadership, support staff and instructors are the absolute best in the industry. Whether you are looking for an IPC CIT (instructor) or CIS (operator/inspector) class for IPC-A-610, J-STD-001, IPC-A-600, IPC-7711/7721 or IPC/WHMA-620, STI is the place to go. Who better to train you or your employees than the people respon-

sible for writing the curriculum? STI is also well known for customizing classes to fit a particular customer's request or needs. Custom classes can be traditional classroom lecture and lab or on-line courses designed to be administered through a corporate intranet. STI teaches more than 50% of its classes on the road or outside of our Madison, AL facility and this trend will continue to increase throughout 2013.

As you can see, STI has a well-rounded menu of choices in regards to your training needs and the best instructors and staff in the world. Contact us for a competitive quote or to discuss a needs assessment for your organization. We look forward to hearing from you soon.

Diana Bradford Vice President dbradford@stielectronicsinc.com

DIANA'S VIEW



CONTACT INFORMATION:
DIANA BRADFORD
VICE PRESIDENT, OPERATIONS/
TRAINING RESOURCES
DBRADFORD@STIELECTRONICSINC.COM



TOM BORMAN



RAY CIRIMELE



ANN DUNCAN



JULIO ESTRADA



FRANK HONYOTSKI



KIM MASON



MICHELLE MORRING



PAT SCOTT



261 Palmer Road Madison, AL 35758 Phone: (256) 461-9191 Fax: (256) 461-9566

Greetings of the Season

and

Best Wishes for

the New Year!





STI is a Resource for Training Services, Training Materials, Engineering Services, and Product Distribution. Visit www.stielectronicsinc.com