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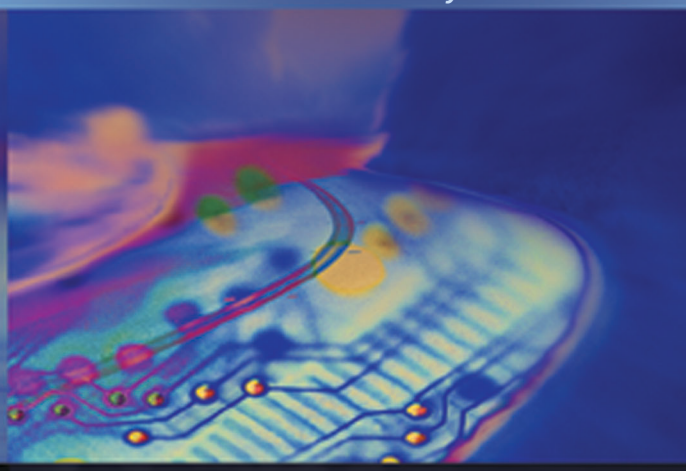
sti electronics

"Woman Owned Small Business"

Volume 6, Issue 2

February 2007



Celebrating 25 Years 1982-2007

inside this issue:

Dave's World

It is always an exciting time as we start a new year and with this one being our 25th, we're working hard to make sure it is really something special. 2006 was a good year with record sales in every department, a new patent, and 5 new employees giving us more capabilities heading into the future. Tom Borman joined us mid-year as an instructor and has done a great job fitting into our team of Trainers. David Robinson joined our Microelectronics Lab and has done an excellent job. David's photo was on the front page of *The Huntsville Times* business section recently in an article about STI. (If you ask, he probably still has some autographed copies available.) Hira Sutradhar, Joel Zarrow, and Pam Whalen have all joined the Manufacturing Lab with Hira and Joel comprising our 2nd Shift and Pam being responsible for inventory. All are doing a fine job and allowing us to continue to grow.

Personally, it was a great year as everyone in the Raby family was healthy from my 9 year old daughter to my very young wife to my 93 year old grandmother. Thanks for all your inquiries regarding my father Jim. He continues to work as much as he wants to and is spending a good deal of time traveling with my mother Ellen. We did lose one member of our family last year when Bud, our 16 year old Yorkshire terrier, died on election night. (You might have noticed that there was not a Dave's World in the previous issue of our newsletter and because of that you missed an excellent article entitled "Nancy Pelosi killed my dog.")

We've already started 2007 with a celebration of Mike Gainey's 10th Anniversary at STI. Mike is now our Vice President of Sales but when he started he was our single employee for the distribution department. For the first few months our only product line was Hakko. Mike would go out and solicit Hakko orders (nothing else), come back to the office and order the products, receive the products, ship the products, and type the invoice. Luckily, he did that enough that we eventually picked up additional product lines (now 100+) and additional people (now 12). I know I was around in those days but can't actually think of anything I did to help. Probably just complained about having too much inventory. As the beginning of an STI tradition, in honor of Mike's 10th Anniversary, he and his wife Jennifer were presented with a cruise.

What's going to happen in 2007? I wish I were smart enough to know. I believe collectively we'll have a good year and our job at STI is to help make sure you have a great one. Please let us know how we can help.

David E. Raby
President/CEO
draby@stielectronicsinc.com

David Raby presenting Mike Gainey with a cruise for 10 years of service

Training Services 2007: Schedule

Madison Alabama

IPC OFFICIAL CERTIFICATION CENTER
ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®

Ann Duncan
Training Coordinator

February

- **February 05-09** — **IPC Rework/Repair and Modification Certified IPC Trainer (CIT) Certification**
- **February 12-15** — **IPC/WHMA-A-620 CIT Certification**
- **February 12-16** — **MSFC/NASA 8739.4 Operator/Inspector Cable/Harness Certification**
- **February 20-21** — **IPC-A-610 CIT Recertification**
- **February 22-23** — **IPC J-STD-001 CIT Recertification**

March

- **March 05-08** — **IPC-A-610 CIT Certification**
- **March 05-09** — **IPC J-STD-001 Certified IPC Specialist (CIS) Certification**
- **March 12-16** — **IPC J-STD-001 CIT Certification**
- **March 19-20** — **IPC Rework/Repair and Modification CIT Recertification**
- **March 26-29** — **MSFC/NASA 8739.1 Operator/Inspector Staking and Conformal Coating Certification**

To register for a course or for additional information go to www.stielectronicsinc.com or e-mail us at training@stielectronicsinc.com.

Training Services

Happy New Year !

By: Dan Foster, Director of Training Services

Dan Foster

Happy New Year from Training Services. We are all very excited about this new year and all that it will bring. Here are a few things that are coming in the near future. We are getting ready in February to teach the new IPC/WHMA-A-620A Requirements and Acceptance for Cable and Wire Harness Assemblies courses. I personally am working on the next revision to the IPC-7711/7721 Rework Repair and Modifications Documents. These projects and some others are all in an effort to better serve you our customer. If you have any suggestions on other courses you would like to see us offer please contact me at dfoster@stielectronicsinc.com. I hope this year brings you health, happiness and prosperity.

To receive future issues of STI's newsletter electronically, please go to www.stielectronicsinc.com.

Engineering Services: Analytical Techniques to Identify Unexpected Contaminants on Electronic Assemblies

By: Kristi Freeman, Analytical Chemist

Kristi Freeman

The presence of unexpected particulate or contaminants on an electronic assembly or its constituents can have detrimental affects on the functionality and/or long term reliability of the electronic system. It is critical that such contaminants be quickly isolated and identified so that possible sources can be traced and corrective actions applied to the process.

STI's Analytical Lab has a wide range of microscopic and analytical equipment available for the analysis of particulate and/or amorphous contaminants, including:

- Ion Chromatography (IC)
- Scanning Electron Microscopy with Energy Dispersive Spectroscopy capability (SEM/EDS)
- Fourier Transform-Infrared Spectroscopy (FTIR)

Ion Chromatography

Ion Chromatography is performed in accordance with IPC-TM-650, Method 2.3.28, "Ionic Analysis of Circuit Boards, Ion Chromatography Method". IC testing is able to detect and quantify cations, anions and weak organic acids to a high degree of accuracy, even when present in small amounts. IC testing is non-destructive in most cases. STI's recommendations for ionic contamination levels are given in Table 1. In addition to the ions listed, fluoride, malate, calcium, and magnesium can also be detected.

Anions	Washed Samples	No Clean Samples
Chloride	<6	<3-5
Nitrite	<3	<3
Sulfate	<3	<3
Bromide	<10	<10
Nitrate	<3	<3
Phosphate	<3	<3
Weak Organic Acids	**Washed Samples**	**No Clean Samples**
Acetate	<3	<3
Formate	<3	<3
MSA, Adipic, Succinic	Total< 25	<125
Cations	**Washed Samples**	**No Clean Samples**
Lithium	<3	<3
Sodium	<3	<3
Ammonium	<3	<3
Potassium	<3	<3

Table 1 – STI recommendations for ionic contamination levels in µg of ion per in^2 of surface area.

Continued on next page

Engineering Services: Analytical Techniques to Identify Unexpected Contaminants on Electronic Assemblies

By: Kristi Freeman, Analytical Chemist

SEM/EDS

EDS analysis provides an elemental analysis of unknown contamination. This is often a useful first step in identifying the contamination. EDS can identify the elements present and the relative concentration by weight of each element. This analysis will indicate if the contaminate is metallic, a metal oxide, or an organic substance. Metals and metal oxides can usually be identified using only EDS, while organic substances undergo further testing using FTIR. An example EDS spectra is shown in Figures 1 and 2.

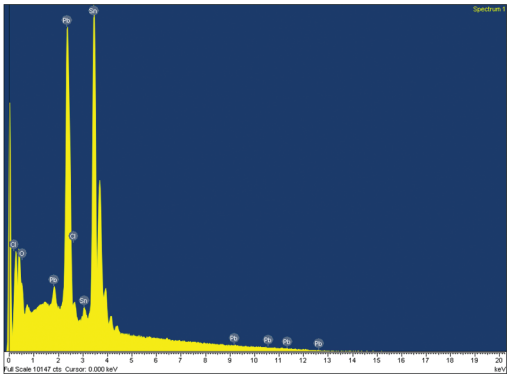


Figure 1 - EDS Spectrum showing elemental composition of a sample (metallic)

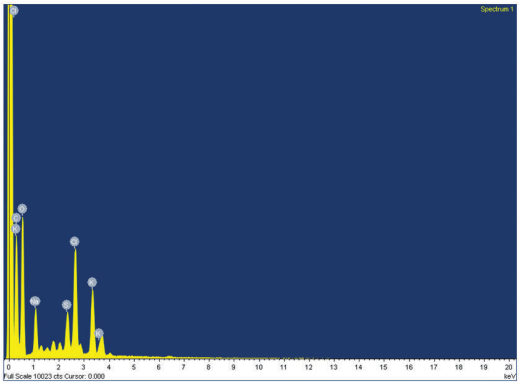


Figure 2 - EDS Spectrum showing elemental composition of a sample (Organic)

FTIR

While IC will give quantitative information on cleanliness, FTIR provides qualitative information on visible organic contamination. FTIR is also generally non-destructive. For FTIR testing, a spectrum is obtained of the unknown substance, and is then referenced against a database of spectra from known substances. An example is shown in Figure 3. Most of the time the comparison will give at least a general match (example - a flux, a cleaner, etc.) but often a much more specific match can be made (example – no clean flux, water soluble flux). Occasionally the contamination can even be matched to a specific brand and number of flux or cleaner. The unknown substance can also be compared to materials used on the PCB during the assembly process or to other materials used in the facility. This will often provide a definitive match that conclusively identifies the contamination.

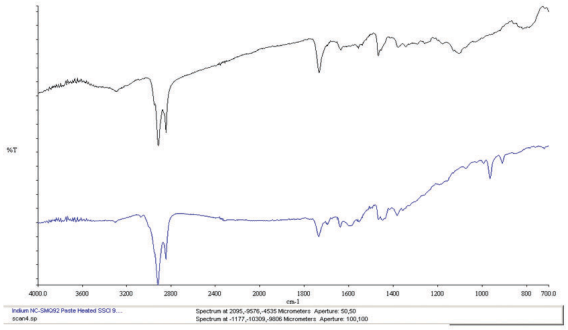


Figure 3 - FTIR Sepctrum comparing an unknown sample (top) and a no-clean flux (bottom)

Many tools are available to determine contamination identity and source. IC testing can be used to determine overall board cleanliness and detect potentially damaging ions. EDS and FTIR can be used in combination to identify visible contamination and possible sources of the contamination. The ability to identify contamination and correct the source of the contamination can greatly increase the long-term reliability of an electronic assembly or its constituents. If you have any questions or comments regarding this article contact Kristi Freeman at kfreeman@stielectronicsinc.com.

Sales & Distribution: LUXO Wave + Plus ESD Magnifier

By: Mike Gainey, Vice President of Sales

Mike Gainey

WAVE+ ESD series magnifiers are designed for use in static sensitive environments. They guard against uncontrolled static dissipation. The outer surfaces of the components in the head assembly are protected with a special coating that alters the electrical characteristics at the surface of the materials. The specially treated material results in surface resistivity in the 10^6 to 10^7 ohms/square (static dissipative). Since the surfaces are no longer insulative, triboelectric charging will result in drastically lower voltages, especially since any charge (under 50 volts) will be uniformly distributed throughout the entire surface of the unit's head assembly. The magnifier arms are powder-coated with a metal-laced paint that measures approximately 10^{10} ohms/square (static dissipative). The entire combination of protection makes it the foremost ESD-safe magnifier in the industry.

Features:

- Lens size (6.75" X 4.5")
- An adjustable neck assembly for positioning the magnifier head at the proper viewing angle so the operator maintains correct posture
- Anti-Reflection (A/R) lens to dissipate glare from overhead lighting so it is not necessary to bend over the lens to black out light reflections
- Precision-ground white crown optical quality glass lens makes it ideal for inspection
- Dual switches for independent control of each light
- Magnification: 3.5 diopter lens (1.85X)
- Total magnification possible: 4.35X
- Lighting: two 13-watt quad compact fluorescent tubes
- Ergonomics: lights are fully enclosed on the sides/front to focus illumination on the subject
- Top-mounted accessory lenses, including a 10 diopter swing away lens
- Heavy duty K-arm .5" square steel tubing - 20 gauge CRS

SPECIAL: While supplies last $329.00 each. *Retail Cost $520.00 each.*

For more information, contact one of our Sales Engineers or Customer Service Representatives at 1-800-858-0604 or sales@stielectronicsinc.com.

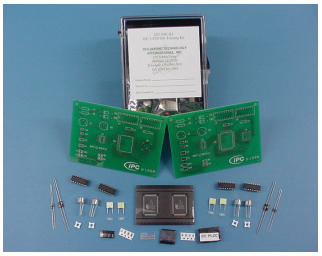
Training Materials: Certification Kit Training Resources

By: Mel Parrish, Director of Training Materials

Mel Parrish

Certification practices provide a diagnostic tool to enable employers to benchmark their workers against high-performance national standards and identify skill gaps if necessary.

Certification programs create skill development and assessment for "baseline" skills necessary for success in the job/career path. The baseline skills may need to be further enhanced through additional specialized training for the specific performance application but the certification approach to skill development allows the basic skills to be accomplished for the individual that has successfully achieved their certification. It provides a "benchmark" for employers to assess their employees based upon standards such as those created through Occupational Skill Standards, or in the case of soldering production process and acceptability standards like those produced by IPC Technical Committees. The use of a certification approach also provides employee motivation and recognition as a result of their certification credentials. Certification achievement through most of the IPC Certification Programs is accomplished through application skill as well as academic performance. In order to enhance effectiveness of the certification approach, solder skill development should be accomplished through a consistent vehicle (soldering kit) to promote standardized achievement of the "baseline" skill requirements, or the standard premise of our certification approach is lost.



J-STD-001 Certification Kit

STI provides skill development materials for the certification application approach for both the Certified IPC Trainer (CIT) as well as the Certified IPC Specialist (CIS). These Soldering kits include all of the standardized materials required to accomplish projects for J-STD-001 and IPC-7711 certification. The kit components are qualified for solderability and consistent performance in the training environment without an extensive procurement effort. They perform consistently from one student to the next and allow the comparison to baseline for employee skill from one company to the next. We even use these kits in our STI training programs. Occasionally, additional or specialized skills are necessary in addition to the certification baseline. We can provide additional specialized training kits for these purposes also, but the initial certification should be accomplished through the standardized kit and certification training program.

If you have any questions regarding this article, contact Mel Parrish at mparrish@stielectronicsinc.com, 256-705-5530.

New Year Special
Sign up for your FREE Lead Free Training Materials sample kit on the STI web site! www.stielectronicsinc.com

Surplus Inventory Sale

STI Electronics, as one of the largest distributors of electronic assembly and solder supplies, occasionally has overstock on some items. We have created a surplus inventory list with prices drastically reduced. The surplus inventory list is available at our website, www.stielectronicsinc.com, and is updated monthly. Please call (256) 705-5545 and ask for Sales or (800) 858-0604. Quantities are limited so don't delay.

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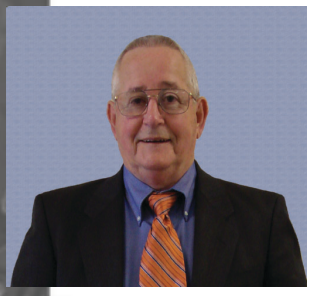
Jim's Corner

By: Jim D. Raby, PE
Technical Director



With our eyes wide open and ears to the ground, we see and hear lots of negative things about our industry and its' outsourcing of work. As I see it, we are not suffering one bit. Unemployment is lower than it has ever been. If we kept the work here who would do it? Everyone is filled to capacity now.

However, I see the cost of doing business off-shore, which includes Mexico, as not a money saver. If one looks at the cost of doing business off shore there are several things that must be considered; i.e. communications, which are difficult, keeping the same trained workers on the job, feedback of problems, return of defective hardware to the vendor and the rework that follows. What about the long supply line, where one finds a problem after the hardware gets in-house and attempts to interrupt the supply line or stop it until the problem can be resolved. One can expect to have a supply line full of bad hardware before the problem is fixed.

It is my opinion that in the USA we have the opportunity to have the very best trained and dedicated workforce in the world. We have in the past and we can again in the future. Mel Scott, who is a hero of mine, just shared with me how work force training goes through a retention cycle, where a great instructor will teach a class and the student only has about an 80% retention rate. Then that person teaches a class and the 80% cycle continues. So it just doesn't seem smart to go off shore, lose a good work force and save a small amount on the manufacturing cost only to spend more on the support activity. Travel, telephone, and lack of failure analysis and feed back in a timely manner all contribute to the cost of manufacturing off shore.

If you have any questions or comments please feel free to contact me at jraby@stielectronicsinc.com.