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NEWSLETTER

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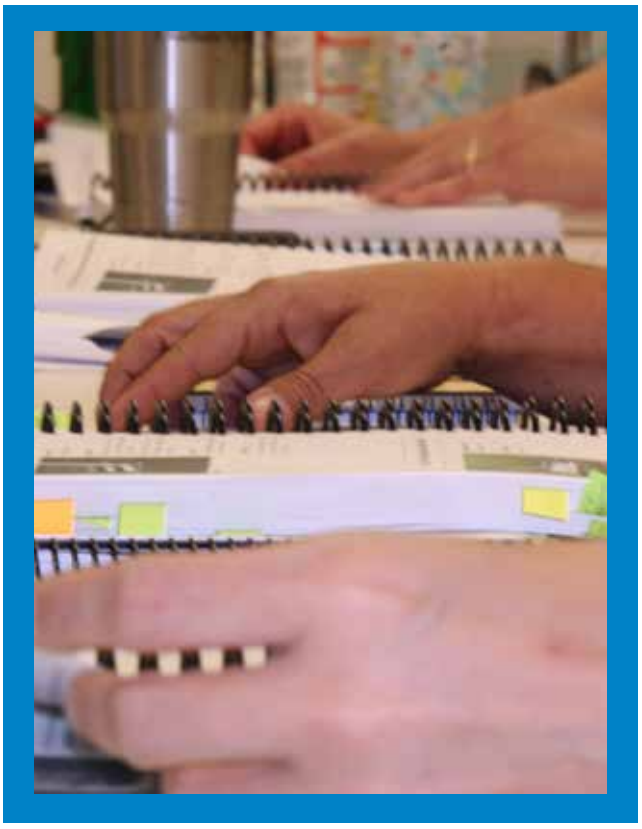

Dave's World

Contact Information:
David Raby
President/CEO
draby@stiusa.com

By: David Raby

July, 2018

I'm Going To Miss You But I Am So Glad You Are Gone

Twenty five years ago we bought the building on Tribble Drive. (It is still THE building on Tribble Drive.) This month we sold it.

In 1993, we were moving STI Electronics (then Soldering Technology International) from San Dimas, California to the Huntsville, Alabama area. We were in a rented 4,000 ft². office complex in San Dimas and hoped we would be able to afford our

own building in Alabama. Being used to California life, I had told the realtor that was helping us look that we wanted to be within 45 minutes of the airport like we were in San Dimas. It turns out that 45 minutes here includes several counties in Alabama and parts of Tennessee. I made several trips looking at various buildings and on one of those trips found the little metal building on Tribble. It was 8,000 ft². which was much larger than we needed (we thought). It was also within a 45 minute walk of Huntsville International Airport.

In its previous life, the building had been the home to several different types of businesses including 1/3 of it being an automobile repair business for a while. It had been foreclosed and was in rough shape but the price wasn't bad (especially with us coming from California). The building had a lot of extra space although we had no idea at the time what we would do with all of that space. I recommended it and Mom and Dad made a quick trip back to see it and we bought it. Mom and Dad quickly bought a house in Madison and moved.

I stayed in California to keep STI running while they worked on getting the building ready. When I say "getting the building ready" most people think of moving into a house where maybe you change the color on a few walls and get some new carpet. This was a little more extensive as the building had been empty for several years so there were little issues like walls that were in various stages of disrepair or even missing. Because of how long it had been empty, they also had to deal with some other issues like spiders the size of small children and a few other animals of the rodent variety who had claimed the building as their home. In addition to dealing with the wildlife, Mom & Dad worked for several months building walls (sometimes having to wait on somebody else to randomly stop by to help put it up), painting, flooring and doing all the other things that needed to be done. I would come back most weekends to help (American Airlines loved me) but they did

almost all of the work. Finally, in the Fall, we were able to move everything out of California and into our new business home.

Everything was great. We had lots of extra space including a big classroom and a larger analytical lab. Life was good. Business quickly grew and suddenly the big building didn't look so big. We added 4,000 ft². which gave us more classroom and warehouse space that was needed as we expanded the building into new areas. Things were good for a few more years until we had to start moving walls and reallocating space. We needed more offices and classrooms and manufacturing had become a serious part of the business requiring even more space. We kept moving things around inside the building and just before it burst, we leased space next door which allowed us to move all of our classrooms and the sales and accounting offices. Eventually, we had about 6,000 ft². leased. After a few years in that configuration, manufacturing and analytical had grown so much we reached the point where we couldn't hire anyone or increase capabilities. We were simply out of room and nowhere else to go. In 2008 we bought land about 500 yards away from the Tribble Drive building and built the 54,000 ft². building we are in now.

When we moved into our new facility, we listed the Tribble building with a realtor and for a variety of reasons it didn't sell. We eventually leased the building. It had a brief run as a church start up and a children's theater. It was also used by our local police department to practice SWAT team operations and allow their K-9 units to train.

As the title of this article says (and no, it isn't the title of a country song although I'd be glad to accept residuals if you want to write one), while I'm glad it finally sold, I am going to miss it because of all the things that happened there.

I mentioned the spiders the size of small children but there was also the snake. Saying Mom is not a snake person is a huge understatement but she was the lucky one to find the unlucky snake in the lobby one morning. Mom, armed with an exact-o knife, disposed of the snake in more pieces than she found it while a young (male) employee stood on a chair and watched. I would imagine her methods although effective, would probably have angered every PETA chapter member near us.

Did I mention the yard waste facility next door to the Tribble building? There was a yard waste recycling facility next door for a few years. One day it caught fire. It was spectacular as all of Madison's fire department, one or two volunteer fire departments, and the airport's Haz-Mat team (in full spaceman gear) used our parking lot and Tribble Drive to fight the fire. They built dirt dams so they could capture and recycle the water. All of the local television stations were on the scene. As the flames were finally subsiding, dams started breaking and muddy flood waters began rushing down the street and across our parking lot. No damage was done at our building although the south side was warm for a while.

We had a tornado warning one day. It's a metal building on a concrete slab so there isn't a great place to be for a tornado but center rooms are the best so that's where we sent everyone in each building. The threat passed and we all went back to our normal day (in the main building anyway). About 20 minutes later, I received a call from one of our instructors who was in the leased building next door asking if it was ok to let the students out of the bathrooms yet. Oops! We forgot about them!

I could keep telling stories but I don't want to bore you or embarrass anyone involved in them but you get the idea that we'll always have great memories of the place. I really am going to miss it.

Changing the subject, Dad has now been gone for a year this month. I miss him every day but I have great confidence that STI (and I) are following a path he would enthusiastically approve.

Thank you for all of your support and please let me know if there is anything we can do to serve you better.

Dave

Training Materials

Multi-Layer Repairs

Contact Information:
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Printed circuit boards continue to get more complex. This complexity usually requires many more conductive layers than in the past. On many boards, 8 conductive layers or more can be considered normal. Of course as board complexity goes up, fabrication yield goes down. This results in higher costs for the bare boards.

Occasionally, boards are fabricated with inner layer design or fabrication defects such as an open conductor. When this happens, a determination has to be made about the feasibility of the repair. The first area of concern is the reliability of the proposed repair. The second area of concern is the cost. Inner layer repairs are very labor intensive and can be cost prohibitive on assemblies with a low BOM cost, however, due to time constraints or high BOM costs the inner layer repair may be necessary.

Once the decision has been made to perform an inner layer repair, it's like real estate… location, location, location. Selecting the location for the excavation is critical. The exact location of the conductor damage can be determined by X-Ray imaging *(Figure 1)* or Time Domain Reflectometry. Once the damaged area off the inner layer conductor has been located *(Figure 2)* the origin of the excavation should be the side of the board with the least obstacles from the board surface to the conductor.

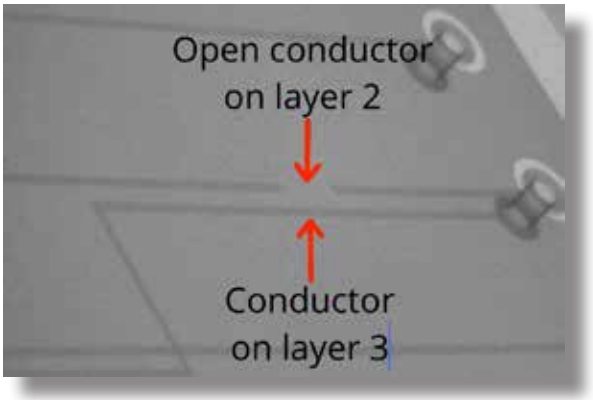


Figure 1

Figure 2

The procedural steps are listed below:

- Excavate down to layer 3 from secondary side.
- Cut and peel back layer 3 conductor.
- Excavate down to layer 2 *(Figure 3)* and perform conductor repair *(Figure 4)*.
- Use vias to check for shorts and opens.

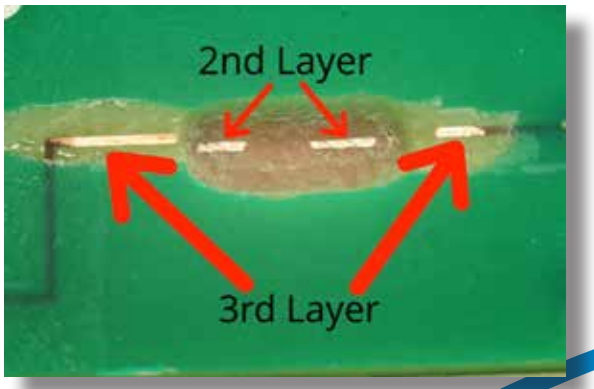


Figure 3

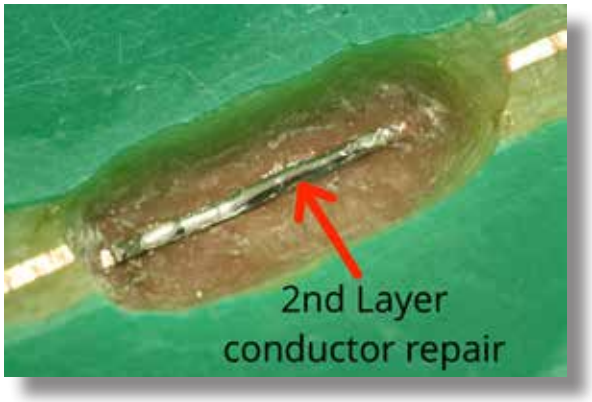


Figure 4

- Epoxy fill excavation, cure epoxy and resurface to level 3 *(Figure 5)*.
- Perform conductor repair on layer 3 *(Figure 6)* and use vias to check for shorts and opens.

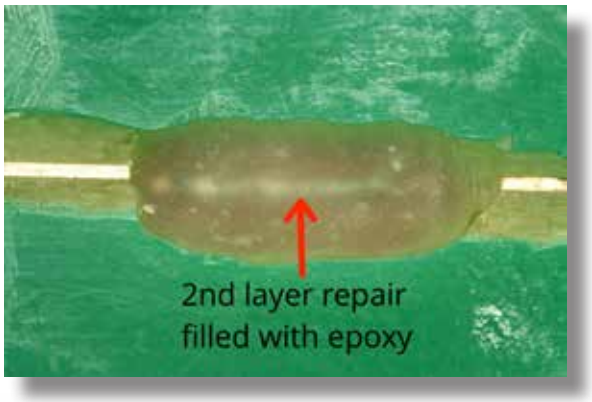


Figure 5

- Epoxy fill excavation, cure epoxy and resurface to level 4 on the secondary side of the board *(Figure 7)*.

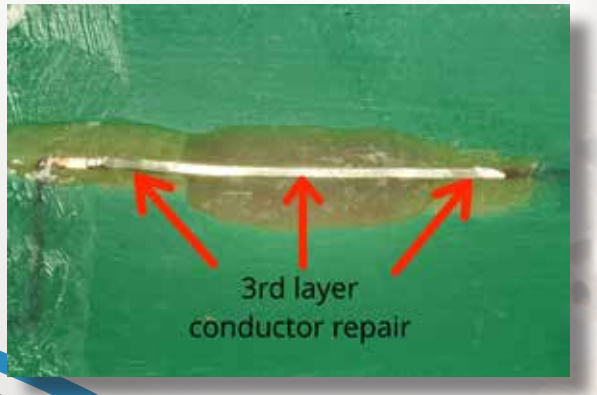


Figure 6

Figure 7

- Perform final electrical tests.

Multi-layer repairs requires a lot of patience, a steady hand and lots of practice. Of course, finding boards to practice on with known inner layer defects can be difficult. Luckily, STI has a training kit with many board defects available for repair. The Advanced Rework & Repair kit has everything you need to practice more common board repairs or more advanced multi-layer repairs.

Use the following links to place an order online and don't forget your coupon code: **7711kit**

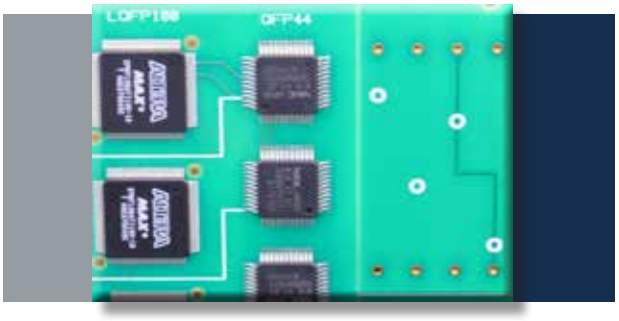
Tin-Lead 405-2875 advanced-rework-repair-certification-kit-tin-lead

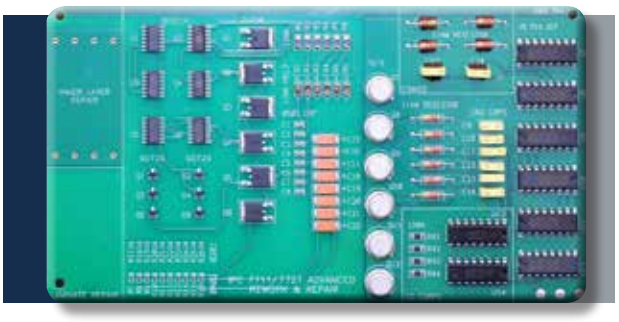
Lead-Free 405-2874 advanced-rework-repair-certification-kit-lead-free

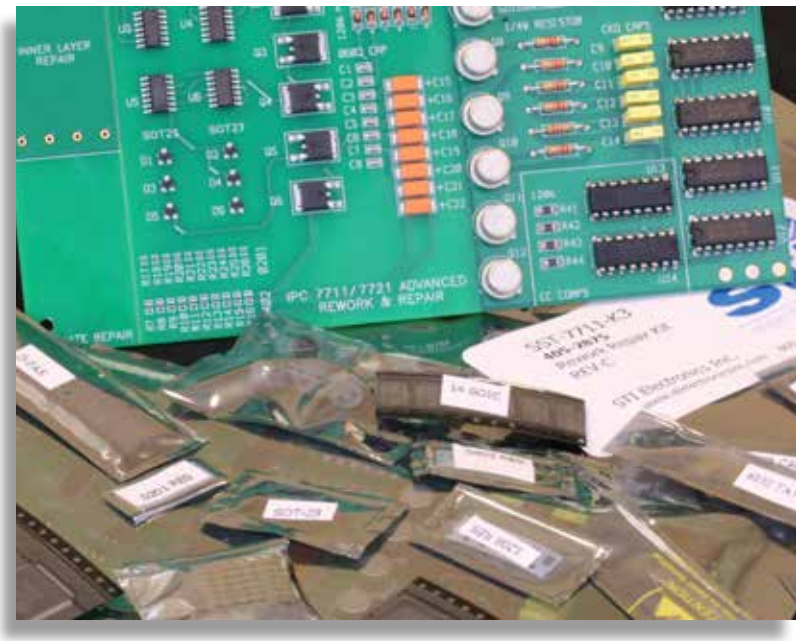
Or call our customer service number
to talk to one of our friendly team members
about your order.

800-858-0604

Training Materials







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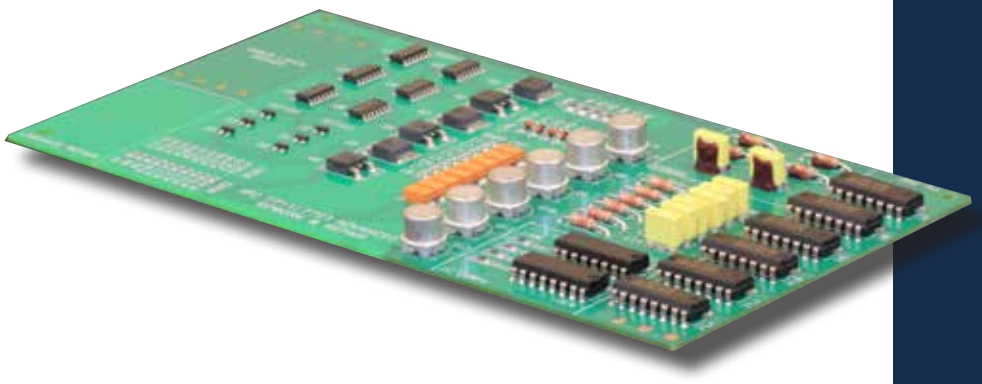

The "OFFICIAL" board for the IPC 7711/7721 Revision C Training Program

CLICK HERE TO ORDER
IPC 7711/7721 Advanced Rework & Repair Kit

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Electronic Ionic Contamination Is Not Only Confined to Flux Residues - PCB Cleanliness?

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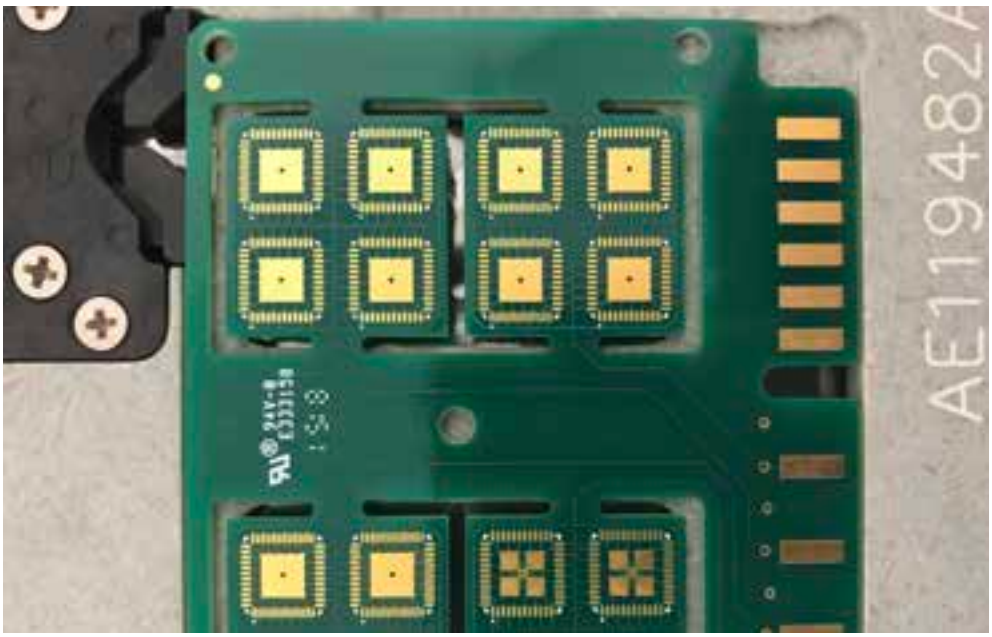

STI QFN TEST VEHICLE - 48 PIN QFN NON DAISY CHAINED PART FOOT PRINT

Figure 1: STI SIR QFN TEST COUPON - SIR Testing of SMT Processing of QFN Components No Clean Flux Chemistry vs. ROL0 Cleanable Chemistry

BY MARK MCMEEN

The electronics industry is facing changing times and how best to define cleanliness and electronic reliability as it relates to overall electronic assembly cleanliness. There are a number of challenges facing the OEM and how best to validate and verify an electronic assembly is clean enough. Which brings up the question of how clean is clean? What's really needed is objective evidence that can be used to ensure electronic hardware is clean enough to meet end customer reliability and warranty objectives. Everybody has looked hard at flux residues and flux chemistry and even thought about component cleanliness, but have you tested your incoming PCBs for ionic contamination? The OEM/contract assembly shops that have to meet certain industry cleanliness expectations such as medical, military and aerospace understand that they must clean/ wash their electronic hardware to meet the end user criticality or warranty and or long term reliability specifications. Particular attention is paid to cleaning underneath Quad Flat No-Lead (QFN), Land Grid Array (LGA) and chip scale packages (CSP) which can be challenging due to their low z axis standoff height and their fine pitch high pin counts. PCB cleanliness is the last thing on OEM/contract electronic assembly companies' mind because the idea of

prewashing incoming boards is not an industry practice. STI Electronics Engineering Lab decided to run a test on bare board suppliers on a STI SIR (Surface Insulation Resistance) Test coupon to see if boards meet the SIR test as an incoming received sample straight out of the package. The test vehicle (Figure 1) was used and two PCB facilities were tested using a standard 48 pin QFN center ground lug component package foot print. The I/O pins are used as SIR sensor traces which allows one to test for surface insulation resistance between adjacent I/O pins and also the center ground lug to see if the component pattern has any plating salts or PCB handling residues or processing Ionics on the surface of component layout/foot print.

The results from running this STI SIR Test coupon were quite interesting: Clean boards saw results of 2E9th to 1E11th while dirty boards saw 5E7th to 3E8th - i.e. Lots of variability in the as received state. The natural pass/fail criteria is 1E8th whereby anything above 1E8th is passing and anything below 9.99E7th is failing. In view of our findings and how once the boards are washed and the results jump to above 5E10th to 9.8E11th for all locations it is easy to discern that PCBs are not clean as an industry standard. The above SIR Test coupon is run 40 degrees C and 90% RH to ensure the board surface has at least 3 to 5 mono layers of water present on the surface of the board which ensures ionic mobility and the test is 168 hours in duration. The above test was initially designed as a mini DOE to discern PCB BASE LINE surface insulation resistance levels for a bare board as received by STI. This mini DOE shows that not all PCB suppliers deliver ionic free or low ionic level PCB cards that are ready for production that meet the SIR level of cleanliness for production builds. The combination of residual plating bath salts and flux residues that have not been fully catalyzed creates an unfavorable ionic mix. When this mix is trapped under a low standoff device, it can very easily create an electrolyte cell that can result in an SIR failure under the device. Over the coming months there will be further studies and insights on PCB cleanliness levels and how best to categorize their risk. Do you know your PCB cleanliness level – SIR value? Should this become a new cleanliness definition? Just a thought…….. The real challenge lies in quantifying cleanliness and their sources and how best to discern and quantify how clean is clean enough?

Please feel free to call

Mark McMeen

V.P. of Engineering

256-705-5515

if you have any comments or questions concerning this mini DOE.

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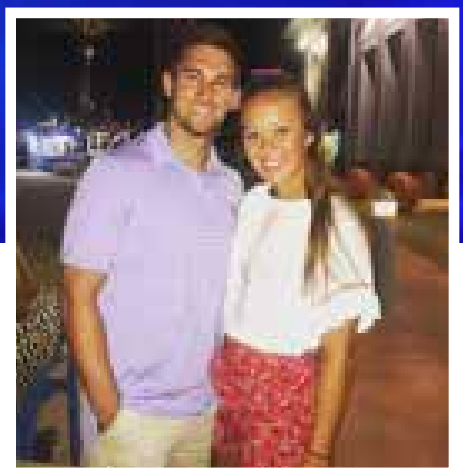
Employee Spotlight



Collin Langley

Electrical Engineer

WorkBackground: Finished at UAH with Bachelors in Electrical Engineering with Minor in Business Administration in May of 2017. Started working at STI in May of 2017.

FamilyInformation: "Too young for kids, but I have a cool dog."

Hobbies: Playing video games, HBO Series

FunFactAboutSelf: Played College Basketball at UAH.

Training Services

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Director of Training Services
pscott@stiusa.com

J-STD-001G Space Addendum

Did you know that the J-STD-001G Space document has been released and the Training Materials are now available for Certified IPC Trainer (CIT) to conduct Certified IPC Specialist (CIS) training? To become certified as a CIS to the 001G Space document you must first take the required modules of the J-STD-001 Course plus 1 additional, optional module.

J-STD-001 CIS Certification Course

Module 1 (Required): Introduction, Policy and Procedures and Basic Requirements of J-STD-001 and Applicable Documents
Module 2 (Optional): Wires and Terminals
Module 3 (Optional): Through Hole Technology
Module 4 (Optional): Surface Mount Technology
Module 5 (Optional): Inspection
Module 6 (Optional): Space Addendum

The certification expiration date for the add on space module for the CIS course is established by the required module (Module 1) for the J-STD-001 course. There's no additional workmanship requirements associated with the Space Addendum training. The CIS course is approximately 4 hours and consists of the following:

- Introduction
- Differences in requirements between J-STD-001G and J-STD-001GS
- Exam –Open Book/On-Line (25 questions)

If you have any scheduling questions, please contact
Julia Adamczyk at
(256) 705-5514
or
Kelli King at
(256) 705-5516

To register for a class please visit our website at
www.stiusa.com
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Course Instructor: Phil Zarrow

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COURSE DESCRIPTION

You have the responsibility and resources to improve the productivity of an assembly operation…what do you do? This course drives awareness and solutions to the adverse impact that non-optimal assembly practices and processes have on the product quality and finanacial success of electronic assembly process, materials (both existing and emerging), equipment, procedures, and methods. Most importantly, practical solutions are presented. Key issues that consistently result in assembly problems and low yields are identified and resolved. This seminar is intended for anyone involved in directing, developing, managing and/or executing assembly line operations including managers, line supervisors and line engineers involved in manufacturing, design and quality engineering.

TOPICS COVERED

- Introduction
- Optimization Objective
- Getting the most productivity from an existing line
- Definition of "Best Practices"
- Some "Deadly Sins" of SMT Assembly
- Best Practices in the Assembly Process
  - Solder Paste Printing Process
  - Pick and Place
  - Reflow Soldering
  - Wave and Selective Soldering
  - Cleaning Vs No-Clean Considerations
- Q&A

WHO SHOULD ATTEND

This course is intended for Manufacturing, Process, Design, Test and Quality Engineering personnel as well as Management who are involved in the production of surface mount or mixed technology assemblies.

About the Instructor

Phil Zarrow has been involved with PCB fabrication and assembly for more than forty years. His experience includes extensive work in PC Fabrication and PCB Assembly as well as equipment and process development. Mr. Zarrow is recognized throughout the world for his expertise in surface mount technology processed, equipment, materials, components and methodologies.

Mr. Zarrow is a popular speaker and workshop instructor. He has chaired and instructed at numerous seminars and conferences in North America, Europe, and Asia. He has published many technical papers and magazine articles as well as contributed a number of chapters to industry books. He is co-arthur of the book, "SMT Glossary - Terms and Definitions." Mr. Zarrow holds two US Patents concerning PCB fabrication and assembly processes and audit methodologies.

Phil is a member of IPC, SME, IMAPS, a co-founder of ITM, Incorporated, and is a past national level officer and national director of the Surface Mount Techology Association (SMTA). He was also Chairman of the Reflow Committee for SMEMA. He was the recipient of the SMTA's Member of Distinction Award (1995) and Founders' Award (2000). Mr. Zarrow has served on the Editorial Advisory Board for Circuits Assembly Magazine and won awards for his writings "On the Forefront" and "Better Manufacturing" columns. He is currently producer and co-host of Circuit Insight's "BoardTalk" audio program.

Click Here To Register

Course Price: $600 per person
10% Discount for Multiple Attendees

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