NEWS

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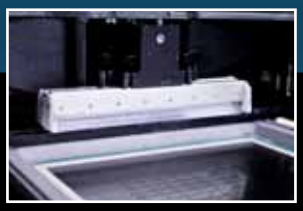
sti electronics inc.®

Leading the way in electronics



DAVE'S WORLD

By: Dave Raby

March 2014

A couple of weeks ago, I was listening to one of our local City Councilmen take questions after a presentation. He's in his first term on the Council and one of the questions was "What has surprised you most since being elected?" His answer and I'll have to paraphrase because honestly I wasn't expecting to be impressed so I wasn't recording or taking notes, was along the lines of: "As soon as I was elected, everyone assumed I was an expert in everything that goes on in the city from repairing roads to refinancing bonds. I'm the same guy I was the day before the election and I care about those things but being elected didn't make me an expert." It's nice to hear a politician, even a first year City Councilman, say he doesn't know everything and act accordingly. We've all seen many examples of local politicians, state officials (in Alabama, apparently being elected means you immediately know more about education than any of the educational professionals), federal officials (many examples but let's start with obviously we can help people in the Congo by burying legislation regarding certain metals in a finance bill that causes US manufacturer's to be less competitive), and even the executive branch (vote for this health care reform and then maybe later you can read it). It's not just in the US either; think of the European experts trying to keep lead out of the landfills.

Getting away from politics (I don't want to be audited again), the same thing applies in the business world. A title doesn't make you an expert. Hopefully, the job holder has done something to earn the title but the Peter Principle can raise its ugly head in many cases and always at the wrong time. I'm the CEO at STI but does that mean I'm the smartest one here? Luckily for all of us, the answer is not even close. I have many responsibilities but one of the biggest is having smart people in the correct positions so when you ask me a question that needs an expert, I can round up the right person from the STI team or through our other contacts to give you an expert answer. Unless your question is on airplanes, college football, major league baseball, or certain parts of US history, that answer may be coming through me but won't be coming from me. My job, from your perspective, is to be the face of STI and represent us at official and unofficial functions as well as in the media and communicate who we are and what we are doing and our overall capabilities. I hope I do pretty well at that but I'm not an expert in many of the things we do. STI has spent over 31 years building a professional team and I have to say I am extremely proud of the expertise we have collectively. STI has never been better positioned to meet the technological demands and needs of our customers.

We had a good show earlier this month at the Houston SMTA Vendor Expo. The Houston SMTA officers along with SMTA headquarters did a great job organizing the event. It was well attended all day and Julio and I had an opportunity to see many old friends and get a chance to meet new ones. We were there to promote our new classrooms in Houston which are now open.

Speaking of classrooms in Houston, last month I told you about our upcoming open house in Houston but I gave you the wrong date. The correct date is Wednesday April 23rd and we'll be there from 2:00 pm until 6:00 pm and would love for you to drop by if you are in the area.

Contact Information:
Dave Raby
President/CEO
draby@stielectronicsinc.com

This has been a busy week for STI. Pat Scott, Mel Parrish and I all attended the APEX show in Las Vegas. STI didn't exhibit but we all attended various luncheons, committee meetings and networked on the tradeshow floor. We also exhibited at the Dixie Crows Symposium in Warner Robins, Georgia and at the Design2Part Show just up the road in Atlanta.

As always, if there is anything we can do to serve you better, please let us know. You can contact me or anyone else listed anywhere in this newsletter. I'll find the right person to answer.

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

MANUFACTURING

Contact Information:
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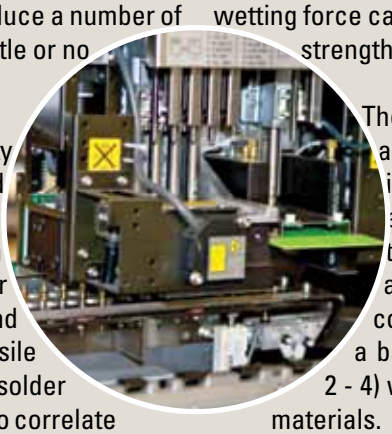
VP of Engineering/Manufacturing
mmcmeen@stielectronicsinc.com

A Mechanical Evaluation of Lead Free Solder Alloys

The transition to lead free solder alloys in electronics manufacturing has created a major concern for engineers responsible for the mechanical reliability of interconnections on electronic assemblies. Lead free solders introduce a number of different material constituents that have had little or no long term reliability testing performed.

The questions being asked by many reliability and process engineers are which lead free solder alloy should I use, and in which flux configuration? Is there a difference in performance between flux types and vendor brands? To answer these questions and understand the principle differences in tensile strength between Sn63/Pb37 and lead free solder alloys, the following test protocol was created to correlate tensile strength to wicking distance via wetting force capability.



This unusual comparison of tensile strength and wetting force capability has a defined objective to correlate wetting angle and wetting force to overall tensile strength of a solder joint. This is done primarily by correlating common measure points from different solder alloys and their specific flux configuration. This solder joint or interconnection and its corresponding wetting force capability have a direct correlation to mechanical strength and integrity.

The testing protocol for evaluating the various alloys incorporated material sets which were identified prior to testing and included multiple alloys and flux configurations. It was important to evaluate multiple variations of lead free alloys, but equally important to establish a control sample of Sn63/Pb37 (Alloy 1) to serve as a baseline. The lead free alloys evaluated (Alloys 2 - 4) were chosen for the varying copper load of the materials. A range of lead free alloys containing 0.75% to 0% copper was chosen for the test.

Pull testing utilized a mechanical pull test unit configured to hold the highest measurement reached during each test. The tensile strength value at failure was then noted and recorded.

continued from pg. 3

This process was completed for four coupons of each flux / alloy, totaling 16 data points for each material configuration. Additionally, optical and real time x-ray inspection was completed on one representative coupon for each material configuration. Finally, cross sections were produced utilizing the specific coupon designated for each alloy configuration. Once completed, the wicking distance from the top of the base copper surface to the top of the solder fillet was measured and recorded.

The data generated from the analysis was segregated by the corresponding test results. The categories of quantitative results were tensile strength, wicking distance, wetting force, and time to wet. Qualitative characteristics that were assessed included voiding from x-ray images and external appearance from visual inspection.

Visual inspection of the test coupons revealed subtle differences in surface appearance. X-ray results demonstrated a significant disparity between the lead bearing and lead free alloys. Voiding was characterized as minimal in Alloy 1. Alloys 2, 3, and 4 exhibited moderate to heavy voiding. In addition, the voiding seemed to be distributed uniformly.

Quantifiable results included tensile strength, wicking distance, and wetting characteristics. The results from the wetting balance testing are summarized in Table 1.

A summarization of the Pull Test results is listed in Table 2. Alloy 1, lead bearing, again performed the best of all alloys tested. Not only was the average tensile strength of the lead bearing solder superior to that of the lead free solders, but also the standard deviation was much smaller. This confirms that even at the manufacturers recommended temperature profile, the lead free solders have a smaller manufacturing process window. The tensile strength of the alloys did increase proportionally to the decreasing amounts of copper. Alloy 4, which contained no copper, demonstrated the highest tensile strength. Conversely, the lead free alloy with the highest amount of copper at 0.75%, Alloy 2, illustrated the lowest tensile strength.

	Alloy			
Characteristic	**1**	**2**	**3**	**4**
Time to Zero Force (sec)	0.60	0.54	0.48	0.52
Time to 2/3 Max Force (sec)	0.92	0.81	0.77	0.78
Maximum Force (mg/mm)	40.16	38.35	41.52	37.65

Table 1. Wetting Balance Results

The final test that was performed was cross-sectioning samples of each alloy to assess the wicking distance up the lead. Table 3 summarizes the results from that analysis.

	Alloy			
Characteristic	**1**	**2**	**3**	**4**
Median Pull Strength (kg)	7.80	5.90	6.49	6.58
Average Pull Strength (kg)	7.77	5.80	6.47	6.52
Standard Deviation	0.26	0.67	0.72	0.58

Table 2. Pull Testing Statistics

A similar correlation to the tensile strength is illustrated in the wicking distance results. Samples which exhibited higher tensile strength values also demonstrated larger wicking distances up the copper lead. This suggests that the surface coverage area, larger when the solder wicks further up the lead, is the basis for the mechanical strength of the soldered interconnect.

Results of the analysis prove that tensile strength has a direct correlation to wetting angle via the z-axis height (wicking distance) of the solder fillet up the lead. Interesting to note is the observation that the highest concentration of copper in the solder paste alloys under evaluation has the lowest wicking distance up the lead. The tensile strength measurements by alloy type and flux configuration, as seen in Figure 1, shows a clear correlation between copper addition and tensile strength. The higher the concentration of copper in a solder alloy, the lower the tensile strength.

	Alloy			
Characteristic	**1**	**2**	**3**	**4**
Average Pull Strength (kg)	7.77	5.80	6.47	6.52
Wicking Distance (mm)	0.536	0.387	0.440	0.484

Table 3. Pull Test Results Summarization

Representative Wetting Angles

Figure 1

In conclusion, while many electronics manufacturers are following a path that will lead to eventual implementation of lead-free solder alloys, it is essential that adequate testing be performed to characterize the effects of such a fundamental change in the manufacturing process.

For more information contact:
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(256) 705-5515

MANUFACTURING ANALYSIS

STI's involvement in research and development programs, both in component packaging technologies and electronics assembly manufacturing, has brought about the installation of the latest and most advanced equipment and the acquisition of the top people in this field.

STI is staffed to design, develop, assemble, and test a ruggedized electronics assembly in an advanced clean room laboratory (Class 1000/ ISO Class 6 certified) to meet our customer's specifications.

Manufacturing

STI Electronics' manufacturing lab encompasses 26,000 sq. ft. of floor space containing two surface mount lines, automated through-hole processing, and multiple flexible work cells for final assembly, 7711/7721 certified rework and repair, box build, and test. The facility and equipment is complimented by a highly skilled and trained work force of electronic technicians and associates, all of whom are certified to the highest standard of IPC J-STD-001 ES (Space Addendum).

Material Failure Analysis

STI's Analytical Laboratory's enhanced capabilities are the result of the recent addition of several new analytical tools and equipment. The analytical equipment. The analytical equipment includes some of the industry's newest and most advanced tools.

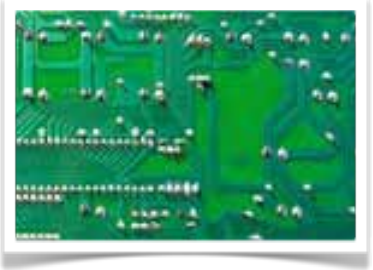
Microelectronics Packaging

The Microelectronics Lab was established to meet the rising need for advanced systems development and packaging to address the emerging challenges and issues facing today's electronics assemblies. Advanced design and modeling software enables STI to design and develop highly integrated hardware to meet shrinking form and fit factor requirements as well as increasing thermal loads. Emerging packaging materials are continuously evaluated to optimize electrical and thermal performance. The microelectronics lab specializes in state-of-the-art packaging design and assembly including current technologies such as Chip-On-Board (COB) and Multichip Module (MCM) as well as emerging technologies such as STI's patented packaging technology termed Imbedded Component/Die Technology (IC/DT®).

Manufacturing Clean Room

IPC-7711/7721 certified rework and repair, box build, and test.

Circuit Design



STI's involvement in research and development programs, both in component packaging technologies and electronics assembly manufacturing, has brought about the acquisition of the top people in this field and the installation of the latest and most advanced equipment and design tools. STI is US-based, ITAR registered, and staffed with engineers to design, develop, and assemble a ruggedized electronics assembly in compliance with our customer's specifications. With experience in Defense, Aerospace, Space, and commercial applications, STI is adept to designing and assembling a product to satisfy our customer's requirements.

TESTING

STI Electronics Inc.'s Engineering Department serves the aerospace, military, and commercial sectors of the electronics industry offering test and evaluation services for component-level and system level electronics hardware. STI offers customized test protocols as well as performs testing in compliance with various EIA/JEDEC, IEC, AEC, ASTM< IPC, and MIL standards.

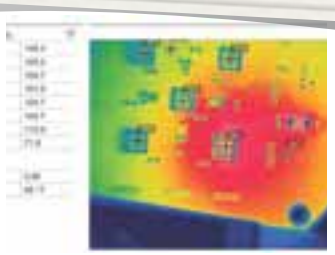
ENVIRONMENTAL TEST SERVICES

All electronic hardware is susceptible to the damaging effects of moisture, temperature, and contaminants. STI understands the criticality of reliability testing and test-to-failure. Improper selection of assembly materials and manufacturing processes can result in field failure returns which can lead to high warranty reserves thus affecting long-term profitability. STI's environmental testing capabilities include replicating environments such as Humidity/Moisture Resistance, Thermal Shock/ Thermal Cycle, Steam Aging and Vibration/Shock testing. Coupled with the ability to perform in-situ electrical testing as well as a full range of post-test analysis of samples, these tools allow for rapid "aging" of components and prediction of operational life of hardware.

ELECTRICAL TEST SERVICES

STI offers a variety of electrical test services from component-level testing/characterization to system-level testing. Electrical testing is offered to validate values in accordance with component manufacturer's performance specifications, a customer's test specification, as well as standard test methods.

- Analog and Digital Designs
- High Frequency RF Layouts
- Controlled Impedance Designs
  - Design Attributes
  - Rules Management
- Design Library Generation
  - Part, Package, and Electrical Symbols
  - Full Forward/Back Annotation

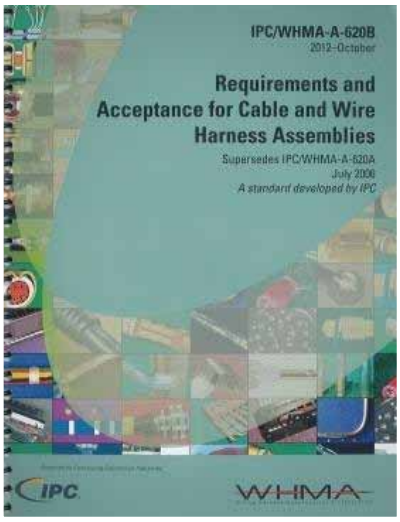


- Thermal Shock
  - Temperature Cycling
  - Moisture Resistance
  - Humidity Cycling
  - Shelf Life
  - Accelerated Aging
  - Vibration Testing
  - Mechanical Shock Testing

TRAINING MATERIALS

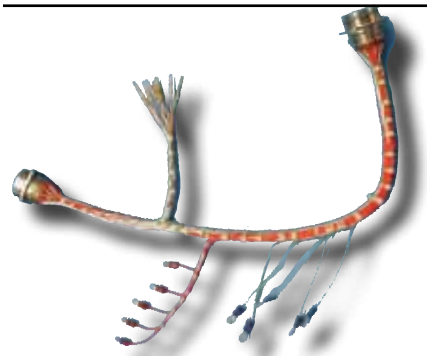
STI is Your One Stop Shop for All of Your Cable and Harness Needs

Contact Information:
Mel Parrish
FSO, Director Training Materials
mparrish@stielectronicsinc.com



The IPC/WHMA-A-620B describes materials, methods, tests and acceptability criteria for producing crimped, mechanically secured, or soldered interconnections and the related assembly activities associated with cable and harness assemblies. Revision B remains the only industry-consensus standard for Requirements and Acceptance of Cable and Wire Harness Assemblies. IPC and the Wire Harness Manufacturers Association (WHMA) continued to work together to develop this significant update.

This Revision now has 682 full-color pictures and illustrations – 125 are new or updated. Included in the 19 chapters are criteria for wire prep, soldering to terminals, crimping of stamped and formed contacts and machined contacts, insulation displacement connectors, ultrasonic welding, splicing, connectors, molding, marking, coax/biax cables, wrapping/lacing, shielding, assembly and wire-wrap terminations. 400 pages. To order your copy today, call (800) 858-0604 or sales@stielectronicsinc.com.



Cable Assembly Training Kit

This Cable Assembly Kit addresses the majority of component types that will be encountered in operational production. It utilizes Mil Spec style connectors that have two sizes of contacts combined with the appropriate insertion/extraction tools.

STI Part # 405-2453..... $155.60

What's Inside the Terminal Kit

STI Part #	Description	Quantity
405-2418	22 AWG Wire (White)	5′
405-2413	20 AWG Wire (Orange)	5′
405-1053	Gold Cups	5
405-1054	Turret Terminals	5
405-1055	Bifurcated Terminals	5
405-1056	Hook Terminals	5
405-1057	Pierced Terminal	5

**Note: Backshell (M85049/52) available. Part # 405-2360*

What's Inside the Cable Assembly Training Kit

STI Part #	Description	Quantity
405-2366	MS3471L22-41P Connectors*	2
405-2352	M39029/4-110 Contacts	16
405-2353	M39029/4-111 Contacts	30
405-2413	20 AWG Wire (Orange)	70′
405-2414	20 AWG Wire (Red)	50′
405-2418	20 AWG (White)	30′
400-8251	Cable Ties	30
405-1059	Gold Cup (Large)	4
405-1053	Gold Cup (Small)	10
405-2546	Terminal Lugs 22-18	10
405-2551	SO 101R Solder Sleeves	4
405-2552	SO 102R Solder Sleeves	4

TRAINING MATERIALS

IPC/WHMA-A-620 REQUIREMENTS AND ACCEPTANCE OF CABLE AND ACCEPTANCE OF CABLE AND WIRE HARNESS ASSEMBLIES

IPC/WHMA-A-620 Training Center

IPC/WHMA-A-620 is the first industry-consensus standard for Cable and Wire Harness Assemblies. This document covers criteria for Wire Preparation, Soldered Terminations, Crimping of Stamped and Formed Contacts and Machined Contacts, Insulation Displacement Connectors, Ultrasonic Welding, Splicing, Connectorization, Over-Molding/ Potting, Marking/Labeling, Coax and Biaxial Cable Assemblies, Securing, Harness/Cable Electrical Shielding, Cable/Wire Harness Protective Coverings, Finished Assembly Installation and Solderless Wrap.

IPC/WHMA-A-620 Certified IPC Trainer (CIT) Certification Program

32 Hours/Lecture

This training program provides a detailed review of the IPC/ WHMA-A-620 Requirements and Acceptance for Cable and Harness Assemblies and concludes with a qualifying examination. CIT's are qualified to teach CIS's. After successful completion of the course, CIT's are certified for 2 years.

IPC/WHMA-A-620 Certified IPC Trainer (CIT) Recertification Program
16 Hours/Lecture

CIT's are certified for 2 years and must attend a 16-hour recertification class to maintain their certification status.

IPC/WHMA-A-620 Certified IPC Application Specialist(CIS) Certification/Recertification Program
24 Hours (Modules 1-8)/Lecture

The CIS program is modularized to allow for maximum flexibility in meeting individual training needs. This Program will familiarize the student with the IPC/WHMA-A-620 Requirements and Acceptance for Cable and Harness Assemblies document. The program includes the general requirements of the specification and related documents, the difference between the classes of product, and defines the acceptance criteria for various conditions.

IPC/WHMA-A-620 Space Addendum Certified IPC Trainer (CIT)/Certified IPC Application Specialist (CIS) Program
40 Hours/Lecture and Hands-On
Prerequisite: IPC/WHMA-A-620 CIT Certification Course or IPC/WHMA-A-620 CIS Certification Course (All Modules)

This course covers the additional requirements of the IPC/WHMA-A-620 Space Electronics Hardware Addendum over those published in the IPC/ WHMA-A-620. This course focuses on the hands-on skills necessary to produce 3 cable assemblies. Workmanship includes crimping of lugs and IDC connectors, stripping coax cable, assembly of TNC and BNC coax connectors, floating shields, lash splices, crimping and insertion of contacts and installation and routing of each cable assembly. These classes are available at our Training Center in Madison, AL, Houston, TX or your facility. Contact us today at (256) 705-5528 or training@stielectronicsinc.com to schedule your classes today.

Customized Training Courses

STI has the expertise to design and develop customized training courses to meet your company's needs. Topics include Basic Soldering, Wave Soldering, Lead Free Soldering, Flex & Rigid Flex Soldering/ Rework, and BGA Rework to name a few.

ELECTRONIC ASSEMBLY & SOLDER SUPPLIES

MBT 350 with TD-100, MT-100 & SX-100

This configuration features the TD-100 Thermo-Drive iron that delivers the highest level of performance. The TD-100 uses tip-heater cartridge tips that posess amazing thermal performance. This configuration is ideal for production environments where high volumes and efficiency dictate the working environment.

To really protect your more expensive Tip-Heater Cartridge and fine point tips from oxidation, the TD-100 can be used with the new "Instant-SetBack Cubby". The cubby puts the irons channel into SetBack if it is in the cubby for more than 45 seconds! Up to two Instant-SetBack Cubby can be connected to the MBT 350.

Includes TD-100 ThermoDrive Soldering Iron, SX-100 Sodr-X-Tractor Desoldering Handpiece and MT-100 MiniTweez Handpiece (IntelliHeat versions). Tips sold separately.

120 V Part Number: 8007-0454

- Power Requirements120 VAC, 60Hz (240 watts maximum) & 120VAC, 50Hz (240 wats Maximum)
- Handpiece Technology CompatabilityIntelliHeat
- Tip to Ground resistance<2ohms
- Temperature Stability+/- 1.1C (2F)
- Temperature accuracyMeets or exceeds ANSI-J-Std-001
- Set Temp RangeTip Heater Cartridge Compatible Handpieces = 205° to 454°C (400° to 850°F) Nominal

SensaTemp Compatible Handpieces = 37°C to 482°C (100° to 900°F) Nominal

- Vacuum Rise Time150ms Average as measured with PACE Process Monitor
- Vacuum20in Hg max
- Pressure18psi max
- Air Flow8 SLPM max

Free Shipping for the month of April. Call for special pricing and quantity discounts.

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ELECTRONIC ASSEMBLY

STI Electronics, Inc. is one of the largest stocking distributors in the USA. STI is located in Madison, AL with sales staff covering the entire Southeast. STI's friendly Inside Sales Team in conjunction with our Outside Sales Staff work hand in hand to make sure the customer receives the technical support necessary to make informed purchase decisions at the best prices possible.

PRODUCTS

3M
3M ESD
ACL Staticide
AIM
American Beauty
APEX
ASG
Aven
Beautech
Bio-Fit
Bonkote
Botron
Brady
Chemtronics
Conductive Containers, Inc.
Creative Global Solutions
Dantona
DEK
Easy Braid
Edsyn
Erem
Excelta
Fancort
General Tools
Gordon Brush
Hakko
Hunter Products
Ideal
Identco
Janpak
JBC
Jensen Global
Kahnetics
Kester
Lewis Bins
Liberty Packaging
Lindstrom
Lista
Lufkin
Luxo Lighting
LW Scientific
Metcal
Micro-Care
Nicholson
O.C. White
Pace
Panavise
Plato Products
Production Basics
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E-STORE

For the convenience of our customers, all products available at STI can be purchased from our E-Store accessible at

www.stielectronicsinc.com

NEW TRAINING CENTER OPEN

The Training Center has one Hands-on Classroom that will be fully equipped to conduct basic soldering courses, J-STD-001 Certification courses and Rework and Repair Courses along with two Lecture Classrooms to conduct IPC-A-610, IPC/WHMA-A-620 etc.

Training Services and Classes Available at STI Electronics, Inc.

Contact Information:
Pat Scott
Director of Training Services
pscott@stielectronicsinc.com

Join Us For Our
Open House

Please Plan on
Joining Us at our
New Houston
Training Center

Wednesday, April 23rd
2:00 - 6:00 p.m.

9920 W. Sam Houston
Parkway S.,
Suite 420
Houston, TX 77099

Our 2014 Texas Training Schedule is available in this newsletter and on our website at **www.stielectronicsinc.com**

2014 Houston, Texas Schedule

J-STD-001 "Requirements for Soldered Electrical and Electronic Assemblies"

J-STD-001 Certified IPC TRainer (CIT) Certification Course

May 5-9	July 7-11
November 3-7	December 1-5

J-STD-001 Certified IPC Trainer (CIT) Recertification Course

May 14-15	November 19-20

J-STD-001 Certified IPC Trainer (CIT) Space Addendum Course

May 16	November 14

J-STD-001 Certified IPC Application Specialist (CIS) Certification Course (Modules 1-6)

April 7-11	August 4-8

J-STD-001 Certified IPC Application Specialist (CIS) Recertification Course (Modules 1-5)

October 13-14	November 17-18

IPC-A-610E "Acceptability of Electronic Assemblies"

IPC-A-610 Certified IPC Trainer (CIT) Recertification Course

April 17-18	May 12-13
August 14-15	November 10-11
December 8-10	

IPC-A-610 Certified IPC Application Specialist (CIS) Certification Course

April 14-16	June 11-13
August 11-13	

All classes will be conducted at
9920 W. Sam Houston Pkwy., Ste 420
Houston, TX 77099

STI's J-STD-001 Inspection Kit

Part No. STI-INSP-001-E1

NEW!

This training kit was designed by the Master IPC Trainers (MIT's) at STI Electronics to assist MITs and Certified IPC Trainers (CITs) with an easy way to administer the physical inspection requirements of Module 5 of the IPC-J-STD-001 trainng program. These materials can also be used for other training programs that reference the IPC J-STD-001 Criteria.

Kit Contents:

- DVD
  - Instructional Video
  - Board Layout Form
  - Student Terminal Inspection Worksheets
  - Student PCA Inpsection Worksheet
  - Instructor Answer Keys
- Encapsulated Inspection Samples
  - (6) Printed Circuit Assembly (PCA) Samples
  - (8) Soldered Terminal Samples

Cost: $400.00

To place an order contact sales at (800) 858-0604 or sales@stielectronicsinc.com.

261 Palmer Road • Madison, AL 35758 • (800) 858-0604 • Fax 888) 650-3006

www.stielectronicsinc.com

Best Practices in Electronic Assembly Processes

Course Title:
Understanding and Implementing Best Practices in Electronic Assembly Processes

Course Instructor: Phil Zarrow & Joe Belmonte

Duration: 2 Days
When: May 20-21, 2014
Where: STI Electronics, Inc.

Course Objectives:

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 financial success of electronic assembly businesses. A comprehensive perspective on problem issues is developed for the most currently critical 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 Best Practices
- Pick and Place Best Practices
- Re-Flow Soldering Best Practices
- Wave and Selective Soldering Best Practices
- Conformal Coating Best Practices
- Best Practices Concerning "Challenging Technologies"
- QFNs
- Ultra-Miniature Components (0201s, 0100s, ultra-fine pitch BGAs and CSPs
- Process Optimization Best Practices
- Data Driven Process Design
- Practical Use of Design of Experiments (DOE) in Electronic Manufacturing
- Practical Use of Statistical Process Control (SPC) in Electronics Manufacturing
- Manufacturing organization best practices
- Q & A

Who Should Attend:

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

Course Price: $950.00 per person. 10% discount for multiple attendees.

Email STI Electronics, Inc. for more information or to register for the class (training@stielectronicsinc.com).

2014 Schedule

J-STD-001 "Requirements for Soldered Electrical and Electronic Assemblies"

IPC J-STD-001 Training Center

J-STD-001 Certified IPC Trainer (CIT) Certification Course - Madison, AL

April 21-25	August 11-15
June 2-6	December 1-5

J-STD-001 Certified IPC Trainer (CIT) Recertification Course - Madison, AL

April 30 - May 1	May 29-30
June 25-26	July 30-31
August 27-28	September 24-25
October 29-30	November 19-20

J-STD-001 Certified IPC Trainer (CIT) Space Addendum Course - Madison, AL

April 25	May 2
June 27	July 2
August 1 & 29	September 26
August 1 & 29	November 21
October 31	

J-STD-001 Certified IPC Application Specialist (CIS) Certification Course (Modules 1-6) - Madison, AL

June 23-27
Sept. 29 - Oct. 3

IPC-A-610E "Acceptability of Electronic Assemblies"

IPC/WHMA-A-620 Training Center

IPC-A-610 Certified IPC Trainer (CIT) Certification Course - Madison, AL

April 15-18	June 9-12
August 18-21	Decemer 8-11

IPC-A-610 Certified IPC Trainer (CIT) Recertification Course - Madison, AL

April 28-29	May 27-28
June 23-24	July 28-29
August 25-26	September 22-23
October 27-28	November 17-18

IPC-A-610 Certified IPC Application Specialist (CIA) Certification Course - Madison, AL

November 12-14

IPC-A-600E" Acceptability of Printed Boards"

IPC-A-600 Training Center

IPC-A-600 Certified IPC Trainer (CIT) Certification/ Recertification Course - Madison, AL

October 15-17

2014 Schedule

IPC/WHMA-A-620 "Requirements and Acceptance for Cable and Wire Harness Assemblies"

IPC/WHMA-A-620 Training Center

IPC/WHMA-A-620 Certified IPC Trainer (CIT) Certification Course - Madison, AL

May 19-22
July 8-11
October 20-23

IPC/WHMA-A-620 Certified IPC Trainer (CIT) Recertification Course, Madison, AL

April 21-22
May 8-9
June 30-July 1
September 11-12
October 15-16

IPC/WHMA-A-620 B Certified IPC Trainer (CIT) Space Addendum Course - Madison, AL

Prerequisite: IPC/WHMA-A-620B CIT Certification or Recertification Course.

May 12-16
July 14-18
September 15-19

IPC-7711/7721 "7721B Rework, "Modification and Repair of Electronic Assemblies

IPC-7711/7721 Training Center

IPC-7711/7721 Certified IPC Trainer (CIT) Certification Course - Madison, AL

July 21-25
October 6-10

IPC-7711/7721 "7721B Rework, "Modification and Repair of Electronic Assemblies

IPC-7711/7721 Training Center

IPC-7711/7721 Certified IPC Trainer (CIT) Recertification Course - Madison, AL

April 23-24
July 28-29
September 4-5
November 13-14

IPC-7711/7721 Certified IPC Application Specialist (CIS) Certification Course - Madison, AL

August 11-19
December 8-16

IPC-7711/7721 Certified IPC Application Specialist (CIA) Recertification Course - Madison, AL

December 17-18

Basic Soldering - Madison, AL
Available upon request.

MSFC/NASA-STD-8739.4 Cable Harness Certification Operator/Inspector

April 14-18

MSFC/NASA-STD-8739.1 Staking and Conformal Coating Operator/Inspector

November 3-6

To register for a class visit our website at www.stielectronicsinc.com.