



Soldering Technology International News

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April 2004

www.solderingtech.com

Dave's World

By David Raby



It has been a busy time at Soldering Technology International (STI) since my previous article. I mentioned at the end of that article that STI had just become a distributor for Kester Solder. That announcement came after the press deadline so that was all I could say at the time. I can tell you now that this is a very exciting opportunity for STI, as well as Kester, and you can look for big things from the two companies in the future. The technical capabilities, training programs, geographical needs, and customer service philosophies of both companies mesh very well and we expect the combination to be a very positive experience for our customers.

The only downside of becoming a Kester distributor was that we could no longer be an AIM distributor. We have worked with AIM for the past 7 years and it has been a very positive relationship for both companies. We are going to miss working with Rick Black and his organization and sincerely wish them the best of luck in the future.

We have also expanded our coverage of Florida by adding a 3rd sales person to the state. Ken Ward joins us and brings several years of experience in the electronics industry to STI. Ken joins Brian Parker and Brandon Champion to give us much more extensive coverage in Florida. I expect in the next issue to be writing about our new warehouse in the Tampa area.

I've also written vaguely over the past couple of years about the "Navy Project" our lab has been working on. It is finally public and we have spent a great deal of time on the road the past couple of months telling people about it. The project is called "Imbedded Component/Die Technology" (IC/DT) and involves imbedding all components on inner layers of the board through openings (cavities) in the board. You can read about the patented process inside this newsletter and also in the March issue of "Circuits Assembly" as well as in the SMTA's Pan Pacific Expo's Conference Proceedings.

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Trade Show Schedule

Atlanta SMTA Expo
Gwinnett Civic Center
Duluth, GA
April 22, 2004

Space and Missile Defense Conference and Exhibition
Von Braun Center
Huntsville, Alabama
August 16-19, 2004

Assembly Technology Expo
Rosemont, IL
September 28-30, 2004

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Dave's World (Cont.)

I owe many thanks to the PEO IWS 3A Program Office of the US Navy for their support in the research of this technology and to STI employees Mark McMeen, Casey Hatcher, and Jason Gjesvold along with Jim Raby for making it a reality. I honestly don't think I'm exaggerating when I say that I think this project will revolutionize the manufacturing of electronic assemblies.

On that note, I've got to run. A revolution can be very time consuming.

Best Regards,



David Raby
President/CEO

2004 Training-At-A-Glance Schedule

April 2004

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

May 2004

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

June 2004

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

- **April 12-16** - J-STD-001 Application Specialist Certification
- **April 12-15** - IPC/WHMA-A-620 Certified IPC Trainer (CIT) Certification
- **April 19-20** - IPC-A-610 CIT Recertification
- **April 21-22** - IPC J-STD-001 CIT Recertification
- **May 03-07** - IPC J-STD-001 CIT Certification
- **May 10-14** - IPC-A-610 CIT Certification
- **May 17-18** - IPC Rework and Repair CIT Recertification
- **June 07-11** - IPC Rework and Repair CIT Certification
- **June 14-17** - IPC/WHMA-A-620 CIT Certification
- **June 21-22** - IPC-A-610 CIT Recertification
- **June 23-24** - IPC J-STD-001 CIT Recertification

Register for Classes On-line at www.solderingtech.com

(256) 705-5512 or (800) 767-4919

Classes are conducted at our facility in Madison, AL unless otherwise noted.



STI² Imbedded Component/Die Technology

By: Mark McMeen

The Navy's Program Executive Office for Integrated Warfare Systems, STANDARD Missile Program Office (PEO IWS 3A), with support from ONR's Best Manufacturing Practices Center of Excellence (BMPCOE), identified the need for more robust circuit cards for critical Missile applications. Current industry trends toward all Plastic Encapsulated Microcircuits (PEMs), Lead Free Solders, and other factors threatened to significantly reduce the quality of military systems. After reviewing what was available from industry a test program was initiated to prototype an SM-2 circuit card and understand the production processes necessary to produce hardware utilizing Soldering Technology International's (STI) patent pending manufacturing technology called "Imbedded Component / Die Technology" (IC/DT).

STI has developed a new cutting edge technology for designing and manufacturing 3-Dimensional (3-D) circuit card assemblies (CCA) for military electronics. This revolutionary concept, the vision of Jim Raby (STI founder and Technical Director), addresses age-old barriers in circuit card design and fabrication. It eliminates many of the limitations in 2-Dimensional (2-D) printed circuit board (PCB) assembly. The ability to imbed components inside a printed circuit card assembly enables the CCA to handle **higher G-forces and thermal stresses** than current technology. This is accomplished by imbedding the die inside the circuit cards as shown below. No secondary packaging or solder interconnects are needed. Numerous other benefits result from this technology including greatly reduced board height and the ability to deal with greater I/O densities. Scott Reiter of PEO IWS 3A stated that "The main objective of the PEO IWS 3A project is to develop ultra high reliability circuit cards and eliminate a myriad of problems associated with current circuit card assembly processes, such as tin whiskers, PEMs hermiticity, parts obsolescence, and more". Brian Willoughby from the Navy's BMPCOE said, "We cannot afford to solve all these problems piece meal, a new approach was needed". This technology promises to **increase military reliability** by enhancing the **overall robustness** of the 3-D CCA eliminating many of the current and projected failure mechanisms.



Figure 1. New 3-D CCA Assembly with Imbedded Components (Source: STI).

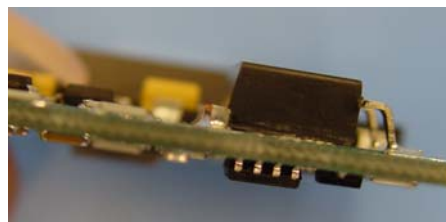


Figure 2. Current 2-D PCB Assembly with High-Profile Components (Source: STI).

The Navy sees current trends in industry as troubling. The military's smaller and smaller share of the electronics component market mandates the need for new thinking in the way military electronics are manufactured. Mr. Reiter stated "That we no longer have the market share necessary to drive the packaging and interconnect markets of commercial electronics to the quality we need for missile systems; this technology offers us an option to maintain the high quality and reliability we need in our military systems".

Continued on Page 4

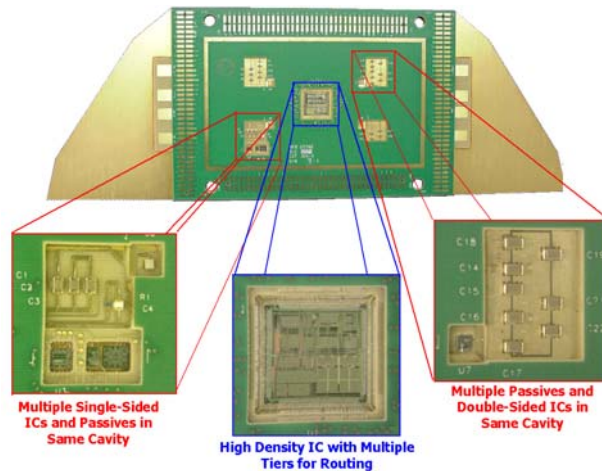


STI² Imbedded Component/Die Technology (cont.)

By: Mark McMeen

STI's "IMBEDDED COMPONENT / DIE TECHNOLOGY" (IC/DT), utilizes the smallest form and fit factor components and die available today with no secondary packaging (Figure 1). The imbedded technology places these components and bare die inside a printed circuit board substrate in a 3-D state utilizing the smallest amount of real estate required to meet the I/O objective. This is truly the smallest form factor available today since it is chip / die scale. This design methodology equates to lighter, faster, more reliable, and smaller CCA's. Size reductions of 80% can be achieved by eliminating the secondary packaging of most components / die and utilizing STI's Imbedded Component / Die Technology.

After several years of a very successful test program, STI with support from Raytheon is currently developing a circuit card that will be test flown in a SM-2 missile firing, currently scheduled for CY04.



IC/DT Advantages and Features (Source: STI)

Please visit our website at http://www.solderingtech.com/tech_articles/IC-DT_.pdf to read the full technical article. Questions may be directed to Mark McMeen at Soldering Technology International, 102 Tribble Drive, Madison, AL 35758; (256) 705-5515; E-mail: mmcmeen@solderingtech.com

Training Services: Hints, Tips and Solutions

By Frank Honyotski

Measles got you down?

Are you having problems with excessive measling? Measling is a condition that occurs in laminated base material in which the internal glass fiber are separated from the resin. They appear as discrete white spots in the laminate and are usually related to thermally induced stress. Baking the board may solve a lot of your problems. Make sure there are no heat sensitive parts that will be damaged by the temperature you plan to bake the board at. Bake below 100°C to stay below the boiling point of water. The goal is to evaporate the moisture not to turn it into steam that will actually create measles. The thickness of the board should be taken into consideration when determining the duration of the bake, however, 24 hours seems to work fine for most boards. Once the baking is complete soldering operations should be performed on the board immediately to reduce the amount of moisture re-absorption. Check the operating temperature of the soldering iron as well because extreme temperatures (428-482°C) will start to cause board damage after a few seconds of contact.

sti STI becomes the ERSA Selective Soldering & Reflow Oven Rep

STI has represented ERSA in the tool division selling products such as the Ersascope and IR550 for over 5 years. ERSA has and continues to be a front runner in selective soldering. The Versaflow® has been a staple in the industry especially in automotive electronics. Now ERSA is offering the Ecoselect for those with a smaller budget. We are truly excited about the capabilities of the ERSA equipment.



VERSAFLOW Highspeed



VERSAFLOW Ecoselect

Please visit www.ersa.com for a complete representation of offerings or contact one of our friendly Customer Service Representatives for additional information at (800) 858-0604.

Training Materials: Certification Kit News

As most of you are aware, the terms that we commonly use for our Certification Titles under the IPC programs have changed to Certified IPC Trainer (CIT) and Certified IPC Specialist (CIS). These terms are used throughout the many Certification Program like IPC-A-600, 610, 620, 7711/21, J-STD-001 and are intended to standardize the various titles created through the various IPC Training and Certification Committees over the years. The previous terms caused some confusion for those of us that are certified in multiple disciplines and the new terms better describe the intended certification audience and those actually attending the programs.



Standardized training as one of the goals for certification also benefits from standardized training materials such as the Certification Workmanship Kit created by STI to support the J-STD-001 CIS, CIT Training programs. The kits provide a consistent and economical method of performing Workmanship Performance projects required for CIT and CIS Certification. Each kit includes two circuit boards and enough components to build two assemblies. One for skill and technique practice, and the second for certification record.

For more information on the new IPC Certification titles or any of the Workmanship Certification kits, please contact Mel Parrish at mparrish@solderingtech.com or (256) 705-5530.

Surplus Inventory Sale

STI, 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.solderingtech.com, and is updated monthly. Please call (256) 461-9191 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



By now you have read the technical article in the previous pages that I have been eluding to in earlier editions of this newsletter. This technology (IC/DT) is not only the best program that I have ever been associated with, it also offers the solution to more problems than any other. IC/DT can withstand a much more harsh environment than anything before. It also protects from Electromagnetic Interference and can withstand vibration and shock levels never before seen by an electronic assembly. In addition, IC/DT is the packaging solution for the use of “system on a chip” technology.

This new technology has taken on problems that have been on our tables for many years ie, efficient use of board area, cutting down on the number of interconnects between chip and circuit (secondary packaging) which provides for speed and cleanliness of signal. IC/DT also eliminates the need for all soldering including Lead-Free.

The largest technological hurdle has been the development of the bare board. It was not easy to find a board supplier willing to take on this task, using so much man power and so much equipment without knowing the planned outcome. Our board manufacturer stepped up to the plate and has done an outstanding job for us. Couple the board supplier, our people, and our sponsor, and a new technology has been born that should serve the industry well for many years to come. The task is not yet complete, but we will continue this development and refine it until manufacturability is commonplace. Mission Assurance at affordable prices, that’s what we’ve accomplished.

Remember if you have questions regarding problems in your work area on the subject of soldering technology, just send me an e-mail.

Thanks,
Jim