

Soldering Technology International News



Special Points of Interest

- **Dave's World**
- **Trade Show Schedule**
- **Training Schedule**
- **Engineering Services - Solder Depth Insertion: Why It Matters To You**
- **STI's Sales Department Features OK International**
- **Promotions and Discounts from OK International**
- **An Old Training Solution Revisited**
- **Jim's Corner**

Trade Show Schedule

SouthCon
Orlando, FL

January 14-15, 2004

Commercialization of Military & Space Electronics

Los Angeles, CA

February 9-12, 2004

Pan Pacific

Kahuku, Oahu, HI

February 10-12, 2004

APEX

Anaheim, CA

February 24-26, 2004

Atlanta SMTA Expo

Gwinnett Civic Center

April 22, 2004

Dave's World

I'm retired. Actually, I was retired against my will. Not from Soldering Technology International (39 employees can stop their celebration), but from the Surface Mount Technology Association (SMTA) Board of Directors. I've completed the maximum allowable two 3 year terms. I understand now why Congress doesn't want term limits. Once you have the best job in the world, why would you want to ever give it up? It's the first time since Little League or Cub Scouts that I've retired.

By David Raby



After several years of being an officer in the Tennessee Valley Chapter of the SMTA, in 1997 I was asked to run for a position on the SMTA Board of Directors. For some reason, I thought maybe with my experience running a small company I could help the overall organization grow and prosper, so I agreed. For some stranger reason, the 4000+ members of the SMTA, most of whom must have a sense of humor, elected me to the board and the fun began. My first board meeting was at Surface Mount International in San Jose, California during the fall of 1997. When I met the other directors, I quickly realized I was in way over my head. These folks were smart. They were leaders from many of our industry's leading companies and all were intent on making the SMTA the best organization it could possibly be. Eleven of the 12 directors were very technically oriented and also well versed in business. The other was, well... me. Somehow, they all seemed to accept me and the next 6 years were the best of my professional life.

From an industry point of view, the past 6 years have featured the best and worst of times. From an SMTA point of view, I'm proud to say that the organization has maintained its focus and overcome many challenges. They continue to provide relevant information to individuals and companies on existing and emerging technologies so those individuals and companies can achieve or maintain a competitive edge in the marketplace.

From an individual point of view, it has only been the best of times. I have learned so much about the industry, about technology, about business, about people, and about myself from a group of people of a caliber that I never would have had a chance to associate with if it had not been for the SMTA. I've had a chance to work with industry professionals all around the world and will continue relationships with many of those people even though my term is over. I've worked with two SMTA Presidents, Greg Evans of Indium Corporation whom I consider one of the best business people I have ever met, and Rod Howell of Libra Industries who has done a tremendous job leading us through the worst of the industry downturn while positioning us to take advantage of the recovery and never losing focus of our mission and the needs of the membership. I've also had the privilege of working with JoAnn Stromberg who is the absolute best Administrator that any professional organization has ever had. The rest of us come and go but as long as JoAnn is around, the organization will be in good hands.

Continued on Page 2

Dave's World (Cont.)

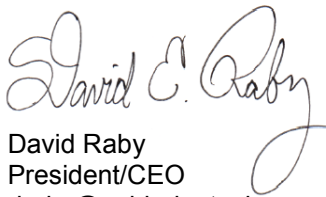
From an STI point of view, it was one of our best investments ever. Its President spent a few hours per month for 6 years working with and learning from leaders of the industry. STI has also gained credibility from being constantly associated with industry leading companies of the other directors. When you're a small company, it's good to see your name on equal billing with the likes of Hewlett Packard, Texas Instruments, Raytheon, Sanmina, Flextronics, and many others.

Over the next couple of months, most of the local chapters will be hosting meetings. I highly recommend, as always, that you attend because you will learn something. Those chapters are also looking for volunteers for local officers for the upcoming year. Give it a try and you'll probably find the same thing I did. You'll also feel good because you're working to help the industry grow. If you like it, in the summer JoAnn will be looking for volunteers for the board.

As far as retiring from STI, my daughter should gradu-

ate from college in about 16 years and my house is scheduled to be paid off in 29 ½ years. After that, I'll think about it.

Until next time, if you need me, I'll be in my rocking chair...



David Raby
President/CEO
draby@solderingtech.com

2003 Training-At-A-Glance Schedule

October 2003

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	

November 2003

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						

- **October 6-7** - IPC-A-610 Class "A" Instructor **Recertification**
- **October 8-9** - IPC J-STD-001 Registered Instructor **Recertification**
- **October 20-24** - IPC Rework and Repair Registered Instructor Certification
- **October 20-24** - IPC J-STD-001 Operator Proficiency Certification
- **October 27-30** - IPC/WHMA-A-620 Instructor Certification
- **October 27-31** - STI MSFC/NASA Solder Certification
- **November 3-7** - IPC J-STD-001 Registered Instructor Certification
- **November 3-4** - IPC Rework and Repair Registered Instructor **Recertification**
- **November 10-13** - IPC/WHMA-A-620 Instructor Certification
- **November 17-21** - IPC-A-610 Class "A" Instructor Certification
- **November 17-21** - STI MSFC/NASA Cable and Harness Certification

Register for Classes

On-line at www.solderingtech.com

or call

1-256-705-5512 or 1-800-858-0604

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



STI² Solder Depth Insertion: Why It Matters To You

By: Jason Gjesvold

While the vast majority of electronics manufacturing service providers consistently monitor process parameters to ensure their products are being manufactured within specified design tolerances, many are not aware of an attribute related to the insertion depth of the components. This depth, also known as the pedestal height, has a large impact on the end reliability of the solder connection, especially in harsh environments where vibration and thermal cycling are present. This pedestal height, a function of the insertion depth by the component placement equipment, determines the amount of bulk solder under the component leadframe and directly contributes to the overall strength and durability of the solder joint. Over the next month, STI's Engineering Services Division, in an effort to continually inform our customer base, will perform a study on pedestal height and the effects of component insertion depth. This detailed study will be aimed at determining the optimal placement depth to produce sufficient bulk solder region to ensure a robust solder connection is formed.

In preparation for the study, a detailed protocol was developed to ensure all variables were correctly identified. First, the component set was analyzed to determine the variables present. Most obvious was the need for very consistent and coplanar leads with respect to the component body. Most component placement machines assess the height of the component based on laser ranging from the bottom of the component body. Therefore, it is imperative that the component leads are well formed and consistently coplanar from device to device. Next, the solderability of the parts must be uniform and acceptable. In order to achieve the conditions specified, new components are being procured and sent to a specialist for leadframe alignment and verification. While the components are very important, they are only half of the material requirement. Since there is a variety of board finishes in use today, we have selected two very common board configurations to replicate during this test.

Continued on Page 4

Training Services: Hints, Tips, and Solutions

When trying to choose the right tip temperature, the first thing that must be done is to "read" the board to determine its thermal mass. 1. What type of laminate material is the board made of? Ceramic boards will absorb heat and may require preheating. A flexible board will heat rapidly. 2. How much metal is going to be heated by the tip? A plated through hole with a ground plane will require more heat than a single sided board. 3. What type of component is going to be soldered? A heat sensitive part may require a thermal shunt and a leadless ceramic chip carrier will dissipate the heat in a rapid manner.

The IPC-7711 suggests a starting temperature of 315°C (600°F) for most generic installations and then adjust up or down depending on the thermal mass of the connection. Trying to work at an incorrect temperature can damage the board by causing laminate or conductor damage.



• Newsletter Update •

To sign up to receive this newsletter electronically, by mail, or to discontinue receiving it, please contact Sandy Flack at 1-256-705-5520 or e-mail at sflack@solderingtech.com.

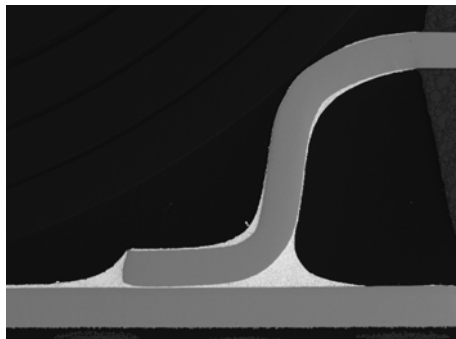




STI² Solder Depth Insertion: Why It Matters To You (Cont.)

The first board type will be a hot air solder leveled (HASL) board. The other will be an electroless nickel immersion gold (ENIG) board surface finish. These two boards should have marked differences in the pedestal height characteristics and should allow for a good comparison.

Finally, the proper alloy and flux chemistry must be specified for the test. In this evaluation, standard eutectic solder (Sn63/Pb37) will be utilized with a rosin mildly activated (RMA) flux. This flux will provide the activity needed for proper wetting, but will not encourage the solder to wick up the component leadframe and possibly skew the results. Stencil thicknesses for the board configurations will include a 3 mil stencil for the ENIG board, and a 6 mil stencil for the HASL board. Solder depth insertion intervals will consist of 0, 1, 2, and 3 mil insertion depths on the ENIG board, and 0, 2, 4, and 6 mil insertion depths on the HASL board. Following reflow, the samples will be microsectioned and analyzed with our scanning electron microscope to assess the thickness of solder under the leads, the amount of solder wicking up the leads, and the heel/toe fillet formation. A representative picture of what will be assessed can be seen in the figure below.



The full results table along with applicable data in reference to the pick and place machine setup will be discussed in the next issue of the newsletter. Stay tuned...

Please contact Jason Gjesvold at 1-256-705-5531 or email at jgjesvold@solderingtech.com if you have any questions regarding this article.

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 1-256-461-9191 or 1-800-858-0604 and ask for Sales. Quantities are limited so don't delay!

sti STI's Sales Department Features OK International

STI is proud to announce the addition of OK International to our product line. Products include Metcal Precision Soldering Equipment and Techon Dispensing Systems. Metcal continues to be a leader in the field of high end soldering and rework equipment. Techon offers a variety of dispensing systems capable of meeting consistently high quality performance requirements. We currently have significant levels of inventory ready to ship. Please contact one of our friendly Customer Service Representatives at 1-800-858-0604 for further details or to place an order.

Ask yourself three questions:

- Do I have STI's new catalog?
- Have I tried STI's pricing?
- Have I tried STI's Customer Service?

If you've answered NO to any of these questions, give STI a call and see what we can do for you.

Promotions and Discounts from OK International

⇒ Buy 4 – Get One Free

The Buy 4 – Get One Free promotion. If a Customer buys any four MX-500S, TS, or DS units, they get one unit free.

⇒ STSS Trade-In

Any Customer can trade in an old STSS Power Supply for a \$150 rebate on any new MX-500 unit.

An Old Training Solution Revisited



STI Part numbers

405-1024, Turret
405-1025, Bifurcated

Wire routing and component attachment to solder terminals is as consistent with production today as it has been throughout the years. A recent customer request, "can you still make these", resulted in the revitalization of an established product that allows solder skill training using terminals swage mounted to laminate blocks. These are very handy to use for training and skills development since they add to the realism of soldering with mounted terminals. It is one of the only ways to practice continuous wrap terminal wiring and terminal to terminal component mounting. Two terminal types are currently available: Turret and Bifurcated. Both have common properties to allow skill transfer to many other types. The terminals are mounted to 0.125" laminate to allow them to be grasped in a common workmanship vise. If you would like to enhance your training program using mounted terminals, please email or call your Customer Service Representative at 1-800-858-0604.



**Soldering Technology International, Inc.
(STI)**

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Jim’s Corner
Wave Solder 101

By: Jim D. Raby, PE



Last issue I said we would continue our discussion on different solder defects encountered from the wave solder process and review some of the causes of these defects. In addition, I also want to touch on pre-baking of boards. Let’s continue our discussion.

The defects that we’ll discuss in this issue are insufficient solder, solder voids and pinholes, and grainy solder.

“Insufficient Solder” - This defect is defined by the solder not coming up through the plated through hole far enough to meet requirements.

Possible Causes	
Flux not wetting the inside of the hole-check flux pressure	PWB immersion depth less than 50%
Conveyor speed too fast	Solder pot temperature is too low
Specific gravity of the flux is too high	

“Solder Voids and Pinholes” - These defects are characterized by holes in the solder joint. The bottom of the hole may or may not be visible.

Possible Causes	
Conveyor speed too fast	Specific gravity of the flux is too high
PWB immersion depth less than 50%	Outgassing - Crack/void in the plated through hole copper wall
Possible lead contamination	Specific gravity of the flux is too low - Excess solvent trapped

“Grainy Solder” - This defect is defined by a rough surface texture and the solder may be dull in appearance.

Possible Cause
Contaminated Solder Bath

There is one last thing I’d like to mention here and that’s about baking a board prior to running it across a wave. If you are having problems with blowholes, you may want to try pre-baking the boards. Blowholes may be caused by outgassing from an improper cure during board manufacture. The temperature and length of time for baking will depend on the individual board characteristics (i.e., thickness, number of layers, number of power and ground planes, and overall size are a few). Moisture or high humidity exposure may also require the board to be baked prior to wave soldering.