Abstract:

Embedding active and passive components in the circuit board offers improved performance by cutting interconnect parasitics, reliability gains by eliminating wire-bonds and solder-bumps, and reduced cost and size by parts list reduction. Like every new development, these benefits come at a price: disrupted logistics, yield management concerns, and limited rework and repair options. This presentation reviews the application and implementation of commercial and developmental technologies to embed active as well as passive components in printed circuit boards and other interconnect substrates. Topics include advanced material options, die contact metallurgy and processes, embedded chip packaging, and options for embedded passives. Solutions include organic-based (PWB, flex, and thin film) systems and ceramic-based (thick film, LTCC, and HTCC). Examples of specific embedded component structures, including Verdant’s Occam, Freescale’s RCP, and Imbera’s IMB technologies, demonstrate both the power and limitations of these approaches.
Bio-

A graduate of Stanford University, **Charles E. Bauer, Ph.D.** focuses in the areas of strategic technology planning, market analysis and international business development. With more than 30 years’ experience, Dr. Bauer also serves on Advisory Boards for a variety of academic and governmental institutions bringing tremendous breadth and depth to his work. Currently, Chuck serves as Senior Managing Director at TechLead Corporation and honors include:

- Founder, Pan Pacific Microelectronics Symposium
- SMTA Board of Directors (1997-2001)
- SMTA International Leadership Award (2007);
- SMTA Luminary (2009)
- Senior Member IEEE/CPMT
- Founder, ISHM/IMAPS Advanced Technology Workshop Program
- University of Portland Pamplin School of Business Administration Significant 75 Alumni Award

TechLead Corporation, an international management and engineering consulting firm with offices in Asia, Europe, and North America, stimulates the growth and success of its clients. Differentiating from other consultancies, TechLead emphasizes rigorous analysis and expert judgment resulting in actionable recommendations. TechLead's staff of seasoned professionals combines unique and extensive knowledge with more than 140 years of in-depth industry experience to transform data into INFORMATION and knowledge into UNDERSTANDING yielding substantiated insight into your organization’s most demanding business and technology needs.

Upcoming Chapter meetings

**June Technical Speaker:**

Mark Gerber of ASE Group: “Packaging Roadmap” at our June 17th, Chapter meeting.

**Chapter Calendar 2015/16:**

- June - Chapter meeting on the 17th “Advanced Packaging”
- July & August Open
- September - Chapter meeting on the 11th Chapter Training Program
- October - SMTAI
- November - Chapter meeting on the 13th “Medical Electronics”
- December - Members Party on the 4th
- January - Chapter Meeting on the 8th “Failure Analysis”
- February - Hosting SMTA Chapter Leadership Forum
Presidents Message

Greetings to SMTA Dallas Chapter members and guests.

Due to the growth in attendance at our chapter meetings, we are steadily adding to the infrastructure of the meetings. We now have a good sound system, wireless microphones and a larger venue. The food is good and at a reasonable price. We have more volunteers to help with registration and set-up. We have a productive amount of technical information at these meetings that has resulted in greater participation. Last month’s presentation on Materials, Processes, and Defects was well received and could result in an all day training session available to you in November.

I am also very excited about our May 21 meeting as Chuck Bauer is a fantastic international speaker with a great topic.

Gary Tanel
Dallas Chapter President

Dallas Chapter Membership Rolls— 138 Members !!

- Global Members: 7
- Individual Members: 68
- Corp Members: 34
- Participating Members: 19
- Associate/Student Members: 9

Dallas Chapter Volunteers

“Many Hands Make Light Work” - THANKS !

Jimmy Fallin—Meeting setup and Audio
Carol Primdahl—Name Badges
Alicia Hamby—Web site and Linkedin updates
Tiao Zhou—Technical Committee

Dallas Chapter Corporate Member List - May 2015

ACD
Barry Sales, Inc.
BBM, Inc.
Circuitronics
Conecessus LLC
CVInc.
DG Marketing Corporation
Dragon Circuits
E.T.S. Group, Inc.
Electrolab Inc.
EWD Solutions
FHP Reps
Fujitsu Network Communications
GSC (Garland Service Company)
JTAG Technologies
Keysight Technologies
Krypton Solutions
Mek Americas LLC
Morgan Newton Company
National Circuit Assembly
NPI Technologies, Inc.
One Source Group
PAC Global, Inc.
Philips Entertainment
Precision Technology, Inc.
Roper Resources, Inc.
Southwest Systems Technology Inc.
SPEA America
Sunshine Global PCB Group
SVTronics, Inc.
The IPS Group, LLC
Trilogy Circuits, Inc
Variosystems, Inc.
VI Technology
Page 4 - Just wondering…

Are you reading this at work?

Here's a morning caffeine quiz.

1. You're an average American coffee drinker. That means you consume ...
   a) 1 cup a day b) 2 cups a day c) 3 cups a day

2. True or false: If coffee says "decaffeinated" on the label, you can assume there's no caffeine in it.

3. How long does it take to get the peak caffeine rush from a cup of coffee?
   a) 5 minutes b) 15 minutes c) 30 minutes

4. True or False: You get more caffeine in a cup of espresso than in a mug of coffee.

5. • True or false: The way you can tell how much caffeine is in coffee beans is how dark or light they are.

6. Do people get more sensitive or less sensitive to caffeine as they get older?

7. • True or false: Coffee is the world's second most popular drink.

8. On average, how long will it take your body to get rid of the first half of the caffeine you've drunk?
   a) 2 to 3 hours b) 3 to 6 hours c) 6 to 8 hours

9. Roughly what percentage of the world's adults drink coffee every day?

10. Who rids their bodies of caffeine quicker—men or women?

11. True or false: Drinking moderate amounts of coffee can reduce your chance of getting colon cancer by as much as 30%.

12. Where does most of the caffeine used in soft drinks come from?
   a) The kola nuts used in flavoring b) Decaffeinated coffee c) A lab in Omaha, Nebraska

13. Why is caffeine put in soft drinks?

14. True or false: Drinks containing caffeine make you urinate more.

Answers on Page 6
Page 5 Technology Corner

**What is a net-list used for in a fabrication environment?**

A net-list compare is required for IPC Class 2 or 3 jobs and any other job that the customer has supplied a net-list. Typically the net lists are IPCD356, IPCD356A or some other Ascii type file such as a Mentor neutral file.

The purpose of the net-list is to verify the design criteria against the output Gerber files to make sure there are no differences between the desired design and the generated Gerber files.

Many times over the years the manufacturer has been asked to generate a net-list file from the provided Gerber’s.

This is NOT a valid computation. If the fabricator generates a net-list based upon the provided output Gerber’s, at no time will there EVER be a mis-match. The more complex the design is, the more a net-list really should be provided to verify the Gerber output files against the master design. Does this mean that if the design company provides a net-list and it is created at the same time as the Gerber files that you will be guaranteed to not have any inconsistencies? Not at all. The net-list itself can have definition issues that can arise, such as tooling holes also used as grounding and can come up in an analysis as “broken” or open nets. The same can be said for edge connection type features where plated half holes or slots make a physical connection in the final application.

A very common INTENTIONAL mismatch is a netlist short from Analog ground to digital Ground, typically described right at the beginning of the netlist, net 0 or net 1.

It is ALWAYS helpful when a known anomaly exists on the net-list, that it be communicated via a read-me or some other note so that the job does not go on hold and lose time in the manufacturing front-end. Something as simple as a note saying, “Shorted net at AGND/DGND is intentional.” Can keep your parts from going on hold.

Karl Doebbert....
REASONS TO JOIN YOUR LOCAL SMTA CHAPTER

- Do you have something to share such as new technologies or new products?
- Are you new in a sales territory – do you know all the players? Do they know you?

Be informed and involved on the Local Chapter level:

- Take advantage of technical information provided at local meetings
- Get to know colleagues in your local area
- Network for technical information and get to know companies and people in your local area
  - Share information with colleagues on new products and services

THE MISSION OF SMTA

The Surface Mount Technology Association (SMTA) membership is a network of professionals who build skills, share practical experience and develop solutions in electronic assembly technologies and related business operations.

MEMBERSHIP DUES

Participating: $50 - If your company (same location/division) holds a Corporate Membership it’s employees are eligible to receive the full range of benefits at a discounted price.

Individual: $75 - This membership is designed for individuals who wish to join SMTA to receive all the benefits independent of a Corporate Membership.

Corporate: $450 - A corporate membership in SMTA provides discounts to employees located in the same location/division where the Corporate Membership is held.

Student/Retiree: $5 - The Student/Retiree Membership is available to all full-time post-secondary students and retirees at a discounted rate.

HOW TO JOIN

On-line at www.smta.org

PAGE 5 ANSWERS: 1=b, 2=False, 3=c, 4=False, 5=False, 6=More Sensitive, 7=True, 8=b, 9=About 50%, 10=men, 11=True, 12=b, 13= to addict you to the drink, 14=True.