



WEST 2015

Conference & Exhibition

SHOW GUIDE

SANTA CLARA CONVENTION CENTER
CONFERENCE: SEPTEMBER 15 - 17
EXHIBITION: WEDNESDAY SEPTEMBER 16

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From the PCB West 2015 Conference Chair

For 24 years PCB West has been proud to come to the Silicon Valley as the premier conference and exhibition for the PCB supply chain.

And no wonder! The area is teeming with excitement as innovators and blue chip companies alike compete to develop the Next Big Thing.

This year's event, which takes place September 15th - 17th at the Santa Clara Convention Center, focuses on the design and manufacture of PCBs, HDI, electronics assembly and printed circuit board test, and gives engineers, designers, fabricators, assemblers and managers an opportunity to improve skills, increase knowledge and network with peers, colleagues and experts. The program – our largest to date – features something for everyone, no matter their experience level or background. The IPC Designers Council Certification Program also returns for the third straight year.

We are also pleased to note that the exhibition has grown with the conference, to the point where now more than 100 companies will show off what they can do. See why this is the largest and most in-depth PCB trade show in the Silicon Valley.

Looking forward to seeing you at the show!



Mike Buetow



PCB West Guidelines

ADA Requirements

Anyone requiring special ADA assistance as outlined in the ADA, please contact Show Management at the registration desk.

Age Restrictions

No children under the age of 18 are permitted.

Paging

Only emergency paging and show management announcements will be allowed during show hours.

Conference Proceedings

Conference Proceedings are available onsite at the registration desk for \$150. Proceedings may also be purchased after the show online at www.pcbwest.com.

Exhibition Policy/No Suitcasing

Please note that any attendee or exhibitor who is observed to be soliciting business in the aisles or other public spaces, in another company's booth, or in violation of any portion of the PCB West Exhibitor Kit will be asked to leave immediately. Please report any violations to show management at the registration desk.

Security

All PCB West 2015 badges must be visible at all times. Badges indicate the admission type for each attendee. If your badge is not visible, you will not be permitted inside.

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PCB West Schedule-at-a-Glance

TUESDAY, SEPTEMBER 15

9:00 am – 10:00 am

1: 3D Multi-board Product-level Design

Speakers: Craig Armenti, Zuken
Room: 208

9:00 am – 11:00 am

2: An Integrated Approach to RF/MW Design and Manufacturing

Speaker: Judy Warner and Norm Swanberg, Zentech
Room: 207

3: Differential Pairing Routing

Speaker: Rick Hartley, RHartley Enterprises
Room: 203/204

4: Methods for Dissipating Heat from Circuit Boards

Speaker: Markus Wille, Schoeller-Electronics GmbH
Room: 206

9:00 am – 12:30 pm

5: How Current Flows in PCB Traces

Speaker: Doug Brooks, Ultra CAD
Room: 201

9:00 am – 5:00 pm

6: The Basics of PCB Design

Speaker: Susy Webb, Design Science
Room: 202

10:00 am to 11:00 am

7: Electromagnetic Fields for Normal Folks

Speaker: Dan Beeker, Freescale
Room: 208

11:00 am to 12:00 pm

8: Like the Controlled Substances, RoHS Persists

Speaker: Jim Bogert, FischerTechnology, Inc.
Room: 208

9: Power Delivery Network Design for PCB Designers

Speaker: John Carney, Cadence
Room: 203/204

10: Build Better Products Faster with Product-Level Architecture Validation

Speakers: Bob Potock, Zuken
Room: 207

12:30 pm to 1:30 pm

Streamline Lunch-n-Learn

(Tuesday Conference attendees and speakers only)
Room 209/210

1:30 pm to 2:30 pm

11: PCBs with Embedded RFID Technology

Speakers: Gernot Seeger, Beta Layout
Room: 208

1:30 pm to 4:00 pm

12: Power Integrity and Decoupling Primer for PCB Designers

Speaker: Ralf Brüning, Zuken
Room: 206

1:30 pm to 5:00 pm

13: Circuit Grounding to Control Noise and EMI

Speaker: Rick Hartley, RHartley Enterprises
Room: 203/204

14: PCB Stack Up Design and Material Selection

Speaker: Bill Hargin, NanYa
Room: 201

1:30 pm to 5:30 pm

15: Effective PCB Design: Techniques to Improve Performance

Speakers: Dan Beeker, Freescale
Room: 207

2:30 pm to 5:00 pm

16: Embedded Actives and Passives

Speaker: Happy Holden
Room: 208

4:00 pm to 5:00 pm

17: Techniques to Route and Tune Advanced Interfaces in 1/4th the Time

Speaker: Michael Catrambone, Cadence
Room: 206

WEDNESDAY, SEPTEMBER 16

8:30 am to 12:00 pm

18: Journey into the Basics of HDI

Speaker: Susy Webb, Design Science
Room: 202

19: Basics of PCB Fabrication

Speaker: Kathy Nargi-Toth, NCAB USA
Room: 201

9:00 am – 10:00 am

20: How to Market Your Design Skills

Speaker: Gary Ferrari, FTG
Room: 207

21: Compliant High-Density Interconnect for Semiconductors and Optoelectronics

Speaker: Eugene Chow, PARC
Room: 208

9:00 am – 11:00 am

22: Design of Power Distribution and Decoupling

Speaker: Rick Hartley, RHartley Enterprises
Room: 203/204

9:00 am – 12:00 pm

23: Trace Current and Temperatures Revisited

Speaker: Doug Brooks, UltraCAD
Room: 206

Meet Me at the Water Cooler
Sponsored by Prototron,
Booth #505

10:00 am - 2:00 pm

Barista Coffee Cart on the exhibit floor
sponsored by Zuken,
Booth #413

10:00 am to 11:00 am

24: Implications of Silicon on Polymer Technology for PCBs

Speaker: Rich Chaney, American Semiconductor
Room: 207

10:00 am to 12:00 pm

25: Updates to IPC Design Standards

Speaker: Gary Ferrari, FTG
Room: 208

11:00 am to 12:00 pm

26: Achieving Signal Integrity and Meeting EMI Radiation Requirements Using High-Speed Connectors

Speaker: Robert Hanson, Americom
Room: 203/204

27: Roll to Roll Printed Electronics Manufacturing

Speaker: Richard Morris, Si-Cal Technologies
Room: 207

12:00 pm to 1:00 pm

"Networking and Noshing" luncheon on exhibit floor sponsored by Sierra Circuits, Booth #408

PCB West Schedule-at-a-Glance (continued)

WEDNESDAY, SEPTEMBER 16 (continued)

1:00 pm to 2:00 pm

28: Power Distribution Made Easy

Speaker: Dan Beeker, Freescale
Room: 201

29: How to Avoid Getting Totally Skewed: Glass-Weave Skew in High-Speed Design

Speaker: Bill Hargin, NanYa
Room: 202

1:00 pm to 3:00 pm

30: Alternate Finishes to HASL (including ENIG, ENEPIG, Immersion Silver, Immersion Tin and DIG)

Speaker: George Milad and Don Gudeczuaskas, Uyemura
Room: 208

1:00 pm to 4:30 pm

31: RF and Mixed Signal Board Design

Speaker: Rick Hartley, RHartley Enterprises
Room: 203/204

32: What's New in IPC-7351C

Speaker: Tom Hausherr, PCB Libraries
Room: 206

2:00 pm to 3:00 pm

33: Ten Common Misunderstandings in High-Speed PCB Design

Speaker: Bruce Wu, EDADOC
Room: 201

2:00 pm to 4:00 pm

34: PCB Design Techniques to Improve ESD Robustness

Speaker: Dan Beeker, Freescale
Room: 207

35: Switching Circuits in Electronic Systems (Problems and Solutions for the Design Engineer)

Speaker: Doug Smith, D. C. Smith Consultants
Room: 202

3:00 pm to 4:00 pm

36: Tips and Techniques to Characterize Signal Integrity Problems Quickly and Accurately

Speaker: Heidi Barns, Keysight Technologies
Room: 201

3:00 pm to 5:00 pm

37: Buried Planar Capacitance

Speaker: Gary Ferrari, FTG
Room: 208

4:00 pm to 5:00 pm

38: PCB Design: Best Practices for More Reliable Manufacturing

Speaker: Duane Benson, Screaming Circuits
Room: 207

39: Interconnect Loss Budgeting for Multi-Gigabit Design

Speaker: Bill Hargin, NanYa
Room: 201

5:00 pm to 6:00 pm

Evening Reception on the exhibit floor sponsored by Altium, Booth #311

5:00 pm

Complimentary beverages provided by EMA, Booth #400

WEDNESDAY, SEPTEMBER 16 FREE DESIGN SESSIONS

*The below session indicated with a "F" are free to all exhibition and conference attendees

9:00 am to 10:00 am

F1: Wideband Insertion Loss Testing of Multiple PCB Final Plated Finishes

Speaker: John Coonrod, Rogers
Room: Mission City 3

F2: Replacing IDF with IDX Baseline Flow

Speaker: Ed Acheson, Cadence
Room: 212

10:00 am to 11:00 am

F3: Think Systems! Circuit Components to Completing Complex Project Designs

Speaker: Mahmoud Wahby, National Instruments
Room: Mission City 3

F4: An Update on Design Data Transfer Using IPC-2581

Speaker: Hemant Shah, Cadence
Room: 212

11:00 am to 12:00 pm

F5: Pre-bonded and Post-bonded Metal-Backed PCBs and Their Uses

Speaker: Anaya Vardya, American Standard Circuits
Room: 212

F6: High Frequency Loss Test Methods for Laminate Materials Comparison

Speaker: Karl Sauter, Oracle
Room: Mission City 3

1:00 pm to 3:00 pm

F7: 10 (More) Common Errors in PCB Design and How to Catch Them

Speaker: Ray Fugitt, DownStream and Dave Hoover, TTM
Room: Mission City 3

3:00 pm to 4:00 pm

F8: Electromagnetic Fields and Signal Integrity

Speaker: Doug Brooks, UltraCAD
Room: Mission City 3

4:00 pm to 5:00 pm

F9: Accelerating the PCB Design Process

Speaker: Gary Lameris, Mentor Graphics
Room: Mission City 3

WEDNESDAY, SEPTEMBER 16 FREE ASSEMBLY SESSIONS

*The below session indicated with a "F" are free to all exhibition and conference attendees

1:00 pm to 2:00 pm

F10: Introduction to PCB & EMS Warpage Management

Speaker: Ken Chiavone, Akrometrix
Room: 212

2:00 pm to 3:00 pm

F11: Insights on the U.S. Circuit Board Manufacturing Base

Speaker: Mark Crawford, US Dept. of Commerce
Room: 212

3:00 pm to 4:30 pm

F12: Developments in Board and Assembly Level Process

Speaker: Babak Arfaei, Universal Advanced Process Laboratory Circuits
Room: 212

PCB West Schedule-at-a-Glance (continued)

THURSDAY, SEPTEMBER 17

9:00 am to 10:00 am

40: Optimizing Cost and Performance with 3D Chip/Package/Board Co-design

Speaker: Humair Mandavia, Zuken
Room: 207

9:00 am to 12:30 pm

41: PCB Design Fundamentals

Speaker: Randall Myers, Mentor Graphics
Room: 203

42: Building a Bridge from PCB Design to Manufacturing

Speaker: Susy Webb, Design Science
Room: 202

43: Design and Assembly Process Principles for Flexible and Rigid Flex Circuits

Speaker: Vern Solberg, Solberg Technologies
Room: 205

9:00 am to 5:00 pm

44: Design for High Reliability PCBs and Assemblies

Speaker: Gary Ferrari, FTG
Room: 208

10:00 am to 12:30 pm

45: What You Need to Learn to Gain 3X to 4X Higher Layout Density

Speaker: Happy Holden
Room: 204

10:00 am to 11:00 am

46: Assessing a PCB Assembly Facility

Speaker: Phil Marcoux, One PPM and Tom Clifford
Room: 207

11:00 pm to 12:00 pm

47: Global Supply Chain Qualification and Monitoring Methods

Speaker: Kathy Nargi-Toth, NCAB
Room: 207

12:30 pm to 1:30 pm

Polar Instruments Lunch-n-Learn

(Thursday conference attendees and speakers only)

Room: Mission City 5

1:30 pm to 3:30 pm

48: Layout of Switch Mode Power Supplies

Speaker: Rick Hartley, RHartley Enterprises
Room: 203

49: Next Generation High Density Structures and Applications

Speaker: Happy Holden
Room: 201

50: Ask the Flexperts

Speaker: Mark Finstad, Flex Circuit Technologies and Mark Verbrugge, Amphenol Sincere

Room: 202

1:30 pm to 4:30 pm

51: The Challenges of Designing with the New BGAs

Speaker: Susy Webb, Design Science
Room: 205

1:30 pm to 5:00 pm

52: Cost-Conscious Test Strategies for Electronic Products

Speaker: Robert Hanson, Americom
Room: 207

3:30 pm to 4:30 pm

53: Addressing Multi-Board Systems Design with an Optimized Design Process

Speaker: Gary Lameris, Mentor Graphics
Room: 202

3:30 pm to 5:30 pm

54: Signal Attenuation in Very High Speed Circuits

Speaker: Rick Hartley, RHartley Enterprises
Room: 203

FRIDAY, SEPTEMBER 18 THROUGH SUNDAY, SEPTEMBER 19 IPC CERTIFICATION COURSES

Questions regarding the IPC Certification Program, please contact Cheryl Fisher at 800.643.7822 x223 or cherylfisher@eptac.com.

9:00 am to 5:00 pm

S1: IPC Designers Certification Program (CID)

Speaker: Mike Creeden
Room: 201

S2: IPC Advanced Designers Certification Program (CID+)

Speaker: Gary Ferrari, FTG
Room: 202

SUNDAY 9:00 am to 12:00 pm

Exam day

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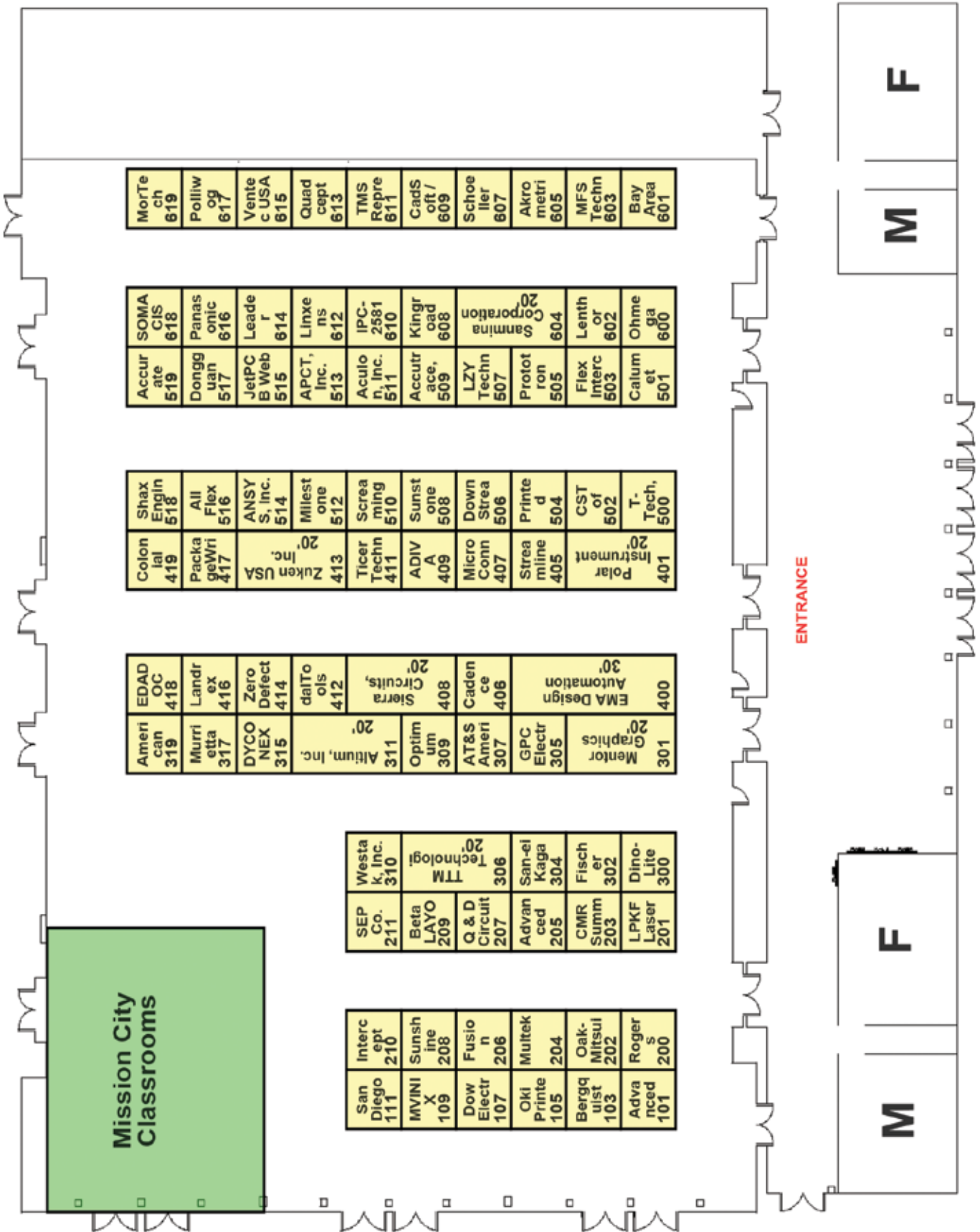
Visit us in booth #519

PCB West Exhibitor List

Accurate Circuit Engineering	Booth #519
Accutrace, Inc.	Booth #509
Aculon, Inc.	Booth #511
ADIVA Corporation	Booth #409
Advanced Assembly, LLC	Booth #101
Advanced Circuits	Booth #205
Akrometrix, LLC	Booth #605
All Flex Flexible Circuits & Heaters	Booth #516
Altium, Inc.	Booth #311
American Standard Circuits, Inc.	Booth #319
ANSYS, Inc.	Booth #514
APCT, Inc.	Booth #513
AT&S Americas LLC	Booth #307
Bay Area Circuits, Inc.	Booth #601
Bergquist Company (The)	Booth #103
Beta LAYOUT Ltd.	Booth #209
Cadence Design Systems	Booth #406
CadSoft / PentaLogix	Booth #609
Calumet Electronics Corporation	Booth #501
CMR Summit Technologies	Booth #203
Colonial Circuits, Inc.	Booth #419
CST of America, Inc.	Booth #502
dalTools	Booth #412
Dino-Lite Scopes (Big C)	Booth #300
Dongguan Shengyi Electronics Limited	Booth #517
Dow Electronic Materials	Booth #107
DownStream Technologies, Inc.	Booth #506
DYCONEX AG	Booth #315
EDADOC USA, Inc.	Booth #418
EMA Design Automation	Booth #400
Fischer Technology, Inc.	Booth #302
Flex Interconnect Technologies	Booth #503
Fusion Electronics Pvt Ltd	Booth #206
GPC Electronics	Booth #305
Intercept Technology, Inc.	Booth #210
IPC-2581 Consortium	Booth #610
JetPCB Web LLC	Booth #515
Kingroad Elec. Co.,Ltd. Zhuhai	Booth #608
Landrex Technologies Co., Ltd.	Booth #416
LeaderTech, Inc.	Booth #614
Lenthor Engineering, Inc.	Booth #602
Linxens Holding	Booth #612
LPKF Laser & Electronics	Booth #201

LZYTechnology USA Inc.	Booth #507
Mentor Graphics Corporation	Booth #301
MFS Technology (S) Pte Ltd	Booth #603
MicroConnex	Booth #407
Milestone Technology	Booth #512
MorTech	Booth #619
Multek	Booth #204
Murrietta Circuits	Booth #317
MVINIX Corporation	Booth #109
Oak-Mitsui Technologies	Booth #202
Ohmega Technologies, Inc.	Booth #600
Oki Printed Circuits Co., Ltd.	Booth #105
Optimum Design Associates	Booth #309
PackageWright	Booth #417
Panasonic Electronic Materials	Booth #616
Polar Instruments, Inc.	Booth #401
Polliwog Corporation	Booth #617
Printed Circuits, Inc.	Booth #504
Prototron Circuits	Booth #505
Q & D Circuits Co. Ltd.	Booth #207
Quadcept	Booth #613
Rogers Corporation	Booth #200
San Diego PCB, Inc.	Booth #111
San-ei Kagaku Co., Ltd.	Booth #304
Sanmina Corporation	Booth #604
Schoeller Electronics GmbH	Booth #607
Screaming Circuits	Booth #510
SEP Co. Ltd.	Booth #211
Shax Engineering	Booth #518
Sierra Circuits, Inc.	Booth #408
SOMACIS	Booth #618
Streamline Circuits	Booth #405
Sunshine Global PCB Group	Booth #208
Sunstone Circuits	Booth #508
Ticer Technologies	Booth #411
TMS Representatives, LLC	Booth #611
T-Tech, Inc.	Booth #500
TTM Technologies, Inc.	Booth #306
Ventec USA	Booth #615
Westak, Inc.	Booth #310
Zero Defects International	Booth #414
Zuken	Booth #413

PCB West Exhibit Floor (Located in the Mission City Ballroom)



MorTech 619	Pollwog 617	Ventic USA 615	Quadcept 613	TMS Repre 611	CadSoft / 609	Schoeller 607	Akrometri 605	MFS Techn 603	Bay Area 601
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Accurate 519	Dongguan 517	JetPCB Web 515	APCT, Inc. 513	Aculon, Inc. 511	Accurate, 509	LZY Techn 507	Prototron 505	Flex Inter 503	Calumet 501
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Colonial 419	PackageWri 417	ANSYS, Inc. 514	Milestone 512	Screening 510	Sunstone 508	Down Street 506	Printed 504	CST of 502	Tech, 500
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American 319	Murrietta 317	DYCO NEX 315	Altium, Inc. 311	Optimum 309	AT&S Ameri 307	GPC Electr 305	Mentor Graphics 301	EMA Design 300	Automation 300
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Westek, Inc. 310	Beta LAYO 209	Q & D Circuit 207	San-el Kaga 304	Fisch 302	Dino-Lite 300
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San Diego 111	MVNI X 109	Dow Electr 107	Okiprinte 105	Bergquist 103	Advanced 101
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ENTRANCE

M F

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PCB West Exhibitors



Accurate Circuit Engineering

Booth #519
3019 S. Kilson Dr.
Santa Ana, CA 92865
P: 714-546-2162
sales@ace-pcb.com
ace-pcb.com

Accurate Circuit Engineering is a high-tech/quick turn manufacturer of high-speed hybrid and high layer count PCBs. We offer a complete one-stop solution for PCBs in as little as 24 hrs. ACE is AS9100C, Mil-Spec and ITAR certified.

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P: 408-748-9600
lana@pcbnet.com
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Gattuso@aculon.com
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sales@aapcb.com
aapcb.com

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Advanced Circuits

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Advanced Circuits manufactures PCBs from prototype boards to complex designs and large-scale production. Our high-quality standards and dependability, combined with our small quantity quick turn PCB assembly services, make us the leading one-stop solution for your PCB requirements.

Akrometrix, LLC

Booth #605
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P: 404-486-0880
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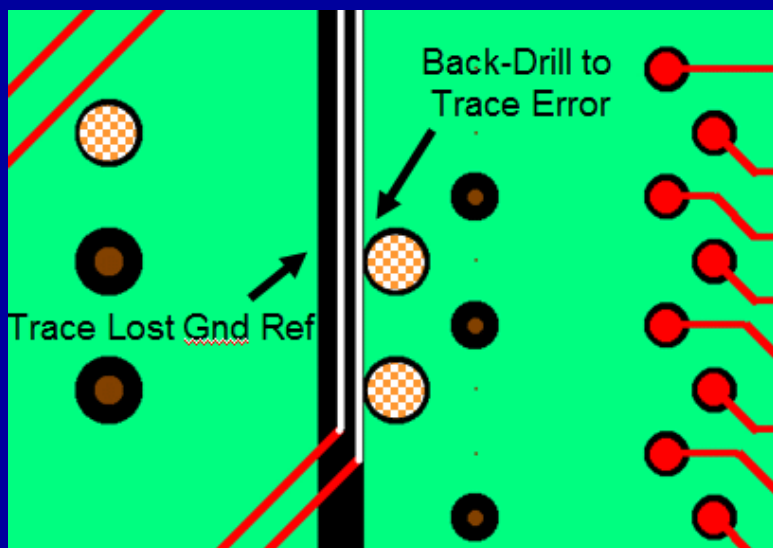
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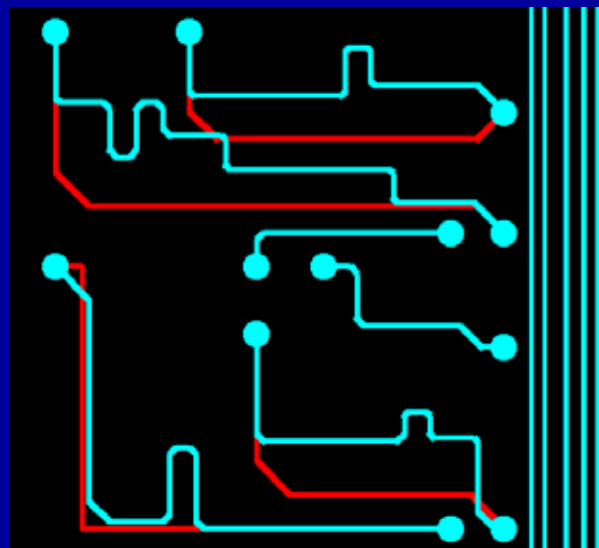
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PCB West Exhibitors (continued)

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altium.com

Known for excellence in native 3D PCB editing, Altium Designer incorporates the tools engineers and PCB designers need into a stress-free single user interface, while increasing design successes and reducing overall design times.

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a.pace@ats.net
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AT&S is the largest and technology-leading producer of printed circuit boards in Europe, with plants in Austria, China, India and Korea. AT&S has the most advanced high-tech facility for mass production of HDI printed circuit boards in China.

Bay Area Circuits, Inc.

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44358 Old Warm Springs Blvd.
Fremont, CA 94538
P: 510-933-9000
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Bay Area Circuits serves the PCB needs of electronics manufacturers, contract assemblers, and design engineers. Focusing on quick turn prototyping and production, leveraging high-quality designs, Bay Area Circuits has become the premier PCB supplier for discerning customers globally.

Bergquist Company (The)

Booth #103
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P: 952-835-2322
jannaf@bergquistcompany.com
bergquistcompany.com

Bergquist, a Henkel brand, manufactures high-performance thermal management materials that offer exceptional thermal control for today's advanced electronics devices.



Beta LAYOUT Ltd.

Booth #209
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tony.shoot@beta-layout.us
pcb-pool.com

Beta LAYOUT has been providing PCB services for 25 years. The technologies offered range from standard single lamination to blind, buried and microvia PCBs, in addition to standard FR-4 and hybrid materials.

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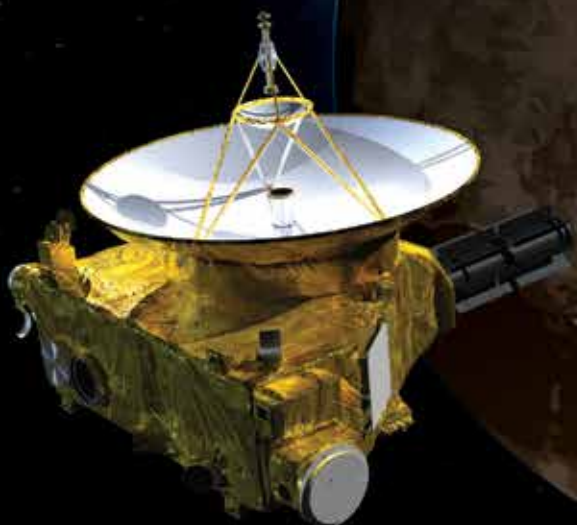
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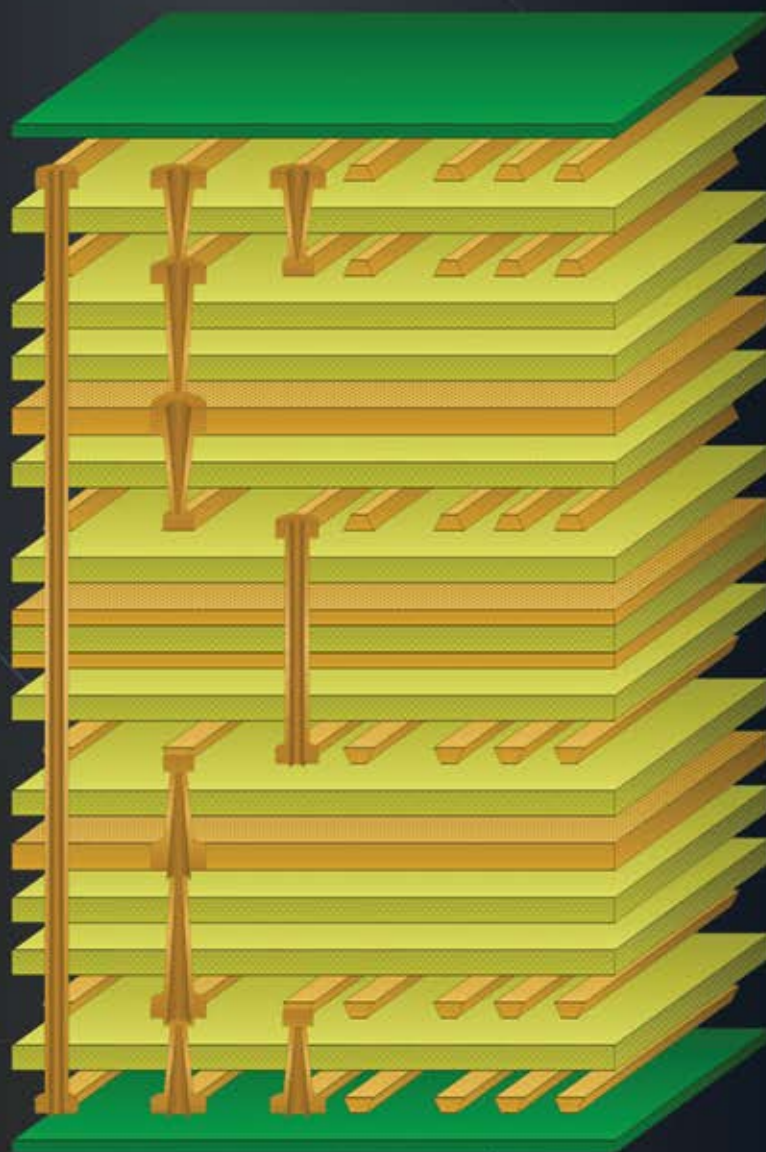
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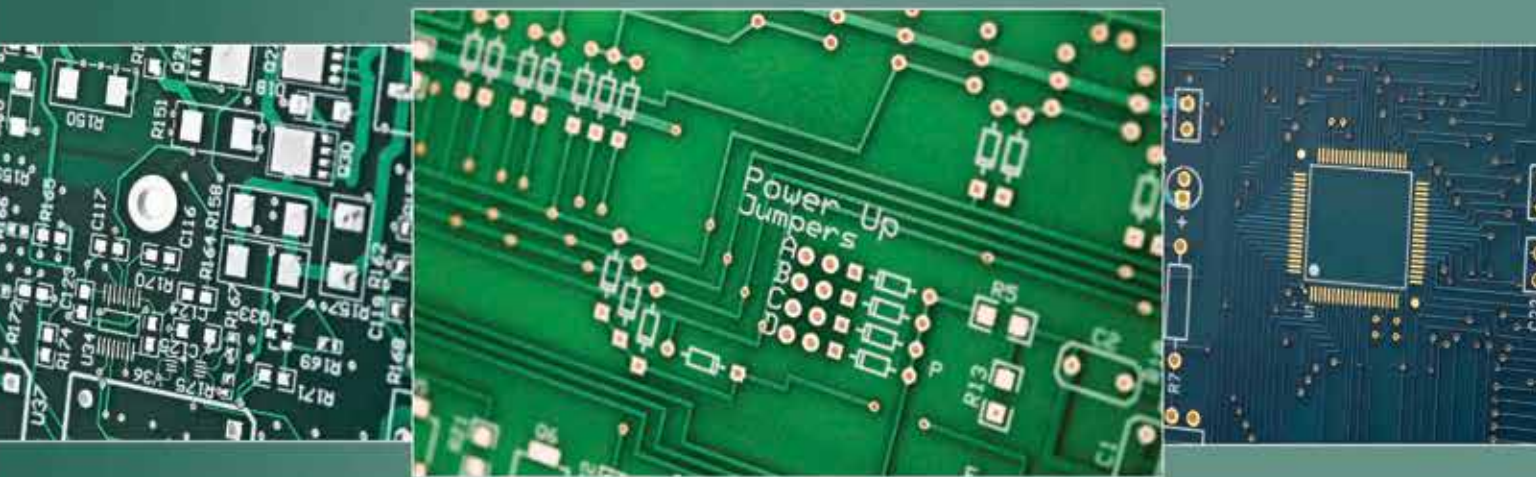
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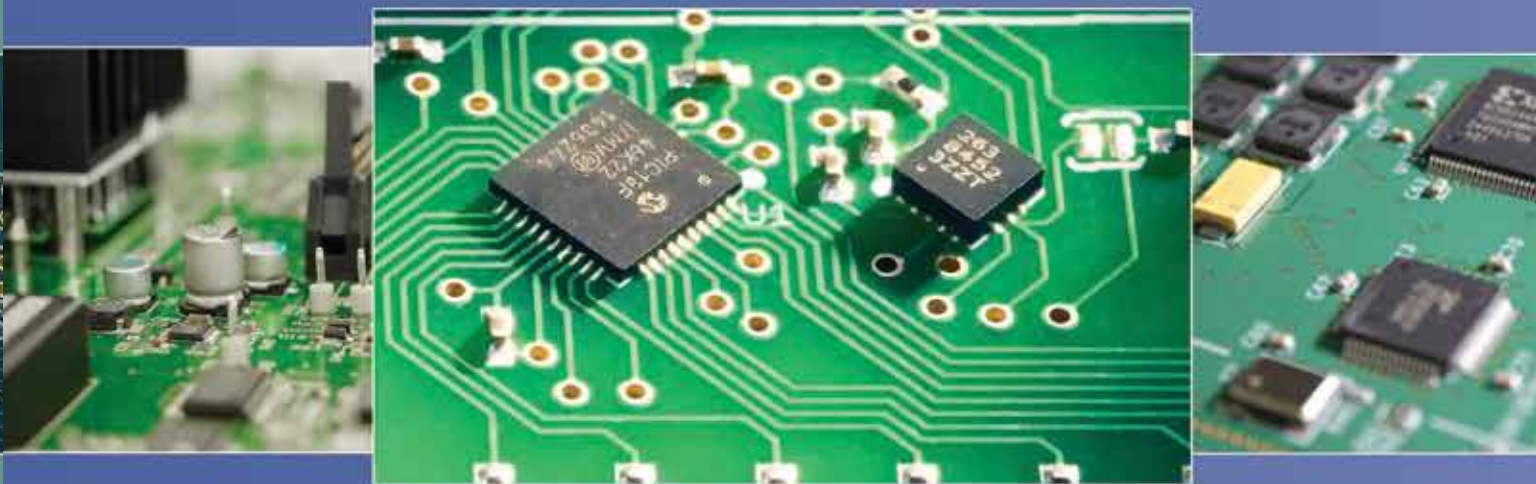
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Sunshine Global PCB Group manufactures printed circuit boards, specializing in high-mix products with low to medium volumes. Capabilities include 2L-36L PCBs, HDI, stacked microvias, via-in-pad, blind/buried vias, low loss materials, aluminum-backed boards, rigid-flex and flex circuits.



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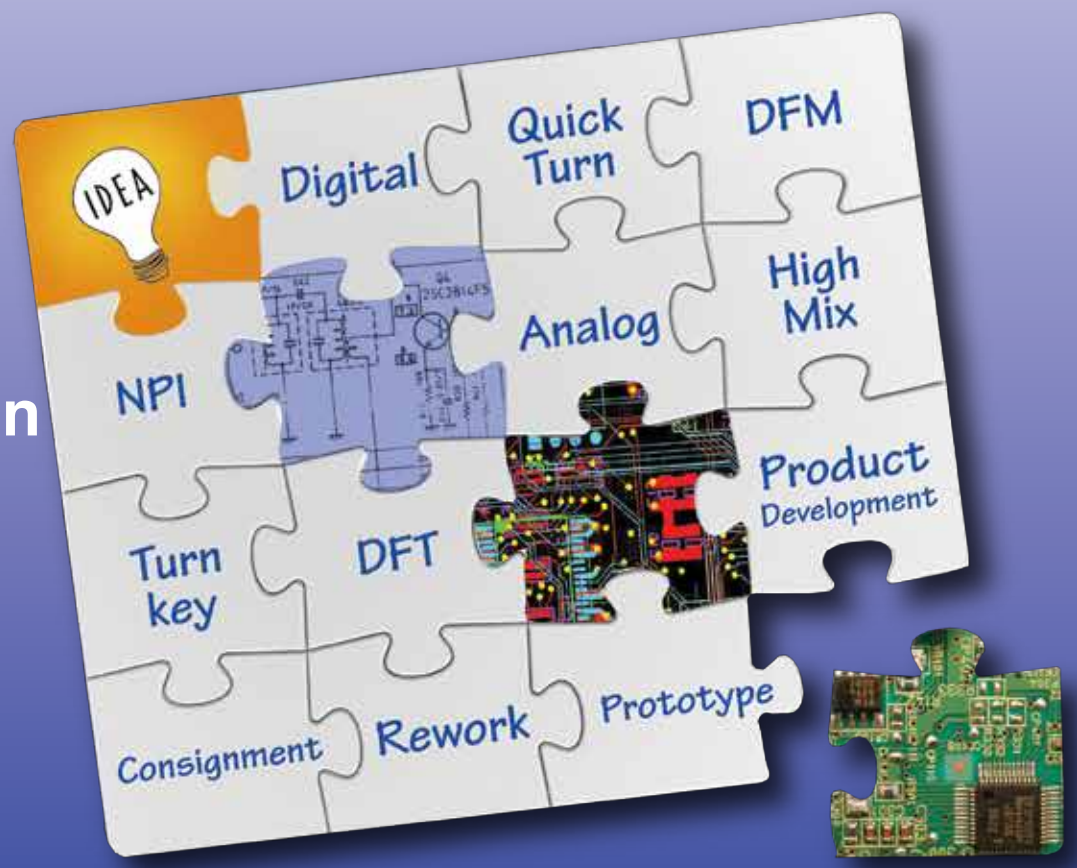
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TMS Representatives, LLC is a manufacturers' representative, technical sales and consultation firm. We partner with Spirit Circuits for MCPCB, multilayer PCB, flex, rigid-flex and specialty circuit board manufacture.

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T-Tech manufactures Quick Circuit PCB prototyping systems and produces analog, digital and RF/microwave circuit boards. T-Tech will show the QCJ5 series prototyping system with 3-axis motion and automatic tool change. Dispensing, depaneling, solder mask and IsoPro 3.2 software are new.

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P: 714-327-3000
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TTM Technologies manufactures PCBs, backplane and sub-system assemblies. TTM stands for time-to-market, and represents how the company's time-critical, one-stop manufacturing services enable customers to shorten the time required to develop new products and bring them to market.



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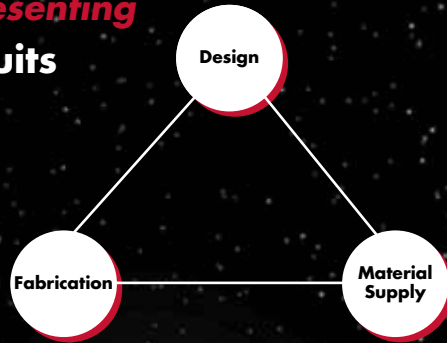
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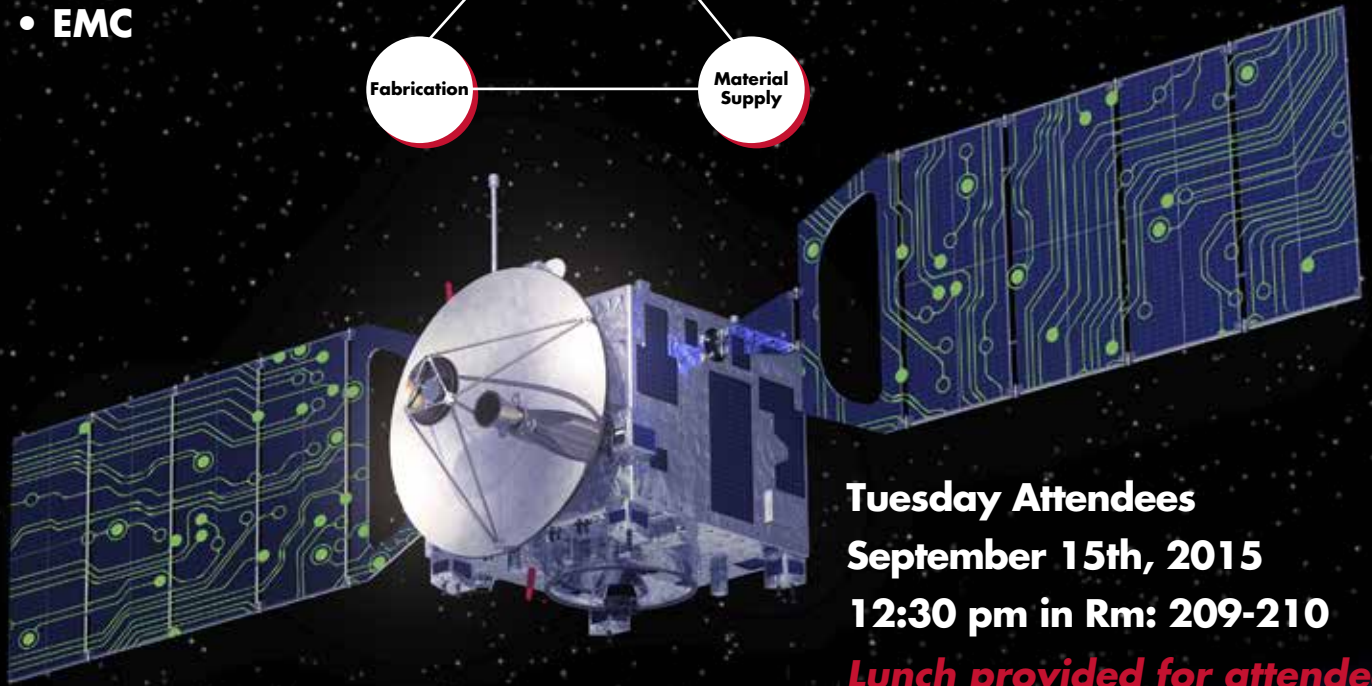
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PCB West Speaker Biographies

EDWARD B. ACHESON is a principal product engineer for Allegro PCB products at Cadence Design Systems, focusing on DFM, ECAD-MCAD (EDMD Schema), as well as the IPC-2581 Consortium. Acheson joined Cadence in 1990 and has played several roles, including software developer, consulting and process services engineer. In addition to product engineer duties, he leads the technical working group in the IPC-2581 Consortium. Prior to Cadence, Acheson was one of the first ECAD users at Wang Labs.

BABAK ARFAEI, PH.D. is currently a Process Research Engineer at Universal Instruments' Advanced Process Laboratory, where he conducts research in the area of reliability of electronic packages. He also serves as a research assistant professor in the Physics Department at Binghamton University. He is carrying out research on cutting edge packaging technology related topics such as new lead-free solder materials, Cu pillars and 2.5/3D packaging in collaboration with members of the Advanced Research on Electronics Assembly (AREA) consortium.

CRAIG ARMENTI is senior technical marketing manager for PCB products at Zuken. Over his 30-year career, he has held application support and management positions with several major telecommunication companies. He has a bachelor's in electrical engineering and an MBA from Fairleigh Dickinson.

HEIDI BARNES is a senior application engineer for high-speed digital applications in the EEs of EDA Group of Keysight Technologies. Past experience includes over six years in signal integrity for ATE test fixtures for Verigy, an Advantest Group, and six years in RF/microwave microcircuit packaging for Agilent Technologies. She rejoined Agilent Technologies in 2012 and holds a bachelor of science degree in electrical engineering from the California Institute of Technology.

DENIS C. BARBINI, PH.D., is associate director of the Universal Instruments' Advanced Process Laboratory. He started his career in the electronics manufacturing world after earning his doctorate in chemistry from Binghamton University. His current focus is identifying the critical needs in emerging technologies and electronics assembly processes in order to develop specific research and development projects. He has authored hundreds of peer reviewed articles, contributed to several books and presented to thousands of his peers on the results of his research over the past 17 years.

DANIEL BEEKER is a senior field applications engineer at Freescale Semiconductor. Prior to that, he spent 24 years as a field applications engineer at Motorola. He has 35 years' experience in electronics design, EMC and signal integrity.

DUANE BENSON is marketing manager for Screaming Circuits. Since the 1980s, as a product manager for companies such as Metheus and In Focus Systems, Benson has had prototype assembly experience ranging from solderless proto boards and wire wrap to hand soldering surface mount parts to fully automated machine assembly. His design experience has most recently included small robotics and motor control, which he writes about in industry publications and on his company blog. At Screaming Circuits, he uses knowledge gained from the company's prototype assembly service to write about techniques to improve the manufacturability of designs using advanced packaged components.

JIM BOGERT is director of western sales at Fischer Technology. He has over 30 years of experience in materials metrology with emphasis in x-ray fluorescence. He has held positions as applications scientist, product manager, and director of marketing and sales in the scientific equipment manufacturing industry.

DOUGLAS BROOKS has bachelor's and master's degrees in electrical engineering from Stanford University and a Ph.D. from the University of Washington. He has held positions in engineering, marketing, and general management with Hughes Aircraft, Texas Instruments and ELDEC. Brooks owned his own manufacturing company, and in 1992 he formed UltraCAD Design.

RALF BRUENING is product manager and senior consultant at the Zuken EMC Technology Centre. He holds degrees in computer science, electrical engineering and economics from the University of Paderborn. He is a member of the IBIS Open Forum and is a work-package leader for eMobility electronic design and simulation issues for the CATRENE research project.

JOHN CARNEY is a field application engineer with Cadence. He supports all Allegro PCB design products and the Signity product line. He graduated with a bachelor's in electrical engineering from SIU in 1998 and took a position at Orcad immediately following graduation. He loves being an AE because he never has the same day twice.

MICHAEL CATRAMBONE is a principal product engineer for Allegro PCB products at Cadence Design Systems, focusing on Allegro Core Functionality (constraint management, high-speed interfaces and interconnect and emerging technologies). Mike joined Cadence in 2012 as a principal product validation engineer prior to moving into his current role in 2015. Prior to joining Cadence he had over 24 years' experience in PCB development, library management, EDA software support and value-added process improvement, working for such companies as Automated Systems, USRobotics, 3Com Corporation, ComWorks, UTStarcom and Plexus Engineering Solutions. He is deeply involved with the Cadence user community, a past chairman of CDNLive - Cadence User Group and a past board member of the International Cadence Users Group.

RICHARD CHANEY is general manager for American Semiconductor. He has over 20 years of experience in semiconductor technology and management. He currently manages the Flex Silicon-on-Polymer production line, including product management, process engineering, and research and development. His work with pliable ICs extends into flexible electronics, including design of flexible circuits and integrating flexible assemblies into system manufacturing. Prior to American Semiconductor, Chaney was employed at Micron Technology where he had responsibility for the automotive, industrial, medical and military segment for DRAM and NAND products. Chaney holds a bachelor's in electrical engineering from Texas A&M University, an MBA from San Jose State University and multiple patents for data storage technology.

KEN CHIAVONE is vice president of engineering at Akrometrix. He leads the product development group with an emphasis on integrating advanced technological capabilities with intuitive user experience, and generating results for product owners that deliver value to their organizations. He is a graduate of Mercer University and for the past 20 years has designed new and next-generation products in the industrial, medical, software, and metrology industries.

DR. EUGENE CHOW manages the Microsystems Group at the Palo Alto Research Center (PARC). His group is developing advanced microdevices and systems for electronics packaging, printing, micro-chip assembly, and biomedical applications. PARC is a wholly owned subsidiary of Xerox, with research funding from Xerox, government, and non-Xerox commercial companies.



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PCB West Speaker Biographies (continued)

He earned a Ph.D. in electrical engineering and a master's in engineering management from Stanford University, as well as a bachelor's in engineering physics from UC Berkeley.

TOM CLIFFORD has a bachelor's in chemical engineering from Texas Tech, and has worked in plastics development, microelectronics, and aerospace industries for the past 40 years. He worked at Lockheed Martin/Sunnyvale before his recent retirement. Consultation jobs included working with ion-thrusters, medical products, soil remediation, reliability predictions, and novel electronics assembly architecture. He has served in editorial/advisory positions with Printed Circuits Europe, CIRCUITS ASSEMBLY and MEPTEC. He holds several patents and has authored many technical publications on SMT/PWB technologies, life-test statistics, test methods, quality assurance, reliability predictions, embedded passives, and outsource management.

JOHN COONROD is a market development engineer for Rogers Corp., Advanced Circuit Materials Division. He has been involved with the printed circuit board industry for 25 years, and has worked in multiple engineering positions related to flexible, rigid and high-frequency PCBs. Coonrod holds a bachelor's in electrical engineering from Arizona State University.

MARK H. CRAWFORD is a trade and industry analyst at the U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. He works with a team of analysts that produce specialized industrial assessments on a range of topics, including counterfeit electronics, space industry supply chain, strategic materials supply, parachute production, foreign dependency in health care, and information security practices.

DON GUDECZAUSKAS is vice president and technical director at UIC/Uyemura International Corp., where he has been employed for the past 20 years. Prior to UIC, Don was development manager at Mott Corp. and previously held numerous positions at the American Chemical and Refining division of Handy and Harman. Don has bachelor's and master's degrees in metallurgical engineering from the Colorado School of Mines. Don has authored several papers on surface finishes while employed at UIC and has worked with ENIG since its introduction into North America in the late 1990s.

GARY FERRARI is director of technical support, Firan Technology Group. He has

35 years' experience in electronics packaging and has held senior operations, quality and engineering positions, most recently as executive director and co-founder of the IPC Designers Council. He chaired the IPC Technical Activities Executive Committee, provided DfM consulting services, and spearheaded IPC's PWB Designer Certification Program. He was inducted into the IPC Hall of Fame in 2015.

MARK FINSTAD has more than 30 years' experience building and designing flex circuits. He coauthors the "Ask the Flexperts" column in PRINTED CIRCUIT DESIGN & FAB magazine, and is currently a senior application engineer with Flexible Circuit Technologies.

RAY FUGITT has nearly 30 years' experience in EDA, 15 in PCB manufacturing (HAL, dry film, AOI, and electrical test). He was a CAM supervisor at Hadco Tech Center 2. Fugitt joined ACT in 2000 to support the CAM350 product line. He now supports CAM350 and BluePrint products in a technical sales role with DownStream Technologies.

ROBERT HANSON has more than 40 years' experience in design, manufacturing and testing. He has bachelor's degrees in industrial engineering and business administration, and a master's in electrical engineering. Hanson has been a digital design engineer at Boeing, Rockwell, Honeywell and Loral.

BILL HARGIN is director of North American marketing for Nan Ya Plastic's PCB laminate division in Taiwan. He has 15 years' experience in PCB signal integrity, previously serving as product manager for Mentor Graphics' HyperLynx SI software. Hargin has spent much of the last three years focused on stackup, PDN design and PCB materials selection.

RICK HARTLEY is the principal of RHartley Enterprises, through which he consults and teaches internationally to resolve noise, signal integrity and EMI problems. Hartley's focus is on correct design of PC boards to prevent and solve problems. He has consulted with major corporations in the US, Australia, Brazil, Canada, China, Denmark, England, France, Germany, Japan, Mexico and Spain. His design career has focused on circuits and PC boards for computers, aircraft avionics, automotive and appliance electronics and telecommunications. Hartley has a degree in engineering from Ohio Technical Institute and 50 years of experience. He has dedicated the past 39 years to PC board and circuit development, with emphasis on control of problems in both digital and RF circuits. He is a past member of the

Editorial Review Board of *Printed Circuit Design Magazine* and has written numerous technical papers and articles on methods to control noise, EMI and signal integrity. Hartley is also on the IPC Designers Council Board of Directors.

TOM HAUSHERR, CID+, CIT, has been president of PCB Libraries since 2013 and was owner of CADPRO for 12 years. He created LP Wizard, Library Expert and Parts on Demand and started schematic diagrams and PCB layout in 1974. He is on the executive committee for the development of IPC-7351 *Land Pattern Guidelines*.

HAPPY HOLDEN is the retired chief technical officer for Hon Hai Precision Industries (Foxconn). Prior to Foxconn, he was senior PCB technologist for Mentor Graphics, and advanced technology manager at NanYa/Westwood Associates and Merix. He previously worked at Hewlett-Packard for 28 years as director of PCB R&D, application manager for Asia-Pacific, PCB design services manager and manufacturing (PCB) engineering manager. He has been involved in advanced PCB technologies for 45 years.

DAVE HOOVER is field application engineer at TTM Technologies, where he has worked since 2011. He has 25 years' experience in printed circuit board fabrication and development of HDI, microvias and other leading technologies at such companies as Hadco, Sanmina, Data Circuit, Multek and Cisco.

GARY LAMERIS joined Mentor Graphics in 2008 as a technical marketing engineer for the Mentor Expedition PCB flow. Prior to Mentor, he served on the DxDesigner and PADS Customer Advisory Boards. Throughout his career, Lameris has served on the boards of a variety of associations, including chairing the Associate Membership Committee for the National Conference on Weights and Measures, the weighing subcommittee of the National Type Evaluation Technical Committees (NTETC), and as industry advisor to the National Institute of Standards and Technology (NIST). His experience includes 22 years as a senior design engineer at Hobart and program manager at Simclar Inc., a contract assembler of printed circuit boards. He has a bachelor's in electrical engineering from Michigan Technological University.

PHIL MARCOUX is managing director at Chip Systems Innovations and founder of PPM Associates, a consulting firm specializing in 2.5/3D packaging. Known by many as "The Father of SMT" – he was CEO of a company that was the first in the US to implement SMT lines – Marcoux has been on the leading edge of semiconductor packaging for more than 30 years.


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PCB West Speaker Biographies (continued)

GEORGE MILAD is national accounts manager for technology at Uyemura, for which he has worked for nearly 20 years. He has 30 years' experience in PCB fabrication and plating technology. He is chair of the IPC Plating Committee.

RICHARD MORRIS is business development / sales at Si-Cal Technologies. He has more than 15 years' experience in printed electronics, including a combined 10 with Sun Chemical and Paralec. He has a bachelor's in chemistry from the University of Bristol.

RANDALL MYERS is a technical marketing engineer at Mentor Graphics. He has been involved with PCB design and electrical engineering for more than 15 years at various OEMs and service bureaus. He has master's degrees in electrical engineering for computer architecture and computer engineering from the University of Colorado.

KATHY NARGI-TOTH is director of quality and technology at NCAB Group USA. She has a bachelor's in marketing and a minor in chemistry. She is a Six Sigma Black Belt, is a certified IPC-A-600 and IPC-6012 trainer, and is Lean certified. Previous job functions included engineering manager, technical marketing manager, global business development director, and editor for *PRINTED CIRCUIT DESIGN & FAB* magazine.

BOB POTOCK is vice president of marketing for Zuken USA and has been involved in PCB-centric design and engineering data management throughout most of his career. He has held positions in software/hardware engineering and marketing at companies that include Mentor Graphics, AT&T Bell Labs, Intel and Unisys. He joined Zuken in 2013.

KARL SAUTER has 30 years' experience in printed circuit board technology, 27 of which have been with Sun Microsystems and Oracle Corp. He has been awarded patents for power distribution for high-speed integrated circuits, and method of improving the alignment of holes with other elements on a printed circuit board. He is currently principal engineer, PCB Technology at Oracle.

GERNOT SEEGER has a graduate degree in electrical engineering and joined Beta LAYOUT over six years ago as business development manager. In November 2011 he assumed the position of operations manager, and in January 2014 he became managing director of Beta LAYOUT GmbH. He played a key role in setting up the PCB assembly production department and in the design and development of the RFID Magic Application Machine (MAM).

HEMANT SHAH has been with Cadence SPB division since 2000 as product marketing director for High-Speed Products. Previously, he was engineering director for advanced development at Xynetix Design Systems, where he also held a product marketing director role. He holds a bachelor's in electrical engineering and a master's in computer science.

DOUGLAS SMITH is an independent consultant specializing in high-frequency measurements, circuit/system design and verification, switching power supply noise and specifications, EMC, and immunity to transient noise. He spent 26 years at AT&T Bell Laboratories. He also was manager of EMC development and test at Auspex Systems. He has a bachelor's in electrical engineering from Vanderbilt and a master's from the California Institute of Technology.

VERN SOLBERG is the senior technical consultant for Invensas Corp. based in San Jose, CA. He has served the SMT and microelectronics industry in senior design and manufacturing roles for more than 30 years. Solberg is an active member of IEEE, SMTA, IMAPS and IPC, where he currently serves as chairman for the D-55 Task Group, developing IPC-7092, *Design and Assembly Process Implementation for Embedded Components*.

NORM SWANBERG has more than 30 years' experience in wireless, RF and microwave hardware and system design for commercial and defense applications. He has designed products from low-frequency analog to microwave/mm wave frequencies up to 200GHz at a component, hardware and system level. He was named number one out of 13 EDA experts in the US by Keysight Technologies for his mastery of the Genesys platform. Swanberg holds a master's in electrical engineering from Northeastern University and a master's in physics from Brown University. He has worked with IBM, Google, Peregrine, Space Micro and L-3 Communications. He now has a consulting firm in San Diego called Dome Resonators.

ANAYA VARDYA has 30 years in the electronics manufacturing business and is currently the CEO of American Standard Circuits, a Chicago-based manufacturer of rigid, metal-backed, and flex PCBs for a variety of applications and markets. He was previously COO of Coretec and senior VP operations of Merix (now part of Viasystems). Prior to that, he held a variety of positions with IBM. He has a master's in chemical engineering from the University of Cincinnati and a bachelor's of technology from Indian Institute of Technology (Bombay).

MARK VERBRUGGE has more than 25 years' experience building and designing flex circuits. He is coauthor of the "Ask the Flexperts" column in *PRINTED CIRCUIT DESIGN & FAB* magazine. He is sales applications engineer at Amphenol Sincere, and previously spent more than two decades at PICA Manufacturing Solutions, and in Minco's flex circuit division.

MAHMOUD WAHBY is general manager, National Instruments Toronto, where he has been part of the product marketing team since 2011. His responsibilities include defining product positioning and marketing strategy and driving awareness and relationships with partner companies for the circuit design tools. He has a background in RF applications, having worked with Ericsson and Transradio Sender System in Berlin, Germany. He holds a master's from Queen's University in Canada with research focus on the synthesis and analysis of RF passive components.

JUDY WARNER is director of business development, Western Region and RF/microwave markets for Zentech Manufacturing, a contract manufacturer that provides fully integrated supply chain solutions for the defense, telecom, medical and space industries. She has over 20 years' experience in electronics, the past five focused on RF and microwave technology solutions. She is a contributor to a variety of microwave and electronics industry trade publications, including four years as a guest blogger for *Microwave Journal*.

SUSY WEBB is a senior PCB designer with 33 years' experience. Her career includes point-to-point microwave network systems, oceanographic oil exploration equipment, and CPCL and ATX computer motherboards. She is CID certified and has been a columnist for *PRINTED CIRCUIT DESIGN & FAB* magazine. She is a member of the IPC Designer's Council Executive Board and a member of its education committee.

MARKUS WILLE received a degree in communications from the University of Applied Sciences in Dortmund, focusing on RF and microwave engineering. Since 1987, he has worked as a product manager for Schoeller-Electronics, leading the R&D department since 2012. He works on new concepts for PCB techniques, as well as techniques for heat dissipation.

BRUCE WU is with EDADOC Technology. He is a member of the IPC PCB Designers Council of China and previously worked with Huawei, UTstarcom and Cadence for more than 15 years in high-speed PCB design and SI analysis. He is author of *Cadence PCB Design: Allegro PCB Editor Design Guide*.

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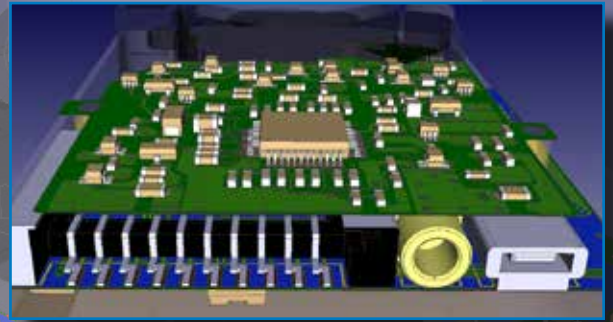
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