

ROUTE

ISSUES FOR THE IPC DESIGNERS COUNCIL

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Colleges, Trade Schools Ascend on Certification 'Summit'

At **Collin County Community College**, a technical school located north of Dallas in Frisco, TX, 26 students are working toward an associate degree in printed circuit design.

At **Eastfield College**, CCCC's neighbor on the east side of Dallas, a similar program is ramping up.

Representatives from the schools, along with some eight others, converged at CCCC on Nov. 11, primed for a one-day "education summit" to bring them up to speed on Designer Council certification. One came all the way from India, another from Australia.

As part of the strategy to make designer certification a widespread program, the Council is taking steps to make the exam study guide and other materials available within the training community. That includes reaching out to junior colleges, technical schools, and dedicated training providers, many of whom are reaching back.

Indeed, the study guide was recently revised; the updated copy is a standalone document. "We envision [the study guide] to be used as a handbook for the courses," explains DC executive director **Gary Ferrari**, who adds that the concept was "well received."

The biggest problem the schools face, Ferrari says, is knowing what the others are doing. "They're looking to exchange information on programming and federal grants.



Peaking: (front, from left) Kowalewski, D. J. Barbaria, Vinod Patel. (Rear, from left) Dr. Michael Hutchins, Wells, Krista Fairbanks, Lyn Dayman, Ferrari, John Baltzer, Warner Richeson

When they team, they know what's going on, and where they can get resources." The schools requested a dedicated email forum be established to enable communication, he says.

Such information can be quite valuable. The state of California, among others, provides substantial grants for high-tech training. And companies are taking advantage.

The **Copper Connection**, a Silicon Valley training provider, is linked with **Palomar College**, located east of San Diego, and **North Seattle Community College**. Together, they want to blanket the West Coast. Copper Connection already has a state-approved and -funded certificate program, a 40-hour workshop that includes the exam. The state of California paid Copper Connection to develop the program, and funds the tuition of the students. (It does not reimburse

for the exam.)

Aiding the progress are Designers Council members, some of whom schools have tapped to lead the courses. **Glenn Wells**, a PCB designer at **Intellect Inc.**, and **NEC's Andy Kowalewski**, are among the instructors at CCCC.

Wells has been in contact with the **Scottish Advanced Manufacturing Centre**, which is seeking to build the program in the U.K.

One area that Ferrari is pushing forward is the exam's availability. To date, none of the schools administer the exam. CCCC's syllabus calls for students to sit for the exam during the beginning of their third semester. The school does not yet have a site license, but Wells is a certified IPC instructor. Other schools will have to contract with licensed instructors, or send candidates through the IPC program.

Chapter Reports

AHOT/AUSTIN

Next meeting: Dec. 7

Topic: General meeting/party

Location: Buffalo Billiards (Austin)

Our end of the year party will be held Dec. 7. We plan to combine our AHOT general meeting with a billiards/pool tourney at Buffalo Billiards on the infamous Sixth Street. New board members will be introduced, as will the winners of the "Design of the Year" contest. **Valor** has offered a \$250 prize for the contest winner. The time will be 7 to 11 p.m.; Buffalo Billiards address is 201 E. Sixth Street.

ATLANTA

Next meeting: Dec. 8

Topic: Plant tour

Location: **ACT Manufacturing** (Duluth)

The meeting starts at 6:00 pm. ACT is an assembly company. A holiday social will follow. Directions and an update will be sent by email.

AUSTRALASIAN

Next meeting: Dec. 14 and Dec. 16

Topic: Electrical safety considerations

Location: Sydney, Melbourne

The next meetings of the chapter are in Sydney on Dec. 14, and Melbourne on Dec. 16. The topic is Electrical Safety Considerations in PCB Design. Some Christmas cheer will follow each meeting.

The Surface Mount '99 Conference held recently in Sydney was a feast for designers. **John Sabo**, president of the Designers Council, joined us Down Under to present the designer certification workshop and exam. He was assisted by a local certified designer, **Leon Fonstin**, from Melbourne who has now been accepted by the Council as an Instructor for the workshop and examination in Australia and New Zealand. Thirteen designers attained certification, bringing the total certified in Australia and New Zealand to 26.

Designers were also treated to sessions by **Chris Zombolas** and **Barry Sutcliffe**, on EMC compliance; **Peter Jansen**, on programmable logic; IBM's **Marie Cole**, on ball grid array design and assembly; **Martin Cotton** of **ViaSystems**, on the latest advancements in high density interconnection and high speed design; and Sabo also presented a session on geometric dimensioning and tolerancing.

Highlights of the conference were many: Designers who attended Cotton's session

said that the material presented was "mind blowing." The conference was an outstanding success, with the 336 delegates treated to a technical feast (and a great conference dinner!).

Dates for monthly meetings in Melbourne alternate between Wednesday (odd months) and Thursday (even months) at 6:30 p.m. at the SMCBA offices. Further details on all programs are at www.smcba.asn.au.

Chapter Anniversaries

December

Northeast Ohio (1992)*

*Charter member

CANADA (Toronto)

On Nov. 23 we sponsored a talk on EMI compliance by design, presented by **Victor Kee P. Eng**, a principal at **Ultratech Engineering Labs Inc.**, a provider of product approval and compliance services.

Eng discussed everything a designer needs to know about EMI compliance and how to provide a successful platform for today's electronic devices. He presented the basics of understanding how to design product compliance into a unit. Eng covered board design, layout, and integration into a chassis housing, and the impact of the design consideration for regulatory compliance for the product.

CASCADE (Seattle)

Next meeting: Jan. 13

Topic: High speed design

Location: **Prototron Circuits** (Redmond)

On Nov. 18, we featured **Patrick G. Andre** of **CKC Labs** in Redmond, who gave a very informative talk on EMC testing and design.

Next month, **Doug Brooks** from **UltraCAD Design Inc.** (www.ultracad.com) will talk on high speed design. The meeting will be held at Prototron Circuits (www.prototron.com). Social hour: 6 p.m. to 7; speaker: 7 to 8:50; wrapup: 8:50 to 9. For more information contact **Cherie Litson** (seacherie@aol.com)

CENTRAL OHIO

Next meeting: Dec. 4

Topic: Holiday Party

Location: Hops Microbrewery (Beavercreek)

Everyone is invited to attend a holiday gathering for our chapter, Dec. 4, at 4:30 at Hops in Beavercreek, OH (hopefully we will beat the mall dinner crowd). Hops is a microbrewery/eatery that recently opened at the Fairfield Commons Mall. Spouse, significant others, and friends are invited to share in this event. Hops address is 2711 N Fairfield Rd. Its phone number is 937-320-0600.

If you have any questions and to RSVP, call **Mike Floyd** at **Alpha-C Inc.** (937-252-9496 ext. 120).

COLORADO

Next meeting: Jan. 7

Topic: DfM/DfT

Location: Holiday Inn (Northglenn)

The Holiday Inn is located at I-25 and 120th Ave. The meeting time is 2 p.m. to 6. The topics are designing for manufacturability and testability, and designing tips. Also, an update on IPC Designer Certification will be presented.

Sponsors will be available to answer questions and show you their products. Sponsors for this meeting will be: **Hadco Corp.**, **MentorGraphics/Veribest**, and **Valor**.

GREATER PHOENIX

No meeting for December. The members have elected new representatives for the new year. They are: president, **Cyrus Ringle**; vice president, **Eric Lassele**; treasurer, **Lew Burnett**; secretary, **Frank Macias**.



"Well received": Gary Ferrari, Damon Oran, Dwight Schirmer, and Glenn Wells take a break from the summit.



That's educational: Dr. Mike Hutchins (left), Glenn Wells, and Gary Ferrari discuss federal grants and information sharing during the Education Summit meeting in November.

For the November meeting, we asked that one representative from each company or location give a presentation on how they document their PWBs. All the presenters did an outstanding job of giving designers ideas on documentation and the reasons why the documentation was created the way it was. It also pointed out that different divisions of the same company may handle the documentation in a completely different manner. Upon completion of the presentation each presenter received a plaque for the effort and time put into the presentation.

Presenters were:

- Cyrus Ringle, Inter-Tel
- Vicki Manfredi, Motorola (SPS)
- Larry Gauthier, Motorola (SSG)
- Doug Cole, Lockheed Martin (MDS)
- Jeff Grammer, Motorola (SATCOM)
- Ben Whittaker, Honeywell
- Tony Valente, Unisys
- Rick Moore, Medtronic
- Clyde Fouts, Honeywell (IAC)
- David Baldwin, Baldwin Tech
- Lew Burnett, Honeywell
- Frank B. DeArmond, DeArmond Enterprises

NORTHEAST OHIO

Next meeting: Dec. 15
 Topic: Elections/part 2 of high-speed design
 Location: TBD
 The meeting will begin with executive elections, then proceed directly to the second half of high-speed design. This meeting will focus on signal integrity and controlling emissions at the circuit level using HyperLynx software.

Mark Sinreich, president of **Avid Technologies**, will demonstrate the software. HyperLynx is used by Avid for its critical

layouts; Sinreich will show some of the techniques Avid uses. Meeting time is 4:00 to 6:20.

NORTH TEXAS

Next meeting: Jan. 6 or 13
 In November, the chapter was honored to have **Gary Ferrari** presenting on the GenCAM format, as well as the benefits of becoming a certified designer. This in-depth presentation provided much information and was an excellent overview of the format. Also in November, we held a certification workshop, led by **Glenn Wells**, a certified instructor, with 15 people joining the ranks of CID. This was a 100 percent pass rate – well done!

There will be no meeting in December and we will resume meetings on Jan. 6 or 13; we wish you all the very best of holiday seasons.

PACIFIC NORTHWEST (Portland)

Next meeting: Dec. 8
 Topic: Board planning meeting
 Location: The Keg Restaurant (Aloha, OR)
 Our Nov. 17 general membership meeting was held at the Jones Farm location of **Intel Corp.** Our guest speaker was **David Coleman**, a senior design engineer, presenting The Three T's of Routing Topologies. The three T's include timing, topology, and termination. PCB features make the difference in good designs. Many considerations come together to make the topology work with all the variables. These include material layout, trace widths for performance, voltage margins and termination determinations. The best approach to these designs is the "approach and conquer" design scheme.

Divide the portions of the board and thor-

oughly think through the requirements for each section. From the beginning of design, consider these conceptual design issues: cost effective, manufacturable, guaranteed performance, low defect rates, and the ability to meet or beat the schedule.

The upcoming executive board meeting will cement the plans for 2000 developed at the last board meeting. Meeting time is 5:30 p.m. to 8. Future topics include future technologies, improved fabrication processes, RF layout technology, high density interconnect design concerns, and an EMI workshop. Tours of local fabrication and assembly sites are also part of the schedule. Speakers for the first half of the year are already set and locations are also nearly firm.

RESEARCH TRIANGLE PARK

Next meeting: January 19, 2000

Topic: Chapter kickoff

Location: **Ericsson**

The IPC's Gary Ferrari will be the guest speaker for the kickoff of a new DC chapter located in the Research Triangle Park area of North Carolina. We will discuss what the DC is, what the benefits of joining are, and what educational opportunities are available for designers. We will also discuss the startup and organization of the chapter. Free pizza and soft drinks will be served beginning at 5:30 and the general meeting will begin at 6:30. You must RSVP by January 12 to get in on the free food and drinks.

Contact: **Steve Trasatto**, Ericsson
 (919)472-4783; steve.trasatto@ericsson.com.

SMOKY MOUNTAIN (Knoxville)

Next meeting: January

Location: **Philips Consumer Electronics**

The next meeting will be in January (if we survive Y2K!). The location is unknown, but **Dwayne Beeler** is working on CSI. The guest speaker will be from **Pads Software** (also the sponsor) and the subject will be signal integrity.

SOUTHEASTERN MICHIGAN

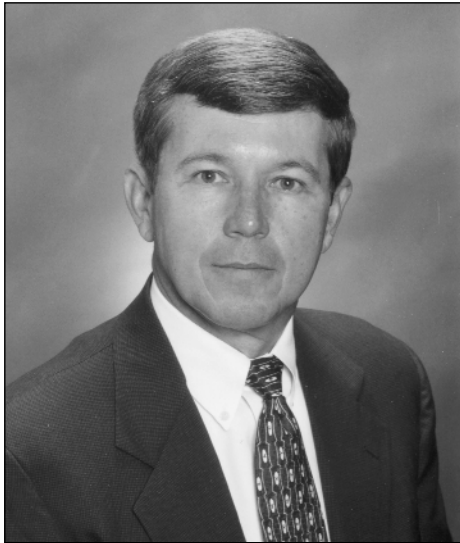
Next meeting: Jan. 13

Topic: Chapter business

Location: Farmington Public Library

The SeMIs presently are reviewing the bylaws that are to be ratified at our next meeting, Jan. 13, at the Farmington Public Library, from 7 p.m. to 9. We will make some decisions then about our next activity. Our last meeting was held on Nov. 8. We had our local representative from **ACCEL Technologies**, **Chris Keil**, show the latest advancements and how to use them. We hope to establish a regular meeting day and time in the future.

News



In with a bang: McGuirk

A New Millenium, A New President

Call it IPC's Y2K fix.

IPC will start the New Year with a new president. On Jan. 3, **Denny McGuirk**, head of the **National Fluid Power Association**, will take charge of directing IPC operations, including nearly 90 employees in its headquarters in Northbrook, IL, and its satellite offices in New Mexico, Washington, D.C., California, and Connecticut.

McGuirk, who was executive director of the NFPA for three years, brings leadership skills and an enviable track record of membership retention to the post.

"McGuirk's engaging style and personal qualities are well suited for the challenges ahead and will fit in well with the staff and membership," says IPC chairman **Jim Donaghy**, who also served on the search committee to find IPC's new president. "He is a proven leader of diverse organizations and is comfortable with growth and market change, including globalization, all of which he will face in his new assignment."

Ron Underwood, vice chairman of IPC, adds that McGuirk's main role will be to continue IPC's upward momentum and make it one of the best associations in the country. "IPC's been doing a good job, and he has the presence to continue it."

NFPA, based in Milwaukee, has 225 corpo-

rate members. Its membership retention rate is 97 percent. (By comparison, IPC's retention rate is lower; however, IPC has nearly 2,600 members.)

He spent three years as deputy executive director of general operations at a Virginia-based trade association. McGuirk also served in the United States Air Force for 24 years, retiring as a colonel in 1993.

McGuirk received a bachelor's degree in Western European Affairs from the **USAF Academy**, and a master's in Public Administration from the **University of Colorado**. He received a certificate in Fund Raising Management from **Indiana University Center** on Philanthropy.

McGuirk succeeds **Thom Dammrich**, who departed in October to become president of the **National Marine Manufacturers Association**. Dammrich had served as president and executive director of IPC since 1991, succeeding **Ray Pritchard**, who helped found the organization in 1957.

RECOGNITION

With Honors

In preparation for its two major trade shows next spring, IPC is accepting nominations for all awards, including the top prize – the Raymond E. Pritchard Hall of Fame.

Nominations are also requested for the Presidents Award, the Distinguished Technical Committee Service award, and the Special Recognition award.

The Hall of Fame Award is bestowed upon those individuals who have performed at the highest level of achievement, made extraordinary contributions and provided distinguished service to IPC, and who have advanced the industry through the creation of a spirit of mutual esteem, respect, and recognition among members consistent with the goals and mission of the IPC on a long-term basis. This is the highest level of recognition that IPC gives to a member.

Inductees must be members of IPC, or have been members at the time of retirement. This award is a lifetime achievement award with particular emphasis placed upon long range contributions to IPC and the industry. Multiple

contributions by an individual over a period of years or contributions in a variety of areas will, in most cases, take precedence over a single contribution.

The Presidents Award is given annually to six individuals. It is presented to those who have exhibited ongoing leadership in IPC, and made significant contributions to IPC and the electronics interconnection industry. Individuals can receive this award only once. It can recognize outstanding contributions during the past one to two years or key contributions over a longer period of time.

The Distinguished Technical Committee Service award is given to IPC committee members who have made an exceptional contribution to a specific standard, guideline, round robin test program or other IPC program (such as the Designers Council). Any individual actively involved on an IPC committee is eligible. Individuals may receive the Distinguished Committee Service award more than once.

The Special Recognition award is bestowed on IPC members who have made a recent exceptional contribution to the IPC program or the industry. The period of activity may be short-term or a one-time event, and the award may be received more than once.

Nominations should bear the name and company of the candidate, and include a statement describing how the nominee meets award criteria, what the contribution was, or why he or she is deserving of special recognition. All nominations are considered confidential.

All nominations must be submitted to **Mike Buetow**, communications director, at IPC no later than Jan. 15. Contact Buetow for more information (page 2).

APEX takes place March 12-16, in Long Beach, CA. IPC Printed Circuits Expo takes place April 2-6, in San Diego.

WINTER MEETINGS

Cold Fusion

IPC's annual Winter Interim Meetings are set for January, at the usual locale in Tempe, AZ.

Several task groups have already made plans to meet during the two weeks of sessions. (Meeting times vary; contact the IPC technical staff for specifics and updates.)

News (Cont.)

All meetings will take place at the Fiesta Inn. A block of rooms is reserved between Jan. 20 and Feb. 4, at the rate of \$109 (single or double occupancy). The cutoff date for reservations is Jan. 4. For reservations, call 800-528-6481. Make reservations now to ensure accommodations.

- Jan. 22 IPC-A-610 Task Group
 Jan. 24 J-STD-001 Task Group
 Conformal Coating Handbook Task Group
 HDI Subcommittee
 Jan. 25 J-STD-001 Task Group
 Conformal Coating Handbook Task Group
 HDI Subcommittee
 HDI Design Subcommittee
 Assembly Equipment Task Group
 Jan. 26 Flexible Circuits Performance Specifications Subcommittee
 Conformal Coating Handbook Task Group
 Jan. 27 UL796F Task Group
 J-STD-020/J-STD-033 Task Group
 Wire Harness Acceptability Task Group

- Jan. 28 J-STD-020/J-STD-033 Task Group
 Wire Harness Acceptability Task Group
 Flexible Circuits Base Materials Subcommittee
 Flex Peel Strength Task Group
 Jan. 28 Roadmap Verification Analysis
 Jan. 29 Roadmap Verification Analysis
 Jan. 31 IPC-MF-150 Task Group
 Feb. 1 Laminate/Prepreg Materials/Test Methods
 DPMO Task Group
 I PC-6012 Task Group
 Feb. 2 Laminate/Prepreg Materials/Test Methods
 DPMO Task Group
 SM Land Patterns Subcommittee
 IPC-6012 Task Group
 S PC Subcommittee
 Feb. 3 Laminate/Prepreg Materials/Test Methods
 SPC Subcommittee
 IPC-2221 Task Group
 IPC-A-600 Task Group
 Feb. 4 SPC Subcommittee
 IPC-2221/IPC-2222 Task Group

REFORM

DoD Shows 'Flexible' Thinking

Yet another longstanding military standard has fallen.

The Defense Supply Center Columbus (DSCC) in August announced the cancellation of MIL-STD-2118, its design standard for flexible circuits. The cancellation notice lists IPC-2221 and IPC-2223 as the superseding documents.

According to the DSCC notice, IPC-2221 and IPC-2223 were officially adopted by the Department of Defense on Sept. 1.

Also, DSCC announced that the cancellation notice for MIL-STD-275 was updated to make reference to IPC-2221. MIL-STD-275 formerly was superseded by IPC-D-275, which in turn was superseded by IPC-2221 and its sectional documents.

The cancellations continue the acquisition reform practices of the DoD, which is adopting commercial standards to replace military ones.

Reports (Cont.)

SOUTHERN NEW ENGLAND

Next meeting: Dec. 8

Topic: Year end summary

Location: Connie's (Derby)

Our December meeting will focus on a the year in summary, featuring the highlights of our most effective meetings. Special recognition will be made to our 16 certified designers. Holiday festivities will commence immediately following the business meeting. The Southern New England Chapter would like to wish the IPC and all chapters a Happy, Healthy, Prosperous Holiday Season and New Year.

RSVP by noon on Dec. 7 to **Vin Stabile** at (203-968-1403; vms5130@aol.com).

SOUTH JERSEY

Len Roach of **Lucent Technologies**

(Princeton) is attempting to arrange for a plant tour after January. The tour will include BGA and surface mount design and assembly. Email **Leon Cohen** at

LeonC@juno.com if you are interested and can attend a daytime meeting.

SPACE COAST

Next meeting: Dec. 16

Location: China Buffet (Palm Bay)

Topic: Luncheon

The luncheon starts at 11:30 a.m., and is open to paid members only. The cost is \$5 per person, drink and tip included (a great price for the fine buffet). RSVP to **Bill Cardew** at **Harris** (wcardew@harris.com) by Dec. 13 if you want to attend.

We will have lots of terrific door prizes, with values up to \$25. We will discuss plans for next year, and want to know what our members would like to see.

We are accepting nominations for officers for 2000 (president, vice president, secretary, treasurer). Elections will be held in January. Please submit all nominations to **Chuck Fisher** at **Harris** (crfisher@harris.com) by Dec. 31. The January meeting will also be the time to present your personal Board from



The Cascade chapter poses at its November meeting.

Hell 1999. If you are interested in competing for the coveted Board from Hell honors and prizes, contact Fisher by Jan 10 so we know how to plan the meeting.

SUSQUEHANNA

We toured the Hadco PWB plant in Owego last month. The meeting was very well attended by local designers and a few designers who traveled from Syracuse. Our thanks to Hadco and **Steve Zimmer**, who led the tour. In coming months we hope to have a tour of an assembly shop and some round-table discussions.

New CIDs on the Block

The following designers successfully took the IPC Designers Council Certification Exam between June and October and are now Certified Interconnect Designers.

Alan Kaplan
Alwin Oshiro
Amnon Polishuk
Anat Frizlander
Andy Lucas
Ann Pelcha
Arturo Jordan
Barbara Candiotti
Barbara L. Zaepfel
Bill Gaudelli
Bill Rannard
Bob Powers
Bohumira Halas
Bradley Marshall
Brett Smith
Brian F. Manion
Bruce A. Harrison
Carol J. Maxwell
Charles Davies
Cherie Litson
Chick Cerreta
Christi Shea
Christopher Delfs
Clifford H. Lamson
Colleen Salvaggi
Curtis W. Shirley
Dan Goldenberg
Dan Head
Daniel J. O'Neil
Darren Hermsen
Darren Jensen
Dave Stabile
David Rose
David Francis
David Hyde
David Israel
David Rubeo
David S. Beal
David Simpson
David Wolfowitz
Dennis Carrow
Dominic Bragge
Donald Lamothe
Doug Flesner
Ed Lutz
Ed Piekos
Edward A. Casacia
Edward M. Russell

Eli Udie
Esther Bar-Yamin
Ezequiel Cruz
Fawn Engelmann
Francisco Morales
Fred Auger
Gary D. Hawkins
Genia Barzilay
Geoffrey Littrell
George Boncek
George Bernal
George Tanner, Jr.
Gino Guerra
Glen Finley
Glenn Ball
Hana Gurevich
Harry R. LaBrie
Harry W. Hallstrom
Hector Wong
Hing-Chin Lee
Igor Shvetsov
Inna Kogan
Ira D. Adams
Irina Pisman
Jack Wagner
James Reader
James E. Liechty
James F. Fay, Jr.
James W. Smith, Jr.
Janella Ashbaugh
Jason Roetz
Jeanne M. Hereth
Jerry A. Temple, Jr.
Jerry Valdiviez
Jim Bauer
John Bunter
John Morton
John Mason
John McKinley
John O'Reilly
John P. George
John Green
John Willis
Juan Galvan, Jr.
Karen Jenks-Kubitschek
Karen McCormick
Kari Kittila
Keith Chatwin

Editor's note: Try as we may, mistakes do happen. If your name was incorrectly omitted from this list, please contact **Christine Myrick**; we'll include it next month.

Kenneth Stephens
Lan Lo
Laurie Townsend
Lawrence Gruppi
Lina Brown
Linda M. Gallo
Linda Melsheimer
Lois Purcell
Lonnell Johns
Lynn Isaacson
Maggie Rilling
Marc D. Bicknell
Marian Myers
Mark Mainland
Mark Radley
Mark Hawling
Mark Helgestad
Mark Kascak
Mark Koitmaa
Mark Stern
Marty Sheppard
Max Pinto
Michael B. Burlingame
Michael Bentley
Michael Joyner
Michael L. Vaughan
Michael Naray
Michael R. Reagan
Michael Wilhelm
Murray MacCallum
Nancee A. Ault
Naomi Izhak
Orit Machbuby
Pat Hynes
Patricia Loewen
Patty Causey
Paul Grodey
Paul Mirowsky
Paul Switzer
Rafael Swissa
Ray W. Merrick
Richard Henry
Richard Smalling
Rick Wright
Rob Walls
Rob Yoder
Rob Leahy
Robert Beal

Robert C. Helwig
Robert L. Peck, Jr.
Robert M. Wolfe
Robert Millard
Robert Pauley
Robert Gambling
Robert Ochs
Rodney L. Miller
Ronny Luman
Roy Mackert
Russ Venables
Salvitre Balkissoon
Scott McMath
Scott J. Trudo
Shane Hollis
Sharon Mason Paige
Shawn Windom
Sherilyn Harrison
Sherri O. Smith
Shirley E. Smith
Shlomo Barda
Shlomo Hadad
Stephen Morgan
Steve Collins
Steven Gong
Susan G. Daum
Terry A. Tavares
Thomas Richardson
Thomas Mulligan
Thomas A. Stewart
Thomas Burek
Tim Linke
Tim Tate
Todd Thaler
Trisha A. Lorimor
V. Ann Hopkins
Victor Shimoni
Viet Luu
Vince Paku
Vincent Stabile
William A. Cardew
William C. Branning
William Kessler
Yair Melamed
Yanush Hersuko
Yehuda Nissanzon

Upcoming Events for Designers

DECEMBER

- 15-16 PWB Designer Certification Preparation Workshop
Atlanta
- 17 PWB Designer Certification Exam
Atlanta

JANUARY

- 20 The Microvia Opportunity: Technology, Markets, and Applications Workshop
Orlando
- Design for Surface Mount Technology Workshop
Dallas
- 21 Design for Surface Mount Technology Workshop
Tempe, AZ
- 21-4 IPC Winter Interim Meetings
- 25 Flex Circuits Fundamentals Workshop
Tempe, AZ
- 26-27 PWB Designer Certification Preparation Workshop
Tempe, AZ
- 27 Fundamentals of PWBs Workshop
Austin, TX
- 28 PWB Designer Certification Exam
Tempe, AZ
- 31 High Performance, High Density Base Materials Alternatives to FR-4 Workshop
Tempe, AZ

FEBRUARY

- 23-24 PWB Designer Certification Preparation Workshop
San Diego
- 25 PWB Designer Certification Exam
San Diego

MARCH

- 12-16 **ELECTRONICS ASSEMBLY PROCESS CONFERENCE AND EXHIBITION (APEXSM)**
Long Beach, CA
- 20-23 PCB Design Conference West
Santa Clara, CA
- 29-30 PWB Designer Certification Preparation Workshop
Dallas
- 31 PWB Designer Certification Exam
Dallas

APRIL

- 2-6 **IPC PRINTED CIRCUITS EXPOSM**
- 26-27 PWB Designer Certification Preparation Workshop
Columbus, OH
- 28 PWB Designer Certification Exam
Columbus, OH

MAY

- 24-25 PWB Designer Certification Preparation Workshop
Toronto
- 26 PWB Designer Certification Exam
Toronto

JUNE

- 28-29 PWB Designer Certification Preparation Workshop
Chicago
- 30 PWB Designer Certification Exam
Chicago
- 25-26 PWB Designer Certification Preparation Workshop
Minneapolis
- 27 PWB Designer Certification Exam

JULY

- 26-27 PWB Designer Certification Preparation Workshop
Seattle
- 28 PWB Designer Certification Exam
Seattle

AUGUST

- 23-24 PWB Designer Certification Preparation Workshop
Denver
- 25 PWB Designer Certification Exam
Denver

SEPTEMBER

- 23-29 IPCWORKS 2000
Miami
- 27-28 PWB Designer Certification Preparation Workshop
Fredericksberg, VA
- 29 PWB Designer Certification Exam
Fredericksberg, VA

OCTOBER

- 25-26 PWB Designer Certification Preparation Workshop
Minneapolis
- 27 PWB Designer Certification Exam
Minneapolis

NOVEMBER

- 15-16 PWB Designer Certification Preparation Workshop
Atlanta
- 17 PWB Designer Certification Exam
Atlanta

DECEMBER

- 6-7 PWB Designer Certification Preparation Workshop
Orlando
- 8 PWB Designer Certification Exam
Orlando

IPC workshops: Maryellen Hilderbrand (847-790-5382)

ATLANTA

President: Joseph Gibson, Hadco Inc. (770-474-6645; jgibson@hadco.com)

A/HOT (Austin/Heart of Texas)

President: Rick Prekup, XeTel Corp. (512-435-1376; RPrekup@xetel.com) www.ipc.org/ahot/index.html

AUSTRALASIA

Chapter Administrator: Andrew Pollock, Surface Mount & Circuit Board Association (+61 3 9568-0599; pollock@smcbsa.asn.au) www.smcbsa.asn.au/docs/ipc.html

AUSTRALIAN

President: Tony Saunders, Telstra Electronic Products and Services (+61 08 8352 3055; asaunders@stneeat1.telstra.com.au) www.attcaustralia.com/designers.htm

CANADA (Toronto)

President: Greg Bordash, ATI Technologies Inc. (905-882-2600, ext. 8370; greg@atitech.ca)

CASCADE (Seattle)

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