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Volume 54, Issue 9

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A publication of the
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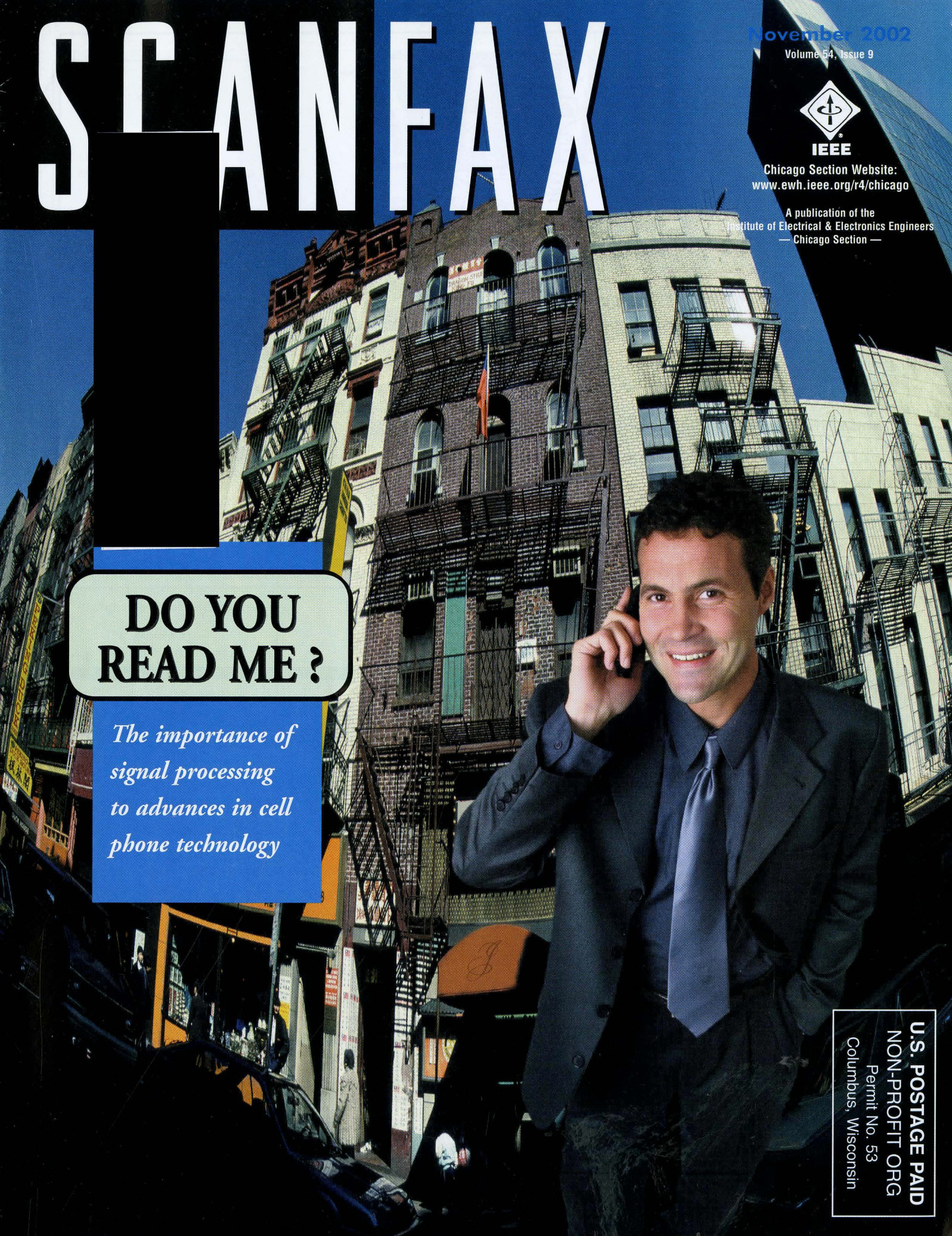
— Chicago Section —



DO YOU READ ME ?

The importance of signal processing to advances in cell phone technology

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Meeting notices should be sent to graphics@slackattack.com

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Feature

Upcoming Events

Departments

CHICAGO SECTION EXECUTIVE COMMITTEE MEETING
Tuesday, November 5, 6:30 p.m.
DeVry DuPage, Room TBA, 1221 N. Swift Rd., Addison, IL
No Registration Needed

ATTENTION

NEW BUSINESS OFFICE LOCATION:

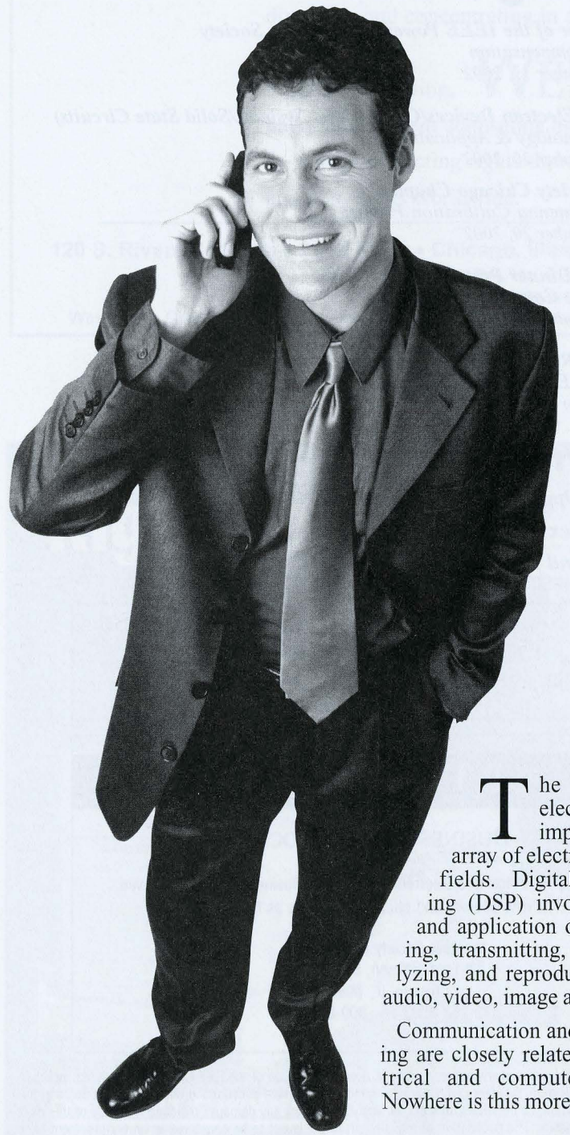
The Institute of Electrical and Electronics Engineers Business Office has moved.
The new address and phone number are as follows:

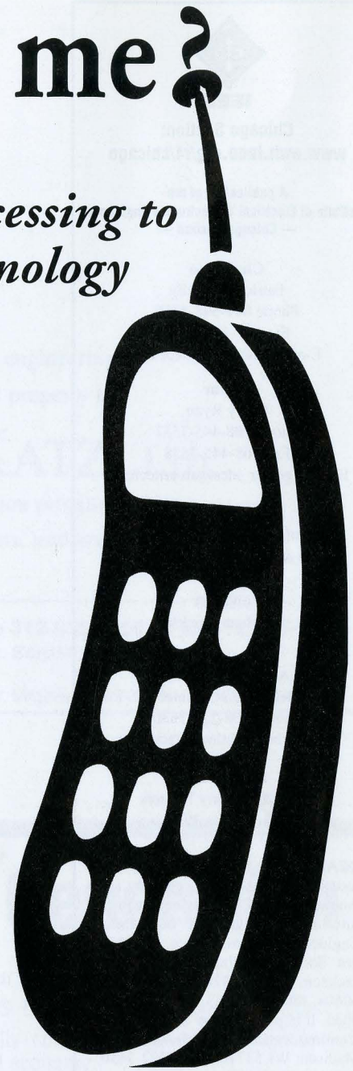
Western Society of Engineers
28 East Jackson, Suite 1320
Chicago, IL 60604
312-253-4333 — 800-898-4333

Do you read me?

The importance of signal processing to advances in cell phone technology

By Paul Zukowski





The processing of electronic signals is important to a wide array of electrical engineering fields. Digital signal processing (DSP) involves the theory and application of filtering, coding, transmitting, detecting, analyzing, and reproducing signals for audio, video, image and other signals.

Communication and signal processing are closely related fields in electrical and computer engineering. Nowhere is this more apparent than in wireless telephone technology, where increasing demand for services to be delivered via the wireless spectrum presents great challenges.

Electrical communication began in 1838 when Samuel B.F. Morse sent a message over a 10-mile telegraph line. Today our communication systems transfer information at rates more than one billion times faster than Morse's first telegraph message. We can have telephone conversations from our automobiles to anyplace in the world. These conversations travel over radio links, copper wires, optical fibers and satellite links. Economic growth has come to depend on the ability to exchange and transfer information.

Currently the next generation (3G) wireless communication systems need to support access to multimedia data available on the Internet. To deliver universal wireless access to multimedia data requires data rates and quality of service much better than those available in current wireless systems. Not only that, but in 3G devices, one or more DSPs supplement the main processor and handle the number crunching required by user applications and air interfaces. While these DSPs provide flexibility because they can be reprogrammed, they are also power hungry and may lack the processing power necessary for 3G and beyond.

Ideally, an application specific integrated circuit (ASIC) would be designed for each 3G phone. ASICs use far less power than DSPs to extend battery life, and ASIC processing power is greater than a DSP. There are also certain functions that a DSP lacks the capability to perform.

However, the typical development time for an ASIC is two years, and the concern is that this will retard the adoption of 3G technology and beyond. Especially in the areas of MPEG-4 video and audio. MPEG-4 processing requires major algorithms such as motion estimation, discrete cosign transform (DCT), and Huffman encoding — all of which demand extremely high levels of processing power.

One way the industry could keep pace with increasing demand and evolving standards is to move from a mixed hardware/software DSP/ASIC design to a pure software development model. A new class of integrated circuit called the adaptive computing machine (ACM) could provide a solution. The architecture of an ACM chip is not rigid like that of a DSP or ASIC. It is designed to map software algorithms directly onto dynamic hardware resources. This makes it particularly flexible because it is both programmable and adaptable. It only takes nanoseconds to adapt on-the-fly to handle ever-evolving interface standards, communication protocols, algorithms, modulation types, and data formats.

In a recent article in Electronic News, Bob Plunkett of Quicksilver Technology Inc., San Jose, wrote, "New technologies such as the ACM are critical to the future success of wireless/mobile communications OEMs. The software-based adaptive computing designs eliminate the need for expensive hardware changes. This alone has dramatic benefits, allowing the developer to enter the design cycle at any point to create changes or variations with software. Changes or updates can also be made even after the product is shipped or while in use."

He envisions the use of high-level language (HLL) software tools to allow software implementers to program the ACM. This could reduce the two-year ASIC implementation period to six months and greatly reduce development costs. Adaptive computing would also allow manufacturers a cost-effective way to change features, functions, and services to their existing handset users through software changes.

Adapting newer, more advanced IC technologies will be the key for original equipment manufacturers to survive the new universe of signal processing demands that 3G and beyond wireless traffic presents. ■

EVENING MEETING

Chicago Chapter of the IEEE Power Engineering Society
Adaptive VAR Compensation
Wednesday, November 13, 2002

Mike Jones, *S&C Electric Company*

About the Topic:

This presentation will review several methods presently used to achieve power factor correction and voltage flicker control, with a specific focus on the use of thyristor switching of capacitors to achieve these results.

The need for voltage sag correction, voltage flicker mitigation, and power factor correction arise from industrial applications which share a similar load profile — a rapidly varying demand for active and reactive power. Solutions to this problem can range from simple to complex, depending on the impact the dynamic load is having on either adjacent loads or on the up stream electrical system.

Thyristor-switched capacitors are distribution-class static VAR compensators utilizing power-electronic switching to provide variable amounts of reactive compensation on a cycle-by-cycle basis. These compensators continuously monitor load conditions and match the output to the requirement of the load, providing real-time VAR compensation. Typical applications for this device include voltage-support, voltage-flicker, and power-factor correction for dynamically varying industrial loads, such as welding operations and large motor drives. In some cases, industrial customers install these devices to mitigate the effects of their variable loads on other customers on the feeder. In other cases, utilities use these devices to improve voltage regulation, to utilize their capacity more efficiently, or to reduce distribution transformer loading and system losses.

Applications for thyristor switched capacitors include such industries as resistance welding operations, petrochemical pumping, mining operations, wood processing operations, paper conversion, steel rolling mills, metal-forming and stamping operations, and even linear-induction-motor-driven rides in amusement parks.

About the Speaker:

Mike Jones is Application Director for the Power Quality Products Division of S&C Electric Company. He holds a BSEE and MBA from the University of Virginia. Prior to S&C he worked at divisions of Emerson Electric and ITT.

Location:

Western Suburban Location To Be Determined - Please visit http://peschicago.org for more details.

Time:

5:30 PM Social
6:30 PM Dinner
7:30 PM Presentation
8:30 PM Adjourn

Reservations:

Dinner tickets can be purchased at the door. Please call the IEEE Business Office at (800) 898-IEEE to make your reservation. For more information, please visit the Chicago Chapter IEEE PES web site:http://peschicago.org

EVENING MEETING

ED/CAS/SSC (Electron Devices/Circuits and Systems/Solid State Circuits)
Bluetooth: Technology & Applications
Wednesday, November 20, 2002

Steve Deutscher, *Motorola*

About the Topic:

This presentation will explore the short-range wireless technology known as Bluetooth. The discussion will focus on market applications of Bluetooth technology with emphasis on usage models as applied to both audio and data functionality. Issues related to ease of use, profile support, and market acceptance will also be discussed. Live demonstrations of commercially available products spanning the personal audio, wireless data, and in-vehicle space will also be given during the presentation. The presentation will cover:

- Brief History of Bluetooth Technology
- Technical Overview of Bluetooth (hardware and software components)
- Bluetooth SIG Involvement with interoperability and standardization
- Bluetooth Profile Definition and Discussion
- Usage Model Discussion
- User Interface Issues/Tradeoffs
- Market Overview of Bluetooth Products
- Demonstration of Commercially Available Products
- Summary Discussion

About the Speaker:

Steve Deutscher is the Director of Product Management for Companion Products and Accessories within Motorola's Personal Communications Sector. He holds the BSEE from Purdue University and an MBA from Indiana University. Steve has been involved with Bluetooth technology for four years. His team has completed development of five Motorola Bluetooth products over the past two years.

Location:

Motorola Schaumburg Campus
1301 Algonquin Road

Enter Campus using Gate A, westmost gate off Alqonquin Road, west of Meacham. Door 13 is under Motorola sign on west face of six story building. Preregistration is required.

Time:

7:00 PM Social (free sandwiches, snacks, and beverages)
7:30 PM Presentation

Reservations:

Please call the IEEE Message Center at (800) 898-4333 or (312) 253-4333 by 1PM Monday, November 18th. For information, call Norm Phoenix at (847)523-1078.

EVENING MEETING

IEEE EMC Society Chicago Chapter
Mars Express Antenna Calibration Project
Wednesday, November 20, 2002

Mike Howard, *Liberty Labs*

About the Topic:

Liberty Labs, Inc. was selected by the University of Iowa to perform the calibration of a dipole antenna used on an upcoming satellite mission to the planet Mars, called the Mars Express. The Mars Express uses the antenna to detect water beneath the permafrost of the surface of Mars. The 130-feet-long antenna transmits a pulsed signal from 1.5 to 5.5 MHz. It uses an on-board super computer to perform real-time analysis of the data retrieved from the dipole. The Mars Express is scheduled to be launched atop a Russian Soyuz Rocket by June 2003. The University of Iowa was selected to design the transmitter/receiver and the antenna, while Liberty Labs, Inc was selected to perform the antenna calibration. The presentation features a slide show and video showing the calibration of this satellite system and antenna. A helicopter was used to suspend a satellite mock-up 500 feet below the helicopter while 10,000 feet above the test site and five miles down range.

About the Speaker:

Mike Howard founded Liberty Labs, Inc. as an antenna calibration service company in 1992. Liberty Labs now operates the world's largest antenna test range sized 50 x 80 meters. This range was used for the calibration of the Mars Explorer antenna.

Location:

Elite Electronic Engineering, Inc.
1516 Centre Circle
Downers Grove, IL

Time:

6:30 PM Social
7:00 PM Meeting Start

Reservations:

Steve Laya (Elite)
Phone: 630-495-9770

Employment Opportunities

Nationwide engineering firm is expanding its Chicago office. We are seeking both entry level and experienced **ELECTRICAL ENGINEERS** to assist us in our growth. Must have BSEE and excellent communication skills. PE or EI would be a plus.

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Candidate will be responsible for electrical engineering and design of commercial, educational, institutional and industrial projects from design inception through construction. The selected candidate will be starting an electrical department. Duties shall include supervising all electrical design projects, scheduling the resources of the electrical department, assisting in business development/business plan implementation, assisting in preparation and management of budgets, and be responsible for project design, contract document review and final review of the department's deliverables.

Qualified candidates will have at least 10 years of experience in electrical power system design, fire alarm system, and other special systems along with the ability to lead and supervise technical people. Candidate must have a BSEE, licensed PE in the State of Illinois or the ability to obtain a license in IL, and 10 years or more of experience.

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Brian Berg & Associates, Ltd.
Attention Brian Berg Jr.,
801 W. Wise Rd.
Schaumburg, IL 60193

EVENING MEETING

IEEE - IAS/IES Dinner Presentation
Active Harmonic Control
Wednesday, November 20, 2002

Charles J. Nochumson, *P.E.*

About the Topic:

Harmonic currents created by various solid state devices travel from the load throughout the electrical distribution system. The amount of harmonic voltage and current that a system will tolerate is dependent upon both the loads on that system and the source(s). The continuing proliferation of nonlinear power electronic loads guarantees the need for ways to address the effects of these damaging harmonic disturbances. This presentation will review the source, causes and effects of created harmonics and review the basics of passive and active harmonic mitigation with emphasis on active mitigation control.

About the Speaker:

Education: University of Illinois in 1965 with BSEE, MBA from Northwestern University 1970

Charles J. Nochumson is an Application Engineer for Cutler-Hammer and was previously an Application Engineer with Westinghouse Electric Corporation in their Distribution and Control Business Unit for 29 years. Mr. Nochumson is co-author of an IEEE paper on "Transfer Considerations in Standby Generator Application," author of a *TAPPI* and IEEE paper on "Application of New Technologies in Power Circuit Breakers with Higher Interrupting Capacity and Short Time Ratings." He has also been published in *Electrical Distributor* and *Plant Engineering* magazines. Mr. Nochumson is a Professional Engineer and Senior Member of IEEE.

Time:

5:30 PM Social
6:00 PM Dinner
7:00 PM Presentation

Location:

Costa's (Greektown)
340 S Halsted St.
Chicago, IL
Costa's is located in Greektown on the corner of Van Buren and Halsted. For detailed directions and a map, see www.iaschicago.com

Reservations:

Please call the IEEE Business Office at (800) 898-IEEE or (312) 253-4333 with your reservation. Please note any special meal requests at the time of the reservation. You can also make your reservations on line at www.iaschicago.com

Cost:

Your cost includes the presentation and a four-course dinner with a choice of the main entry - roast lamb, chicken, or fish. (vegetarian or special dietary meals available upon request). Cost is $25 IEEE Member and $30 non-member. Valet parking is included with your meal.

Information:

For P.E. licenses that require continuing education for renewal, attendance at IEEE Technical Meetings is acceptable as one Professional Development Hour (PDH) per meeting.

EVENING MEETING

IEEE Chicago/Rockford IEEE Consultants' Network
What Makes an Entrepreneur?
Monday, November 25, 2002

About the Topic:

In addition to networking and sharing leads and referrals, there is usually a guest speaker. On November 25, instead of a speaker, we plan to have an open discussion on "What Makes An Entrepreneur?" based on the article by Dave Lundy in the September 8, 2002 edition of the *Chicago Sun-Times*. From lawyer to CEO, entrepreneur to professor, video-game designer to *Rolling Stones* web developer, Howard Tullman has worn many hats over his 35-year career. Although he found success as a class-action lawyer, Tullman saw richer opportunities in the exploding world of high-tech. With venture capital in hand, Tullman built and took public a database-driven company for the insurance industry. It was the first of many entrepreneurial ventures that he founded, advised, or led. Tullman believes the biggest mistakes entrepreneurs make are "falling in love with their products," worrying too much about valuation and trying to be both the "accelerator" and "brake" for their companies." Members and non-members are invited to both the meeting and the optional dinner. (Reservations are NOT required).

Meeting Location:

Palatine Public Library
700 North Court
Palatine, IL

Dinner Location:

Bakers Square
270 E. Northwest Highway and North Court, just south of the library

Time:

6:15 PM Optional Group Dinner at Bakers Square (order off menu - reservations are not required)
7:30 PM Open Discussion-Meeting
9:00 PM Adjourn

Information:

Information about the network can be obtained by e-mail: g.l.blank@ieee.org or visit our web site at http://www.drblank.com/coaction.htm

See you on NOVEMBER 25, and bring consultants and those who aspire to be consultants for a pleasant and informative evening of networking.

Meetings are usually held on the last Monday of odd-numbered months.

PROFESSIONAL AND BUSINESS DIRECTORY

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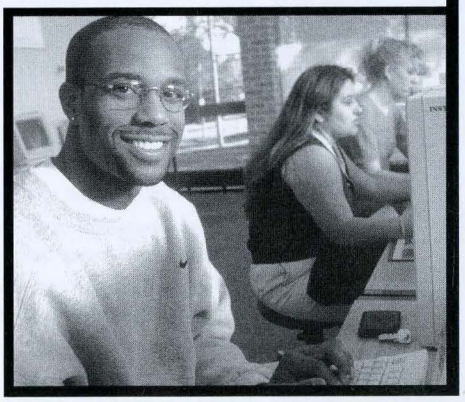

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