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IEEE

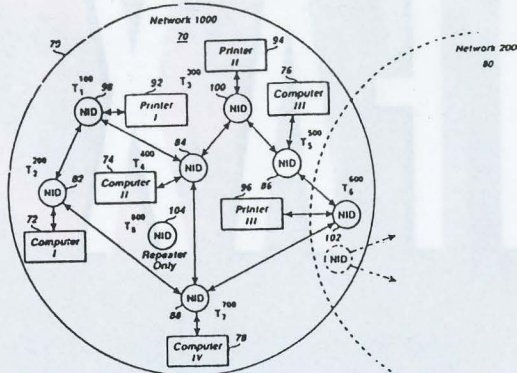
Networking the World™

A publication of the
Institute of Electrical & Electronics Engineers
— Chicago Section —

SYSTEM MANUFACTURERS WORK TO COMPLY

EUROPEAN ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

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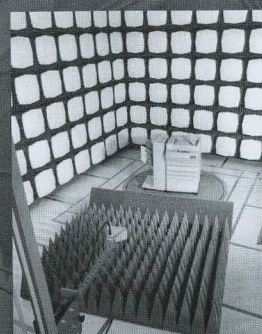
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CHICAGO SECTION EXECUTIVE COMMITTEE MEETING

Tuesday, May 8, 6:30 pm

DeVry DuPage, Room TBA, 1221 N. Swift Rd., Addison, IL

No Registration Needed.

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EUROPEAN ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

Achieving compliance with the European Electromagnetic Compatibility (EMC) Directive can be a challenge, but once subsystem manufacturers get used to them, the tremendous amount of directives and standards are actually quite logical and make sense according to Derek Walton, EMC Consultant with LF Research.

When exporting electrical goods into Europe, it is required that products comply with the Electromagnetic Compatibility (EMC) Directive.

While the approach is relatively clear for a complete finished product, in order to apply the CE mark, manufacturers of subsystems must consider the many ways the subsystem could be used. They must also determine that the EMC Directive has been met.

"If a manufacturer sells something like a washing machine, the product is just taken to a test lab for testing," Walton said. "Our control systems control huge machines and a big challenge is putting the CE mark on it. How do you test something that will go into 101 places and still make it valid? Say you take a large manufacturing machine that puts screws into switchboards into testing. The machine could be 100 feet long and the manufacturer is responsible for making sure the system works and all bugs are worked out prior to sale."

In order to consider the potential for many different installations, Walton breaks the EMC Directive compatibility process into seven steps. The first step involves fully understanding what product standards the subsystem will have to comply with.

"Product standards define the specific testing needed for a category of equipment.

Examples are EN 61326 for control equipment and EN 55024 for Information Technology Equipment. In the few instances where there are still gaps, there are generic Product Standards."

Designing the subsystem within the appropriate protective measures allows for easier removal of components and avoids component installation after they are "thought" to be needed.

"Rather than wait until a product is designed to see how well it can do, it is best to look at the way each of the test requirements stress the product, then add specific protection," Walton said. "Often overlooked is the EMC benefit of multilayer boards. For a small increase in cost, a substantial increase in immunity and corresponding reduction in emissions is typical over single or double layer boards."

Walton recommends designing a mock system that provides a realistic subsystem interface.

"Perhaps the most frequent origin of both emissions and immunity problems is the interconnect wiring and what is connected at the other end. When testing a subsystem, build a fixture to hold everything on it. For each interface, there should be a load attached, unless adding multiple similar inputs can be shown to have no effect. The choice of load should be determined carefully if different loads can be attached to the same interface."

Walton said loads with a significant level of capacitance to ground often exacerbate both emissions and immunity effects and the same attention should be paid to sensors.

"More problems are typically seen trying to reliably sense high impedance devices such as potentiometers over low impedance devices such as 4 to 20 milliamper loops. The interconnection of subsystem components should represent what will be implemented in practice."

Some parameters to consider are:

- Cable make-up, shielded (braid or foil), twisted or coaxial.
- How shield should be terminated.
- The length of the cable-if use of up to 100 feet of wire is allowed, make sure this is evaluated.
- The installation instructions should specifically state what must be done and what should not be done.

The next step involves designing software

(if applicable) that verifies interfaces operate or are exercised correctly. Walton said the testing of software/firmware could be endless and he has effectively used the following approach.

"For each interface in a subsystem, a short routine was written to monitor or stimulate that interface. The ability of that interface to respond correctly was then monitored during the EMC testing. In reality, many interfaces were tested at the same time. What this does is verify that the hardware

and the firmware are operating correctly. If a normal program was running, there may be considerable periods of time when inputs are being ignored by the process, or noise is not being generated. This is a problem for which you are responsible if missed."

Walton said the testing of hardware is not fully described in Product Standards as most address "table top" or "floor mounted" equipment that could require interpretation to determine how to configure the subsystem for testing. "If there is insufficient expertise

CAUTION

January 1, 2001

EN 61000-3-2:1995 Harmonic Current
and EN 61000-3-3:1995 Flicker
Requirement became mandatory

July 1, 2001 three standards become mandatory:

- EN 50082-1:1997 EMC Generic Domestic Immunity Standard
- EN 61326:1997 Product Family Standard for Manufacturers of Measurement Control and Laboratory Equipment
- EN 55024:1998 Immunity Product Standard for Information Technology Equipment (ITE)



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within your organization to substantiate your test set up, this is one area where money is well spent consulting a reputable test facility or consulting an authority in this field within the European community."

While testing is not necessary to show compliance with the EMC Directive, whatever means used to show compliance should be fully documented. If tests are performed, all should be photographed in detail, labeled and stored securely.

"You do not have to test, you have to

comply," Walton said. "If you can do it by mathematics or other means, that is fine but what you do have to look at are all the product directives and what is necessary to show compliance."

When instituting configuration control, design changes are an almost unavoidable part of the process. Walton said each change should be evaluated to determine whether EMC performance could be affected.

"If the impact is negligible, for example changing the color from red to blue, then little

documentation is needed. If the change to a component is critical to the EMC protection—for example a change in microprocessor vendor—then a more detailed analysis or even test may be required. There can be as much as 20 dB difference in the same part procured from a different manufacturer. Do not let changes happen without evaluation and educate your workforce as to why this is important." ■



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LUNCH MEETING

Chicago Chapter of the IEEE Power Engineering Society How Are Large Power Transformers Protected?

Wednesday, May 2, 2001

Greg Czernenko, Senior Electrical Engineer, Raymond Professional Group

About the Topic:

New, improved materials are used to build various size power transformers. Knowing what materials go into a power transformer helps design and build protective relay schemes and what to monitor/alarm on each transformer.

Consulting engineers are always looking at ways to better satisfy the needs of their clients. The cost of protecting major power transformers can be compared to the cost of providing insurance coverage for people. Protection for a power transformer will depend on its location just as the insurance coverage for a person will depend on his life style. A power transformer at a generating station will have a different protection scheme when compared to a power transformer in a substation. Not only the materials but also the locations of the power transformers determine the type of protective relay schemes and the associated costs.

This discussion is intended for an audience of power engineers familiar or unfamiliar

with every nuance for the protection of power transformers. The basic protective relay scheme will be discussed and the differences in protective relay schemes associated with the transformer location. People attending this presentation will leave with the understanding that it takes more than one differential relay, some overcurrent relays and one lockout relay to protect a large power transformer.

About the Speaker:

Greg Czernenko is a Senior Electrical Engineer with the Raymond Professional Group, previously known as Doyen and Associates Inc. Before joining the Raymond Professional Group, Greg held four assignments, lasting over 17 years, in ComEd directly related to the protection of large electrical equipment in transmission substations and generating stations. He taught evening courses in protective relaying for 10 years. Greg holds a Bachelor degree in Electrical Engineering from the University of Illinois at Urbana-Champaign. Greg is a licensed Professional

Engineer in the State of Illinois and a member of the Institute of Electrical and Electronics Engineers.

Location:

Chicago Bar Association, 321 South Plymouth Court (Near Jackson & Dearborn), Chicago, IL 60604

Time:

11:30 Social
12:00 Lunch (optional)
12:15 Presentation
1:00 Adjourn

Reservations:

Lunch tickets can be purchased in the lobby bookstore (\$10.50). Please call the IEEE Business Office at (800) 898-IEEE to make your reservation.

Information:

For more information, please visit the Chicago Chapter IEEE PES web site: www.ece.iit.edu/~flueck/chicago_pes/

ATTENTION IEEE Chicago Section Chapter Chairmen

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Step 2: Fax a confirming hardcopy of the notice to: 608-222-0262.

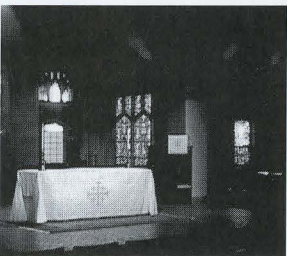
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EVENING MEETING

Chicago/Rockford IEEE Consultants' Network Meeting Insurance Programs Available to IEEE Members Monday, May 14, 2001

About the Topic:

In addition to networking and sharing leads and referrals, there is usually an educational program and/or a guest speaker. In May, there will be a brief introduction to the more than 24 insurance programs available to all IEEE members (consultants, self-employed, employed, unemployed, retired). There will be special emphasis on Professional Liability Insurance, In-Home Business Insurance, Small Employer Group Insurance, Auto & Homeowners Insurance, Long-Term Care, and many more. The no-fee IEEE Financial Advantage Program will also be explained. It provides portable non-technical benefits to all members and their families such as investment and planning, mutual funds, annuities, credit cards, computer hardware and

software purchasing programs, business services, home services (mortgages, moving, real estate), global travel services, and more.

Meetings are usually held on the last Monday of odd-numbered months. Preceding the meeting, we will be getting together for our group dinner. You are invited to join us for the optional informal dinner. We order individually from the menu.

Location:

Dinner: Bakers Square
270 E. Northwest Highway and
North Court, just south of the library.
Meeting: Palatine Public Library
700 North Court, Palatine, IL

Time:

6:15 PM-Dinner
7:30 - 9:00 PM-Meeting

Reservations:

Reservations are not required. There is no charge for attendance at the meeting. Both members and non-members are invited.

Information:

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

See you on May 14, and bring consultants and those who aspire to be consultants for a pleasant and informative evening of networking.

LUNCH MEETING

IEEE-IAS Luncheon Presentation Electrical Power and Communications Requirements for Health Care Facilities Wednesday, May 16, 2001

Timothy Arendt, City of Chicago

About the Topic:

Health care facilities, including hospitals, clinics, nursing homes, and medical offices present unique challenges for electrical design and installation. Mr. Arendt will discuss the demands that health care facilities place on their electrical systems. He will review the special considerations that must be made in both design and installation to meet the requirements and intent of the Electrical Code. Specific topics to be covered are utility services, backup generation, transient protection, emergency systems, and the demands of special areas such as operating rooms.

About the Speaker:

Education: MA in Industrial Relations from Loyola University. **Present Position:** Chief Electrical Inspector of the City of Chicago.

Tim Arendt has been with the Electrical Bureau of the Building Department of City of Chicago since 1978. He was responsible for the preparation and approval of the new 2000 City of Chicago Electrical Code, which represents a major overhaul of the Code from previous editions. He is a member of the International Brotherhood of Electrical Workers (IBEW) Local 134.

NEW Location:

Note New Location! Meeting has moved!
COSTA'S (GREEKTOWN) 810 WEST VAN BUREN, Chicago. Costa's is located in Greektown near Van Buren and Halsted

Time:

11:00 AM Social
12:00 PM Luncheon
12:30 PM Presentation

Reservations:

Your cost includes the presentation and a four-course dinner featuring a roast lamb or grilled chicken. (Vegetarian or special dietary meals available upon request). Cost is \$25 IEEE Member and \$30 non-member. Valet parking is included with your meal.

SEATING IS LIMITED!

Please call the IEEE Business Office at (800) 898-IEEE or (630) 724-0200 with your reservation on or before April 10. Please note your meal request at the time of the reservation.

Note: 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.

IEEE Communications Society - Chicago Chapter Quality of Service in IP Networks/Call for Paper and Participation May 21-22, 2001

Theme: Exploiting Leading Edge Internet Network Technologies

About the Topic:

The emphasis of this educational event is on new approaches and trends in today's communication technology. This event intends to stimulate an environment to enable effective information exchange and learning among network professionals at service-providers and vendor organizations who need to stay up-to-date on the latest industry development. This educational event comprises a 4-hour tutorial session on "Quality of Service in IP Networks" and a symposium devoted to Internet telephony networks and services.

Tutorial:

"Quality of Service in IP Networks"

Presented by Dr. Grenville Armitage, Bell Laboratories, Lucent Technologies "Author of 'Quality of Service In IP Networks: Foundations for a Multi-Service Internet', Macmillan Technical Publishing"

Presentation Session Topics (divided in two categories) include but are not limited to the following:

I. Internet Telephony Networks:

Wireless IP Networks
Standards and Interoperability Issues
Quality of Service

Security and Network Reliability
Mobility Management

II. Internet Telephony Services:

Wireless Multimedia Services
Location Based Service
Billing Services
Network Management Services

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Location:

University of Illinois at Chicago,
Chicago, Illinois

Important Deadlines:

Abstract & Viewgraph Due: March 26, 2001
Notification of Acceptance: April 6, 2001
Full Presentation due: April 23, 2001
Presentation: May 21 & 22, 2001

Abstract/Presentation

Viewgraph Submission:

Authors are requested submit abstract. Your

abstract, 400-500 words, should be informative, containing (a) a title with author's names(s) and affiliation(s); (b) the presentation objective; (c) brief statements of methods; (d) a summary of the results and conclusions. Authors' presentation material need to be in viewgraph (landscape) format. Each presenter is allocated for 40 minutes for presentation including 5 minutes for Q&A. Paper is welcomed, but it is optional.

Information:

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Please complete the following form to register for the 2001 Annual Educational Event to be held on May 21-22, 2001 at the University of Illinois at Chicago, Chicago, Illinois. Return the form either by e-mail to ksmolik@lucent.com or by US mail to Kenneth Smolik, Lucent Technologies, Room 2A-550, 263 Schuman Blvd., Naperville, IL 60566-7050. The registration fee is as follows: IEEE Member \$295, Non-Member \$395, and Student \$125. The price includes materials, lunch, and tutorial.

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Payment: \$395 (non-member) \$295 (member) \$125 (full-time student) circle one

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Account number: _____ Expiration Date: _____

EVENING MEETING

ED/CAS/SSC (Electron Devices/Circuits and Systems/Solid State Circuits)

Cable Modem: Technology & Application - Part 1

Tuesday, May 22, 2001

Venkata Majeti, Cadant

About the Topic:

Success of the Internet as a communications medium has opened doors to a rapid deployment of new products and services that directly benefit the end user. The result is a high-awareness among average residential/small-business user of the technologies that bring high bandwidth to mass markets, namely, DSL and cable modems. This is a two-part presentation that will cover the cable modems from technology and application perspectives. This first-part will cover the following:

- Cable television network architecture
- Migration of cable networks to hybrid fiber/coax (HFC) networks of broadcast systems to two-way interactive networks
- Use of cable RF spectrum
- Recent changes in the use of traditional RF spectrum
- Developments in cable modem technology
- Physical (PHY) & Media Access Control (MAC) Layer specification and design
- Data encapsulation, signaling & control

- Data Over Cable Services Interface Specifications (DOCSIS) Standard
- Other related standards - PacketCable, OpenCable and EuroDOCSIS

The second-part of this presentation will cover the network, cable system and product-level details and is scheduled on June 14, 2001.

About the Speaker:

Venkata C. Majeti is Founder and Chairman of Cadant, an early stage company offering DOCSIS standard based Cable Modem Termination System products. Prior to founding Cadant, Dr. Majeti was instrumental in the engineering and development of digital switching and transmission technologies at Lucent Technologies, 3Com, and Westell. Dr. Majeti has 9 patents and has served as Executive Editor of "Cable Modems: Current Technologies and Applications," a book published by the IEEE Press and the International Engineering Consortium. He holds a PhD from the Indian Institute of

Technology (IIT) Kanpur and a B.Tech from Jawaharlal Nehru Technology University.

Location:

Motorola Schaumburg Campus
1301 Algonquin Road
Enter Campus using Gate A, westmost gate off Algonquin Road, west of Meacham. Door 13 is under Motorola sign on west face of six story building. Preregistration is required.

Time:

6:30 PM Social (Free Sandwiches, Snacks, and Beverages)
7:00 PM Presentation

Reservations:

Please call the IEEE Message Center at (800)898-4333 or (630)724-0200 by 1PM Monday, May 21st. For information, call Norm Phoenix at (847)523-1078.

Chicago IEEE EMC Society Chapter

3RD Annual Chicago EMC MiniSymposium

Tuesday, May 22, 2001

About the Topic:

The event will consist of a full day of EMC material and is a must-see for every engineer faced with electromagnetic compatibility issues. The day will consist of EMC tutorials, technical presentations covering EMC and electrical safety, and design fundamentals for domestic and international EMC regulations. In addition, vendors have been invited to perform actual demonstrations on their equipment or products, and invite technical questions.

The purpose of this event is to offer EMC and regulatory information to individuals interested in the field of EMC who would not normally attend one of the national or international EMC symposiums. In addition to the technical presentations at the

MiniSymposium, there will be a vendor exhibition with over twenty vendors highlighting EMC related products, test equipment, and services. Exhibitors include technical representatives, test facilities, test equipment companies, component suppliers, EMC modeling vendors, and consultants.

Location:

Holiday Inn - Itasca, IL
860 West Irving Park Rd.
TEL: 630-773-2340

Time:

8:00 Registration
8:30-5:00 Program

Reservations:

The MiniSymposium admission fee is \$45

for non-members, \$35 for IEEE members, and \$15 for students. Fees include breakfast rolls, coffee, lunch, and entry into a raffle for a few door prizes.

Members and Non-Members of the IEEE EMC Society are invited to all chapter activities and meetings. For additional information on the MiniSymposium or to learn more about future IEEE EMC Chicago Chapter meetings visit the society web site at

<http://www.ewh.ieee.org/soc/emcs/chicago/>

Chicago Chapter of the IEEE Power Engineering Society Workshop to Develop New National PE Exam Friday & Saturday, June 8-9, 2001

About the Topic:

The format of the electrical PE exam will change with the April 2002 exam. The new format will be all multiple choice questions - with a 4-hour "breadth module," that all electrical and computer engineers will take, plus a 4-hour "depth module" in one of three areas: power; computers; and electronics, communications, and controls. The name of the exam will be changed to "Electrical & Computer Engineering."

Licensed Chicagoland electrical PEs are invited to volunteer their time to review the first exam that has been developed by the National Council of Examiners for Engineering and Surveying (NCEES) and make any suggestions. This is the only such

workshop that will be held, so Illinois engineers will be playing an important role in guiding the development of this new national exam.

Sponsors:

- IEEE/PES Chicago Chapter
- Illinois PE Licensing Board
- Illinois Society of Professional Engineers
- Illinois Institute of Technology - Rice Campus
- NCEES

Location:

IIT - Rice Campus, Wheaton

Time:

8:30 a.m. - 4:30 p.m.

June 8-9, 2001 (both days req'd)

Lunch: provided

Who Should Attend?:

Licensed engineers practicing in any of the following areas: power, computers, communications, electronics, and controls.

Professional Development Hours:

Written confirmation of PDHs, required for some state licensing renewals, will be awarded to participants. Also, employers of participants will be sent a thank-you letter.

Reservations:

Doug Criner, IEEE/PES Chicago Chapter (630-986-9424, dcriner@ieee.org)
Tom King, NCEES (864-654-6824, tom@ncees.org)

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