IEEE ELECTROMAGNETIC COMPATIBILITY GROUP

NEWSLETTER

ISSUE NO. 93 SPRING 1977 EDITOR: ROBERT D. GOLDBLUM

DR. AND MRS. ROBERT M. SAUNDERS

IEEE PRESIDENT SAUNDERS RECEIVES dB AWARD

Newly elected President of the IEEE, Dr. Robert M. Saunders, has been presented the "decade Bunch" (dB) award for:

"OUTSTANDING INTERNATIONAL CONTRIBUTIONS IN THE FIELD OF ELECTROMAGNETIC COMPATIBILITY (EMC)"

This award, presented in the form of a travelling trophy, is presented yearly to an outstanding individual, company, or professional organization for their contributions to the endeavors of the electromagnetic compatibility community. The trophy was unveiled at IEEE Headquarters during the February 20th IEEE Board meeting. The IEEE Group of Electromagnetic Compatibility is one of the foremost and oldest organizations in this field, having been formed in 1957 as the IRE Professional Group on Radio Frequency Interference (PGRFI). The EMC Group now has over 1500 members from over 40 countries.

The decade Bunch (dB Bunch) is a fraternity of eminently qualified engineers devoted to excellence in the field of EMC. Their interests include introducing young engineers, as well as new suppliers, into this complex discipline. According to Walter D. McKerchar, dB Bunch President, "The IEEE is eminently qualified to be the first recipient of the award and we are pleased and privileged to make this presentation."

IEEE ELECTROMAGNETIC COMPATIBILITY GROUP NEWSLETTER is published quarterly by the EMC Group of the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, N.Y. 10017. Sent automatically and without additional cost to each member of the EMC Group.

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FIRST CLASS MAIL

DR. HERBERT A. SCHULKE RESIGNS AS GENERAL MANAGER OF IEEE

Dr. Herbert A. Schulke, Jr. has resigned as Executive Director and General Manager of the IEEE. His resignation will take effect on July 22, 1977. He has served at the helm of this organization since January 1, 1975, bringing into operation an IEEE Service Center in Piscataway, New Jersey and reorganizing Institute operations to provide better fiscal management.

In his letter of resignation, Dr. Schulke expressed a desire to engage more extensively in technical activities and to return to more engineering related work. He had come to IEEE from the Joint Chiefs of Staff where, as a Major General in the U.S. Army, he had served as Director of Communications Electronics. He is a Fellow of the Institute with 30 years of experience in electronics and communications.

Dr. Robert M. Saunders, IEEE President and Professor of Electrical Engineering at the University of California at Irvine, and the Executive Committee of the Institute, issued the following statement:

> "Dr. Schulke, during his short tenure in office, has accomplished a great deal in terms of organizing the Headquarters operations of the Institute. New York operations have been tightened. He has activated the Service Center in New Jersey and it now performs in an exemplary fashion, a significant feat indeed. In fiscal matters he has suggested policy changes, notably the commitment ledger concept, and has responded with alacrity and enthusiasm to suggestions from the Executive Committee such as the deferred expenditure principal recently implemented."

JOHN J. O'NEIL MOVES TO BREEZE-ILLINOIS

Mr. John J. O'Neil, former treasurer and president of the EMC Group and employed by the U.S. Army Electronics Command since 1942, retired at the end of January 1977. John, long active in IEEE, served as chairman of the N.J. Coast Section, organized the EMC Chapter of the Section, and was chairman of the 1969 EMC Symposium. His entire civil service career was related to the problems of achieving EMC of Army equipments. He has served on committees of SAE, EIA and CISPR and was most recently involved with Army preparations for the forthcoming General World Administrative Radio Conference. His association with Breeze-Illinois will be as liaison to various military agencies on the east coast.

NEW ADCOM MEMBERS

The following six candidates have been elected to three year terms as members of the G-EMC Administrative Committee, starting with 1977:

Don H. Heirman	Richard B. Schulz
Jackie Janoski	Leonard Thomas
George M. Kunkel	James C. Toler

The Group would like to express its appreciation to all candidates who participated in this election.

ITEM '77 PUBLISHED

The 1977 edition of ITEM - Interference Technology Engineers Master was mailed to over 25,000 subscribers in early March. ITEM is a comprehensive design guide and directory exclusively devoted to EMI/EMC and contains product information from over 80 manufacturers. This 200-page publication is published annually and is available free by contacting the Circulation Manager, R & B Enterprises, P. O. Box 328, Plymouth Meeting, PA 19462; Tel.: 215-828-6236.

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SECOND INTERNATIONAL SYMPOSIUM AND TECHNICAL EXHIBITION "ELECTROMAGNETIC COMPATIBILITY MONTREUX 1977"

MONTREUX, JUNE 28-30, 1977

After the first successful presentation of this biannual event in 1975 (450 participants from 26 countries, 19 exhibitors, 118 papers), the coming conference will again treat problems of the interaction of electromagnetic energy with electronic and biological systems, the immunity of electronic systems to interference as well as their compatibility with the electromagnetic environment.

The Symposium is held under the auspices of the Director-General of the Swiss PTT, Mr. F. Locher. Cooperating are the URSI, the CISPR, the IEEE, SAE, EUREL and the Association of Polish Electrical Engineers (SEP). The Organizing Committee of the Symposium is chaired by Professor Dr. F. E. Borgnis (Swiss Federal Institute of Technology). Chairman of the Program Committee is Professor Dr. F. L. Stumpers (Philips Research Laboratories, Eindhoven).

The meeting will be opened on Tuesday, June 28th by the Patron of the Symposium in the presence of representatives of the cosponsoring organizations and other prominent guests. Thereafter, in three parallel groups, 37 papers will be delivered in the sessions "High Voltage and Power Lines," "Walsh Functions," "EMI and Computers," "Safety and EMC," "Avionic Systems," "Ignition Noise," "Car Electric Equipment," and "Interference to Communication Systems."

On Wednesday, June 29th, the sessions "Electric and Magnetic Fields," "Shielding," "Immunity," "Frequency Management," "Design for EMC," and "Statistics" with 40 papers will follow.

On the last day of the Symposium, 37 papers will be delivered in the sessions "NEMP and Transient Control," "CISPR-Type Measurements," "EMC System Specifications," "EMC and Life," "Automatic Measuring Systems" and "Effect of Radio Noise on Telecommunication Systems Specifications."

Highlights of the program include papers on compatible design of large electronic systems (aerospace, naval and ground transport), on the influence of dynamic and static fields on living organisms and the sessions sponsored by the IEEE Group on EMC and by URSI Commission E, treating satellite systems, frequency management, quasi-impulsive noise and noisy signals.

Two round-table discussions on experiences with MIL-STD application and on measuring techniques as well as workshops on EMC diagnostics, shielding and other subjects round off the program.

The largest number of contributions comes from the USA (45), followed by Germany (15), Italy (12), Great Britain (11), Poland, USSR, Netherlands, France, Spain, Switzerland, Australia, Canada, Austria, Hungary, India and Japan. The full text of the 114 papers will be made available at the conference in the 550-page record: "Electromagnetic Compatibility 1977." By the end of 1976, 12 exhibitors registered and, further, 14 firms indicated their intention to participate. Up to now, the exhibits include modern measuring systems, shielding and special technologies as well as training and educational facilities from the USA, Germany, France and Switzerland.

Technical excursions and social events are also planned. A special authors lunch will be sponsored by the Symposium. As in 1975, best papers will be awarded prizes (Swiss francs 1'500. - and 1'000. - respectively).

The registration fee, including Symposium Record, is Swiss francs 240. Additional copies of the Symposium Record will be available at SFr. 75. - during the conference and at SFr. 95. - thereafter. Fee reductions for members of cosponsoring organizations, early registrants and students are envisaged.

Contact person: T. Dvorak, ETH-Zentrum HF, 8092 Zurich, Switzerland; Tel.: (01) 32 62 11, Extension 2790.

MONTREUX - WE ARE COMING

The last issue of the Newsletter carried an announcement of the group being formed to travel to the Montreux EMC Symposium and take advantage of the lower group fares. This group arrangement has been set up by Swissair to travel on Swissair's 747 with land accommodations in Montreux, Geneva, and at an inn at some one location in Switzerland. There are some government personnel who must travel on a U.S. flag carrier. As an accommodation to these personnel, Swissair will book them on TWA. All others will fly Swissair.

In anticipation of a proposed fare increase, the tour cost has been increased to:

Tour with unlimited mileage car	$961
Swiss Railpass Package	$959
Eurail Pass Package	$996

The single supplement for the car package is $115, for the Swiss rail package $65, for the Eurail package $100.

(continued)

Other questions have been about staying longer and/or returning from some place other than Zurich or Geneva. Government regulations require that all members of a group qualifying for a special fare travel as a group on the transatlantic round trip. There is no longer a requirement that all members of the group belong to the same club or organization. So, nonmembers of IEEE are eligible to join our tour group.

Another question that has come up is in regard to a breakdown of the cost for business and pleasure. Swissair will issue a statement, on request, that will assign to business expense the transportation and the part of the cost associated with the stay in Montreux during the Symposium. The Internal Revenue Service has new regulations which are in effect this year. In connection with IRS, the maximum rate for per diem allowance for travel in Switzerland is $62. You will want to look into this new IRS regulation if you are making a business deduction on a tax return.

The group assembles in New York at John F. Kennedy International Airport on June 25th for takeoff in a Swissair 747. Those coming from outside New York City area can take advantage of a special "add-on" fare for groups such as ours. From Los Angeles, the add-on fare is $374 round trip for an individual; but, if there is a group of 5 or more coming from Los Angeles to join our Montreux group, the add-on fare is only $175 round trip each. (Transcontinental flights are in the process of being reduced.) From Chicago, the add-on fare is $121 round trip with no provision for a further reduction for groups of 5. Similarly, the Washington, DC add-on is $40 round trip for an individual. There are special add-on fares for all major city originations. You will be advised of your add-on fare when you make your reservation and it will be put on your group ticket if you choose to fly into New York.

Compare this with $891 for the regular tourist class round-trip fare (not including hotel, meals and rental car).

Several inquiries have been made regarding the fares for children who will accompany their parents. For children ages 2 through 11, the cost is:

Tour with unlimited mileage car	$521
Swiss Railpass Package	$542
Eurail Psss Package	$598

For children 12 and older, the full adult rate applies. The cost for the younger children is based on sharing a room with their parents. Larger cars will be made available to families with 2 to 11 year old children. Larger cars will go also to groups of three or more who each travel on a full adult fare.

In 1975, there were 31 persons from the USA who made up the group to travel to the first Montreux EMC Symposoum. We had a most enjoyable time and we look forward to this year's trip. Besides the Symposium, a high point of the trip, there are so many interesting places to visit in Switzerland during that week with the rental car. Some of us travelled into Italy, France and Germany, as well as Switzerland. The weather is beautiful, sunny and mild during this June 25 to July 9 period.

If you have not sent in the coupon to get your name of the mailing list, do it now, using the coupon on the bottom of this article. Springfield Travel Service will send you brochures on Montreux and where to go and what to see in Switzerland. There will also be a folder giving details of the group arrangements.

Start planning your trip to Montreux and Switzerland now.

A deposit of $100 per person will hold your reservation. In case of cancellation, the deposit is refundable in full up to 30 days prior to departure. Balance of the payment is due on or before May 25th.

montreux 1977
june 28-30

JIM HILL
6706 Deland Dr.
Soringfield, VA 22152

Dear Jim:

Please put my name on your mailing list for detailed description of the EMC Group trip to the Montreux Symposium and illustrated brochures on Montreux and Switzerland. I would prefer to travel

☐ SWISSAIR ☐ TWA

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CITY_____ STATE_____ ZIP___

PHONE NO._____

EMC PERSONALITY PROFILES

by William G. Duff

ROBERT D. GOLDBLUM

The EMC Personality for this issue is Bob Goldblum, the editor of the EMC Newsletter. Bob has nineteen years of electronics experience with fifteen years exclusively devoted to Interference Technology, working with government specifications and their application on systems and equipment. Bob has been involved in system/component/facility detail design and development for EMC. During his career, Bob has been active in IEEE-EMC activities and is well known to everyone in the EMC community.

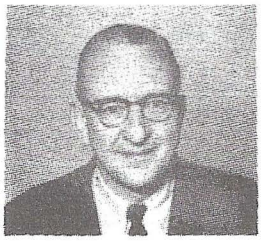
He is presently the founder and president of R & B Enterprises. In this capacity, he is deeply involved in the study of Interference Technology leading to the annual writing and publication of ITEM - Interference Technology Engineers Master. ITEM contains information on a number of subjects, which include shielding, filtering, system/component design analysis for EMP/TEMPEST/EMC. Bob is also currently the director of an employment service providing job placements and specializing in the EMC field. In addition, he provides EMC consultation to a variety of military, industrial and commercial clients.

Before forming R & B Enterprises, Bob worked for the General Electric Company as a supervising engineer. At G.E., he was responsible for technical direction and consultation on systems, subsystems, and component EM compatibility. In this capacity, he performed EMC analysis; provided design guidance; directed EMI/EMC tests and interpreted results and data; and generated EMI proposals, control plans, test plans, and test reports. Bob established and interpreted program requirements and set forth applicable control techniques and restraints relevant to grounding, bonding, harnessing, filtering, shielding and circuit design. He established in-house specs for design and control and worked on missile and ground control systems, including communications, navigation, power subsystems, and test support equipment. Other areas of responsibility included testing and compliance to government specifications, including MIL-STD-461A, MIL-E-6051D, MIL-B-5087B and many others. He contributed to pyrotechnic wiring and safety design, magnetic cleanliness for ocean and aerospace applications, and power system design for hospitals and medical equipment. Bob also directed an interesting three-man study of electromagnetic radiation biological effects, including a test program to destroy viruses with high and low level radiation.

Bob's earlier career activities at American Electronics Labs, Inc. and Sylvania Electronics Systems involved work with ECM, ELINT, and TEMPEST. He participated in the EMC design, analysis, and testing of major electronics (MAR), and various data processing and communications systems, including CRISPY and TEXAS.

Bob has participated in a number of professional activities since he obtained his B.S. in Electrical Engineering and M.E. in Engineering Science from Pennsylvania State University in 1961 and 1967, respectively. He has been the editor of the IEEE G-EMC Newsletter since 1968; is a member of the IEEE G-EMC Administrative Committee; served as a Chairman of the Philadelphia IEEE Chapter G-EMC in 1967-1968; and was Chairman of the 1971 IEEE International EMC Symposium. In addition to all of these activities, Bob has found time to author a number of articles and publications on EMC.

We all owe Bob a vote of thanks for his contributions to the EMC community.



BOOK REVIEWS

BOOK REVIEW

by Jim Hill, RCA Service Company

Our plea for volunteer book reviews has borne fruit. Dr. G. R. Redinbo, our Sequency Union Associate Editor, has offered a review of a book on design of digi tal devices using Walsh or Haar functions. If you have been wondering about the practical application of Walsh functions, this book will tell you how they can be applied to the realm of digital circuitry device design.

The second book review is not in the field of applied technology; but, rather in the area of history, the history of electronic invention. "The Past is Prologue," applies here; but, with an odd twist. Inventions are rarely overnight successes. The inventions of 10, 20, 30 years or more in the past foretell the future. For example, we can foretell that satellite technology will shape the future of electronics. The invention of Intelstat I is barely 12 years old. How will it influence the future of civilization?

In the last Book Reivew Column (Newsletter Issure No. 92), a printer's devil lost the line which gave the publisher of the "Encyclopaedic Dictionary of Mathematics for Engineers and Applied Scientists." The publisher is Pergammon Press, Inc., Maxwell House, Fairview Park, Elmsford, NY 10523.

"Finite Orthogonal Series in the Design of Digital Devices"

BY

M. G. Karpovsky

251 pages plus appendix insert, $35.00
New York: John Wiley and Sons, 1976

Reviewed by G. Robert Redinbo
Electrical and Systems Engineering Department
Rensselaer Polytechnic Institute
Troy, New York

This book introduces new approaches employing finite orthogonal series to the design of devices constructed from digital circuitry. It paves the way for understanding the theory and implementing the techniques by providing a comprehensive presentation of the foundations and a lucid development of their applications. The path to understanding is lined with abundant numbers of detailed illustrative examples which illuminate the salient points of the theory and practice. Fast transform procedures bring many of these design tools within the realm of practicality.

This text is worth considering,not only in its own right; but, also it will be the point of departure for better techniques in the future. Mathematicians,as well as engineers, will find this book stimulating, even though the level of mathematical sophistication is fundamental. The finite orthogonal series uses either Walsh or Haar functions or generalizations of these. Professor Karpovsky, presently with Tel Aviv University, Israel, freely references the literature and, in particular, the Russian literature,some of which he personally contributed. Many of the results in this book are based upon native language Russian articles and many other topics appear here for the first time.

The opening chapter defines systems of logic functions which have domain and range spaces imbedded in the real numbers. A different additive operation is defined in the domain space. For binary logic functions, the Haar and Walsh functions are employed, while for multivalued functions, generalizations of these orthogonal functions are prescribed. The basic functions are carefully defined and the properties of the corresponding transforms are discussed. The use of correlation functions which are suitably defined on the domain space and the applicability of transform theory in their computation are detailed. One important property, central to many optimization procedures in succeeding chapters, interrelates the correlation functions of two logic functions before and after their arguments have been transformed by a nonsingular linear transformation. The last section of Chapter 1 develops discrete transforms on finite Abelian groups; most results and properties contained in the previous sections are special cases of this general theory.

(continued)

In Chapter 2, spectral techniques are used in the analysis and classification of logic functions. The first classes of Boolean functions we meet involve duality: self-dual and anti-self-dual. The inertia group (the anti-self-dual class) is exemplified by linear block codes. Another class involves networks composed of threshold elements where the subclasses employing single threshold elements and those using linear threshold elements are considered in detail. The Chow parameters enter naturally into the discussion.

Several criteria for measuring the realization complexity of logic functions are introduced and, subsequently, used in section 4 where Boolean functions are decomposed into a linear part cascaded with a nonlinear part. The various complexity criteria are applied in turn as a measure of the complexity of the nonlinear part so that an optimum linear operator producing a minimum complexity can be selected. The techniques are extended to the larger family of logic functions. Other configurations of the linear and nonlinear parts are considered in a method labeled polynomial approximations. Finally, bounds on the number of nonvanishing transform coefficients are developed. Detailed information about twenty-one classes of logic functions are relegated to the appendix.

The synthesis of logic functions in the spectral domain is addressed in Chapter 3. Both completely and incompletely specified functions are discussed and the Haar functions are used almost exclusively. With the number of nonzero spectral coefficients as a minimization criterion, an optimum nonsingular linear transformation of the input variables is sought. A suboptimal recursive procedure is defined and the autocorrelation functions of certain characteristic functions determine the class of minimizing transformations at each step in the algorithm. In the last section, spectral methods are applied to the design of digital function generators.

Chapter 4 applies Haar spectral methods to the realization of finite-state sequential machines. A state assignment algorithm which minimizes the number of nonzero spectral coefficients in the meahanization of the excitation function is developed. The first step in this algorithm involves defining a distance matrix on the state transition matrix and then performing a minimal symmetric matching in the distance matrix; the Hungarian algorithm is one such method for implementing this matching. Succeeding steps parallel the first one; but, involve modified state matrices. The algorithm is applicable both to completely and incompletely specified automata.

Spectral methods for determining the intrinsic redundancy (correcting capability) of digital devices are the subject of Chapter 5. The autocorrelation functions of characteristic functions associated with Boolean functions are central to the development.

Analysis and synthesis procedures are considered. The average number of correctable errors is used as a minimization criterion for selecting a nonsingular linear transformation of the input variables. The results are presented both for arithmetic and algebraic errors and various subclasses of errors, e.g., single and multiple errors, burst errors, errors with different costs. Several of these methods also are applied to the design of finite-state sequential machines. In the final section of this chapter, arithmetic (AN + B) codes and spectral realization techniques are combined for the design of finite-state machines.

The sixth and last chapter confronts some of the technical hardware details for implementing the techniques espoused earlier in the book. Serial and parallel configurations are treated and the respective complexities are computed. A brief section on the use of finite field in the computation of the spectral coefficients is included. The final section succinctly compares the advantages and disadvantages between the spectral and classical methods of designing digital devices.

There are several typographical errors in the text, e.g., the proof of Theorem 2.6.1. However, none of these is catastrophic and none will elude a careful reader. One of the book's assets is the thorough bibliography containing the references to the numerous Russian articles.

The application of transform theory to classical circuit design and the use of discrete transform theory in the design of digital filtering and signal processing systems are all familiar to engineers. In fact, virtually all classical circuit symthesis is performed in the frequency domain while digital filtering design relies heavily upon Z-transform techniques. Why cannot logic circuits be synthesized using the appropriate transform domain? Professor Karpovsky's answer is clear.

EDWIN (ED) L. BRONAUGH

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San Antonio, Tx. 78284
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EMCABS

In this issue we are publishing 54 abstracts which were ready for publication but remained unpublished during the earlier EMCABS efforts.

We still need more volunteers to work on the Information Retrieval Committee. The present committee is comprised of myself and the following people:

L. F. Babcock
R. N. Hokkanen
M. Kant
R. B. Schulz
J. S. Hill
J. R. Janoski
G. R. Redinbo
R. M. Showers

We are always open to suggestions about how we can improve the EMCABS. Please let us hear from you.

TECHNICAL DOCTORATES PEAKING OUT

The number of scientists and engineers with Ph.D.'s who were employed by industry increased from 50,000 to about 66,000 between 1973 and 1975, according to an NSF report. As a result, one fourth of all employed doctoral scientists and engineers were affiliated with business and industry in 1975, compared to 22% in 1973. Educational institutions continued to be the largest employers of Ph.D. graduates, employing about 58% of the total. The population of doctoral scientists and engineers grew 13% between 1973 and 1975. The number of Ph.D. women in this group increased so that in 1975 women made up 9.4% of U.S. doctoral scientists and engineers.

However, the National Science Foundation has predicted that by 1985 more than 20% of science and engineering Ph.D.'s in the U.S. labor force may not be working in science or engineering jobs because more Ph.D.'s than jobs will be available. The Bureau of Labor Statistics foresees an even higher proportion of Ph.D.'s who will be unable to find jobs in their fields. Industry is seen as the most likely sector where employment opportunities for science and engineering Ph.D.'s can be increased, but employment and research utilization of Ph.D.'s in the academic sector also is a subject for concern.

AEROSPACE EMPLOYMENT LEVELS OFF

U.S. Aerospace industry employment will stabilize at approximately 895,000 workers by June 1977, according to a survey by the Aerospace Industries Association.

This projected leveling off in employment would end a major decline which started in 1969 from a 1968 peak of 1,500,000 workers.

The aircraft manufacturing segment is showing signs of renewed vitality, and by June 1977 will employ 477,000, an increase of 1.3% from December 1976. This new vitality is based upon new orders for transport aircraft from domestic airlines, domestic and international demands for new and replacement military aircraft, and the continuing strength of the general aviation sector of the industry.

The survey estimates that employment on missile and space programs will continue to decline throughout the period covered by the survey, with an eleven percent drop from December 1975 levels. The category of "other related products"-avionics, non-aerospace and basic research-continues its overall upward trend to 245,000 by June 1977.

OTP Sets Standards for Radar

ACCESSION NO. EMCABS 02 75 45

Hal Taylor
Rairchild News Service
Electronic News
September 13, 1971, p. 8

ABSTRACT:
Radar engineering standards designed to make more of the radio spectrum available for direct communication use were established by the President's Office of Telecommunication Policy

INDEX TERMS: spectrum characteristics, radiated emissions, radar

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AGENCIES REACT TO ELECTROMAGNETIC RADIATION RISKS

ACCESSION NO. EMCABS 02 75 40

ELECTRONICS
Vol. 44, No. 17, August 1971, pp. 35, 36

ABSTRACT:
Standards, limiting the exposure of the general population to non-ionizing radiation will be established within three years, predicts a ranking radiation official at the Environmental Protection Agency. "The only question now is one of degree, a question to be answered by further EPA studies." Although EPA isn't even hinting at the radiation limits it will seek, the young agency's action may set off a string of regulations from agencies that have the power to specify standards more directly impacting the electronics industries' products.

INDEX TERMS: Standards, Federal Control, Electromagnetic Radiation Safety, Hazards, Commercial Equipment

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Accurate Analog Data Transmission

ACCESSION NO. EMCABS 02 75 46

J. E. Buchanan
Westinghouse Electric Corp.
Electromagnetic Design
September 1971, pp. 3-4

ABSTRACT:
Differentail amplifier circuits provide means of transmitting accurately data btween sources. Errors caused by dc signal ground differences, by noise pickup, or by loss of the ground integrity of source and receiver are discussed in this article.

INDEX TERMS: grounds, signal noise pickup

WORLD BODY PARCELS OUT SPACE FREQUENCIES

ACCESSION NO. EMCABS 02 75 42

ELECTRONICS
Vol. 44, No. 16, August 2, 1971, pp. 25, 26

ABSTRACT:
Nearly 700 delegates from 100 nations are seeking their government's approval of a draft treaty on space communications frequency allocations following a grueling six-week meeting of the World Administrative Radio Conference on space telecommunications in Geneva. The treaty will become effective Jan. 1, 1973, if approved as expected, by WARC member governments.

INDEX TERMS: Frequency Allocation, Space, Communication, World Administrative Radio Conference, International

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OPTOELECTRONICS AND MICROPOWER HALT HOSPITAL HAZARDS

ACCESSION NO. EMCABS 02 75 48

EDN/EEE
Vol. 15, No. 20, October 15, 1971, pp. 12, 13

ABSTRACT:
Hospital patients who now are instrumented to medical electronic equipment have gained a new friend. Terrasyn, Inc. of Longmont, Colorado has completed the design and evaulation of a new shock-preventing isolation amplifier for use with EKG monitors or chart recorders. Named "Lifewafer," it uses opto-electronic isolation and operates at very low power levels.

INDEX TERMS: Medical, Hazards, Instrumentation

Federal Limits on Microwave Oven Leakage Go Into Effect Next Month

ACCESSION NO. EMCABS 02 75 43

Don Byrne
Microwaves
Microwaves
September 1971, p. 21

ABSTRACT:
New Food and Drug Administration reulations limiting microwave ovens' leakage to one milliwatt per square centimeter prior to sale go into effect October 6. Sample test results show that as many as 21 percent of the ovens exceeded the 10 milliwatts per square centimeter old limit.

INDEX TERMS:
radiation hazards, radiated emissions

ABSORBING CLAMP MDS-20 FOR INTERFERENCE MEASUREMENTS IN VHF RANGE

ACCESSION NO. EMCABS 02 75 36

NEWS FROM ROHDE & SCHWARZ
Vol. 11, No. 46, 1971, pp. 18-20

ABSTRACT:

Because of the large number of electrical, domestic and industrial appliances in use, it is essential that steps are taken to eliminate both mutual interference and interference to radio and television services.

According to these regulations, interference at frequencies below 30 MHz should be measured in terms of interference voltage using a radio-interference measurement receiver in conjunction with an artificial supply network, whilst interference measurements in the 30 to 300 MHz (or 1000 MHz) range should be carried out in terms of interference field strength.

INDEX TERMS: Interference Absorbing Clamp, Commercial Equipment, Industrial Equipment, Measurement Technique

STATIC ELECTRICITY CAN CAUSE BIPOLAR IC FAILURES

ACCESSION NO. EMCABS 02 75 32

Stephen E. Rose, Component Engineer
Honeywell, San Diego, California
EVALUATION ENGINEERING
Vol. 10, No. 3, May/June 1971, pp. 21-24

ABSTRACT:

For several years, many reliability hazards of static electricity have been known to the electronic industry. A good deal of publicity has been given to the destructive breakdowns that static charges can cause in MOS devices, but little information has been available about the failures the same charge levels can cause to bipolar discretes and IC's. In the past several years there have been some substantial financial losses suffered by bipolar users from static charge damage simply due to the lack of information that bipolar devices are also susceptible to electrostatic overstress.

INDEX TERMS: Static Electricity, Bipolar, Integrated Circuits, Susceptibility

ELECTROMECHANICAL MOTORS

ACCESSION NO. EMCABS 02 75 37

Robert Kulka, Design Engineer
Bergen Laboratories, Inc.
ELECTROMECHANICAL DESIGN
Vol. 15, No. 8, August 1971, pp. 6-10

ABSTRACT:

Getting rid of the inductive kick of stepping motors is no great problem. In the majority of cases a simple flyback diode works just fine. However, there are other procedures which can improve system performance. We'll consider, in the material which follows, various methods of handling inductive currents.

INDEX TERMS: Inductive Kick, Stepping Motors, Diode Suppression, Servo, Switching

Baluns Cut Ground Noise

ACCESSION NO. EMCABS 02 75 34

Gilbert P. Condon
General Electric Co, Missile & Space Div.
Electronic Design
Volume 19, Number 15, July 22, 1971, pp. 62-63

ABSTRACT:

The capabilities of baluns to suppress circulating noise currents is described.

INDEX TERMS: ground noise, conducted emissions, balun

COMPUTER-DERIVED TABLES SOLVE EMI SHIELDING EQUATIONS IN MINUTES

ACCESSION NO. EMCABS 02 75 39

L. F. Babcock, Bell Aerospace Company, Division of Textron, P. O. Box 1, Buffalo, N. Y. 14120
COMMUNICATIONS DESIGNER'S DIGEST
July-August 1971, pp.37-40

ABSTRACT:

To remove the tedium of solving electromagnetic wave shielding equations without sacrificing accuracy, engineers at the Bell Aerospace Division of Textron in Buffalo, N. Y. have developed a computer program which in a few minutes, gives the answers to many common EMC shielding problems.

INDEX TERMS: Shielding, Tables, Analysis

ALLOCATION OF FREQUENCIES IN THE VHF AND UHF BANDS

ACCESSION NO. EMCABS 02 75 35

W. M. Pannell
Pye Telecommunications Limited, Cambridge, Eng.
TELECOMMUNICATIONS
Vol. 5, No. 8, August 1971, pp. 19-23 & 40

ABSTRACT:

The satisfactory operation of large integrated radio systems depends not only upon adequate engineering, but very largely upon the suitable choice of frequencies. This choice must take into consideration the operation of the system as a whole, as well as the individual problems associated with communal siting, e.g. multi-channel operation, single or double frequency operation, mobile density.

INDEX TERMS: Frequency Allocation, VHF/UHF, Intermodulation, Bandwidth Multistations

MEASURING NOISE AND LEVEL ON INTERNATIONAL TELEPHONE SYSTEMS

Jim Plumb and Jacques Holtzinger

ACCESSION NO.
EMCABS 02 75 05

Hewlett-Packard Journal
December 1970, pp. 13-15

ABSTRACT: In telephone and high quality audio or video transmission systems, besides the traditional amplifier noise, thermal noise and induced ac from power lines or ripple, some other important disturbing sources of noise are:

- Crosstalk produced by inductive or capacitive coupling between lines in parallel or at junctions, which can be intelligible, unintelligible or either (babble) when from a various number of sources.
- Clicks and scratching noise generated by atmospheric disturbances, autos, neon lights, defective soldered joints.
- Acoustic noise directly coupled into the telephone sets.

INDEX TERMS: Communication, Telephone, Noise, Measurement, Intelligibility

MAGNETIC SCREENING

Field, Captain J. C. G.

ACCESSION NO.
EMCABS 02 75 01

Electronic Engineering
February 1970, pp 60-63

ABSTRACT: A series of approximate formulae are presented for determining the shielding effectiveness (screening ratio) of a long cylindrical tube immersed in a uniform transverse alternating magnetic field. The appropriate formula, as a function of frequency and permeability, for a particular practical problem may be selected and used with reasonable confidence. Numerical examples are given to illustrate the application of these formulae.

INDEX TERMS: shielding effectiveness, cylindrical tube, magnetic field

MODEL FOR COMPUTATION OF INTERFERENCE TO RADIO-RELAY SYSTEMS FROM GEOSTATIONARY SATELLITES

A. S. May and M. J. Pagones

ACCESSION NO.
EMCABS 02 75 06

BELL SYSTEM TECHNICAL JOURNAL
Vol. 50, No. 1, January 1971, pp. 81-102

ABSTRACT:

A statistical model is suggested for the computation of interference into terrestrial radio-relay systems from geostationary satellites. The model is general, It incorporates radio-relay characteristics, satellite arrangements, and allowable satellite power flux densitites. A program simulator can be used to calculate the satellite power flux density corresponding to a particular radio-relay interference objective. Interference distributions are computed for AT&T and CCIR radio-relay models using the power flux density that was suggested for study at the 1969 CCIR Interim Meeting at Geneva, Switzerland.

INDEX TERMS: Interference, Radio Relay, Susceptibility, Geostationary Satellite Radiation, Computer Model, Microwave.

LET'S DESIGN BANDSTOP FILTERS

Sleven, Robert L.
Airborne Instruments Laboratory, Melville, N. Y.

ACCESSION NO.
EMCABS 02 75 02

Microwaves, Vol. 9, No. 6, June 1970, pp 60-62

ABSTRACT: In any filter application, bandpass or bandstop, certain signals must be passed with minimum attenuation or distortion while unwanted signals are rejected. Bandstop response may be defined by the following electrical parameters: center of stopband, stopband rejection, stopband bandwidth, passband loss, passband bandwidth, passband standing wave ratio and passband delay variation. A step-by-step pseudo-exact bandstop filter design procedure using 0.1 dB Chebyshev design curves is given in this article.

INDEX TERMS: filter, bandstop, design, passband, stopband

BENEFITS OF SMALLER TWT'S

ACCESSION NO.
EMCABS 02 75 07

COMMUNICATIONS DESIGNER'S DIGEST
January-February 1971, pp. 28-30

ABSTRACT:

Intermodulation distortion from traveling wave tubes, klystrons and similar high-power tubes is something that communications designers have grown to accept. Because there are no known tube design techniques for eliminating the distortion-causing mechanisms, engineers have no choice but to back off the output and take the loss in power and efficiency.

Now, however, there is an alternative.

INDEX TERMS: Microwave, TWT, Klystron, Intermodulation, Distortion, Suppression, Predistortion

ELECTROMAGNETIC COMPATIBILITY

ACCESSION NO.
EMCABS 02 75 04

COMMUNICATIONS DESIGNER'S DIGEST
November-December 1970

ABSTRACT:

While space and the oceans illustrate the growing reaches of EMC science, there was lots in the other sessions to indicate its expansion within existing bounds. Topics for the Anaheim, California meeting ranged from shielding, bonding and grounding, and antennas and fields to modelling, susceptibility and emission analysis, and systems EMC management. Also, there were topical titles like Electromagnetic Smog, and futuristic ones like Tomorrow's EMC Solutions, and EMC Design for the 70's. In all, the three-day meeting encompassed 18 sessions and provided a product showcase of more than 60 displays.

INDEX TERMS: EMC Symposium, Review, IEEE

ICs IGNORE NOISE

ACCESSION NO.
EMCABS 02 75 11

Anthony R. Viola
Sylvania Electric Products Inc.
EDN Magazine
Vol. 16, No. 3, February 1, 1971, pp. 29-33.
ABSTRACT:

Signal ground shifts and common-mode noise distort pulse levels to the extent that conventional integrated circuits are unable to process the data or retain the proper logic levels. The trend toward faster integrated circuits does not help the situation, since circuits with low propagation delays are very sensitive to narrow noise spikes or overshoots. In the past, slower circuits usually ignored these spikes.

Devices such as MSI multiplexers and demultiplexers are offered as packaging, cost, wire and power savers, but they do not provide needed protection against signal distortion over long line transmission.

INDEX TERMS: Data Transmission, Long Lines, IC's, MSI, Reflection Ground Shifts, Noise and Cross Talk

TABBING EMI CONTRIBUTORS

ACCESSION NO.
EMCABS 02 75 08

COMMUNICATIONS DESIGNER'S DIGEST
January-February 1971, pp. 54-56
ABSTRACT:

Although cables and wiring are often major EMI contributors in communications designs, little effort has gone into developing standard EMC cable evaluation methods. In the view of J. E. Bridges and D. A. Miller of the IIT Research Institute in Chicago, Illinois, the absence of standard EMC cable evaluation techniques may be partially responsible for the lack of progress in developing EMI-resistant cables.

INDEX TERMS: Cables, EMI Evaluation, Shielding, Triaxial Tester

COMMON MODE VOLTAGE REJECTION

ACCESSION NO.
EMCABS 02 75 12

James R. Springer
Avco Electronics Division
INSTRUMENTS & CONTROL SYSTEMS
Vol. 44, No. 2, February 1971, pp. 99-101
ABSTRACT:

Measurement signals are often transmitted by cable to monitoring stations for observation or recording. The receiving device is commonly a differential amplifier of gain K, which produces an output proportional to the normal mode voltage $E_n = e_1 - e_2$.

A common mode voltage which appears on both lines of a cable is cancelled by subtraction at a differential input. The ability of a device to produce an output independent of the common mode voltage is the common mode rejection ratio, normally specified in dB.

INDEX TERMS: Common Mode, Noise Rejection, Measurement Signals, Cables

CROSSTALK CONSIDERATIONS IN THE TRANSMISSION OF ANALOG SIGNALS ON PAIRED CABLE

ACCESSION NO.
EMCABS 02 75 09

B.J. Bunin, R.B. Hirsch, & R.E. Olsen
THE BELL SYSTEM TECHNICAL JOURNAL
Vol. 50, No. 2, February 1971, pp. 427-458
ABSTRACT:

Crosstalk is an important consideration in the transmission of analog baseband Picturephone signals on paired cable. Crosstalk due to the worst disturbing Picturephone signal can cause a distinctive visible interference pattern. Crosstalk interference from other Picturephone and wideband systems, such as T1 and T2 digital lines, contributes to random noise. In addition, feedback via crosstalk coupling may cause spurious oscillation of cable equalizers. Methods are determined to control these impairments by placing restrictions on equalizer spacing and cable pair assignment.

INDEX TERMS: Crosstalk, Picturephone, Paired Cable, Analog Signals, Communication

ISOLATION TRANSFORMER - FRIEND OR FOE?

ACCESSION NO.
EMCABS 02 75 13

Owen Doyle
Instrumentation Editor
ELECTRONICS
Vol. 44, No. 3, February 1, 1971, pp. 73-74
ABSTRACT:

A battle is raging over the use of isolation transformers in hospitals. One side holds that the devices, which isolate hospital power lines from ground, are essential to protect patients against potentially lethal shock hazards in medical electronics gear. The other side claims that the transformers not only are too expensive but also create hazards themselves.

Everyone agrees that no more than 10 to 20 microamperes should flow into a patient, but today's isolation transformers themselves cause as much as 1 milliampere of leakage current.

INDEX TERMS: Medical Electronics, Isolation Transformer, Shock Hazard, Hospitals, Grounding

SMALL LEAKS LOOM BIG IN RFI WORK

ACCESSION NO.
EMCABS 02 75 10

John Paraskivas
Raytheon Company
EDN Magazine
Vol. 16, No. 3, February 1, 1971, pp. 39-41
ABSTRACT:

RFI in the form of electrical noises, transients, harmonics and other spurious signals can cause loss of data, and it frequently buries low-amplitude signals so thoroughly that they cannot even be detected. We will never eliminate interference completely, but we can at least control the amount that our devices radiate and their tendencies to pick it up. Shielding is the prime weapon in this effort. The problem, as in plumbing, is one of leaks-particularly from panels (with their shaft holes, dial area, switches and the like) and from the joint between access covers and the main enclosure. Any hole or joint in an enclosure, such as the joint between it and its cover plate, is a potential source of leakage.

INDEX TERMS: Shielding, Electric Shielding, Enclosures, Mesh, Gaskets, Measurement

AM & PM NOISE MEASUREMENTS ON A COLD CATHODE CFA

ACCESSION NO.
EMCABS 02 75 20

Ernest E. Hollis and Alister I. Matheson, Sanders Assoc., Bedford, Mass., and Walter J. Griffin, Raytheon Company, Waltham, Mass.

THE MICROWAVE JOURNAL
Vol. 14, No. 4, April 1971, pp. 37-42

ABSTRACT:

A continuous-cathode, forward-wave CFA with a cutoff electrode was examined for intra-spectral AM and PM noises and phase coherence. Included in the noise data are the effects of starting up and turning off the RF triggered current pulse from the tube's cold cathode.

Broadband noise properties have been examined and their characteristics are known, but narrow band data was not available. The rotating space charge and circuit bandwidth properties can be analyzed to qualitatively predict the phase response time, but, again, test data was not available.

INDEX TERMS: AM NOISE, PM NOISE, MICROWAVE, CROSSED-FIELD AMPLIFIER, RADAR MEASUREMENT

CHANNEL SPACING AND NECESSARY BANDWIDTH IN FDM-FM SYSTEMS

ACCESSION NO.
EMCABS 02 75 15

Leif Lundquist

THE BELL SYSTEM TECHNICAL JOURNAL
Vol. 50, No. 3, March 1971, pp. 869-880

ABSTRACT:

We examine the effect of loading and filtering on adjacent channel interference noise and give the results for different cases of filtering and various amounts of bandlimiting. The results are applied to typical systems and an empirical formula relating channel spacing to loading and adjacent channel interference is derived. We give some examples computing the capacity of typical radio channels.

INDEX TERMS: Adjacent Channel Interference, Bandwidth Channel Spacing, FDM-FM Systems, Spectrum Utilization

AM AND FM NOISE IN LOW-NOISE TWT AMPLIFIERS WITH INTEGRAL POWER SUPPLIES

ACCESSION NO.
EMCABS 02 75 21

J. N. Nelson and R. D. Frost
Watkins-Johnson Company, Palo Alto, California

THE MICROWAVE JOURNAL
Vol. 14, No. 4, April 1971, pp. 45-50

ABSTRACT:

Modern radar and communication systems require TWT amplifiers with increasingly lower levels of AM and FM noise. The purpose of this article is to show how AM and FM noise is generated in TWT amplifiers; how it can be kept at minimum levels; and how the user of TWT amplifiers can specify and measure this important source of system noise.

INDEX TERMS: AM Noise, FM Noise, TWT Amplifiers, Noise Suppression, Integral Power Supplies

MAKE THE MOST OF NOISE: CORRELATE IT

ACCESSION NO.
EMCABS 02 75 17

Robert H. Cushman
New York Regional Editor
EDN

Vol. 16, No. 5, March 1, 1971, pp. 29-35

ABSTRACT:

Until rather recently, correlation was thought of mainly as a textbook extravagance. The few correlators in use-for such operations as correlating seismic waves in oil exploration-were clumsy, exasperatingly slow and expensive. Now, modern dirt-cheap ICs (especially the new MOS shift registers) are making correlators as fast, easy to use and inexpensive as spectrum analyzers. It seems likely that they will become standard instruments in many fields and find their way, as OEM components, into many systems.

INDEX TERMS: Noise, Correlation, Reception

NOISE AND DISSIPATION OF ELECTRONIC GYRATORS

ACCESSION NO.
EMCABS 02 75 23

D. Blom and J. O. Voorman

Philips Research Reports
Vol. 26, No. 2, April 1971, pp. 103-113

ABSTRACT:

It is found that an electronic gyrator has a minimum noise production independent of the electronic design. The noise of a practical gyrator will be higher and this is expressed by noise factors. A complete noise model is given as well as a method of calculating the noise model of a gyrator when its electronic circuit is given. This model can be used, for instance, to calculate the noise of gyrator-capacitor filters. Furthermore, a formula is given for the dissipation. This formula gives insight into the expected power consumption of gyrator-capacitor filters.

INDEX TERMS: Dissipation, Noise, Electronic Gyrators, Filters

VOICE CHANNEL NOISE MEASUREMENTS AT LINE FREQUENCY ON CARRIER FREQUENCY COMMUNICATIONS SYSTEMS

ACCESSION NO.
EMCABS 02 75 18

U. L. Beckmann
W&G Instruments, Inc., Hanover, New Jersey

TELECOMMUNICATIONS
Vol. 5, No. 3, March 1971, pp. 21-24

ABSTRACT:

Noise has always been an important circuit parameter of telephone circuits but has become even more so in recent times. This has come about partially because of the more stringent requirements of data transmission circuits and partially because of modern high density carrier systems which have pushed the signal levels further toward the noise in order to keep the overall system load down. Since so many different factors contribute to the noise values, the final noise measurement has become in many cases the "acid test" for a system.

INDEX TERMS: Noise Measurement, Voice, Communication, Data Transmission, Carrier Frequency

CONDUCTIVE COATINGS COMPARED

ACCESSION NO.
EMCABS 02 75 29

A. J. Stock
Acheson Colloids Company
EDN
Vol. 16, No. 9, May 1, 1971, pp. 35-39

ABSTRACT:

Conductive coatings are simply coatings applied to a surface in a thickness ranging from 0.2 to 2.0 mils. They can bleed static, conduct signals, make good contact between different parts, serve as capacitors and provide conductivity in a cement.

In short, conductive coatings are versatile tools that can do many tough jobs very well-when they are used correctly.

Conductive coatings are made up of three key elements: the conductive particles; the binder that holds the particles to the surface; and the carrier, which is generally a fluid.

INDEX TERMS: Conductive Coatings, Finishes, Grounding, Bonding

MICROPOWER THROUGH THE HEART IS A KILLER

ACCESSION NO.
EMCABS 02 75 24

EDN
VOL. 16, NO. 7, April 1, 1971, pp.14-15

ABSTRACT:

Not many years ago, Underwriters Labs, and others said that anything up to 30V was safe. Today, medical electronics manufacturers worry about 10 mV.

Three conditions cause their concern. 1) The skin, which normally presents 10 KΩ or more series impedance, is more and more frequently incised in hospital procedures. 2) Intravenous catheters and modern cardiac monitors provide conductive paths right up to the heart. 3) The patient is increasingly surrounded by electrically powered equipment.

INDEX TERMS: Microshock, Transformer Isolation, Medical Electronics

THE COMMON-CORE FILTER AS AN ELECTROMAGNETIC INTERFERENCE-SUPPRESSION DEVICE

ACCESSION NO.
EMCABS 02 75 30

D. R. Bush

IBM JOURNAL OF RESEARCH AND DEVELOPMENT
Vol. 15, No. 3, May 1971, pp. 242-244

ABSTRACT:

A normal powerline filter is built as a classical low-pass filter, i.e., series inductors and shunt capacitors for each powerline to the machine with the shunt capacitors connected from each powerline to the machine-frame ground. For adequate insertion loss this type of filter must have shunt capacitors of a value that can cause excessive safety ground (green wire) current in convenience-outlet ac-powered machines.

The common-core powerline filter discussed here is intended to reliably suppress the noise conducted along and radiated from the powerline of a machine, yet not affect machine safety and performance. While this type of filter is not new neither is it well known.

INDEX TERMS:
Conducted Interference, Suppression, Filtering, Common-Core Filter

Computer Scare Talk

ACCESSION NO.
EMCABS 02 75 26

Mel Mandell

New York Times
May 9, 1971, Financial Section, p. 3

ABSTRACT:

Computers can be threatened by physical and electronic sabotage. Radiated susceptibility and radiated emissions are two data security threats. Most sabotage fears are discounted in this article. A telephone tap of computer message transmission is described.

INDEX TERMS: computer security, radiated susceptibility, radiated emissions, conducted emissions

NOISE IN GYRATOR-CAPACITOR FILTERS

ACCESSION NO.
EMCABS 02 75 31

J. O. Voorman and D. Blom

Philips Research Reports 26, 114-133, 1971
Vol. 26, No. 2, pp. 114-133

ABSTRACT:

A gyrator-capacitor filter can meet the same filter requirement as an LC filter can, but if electronic gyrators are used the gyrator-capacitor filter is more noisy. The noise of a gyrator has been analyzed in a former publication. Starting with a noise model for a single electronic gyrator we calculate the noise of a complete filter as a function of the frequency. The broadband noise is also considered. Further, it is shown that the noise is almost independent of the filter configuration under certain conditions. Calculations and measurements show excellent agreement.

INDEX TERMS: Filters, Electronic Gyrator, Noise Gyrator, Capacitor Filter

Measuring EMI

ACCESSION NO.
EMCABS 02 75 27

Gustave A. Hormuth
Grumman Aerospace Corp.
Machine Design
May 27, 1971

ABSTRACT:

How to measure EMI with the instrumentation described in the article. And, for better understanding the requirements of military specifications and government legislation for EMI generating or susceptible equipment, the various units of measurement are outlined.

INDEX TERMS: interference, susceptibility, radiated interference, measurement

FILTERS FOR SPECTRUM ANALYZERS

ACCESSION NO.
EMCABS 02 75 52

NEWS FROM ROHDE & SCHWARZ
Vol. 11, No. 49, 1971, pp. 25-26

ABSTRACT:

Bandpass filters are used in most spectrum analyzers for the separation of the individual spectral lines. Apart from bandwidth, the shape of the passband characteristic often has a decisive influence on the application of analyzers. The choice of the filters is therefore of great importance.

INDEX TERMS: Spectrum Analyzers, Filters, Measurement

BRUSHLESS DC MOTORS; HOW TO APPLY THEM

Eastern Air Devices Technical Staff
Dover, New Hampshire

ACCESSION NO.
EMCABS 02 75 49

ELECTROMECHANICAL DESIGN
September 1971, pp. 28-31

ABSTRACT:

A brush-type dc motor represents a weak link in many fan-cooled systems - particularly in high altitude applications or where RFI must be controlled.

When calling for an inverter drive, watch out for line transients. Spikes can lead to transistor breakdown.

Inverters must incorporate features to limit spikes due to switching transients. RFI filtering is sometimes required to limit conducted radio frequency interference on the input power lines. Radiated interference may require some shielding.

INDEX TERMS:
Motors, Brushless, Inverters

NUMERICAL CALCULATION OF MAGNETIC FIELDS IN THE VICINITY OF A MAGNETIC BODY

A.E. Ruehli, D. M. Ellis

ACCESSION NO.
EMCABS 02 75 53

IBM JOURNAL OF RESEARCH AND DEVELOPMENT
Vol. 15, No. 6, November 1971, pp. 478-482

ABSTRACT:

Static magnetic fields, resulting from an applied field, are calculated in the vicinity of a magnetic body. Specifically, numerical results are given for a rectangular body of constant permeability. The reduction or shielding of the magnetic fields is calculated in the neighborhood of the body. Integral equations are developed which can be solved numerically on a computer. Typical fields are described for rectangles of different thicknesses, and comparisons with known solutions are shown.

INDEX TERMS: Magnetic Fields, Magnetic Body, Shielding, Prediction

IMPULSE RADIATOR SPARKS EMC TEST PROGRAMS

Albert A. Smith, Jr. Systems Development Division,
International Business Machines Corporation

ACCESSION NO.
EMCABS 02 75 50

EID-ELECTRONIC INSTRUMENTATION
Vol. 7, No. 10, October 1971, pp. 16-17

ABSTRACT:

Man-made spark discharges, and also those of natural origin, are a source of electromagnetic interference that can disrupt radio communications, telemetry systems, and low-level measurements. With careful control and optimization of their generation, however, spark discharges can serve as a source of useful broadband radiated energy. One such source, the Impulse Radiator, has been used in the determination of the reception patterns of high-gain VHF-UHF TV antennas.

INDEX TERMS: Radiation, Broadband, Generation, Spark Discharge, Antenna Pattern

Spectrum Analyzer Performs as an Environmental Monitor

AIL

ACCESSION NO.
EMCABS 02 75 54

Microwave Journal
November 1971, pp. 60 - 66

ABSTRACT:
The electromagnetic environment at the 1971 WESCON was monitored on an AIL 707 spectrum analyzer. Photographs of the 0 to 4 GHz spectrum provide an indication of the radiated electromagnetic emissions at WESCON and the capabilities of the spectrum analyzer.

INDEX TERMS: radiated emissions, spectrum analyzer, spectrum surveillance

TRANSIENT EFFECTS IN TELEPHONE SWITCHING CIRCUITS WHEN RELAY WINDINGS ARE DISCONNECTED

H. N. Wagar

ACCESSION NO.
EMCABS 02 75 51

THE BELL SYSTEM TECHNICAL JOURNAL
Vol. 50, No. 9, November 1971, pp. 2997-3062

ABSTRACT:

This paper presents an analytical review of the transient events relating to charge, current, voltage, and energy upon disconnection of inductive loads in switching circuits. Based on good agreement between theory and experiment, the analysis is found applicable to a number of long-standing relay and switching circuit problems involving radiation interference, voltage breakdowns in various elements of the contact circuit, and contact erosion.

INDEX TERMS: Switching, Transients, Inductive Circuits, Telephone, Communication, Malfunction

Power Supply Aspects of Semiconductor Equipment
Harold A. Gauper, Jr, John D. Harnden, Jr, and A.M. McQuarrie General Electric
IEEE Spectrum
October 1971

ACCESSION NO.
EMCABS 02 75 59

ABSTRACT:
The article presents the influences of power semiconductors on power lines including power line harmonics, rfi, rfi-free switches, and the aspects of regulatory agencies interference control.

INDEX TERMS: power line interference, conducted interference, radiated interference

If Back Intermodulation Is a Problem In Your Transmitter
Dieter R. Lohrmann and Lt. James P. Hubert
U. S. Army Electronics Command
Electronic Design
Volume 23, November 11, 1971, pp. 48 - 49

ACCESSION NO.
EMCABS 02 75 56

ABSTRACT:
The article discusses a class D (switched) type amplifier design than can reduce intermodulation by 50 decibels. The test technique of using a spectrum analyzer is shown.

INDEX TERMS: intermodulation

Designing with Fast Recovery Rectifiers

Vincent A. Falvo
Westinghouse Electric Corp.
EDN/EEE
October 1,1972, pp. 29 - 31

ACCESSION NO.
EMCABS 02 75 60

ABSTRACT:
Fast recovery rectifiers have reverse recovery time characteristics which cause transient spikes. A test circuit and test parameters for measuring the transient spike are discussed.

INDEX TERMS: rectifier spikes, conducted interference

Making Sampled-Signal Analysis Easier

Larry J. Meeker
Westinghouse Electric Corp.
Electronic Design
Volume 23, November 11,1971, pp. 42 - 45

ACCESSION NO.
EMCABS 02 75 57

ABSTRACT:
The article describes a BASIC computer program that calculates the power spectra of a periodic function.

INDEX TERMS: power spectrum, frequency spectrum

Controlling Interference in Microwave Design

R. J.Mohr
AIL
Microwaves
November, 1971, pp. 31 - 37

ACCESSION NO.
EMCABS 02 75 61

ABSTRACT:
The article explains the electromagnetic compatibility requirements most likely to be of concern to a microwave engineer, with examples to bring out their significance.

INDEX TERMS: electromagnetic compatibility, conducted emissions, radiated emissions, radiated susceptibility

Cut Noise in Switching Regulator

Eugene R. Hnatek
National Semiconductor Corp
Electronic Design
22, October 28, 1971, pp. 49 - 54

ACCESSION NO.
EMCABS 02 75 58

ABSTRACT:
The interference and susceptibility of the switching voltage regulator can be reduced by using simple filters. With design tradeoffs, efficiencies up to 80% are obtainable.

INDEX TERMS:
power supplies, conducted interference, conducted susceptibility

MEETINGS & EVENTS

CALL FOR PAPERS

The 1977 National Telecommunications Conference will be held at the Marriott Hotel in Los Angeles, California on December 5-7, 1977. This premier Telecommunications Industry event features a balanced combination of technical sessions, industrial exhibitors, panels and a tutorial course.

You are cordially invited to attend and participate in the technical program of NTC. Since its inception six years ago, NTC has grown to become recognized in the telecommunications community as the place to present ideas and contributions. In keeping with this tradition, this year's theme offers you the opportunity to expound upon and offer insight into the ways in which your present areas of interest impact upon the future needs of today's world.

GENERAL AREAS OF INTEREST

- Radio Frequency Interference (RFI)
- Communication Networks
- Social Implications of Technology
- Communication Switching
- Communication Electronics
- Error Control Techniques
- Communication Theory
- Microwave and Optical Communications
- Digital Signal Processing
- Data Transmission
- Satellite and Space Communications
- Digital Communication Systems
- Voice and Image Processing
- Computer Communications
- Wire Transmission
- Spectrum Utilization

Within these areas, some specific session topics to be considered are:

Applications of Microprocessors and Minicomputers in Telecommunications
Underwater Communications
Synchronization and Switching Considerations in Communication Networks
Shuttle Communications
The Tracking and Data Relay Satellite Systems (TDRSS)
Oscillator Modelling and Noise Performance

Modulation Techniques for Efficient Use of the Spectrum
Fiber Optic Communications
Frequency and Universal Time Dissemination
Methods of Combating RFI
Multiple Access and Demand Assignment Techniques
Modern Technology in Amateur Radio

An outstanding technical program with distinguished speakers is already in the making with such highlights as: panels on network security and telecommunications for the year 2000, and a tutorial course on modulation and coding techniques for communication over nonlinear satellite channels.

Five (5) copies in English of an original paper in any of the above mentioned or related areas, plus a one-page summary, which includes author's name, complete return address and telephone number, should be submitted by June 1, 1977 to: Marvin K. Simon, Chairman, Technical Program, Jet Propulsion Laboratory, 4800 Oak Grove Dr., Pasadena, CA 91103.

U.S. NATIONAL RADIO SCIENCE MEETING

9-13 JANUARY 1978

University of Colorado, Boulder, Colorado

This open scientific meeting is sponsored by the U.S. National Committee of the International Union of Radio Science. It is being held in cooperation with various societies and groups of the Institute of Electronics and Electrical Engineers. The theme for this meeting will be the common scientific basis of telecommunications and remote sensing. The Chairman of the Technical Program Committee is Dr. James R. Wait. The meeting is being hosted by the University of Colorado, National Oceanic and Atmospheric Administration, Office of Telecommunications, National Bureau of Standards, IEEE Denver section and IEEE AP-S Denver/Boulder Chpater. The U.S. commissions of URSI, indicated below, have suggested the following topics:

COMM. A (on Electromagnetic Metrology); Fiber Optics, and Digital Communication Standards

COMM. B (on Fields and Waves); Integrated and Fiber Optics, Multiple Scattering, Inverse Scattering, Communication Satellite Antennas, and SEM Singularities

COMM. C (on Signals and Systems); Radio, Optical, Cable Telecommunication Systems, Information and Communication Theory, Signal Techniques and Processing, Teaching of Telecommunication Science, and Multipath Effects

COMM. H (on Waves in Plasmas); Wave Dispersion Characteristics, Propagation in Plasmas, Antennas in Plasmas, Non-Linear Phenomena, Diagnostic Techniques, and Plasma Experimentation

(continued)

COMM. J (on Radio Astronomy); Interferometry and Aperture Synthesis, and Millimeter Wavelength Observations

COMM. E (on Interference Environment); Natural and Man-Made Radio Noise, Effects of Noise on System Performance, and Scientific Spectrum Sharing

COMM. F (on Wave Phenomena in Non-Ionized Media); Space Telecommunications, Radio Meteorology, Radio Oceanography, Turbulence, and Millimeter Waves

COMM. G (on Ionospheric Radio); Ionospheric Effects on Communication, Radio Probing of the Ionosphere, Ionospheric Irregularities, Ionosphere Structure, Incoherent Scatter, and Ionospheric Modification

The deadline for receipt of abstracts is 15 September 1977. Necessary instructions for their preparation are to be found in the March/April 1977 issue of Radio Science (Vol. 12, No. 2).

Steering Committee Chairman: Professor S. W. Maley, Dept. of Electrical Engineering, Univ. of Colorado, Boulder, CO 80309

Conference Coordinator: Hal Patterson, Bureau of Conferences and Institutes, Univ. of Colorado, Boulder, CO 80309

1977 IEEE International Symposium

ON

ELECTROMAGNETIC COMPATIBILITY

Olympic Hotel Seattle, Washington August 2, 3 & 4

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CALL FOR PAPERS

1978 SPECIAL ISSUE OF IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES

With the increased emphasis by technical journals and the news media on reporting the harmful health effects of microwaves, many useful medical applications are not being presented in proper perspective. This is true even though there is a rapidly growing interest in the subject, expecially as it relates to cancer treatment.

Therefore, a SPECIAL ISSUE OF THE IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES on "Microwaves in Medicine, with Accent on the Application of Electromagnetics to Cancer Treatment" has been scheduled for publication in July 1978. Papers are solicited which describe original work concerned with the application of microwaves to medicine, especially in the treatment of cancer. Papers may deal with theory or application, and typical topics of interest are:

A. Techniques for controlled local and general hyperthermia

B. Applicator designs for producing hyperthermia

C. Measurement of temperature distributions in tissue under microwave exposure

D. Rapid heating of frozen or refrigerated biological media

E. Non-invasive sensing of tissue properties and conditions

F. Microwave thermography

G. Non-invasive transfer of energy or information to implants

H. Medically beneficial effects

I. Effects on tumor cells

J. Effects on bacteria, viruses, and other organisms

K. Effects on blood flow and mass transport

L. Effects on local tissue metabolism.

Authors are requested to submit three copies of the manuscript by July 15, 1977 to:

Arthur W. Guy, Guest Editor
IEEE TRANSACTIONS ON MTT, Special issue on "Microwaves in Medicine, with Accent on the Application of Electromagnetics to Cancer Treatment"
Department of Rehabilitation Medicine
CC 814 University Hospital RJ-30
Seattle, Washington 98195

SEATTLE '77

1977 IEEE International Symposium on ELECTROMAGNETIC COMPATIBILITY

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CHAPTER CHATTER

by Charles F. W. Anderson

Notice: To all Chapter Chatter Chairmen and/or Secretaries: My new address is at the end of this column.

Yes, there was no Chapter Chatter column in the Winter Issue! No, your Column Editor has not quit without notice or left the country again. Difficulty this time was taking a job with Martin Marietta in Orlando, which had me working 10 to 12 hours a day - plus, a kilomile separation between the column raw material and me. Things are a bit less hectic now, and my wife should be joining me from the "frozen north" shortly - hopefully, before this issue of the Newsletter reaches you. Lots of backlog! (Also, sad to say, lots of chapters which didn't send in reports. This is the Chapter Chairman's responsibility.)

Mohawk Valley

Activities for the '76-'77 season started with election of officers. The new chairman is Gerard Capraro; Thomas Baldwin, Jr. is vice-chairman; and, Carman Paludi, Jr. has the secretary-treasurer spot. Early in the fall, Robert E. Plummer of McDonnell-Douglas presented "Electromagnetic Engineering for Fighter Aircraft." His presentation encompassed the wide variety of avionics skills and involved the diverse problems encountered in dealing with EM field phenomena. Antennas and radomes, EMI, lightning/P-static, EM scattering, fiber optics and composite materials were among topics discussed in connection with the design of modern fighter aircraft.

A group luncheon meeting in December featured Bill Duff (Atlantic Research Corp.) presenting "Industry's View on the Intra-system Electromagnetic Compatibility Analysis Program" (IEMCAP). This talk introduced IEMCAP and summarized results of a survey conducted by Atlantic Research which had the purpose of determining how industry viewed the program. Recommendations also were made and discussed for accelerating implementation of IEMCAP.

Washington, DC

The Chapter's mid-November luncheon meeting featured Garth Kanen of the Frequency Management/Spectrum Planning Staff of FAA. His presentation considered two current EMC problems being experienced by air traffic control radio services. One of these is due to a small number of high-powered FM and TV stations in bands adjacent to ATC services. The other is caused by low-powered, multiple-source CATV systems operating within the band. The speaker described the measurement and analysis program which has been initiated to explore these problems. He played a tape of CATV interference, illustrating the so-called "Harrisburg Effect," which is created by a multitude of low-powered phase-coherent rf sources distributed throughout a lengthy cable system that radiates by virtue of discontinuities. Problems associated with ground monitoring were also identified. A total of 38 were present. At the January 27th meeting, Jim Toler presented certificates of appreciation to the '75-'76 officers for their efforts in winning the Chapter of the Year Award. Recipients were: John Leopold, George Hagn, Tom Doeppner and Al Paul. The meeting also featured a presentation by two speakers: Aaron Sullivan and Leonard Thomas (Sullivan Associates and Thomas Engineering Co., respectively). Their topic was "EMC Guidance and Standards: Spectrum Order or Chaos?" Sully and Len discussed their work on an "EMC Guide," which is under consideration for publication by IEEE. The purpose is to assist communications engineers and designers, world-wide. It will:

- Define and present the aggregate aspects of EMC
- Indicate actions required to assure EMC in equipments and systems
- Identify requirements for measurement instrumentation
- Discuss implications of existing and planned EMC standards

Attendees numbered 33.

San Francisco Bay Area

The Santa Clara sub-section EMC Chapter (which is chaired by Eugene Brummett) had David H. Hoffman of Aeroneutronic Ford as the speaker at their January 19th meeting. His topic was "Measurement of EM Radiation from an Internal-Combustion-Powered Vehicle or Device." There were 14 attendees.

Central New England

This Chapter started with a joint meeting with the Vehicular Technology Group. Art Wall, of the Washington FCC staff, discussed "Land Mobile Communications Interference, Susceptibility and Regulations." Primary emphasis was on Parts 15 and 18 of the FCC regulations, and concerned charges related to portable phones, CB, ignition noise, general RFI, plus other areas affecting EMC. Many questions were directed at the speaker following his presentation. There were 38 attendees. In mid-November, the EMC Chapter, in conjunction with the AES and NPS Groups, sponsored a Nuclear EMP Seminar. Nearly 100 attended this informative meeting. On November 23rd, Don White (Don White Consultants, Inc.) addressed the Chapter meeting. His topic was "Computer Programs for EMC Design and Installation." He discussed the areas in which specialized computer programs may be used to achieve effective EMC design while avoiding over or under-designing. Don also commented on the new FCC regulations and other related topics. Thirty-four were present.

John Clarke, the Chapter Vice President, reports "much improved attendance over previous years." Also, he mentioned that Chairman Dale Samuelson has been doing an excellent publicity job. Among other things, he mails reminder cards to the members and others who might be interested.

John Clarke will serve as Chairman and Dale Samuelson as Vice Chairman of the Chapter for the 1977-78 term.

REGION 8 EMC CHAPTER

A Regional G-EMC activity is to be initiated in Region 8, its purpose being the enhancement of communication among EMC specialists resident within Region 8, and, ultimately, the establishment of Region 8 G-EMC Chapter. It is envisioned to hold Chapter Meetings on a regular basis, twice a year, if possible, and in conjunction with European Symposia or EMC-related conferences that are sponsored by the IEEE. A circular letter will be mailed shortly to the Region 8 G-EMC membership. For any information, contact Dieter B. Hohmann, Preusserstrasse 1 a, D-2000, Hamburg 52, West Germany; Tel.: 040-8807119.

Albuquerque

No direct news from this newly-organized unit, which will be a joint venture of Antennas & Propagation/Microwave Theory & Techniques/EMC. Congratulations, and let's hear from you!

Los Angeles

The Chapter's January 27th meeting featured a talk by Herb Mertel (EMACO) and a special presentation. The latter honored Dr. Robert M. Saunders, Professor of Electrical Engineering, University of California-Irvine, for international contributions to EMC. The "decade Bunch" - Walt McKerchar, President; Jack Moe, Vice President; John Marrow, Secretary, made the presentation. Herb Mertel's talk was titled "An Update of Radio Interference Requirements for Consumer Products." He mentioned that FCC is preparing rules for switching regulators, which eventually may be applied to all RFI generators! Herb noted the activities of voluntary standards organizations, such as ANSI and CBEMA, in preparation of new standards. "Canada," he stated, "has new RFI requirements. Also, the European Economic community has just passed interference directives for appliances and fluorescent fixtures that will become effective next year in most European countries." Mention was made of the stringent RFI limits of the Iron Curtain countries. Herb pointed up the commonality among these new requirements, based on the "Protection Distance" concept, and also noted the voluntary efforts of CISPR. Fred Nichols (LMI) indicated that planning for the 1979 EMC Symposium is well under way. San Diego probably will be the site.

New Jersey Coast

(First, a word of farewell to all of my NJC friends from your Column Editor - Regretfully, I didn't even get a chance to have a last convivial with you.)

The Chapter's October meeting had a presentation by M. J. Pagones, Supervisor of the Bell Laboratories Facilities Planning Group. His topic was "Interference Coordination of the Terrestrial Radio Relay Network." He first presented a review of problems engendered by the increasing density of microwave systems in the common carrier bands and the variety of signals carried by these systems. Satellite communications systems also share the common carrier bands and add to the problems. Frequency congestion now limits expansion of these services. Mr. Pagones then described the frequency coordination techniques of the affected services, values of acceptable interference and changes that must be made for proper coordination of future systems. In November, Malvin L. Shar (of Ft. Monmouth's COMM/ADP Laboratory) discussed "Reduction of Mutual In-

terference." His presentation made mention of the interference problems arising from co-located transmitters. Mr. Shar presented highlights of his experiences at the 1000-meter elevation (Nui Ba Den) in Viet Nam which attracted many diverse military elements, giving details of problems and solutions. No word on the traditional December party; but, I'm assuming it was a first-rate affair, as usual. (Sorry I had to miss it.) My apologies to Don Heirman, Chapter Chairman, for not being able to report on the January meeting - most of my files are still in New Jersey. The February meeting saw the presentation of the Naval Air Systems Command film on "Basic EMC Principles" and "Lightning and Precipitation Static - Damage and Protection." The Chapter is sponsoring a Spectrum Engineering Seminar on March 30th. Donald M. Jansky, Program/Policy Manager, OTP/EDP, will conduct the seminar, highlights of which will be:

- Anatomy of Spectrum Administration
- Spectrum Environment
- Measurement Problems and Solutions

Coordinators are John Prorok of ECOM and Margaretta V. Stone of AEL Service Corp.

(Having had a hand in editing Don Jansky's book on spectrum management in the new Don White Consultants, Inc. series, I truly regret not being able to participate.)

Your Chapter Chatter Editor's new address:

C. F. W. Anderson
1716 Reppard Road
Orlando, Florida 32803
Tel.: 305-896-6649
(Not after 2130 EST/EDT, or before 0600, please!)

CHARLIES' CORNER

Since we last reported on the RFI handbook under preparation by the American Radio Relay League, some re-orientation has taken place. Publication date is not definite at this time, and the content will be more pragmatic and less technical than originally planned, according to Tony Dorbuck of the ARRL Staff. Tony also reported on some interesting findings in the on-going ARRL Labs investigations of rf susceptibility. Both with TV receivers and sources (i.e., typical amateur transceiver equipments) in fringe area environments, most interference appears to be due to the combined effects of the typically poor shielding of TV receivers plus direct leakage from transmitter cases. Significant improvement was obtained by placing the transceiver in an aluminum enclosure deep enough to act as a "wave-guide-below-cutoff" filter, but which still allowed access to the controls of the unit. QST magazine will have the story on these investigations at a later date. We'll advise you of the publication date when that information is available.

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FOR
MAY 1977 EMC TRANSACTIONS

MTTS NATIONAL LECTURE

MICROWAVE RADIATION HAZARDS IN PERSPECTIVE

The well publicized subject of "microwave" hazards is reviewed with a critical review of recent bioeffect research, a discussion of how these results "scale" to man, and the close relation of bioeffect research to ongoing developments in microwave heating applications. The importance of sound microwave engineering in establishing a realistic perspective in this field will be stressed (as well as its frequent absence in past research).

It will be shown that a logical definition of "microwaves" for this subject is 10 MHz to 100 GHz, including the frequencies of maximum penetration of non-ionizing radiation into the human body.

A review of research on microwave bioeffects will include a capsule historical review, a critical review of several examples of research, including artifacts or poor dosimetry leading to false claims of nonthermal effects, and more detailed review of recent research on small animals and the problem of scaling to man. A basic factor in the scaling process is the absorption properties of biological bodies as a function of size, shape and frequency. In this sense, "resonance" properties for man are found to be in the TV and FM broadcast range, whereas small animals are resonant at frequencies close to the frequencies more commonly used for microwave heating in consumer and industrial applications. It will be shown that there are close and mutually beneficial relationships between problems in microwave bioeffect research and problems in microwave heating applications.

The adequacy of U.S. standards relative to Eastern European standards will be discussed relative to research development in both the U.S. and abroad. The roles of professional groups such as ANSI C95, IEEE, and IMPI in developing a critical and realistic perspective are shown to be important. This perspective is critically important in the establishment of factual information and improved standards. The misinformation which abounds in the general press is one of the reasons for the founding of the IEEE Committee on Man and Radiation (COMAR).

The outlook in this field includes:

a. Restoration of a realistic common-sense perspective on microwave hazards for frequencies below 10 GHz.

b. Speculative possibility of truly non-thermal effects in the millimeter-wave range above 30 GHz

c. New applications of microwave heating in cancer therapy.

d. Exciting possibilities for future development in consumer and industrial microwave heating applications (including new ISM frequency allocations).

The National Lecturer may be scheduled by writing or calling: J. M. Osepchuk, Raytheon Co., 28 Seyon St., Waltham, MA 02154; Tel.: 617-899-8400, Ext. 2475.

MIT COURSE ON NON-IONIZING RADIATION

A five-day course titled "Ultrasound, Laser, Ultraviolet and Microwaves:Biophysical and Biological Basis, Hazards, and Applications in Medicine and Industry" will be given by MIT on August 15-19, 1977. Tuition is $525.

With the increasing use of ultrasound, lasers, ultraviolet light, and microwaves in clinical medicine, and with the growing interest of Federal regulatory agencies in the potential hazards associated with the use of these non-ionizing radiations, in the home and in industry, this program should prove interesting and useful to physicians, radiation and physical therapists, physical and biological scientists, engineers, and regulatory affairs officers in industry. It is presented so as to be both interesting and intelligible to people from these diverse backgrounds. Dosimetry, field distributions in biological tissues, biomedical applications, biological effects and the underlying biophysical mechanisms, hazards, and methods of safe use of ultrasound, lasers, microwaves, and ultraviolet are discussed. Use of non-ionizing radiations in biophysical research is covered. Special consideration is given to practical matters such as intensity measurement, safety regulations and their implementation. The biophysical mechanisms and hazards are compared with those of ionizing radiations. The time allotted is in proportion to the importance of each topic. Newly evolving applications, such as use of ultrasound and microwaves in hyperthermic therapy of cancer and their relative merits, are discussed in detail.

For additional information, refer to Course No. 2.77s and write to Office of the Summer Session, Room E19-356, MIT, Cambridge, MA 02139.

LEGISLATION TO PREVENT "WAGE BUSTING" INTRODUCED IN SENATE: BILL SUPPORTED BY IEEE

An amendment to the Service Contract Act of 1965 to protect engineers working on service contracts from the practice of "wage busting" was introduced in the Senate by Senator Lawton Chiles, senior senator from Florida. Senator Dick Stone, also of Florida, and Senator John Sparkman of Alabama are co-sponsors of the bill. "The bill I am introducing," said Senator Chiles, "would give the same protection to professionals as that now offered to other service contract workers."

The legislation would forbid technical support service contractors from paying professional employees less in salary and fringe benefits than they were paid by the previous contractor, if they are performing the same service. Further, it would provide for the use of a national survey in determining the rate of pay of professionals working on such contracts. Blue and white collar workers received similar protection under earlier legislation.

Introduction of S 969 on March 10, 1977 was the culmination of a week of intensive activity by IEEE members to obtain a Senate companion to H.R. 314, the House bill introduced on January 4, 1977 by Congressman Frank Thompson, Jr. of New Jersey and Congressman James Corman of California. S 969 is identical.

Some sixty members of IEEE, the largest technical professional society in the world with some 180,000 members, descended on Capitol Hill at the end of February to lobby Congress to support H.R. 314 and to call early hearings. According to Congressman Thompson, "The need for H.R. 314 is clear.... I want to assure you and make it clear that I think professionals deserve protection under the law and I will take appropriate action to see that they get it."

PRESIDENT CARTER AND TECHNOLOGY

President Carter is the first professionally trained engineer to occupy the White House since Herbert Hoover. He has indicated an appreciation of the value of a science advisor in the Executive Office of the President, the need for strong leadership and planning in energy conservation and shifting of energy R&D priorities to non-nuclear options. He further believes that the federal government must provide leadership and active support for basic research and its applications through established technical agencies of the government. He has also stated that our scientific and technological excellence is a principal tool in achieving a growing and healthy economy which provides jobs for our citizens and, therefore, deserves priority support from the Federal Government.
