

IEEE GROUP ON
MICROWAVE THEORY
AND TECHNIQUES

NEWSLETTER

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EDITORS NOTES

How Does the Engineer Build an Equity?

In past editorials, I have discussed some of the problems of the engineer in relation to the social, economic, and political problems of our time. With these notes, I would like to shift the emphasis to the problems of the engineer himself — in particular: how does an engineer build an equity for himself so that he can properly retire or have investment capital?

Most engineers are somewhat like nomads; that is, they change jobs frequently as our government customer changes his contract placements from company to company. There is a tendency for us to follow the contract dollar. This is not necessarily of our doing; we are either laid-off or terminated as one company fails to land a contract and finds itself in financial difficulty while another company, who lands the contract, needs to hire. This causes a particular problem with most retirement plans presently offered engineers by many corporations. These plans generally involve a contribution by the engineer plus a matching or more than matching contribution by the company. The plan is usually arranged so that it is necessary for the engineer to stay with the company a minimum length of time in order to get a portion of the company's funds. Most plans require at least 10 years tenure with the company before the engineer is entitled to the company's contribution. While many of us are ten year men, the vast majority are far from it and, as we are required by contract placement to move from job to job, we lose the equity built up in the company's retirement plan. As engineers terminate, company contributions are placed in the general fund for the remaining engineers, thus causing the company retirement fund to grow

to enormous values. This, of course, in no way helps those engineers whose short time with the company does not entitle them to any benefits at all under the plan. To recapitulate: how does the engineer build an equity if he has stayed with one company less than a minimum investiture period?

I believe this to be a serious problem and one which we as engineers must solve. In this regard, I have some specific recommendations:

1) Obtain company cooperation to reduce investiture time; 2) Establish a uniform industry-wide plan where the new company picks up the equity in the plan from the old; 3) Allow the individual to set up his own plan by personal contribution (tax free). This latter recommendation is similar to the present plan now being used by personally employed individuals such as doctors; called the "Keough Plan," it allows the doctor to place 10% of his net income up to \$2500 in a retirement plan tax free.

The IEEE can be of real service to the engineering profession by implementing a coordinated effort toward these goals. If our readers agree that this is a cause worthy of further effort, we can submit this idea to GMTT ADCOM for presentation to IEEE Headquarters.



PAST CHAIRMANS REVIEW

by Leo Young

I would like to send all G-MTT members a personal letter of thanks for making my task as chairman of G-MTT AdCom such a pleasant one this year -- but there are so many of you, that I ask your indulgence for sending each one of you the same letter.

I don't quite know where to begin. A chairman is only as effective as the committee members will allow him to be. We have accomplished much this year, without changing the essential character of G-MTT.

This year's National Lecturer, Dick Damon, has improved on a tradition and given more talks than either of his predecessors. In 1970 Harold Sobol will continue to "show the flag" at chapter meetings all over the country.

The March IEEE International Convention saw another most successful program of Microwave Presentations organized by Don Temme. Next year's presentations are in the good hands of John Osepchuk.

The May G-MTT Symposium in Dallas was tremendously successful and unique in many respects, thanks to Ben Hallford, Jim Sadler, John Horton and the enthusiastic support of members of the Dallas chapter generally. The next two symposiums will be under the experienced leadership of Sam Sensiper (Newport Beach, California, 1970) and Warren Cooper (Washington, D.C., 1971).

Of the two Councils, the older one, the Quantum Electronics Council, had three able representatives from G-MTT, Kiyo Tomiyasu, Frank Arams and Walter Kahn. Frank Arams in addition smoothly ran the Meetings and Symposiums Committee. The Solid State Circuits Council is newer, and our relationship with it has evolved and become clearer this year, with the able assistance of our representatives Warren Cooper, Bob Garver and John Horton (who replaced Bob Garver early in the year).

Publications are perhaps our most important product, and Sy Okwit (next year's Vice chairman) provided continuity and experience and a watchful eye. The Transactions under George Haddad maintained their high standard.

Jesse Taub kept us in close touch with IEEE Information Services, and Hal Schrank began work on a Computer Index.

Saul Rosenthal undertook the task of forming a Scholarship Committee and is off to a good start.

Gene Torgow, with the help of M. C. Horton, Rudy Henning and Ted Saad, brought to the Operations (formerly Administration) Committee his energy and experience.

Standards are now handled by the Groups, and we were most fortunate to have Bob Beatty in charge, ably assisted by Pat Loth. New subcommittees of the Waveguide Committee were formed, a new committee on Microwave Magnetics was established, and a Laser Committee is under consideration. All in all, a very successful year.

Don King as Long Range Planning chairman performed a real service by revising and restating G-MTT's long-range goals, which resulted in a revision to our Constitution. Hal Altschuler performed a similar important service on the fiscal side, by giving us a thoughtful and well written report, which brought our financial objectives into clear focus.

The Technical Committees set up during 1968 began to function during 1969 and several of them distinguished themselves. Bill Getsinger and Al Bahr were guest editors of special issues of the Transactions. Gordon Harrison's committee (with the help of Bill From, Arthur Solomon, Jim Bunker, Henry Guckel and many others) did a terrific job for the Microelectronics Conference in St. Louis. Joe Palais has been working on

Holography, Carol Veronda on Space applications. Don King, Bill Brown, Dave Adams all contributed. The time has come to take stock, reorganize, combine and consolidate if necessary, and set up some new committees. Dave Leeson, newly arrived at the job of Technical Committees' Coordinator, promises to use his energy and enthusiasm to further develop and foster these most important committees.

The Membership Services Committee guided and inspired by Al Clavin has made great strides this year, ably assisted by R. D. Randall (News-letter), and many others. A special mention goes to John Horton for his hard work and devotion.

There has been some far-reaching restructuring of TAB (the IEEE Technical Activities Board) under the able chairmanship of Jim Mulligan, placing the Groups into Divisions. This has been hammered out at TAB meetings this year, attended by John Bryant as well as Ross Warren, Saul Rosenthal and Sy Okwit.

There were many others who contributed. To them and to all AdCom and Committee members, to all who came to meetings and wrote us letters, to all Chapter chairmen and their committees, my sincerest thanks.

This year's vice chairman and next year's chairman, John Bryant, was friend and counsellor as well as hard worker. Dick Anderson was quietly efficient and always reliable as Secretary. I hope he will continue to be closely associated with AdCom.

One of the things we shall particularly look forward to next year is Ted Saad's history of G-MTT.

For me it's been a great experience being involved in just about all these activities. We hold many affiliations and loyalties -- to family, country, company, and so on. Our affiliation and loyalty to the engineering profession can be a great power for good, and one of the best groups deserving our support is surely G-MTT.



CHAIRMAN'S VIEWPOINT

by John H. Bryant

From its inception in 1952, the Group on Microwave Theory and Techniques has been the leading professional activity in the microwave field. The IEEE Transactions on Microwave Theory and Techniques is one of the most referenced technical journals. The G-MTT International Symposium held annually is considered The Microwave symposium. The Microwave Prize, awarded by G-MTT each year for the outstanding microwave paper, is one of the most coveted awards in the engineering field. Traditionally, the G-MTT Administrative Committee has maintained a high level of technical activity with emphasis on individual performance and

continued efforts to disseminate information on the most current knowledge and techniques for design of microwave components and systems.

During the coming year we are planning new programs to expand our activities even further. A computer program index has been added to the Transactions; a new microwave award, the W. W. Hansen Award, has been initiated; a Scholarship Program has been approved; plans are being made to have a student paper contest for the 1971 Symposium; new technical committees have been formed to keep G-MTT abreast of new technologies; and, as in the past three years, we will sponsor the microwave presentations at the annual March IEEE convention. After much discussion, it has been decided that the history of G-MTT will be chronicled in a future issue of the Newsletter.

To maintain its programs and continue to broaden its scope of activity, the Administrative Committee is broken down into many separate committees and sub-committees. Soon to be published is a G-MTT Committee Directory, to acquaint you with the people involved in the committees and Chapters, to provide a guideline of the committee functions and to supply addresses and phone numbers of those individuals responsible for each function. The backbone of G-MTT activity is effort put forth by our members. If you are not presently involved, or wish to get more involved, let us know.



ADCOM REPORT (ADMINISTRATIVE COMMITTEE)

by Sy Okwit

On the 15th of December, the last scheduled AdCom meeting for the year, under the chairmanship of Leo Young, was held at the Newporter Inn, Newport Beach, California (the site of the 1970 International Symposium).

IEEE Council

Kiyo Tomiyasu and Frank Arams have both been reappointed to the Quantum Electronics Council, with Kiyo serving as Chairman. It is planned that the Council term will be changed to a calendar year basis in lieu of the present July 1 to June 30 basis.

H. W. Cooper reported that a fee adjustment was being initiated by Headquarters for those MTT members that elect to receive the Solid State Circuits Journal. The new fee is \$7.

Standards Coordinating Committee

R. W. Beatty summarized the report of the Standards Coordinating Committee. Bob pointed out that a proposal to revise the IRE Standard on Waveguide and Waveguide Component Measurements has been approved by the Waveguide Standards Committee and has been forwarded to the IEEE Standards Committee.

Leo Young reported that USASI has been changed to ANSI. This group title appears in the Standards Committee report.

Leo Young reported that the first meeting of the newly organized G-MTT Standards Committee on Microwave Magnetics was held on the 15th of December and was very well attended by the committee members.

Finances

A detailed report was presented by J. H. Bryant discussing group finances and the new budget. The financial condition of MTT is excellent, enabling the AdCom to embark on additional services to members in worthwhile areas.

After motion by E. N. Torgow and seconded by J. H. Bryant, the AdCom unanimously agreed to the resolution that the fee for members joining MTT and electing to receive any Journal in lieu of the MTT Transactions be no less than the fee for members who elect to receive the MTT Transactions.

Chapter Chairman's Report

Leo Young reported that the San Francisco Chapter is planning another dollar seminar this year. The subject is expected to be Microwave Communications and L. Cuccia is tentatively expected to organize this.

Meetings and Symposia

MTT will contribute to the 1970 National Electronics Conference (NEC). Bob Knox, Chairman of the MTT Chicago Chapter, has agreed to organize two sessions: one on surface wave electronics – to be chaired by Dr. A. P. van der Heuvel and, integrated electronics for the millimeter to optical range – to be chaired by Bob Knox.

Don Temme presented a report by J. Osepchuck concerning the 1970 Convention applications sessions. The sessions planned are on microstrip and semiconductor devices.

E. N. Torgow submitted a report for S. Sensiper. Attention was called to a few revisions to the registration fees. Preregistration for members and non-members will be \$14 and \$22 respectively and late registration for members and non-members will be \$17 and \$25 respectively.

Members of the AdCom were taken on a tour of the Newporter facilities.

A stimulating discussion was had concerning the possibility of having exhibits at our 1971 International Symposium. H. W. Cooper and D. D. King are to study the matter and submit a report in time for the March AdCom meeting.

Scholarship Committee

Significant progress is being made in establishing a MTT scholarship. A report was submitted by S. Rosenthal describing many details concerning setting up of a custody account, financial contribution by "Microwaves" publication, the setting up of an awards committee, etc.

Technical Committees

Don Temme reviewed the MTT Film Proposal in the minutes of the September meeting. Don pointed out how films could be effective in promoting microwave engineering, expanding the National Lecture Program, and for recruiting MTT members. Don also discussed briefly the costs and times associated with such a program. Don Temme will plan to show an Eta Kappa Nu film (a good example) at the March AdCom meeting.

The AdCom gave a general expression of support for continued effort in this direction. It is expected that first serious attempts in this direction will cost about \$3000.

E. N. Torgow reviewed the proposal for the W. W. Hansen award. Ted Saad moved that the W. W. Hansen Award proposal be approved as previously presented. After second, the motion carried.

D. D. King will head the awards committee for next year.

T. S. Saad reported that he is canvassing long-time members of AdCom for historical background. This information should be available for the next December AdCom meeting.

TAB Reorganization

J. H. Bryant discussed the new divisional organization structure proposed by TAB AdHoc Committee. The Solid State Circuits Council and the Quantum Electronics Council were not placed in any specific division to avoid complications. J. H. Bryant moved that both of these Councils be placed in division 4 (MTT is part of division 4).

The AdCom unanimously voted to nominate D. D. King for Director of Division 4 as described in the TAB reorganization documents.

Membership Services

J. B. Horton submitted a report on the National Lecturer program for the past year. From all reports and correspondence this program has been very successful. The National Lecturer for 1970 will be Harold Sobol. Plans are being finalized for a very active lecturing schedule.

A new membership survey was prepared by G. Oltman which covers many interesting topics both technical and non-technical. A budget was submitted estimating the cost of embarking on this program and was looked upon favorably by AdCom.

J. B. Horton discussed the publication of a pocket size directory which will go to all MTT members. This will be an extremely useful guide, having a list of group officers, AdCom members, editors, committees, chapter chairmen, etc., and other information concerning MTT activities.

A. Clavin moved that AdCom approve: 1) the publication and funding of the survey presented by G. Oltman, 2) the directory proposed by J. B. Horton and, 3) a special edition of the Newsletter containing a membership directory. This motion was carried.

Al Clavin reported that the G-MTT symbol has stimulated much interest and expects to have a proposal by the March meeting.

L. Young discussed some of the conclusions reached in the Sunday evening informal discussion. First, the question was raised, Should MTT or IEEE be involved in social action? Second, the thoughts that a Council for social action might be appropriate. Third, a "rump" session was suggested for the Symposium. A representative from W.E.M.A., a

congressman (perhaps Gubser), and Bill Rambo of S.R.I. might be possibilities. D. B. Leeson agreed to pursue the "rump" session idea.

Proposed 1970 AdCom Meeting Dates

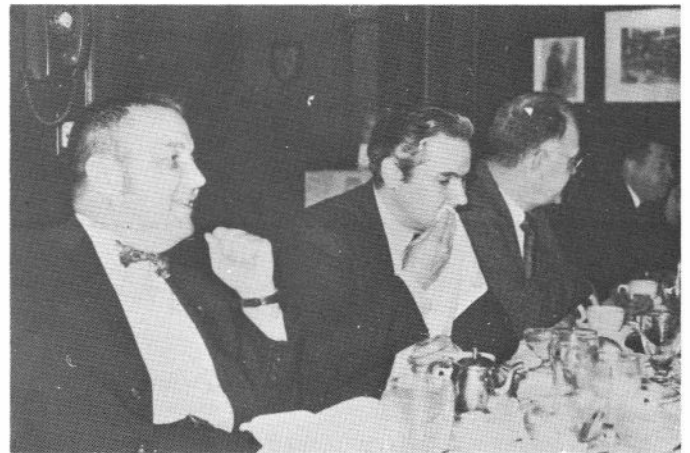
March 23	New York City
May 10	Newport Beach
September 17/18	New York City
December 7	California Location

New Business

John Bryant mentioned the Systems Science Council. He expects to discuss this again at the next meeting.

The AdCom gave a vote of appreciation to Chairman Leo Young for his work of the past year. Expressions of thanks were also given to other AdCom members and workers.

The next meeting will be held on 23rd March during the IEEE Convention in New York City.



Warren Cooper, Sy Okwit, Dean Anderson, Chuck Swift----
Members of ADCOM and Symposium Steering Committee ----
having lunch at the Newporter Inn

LAWS OF PERVERSITY

As the new decade springs upon us, it might be wise to restate some old tried and true guidelines to consider while reminiscing past successes or failures. Then to assist in planning for future successes, Mr. Amasa Pratt of Hughes Aircraft has offered to share his "Rules of Pratt" with us. Good luck!!

PARKINSON'S LAWS

- 1) Work expands to fill the time available for its completion.
- 2) Expenditures rise to meet income.
- 3) The law of 1000: Any enterprise employing more than 1000 becomes a self-perpetuating empire, creating so much internal work that it no longer needs any contact with the outside world.

MURPHY'S LAWS

- 1) Anything that can go wrong will go wrong.
- 2) Any problem left to itself will get worse.
- 3) If considerable time is expended seeking the answer to a problem with the only result being failure, the answer will be immediately obvious to the first unqualified person.

THE RULES OF PRATT

- 1) If an apparently severe problem manifests itself, no solution is acceptable unless it is involved, expensive and time consuming.
- 2) a) Completion of any task within the allocated time and budget does not bring credit upon the performing personnel - it merely proves the task was easier than expected.
b) Failure to complete any task within the allocated time and budget proves the task was more difficult than expected and requires promotion for those in charge.
- 3) Sufficient moneys to do the job correctly the first time are usually not available; however, ample funds are much more easily obtained for repeated major redesigns.

It was recommended that the new Committee on Microwave Magnetics operate as a separate committee, not a subcommittee, and that the Waveguide Standards Committee retain within its scope microwave ferrite components.

(2) A G-MTT Standards Committee on Microwave Magnetics (L. Young, Chmn.) has been formed. A report on their first meeting on December 12 will be given separately by the chairman.

(3) K. Tomiyasu reports that considerable work has been done on definitions of laser terms by a committee under A. G. Fox of BTL. This work was done within G-ED around 1966. Since then, the IEEE formed a Quantum Electronics Council (QEC), which could logically take the initiative in bringing this work to its conclusion (approval by the IEEE Standards Committee and publication). G-MTT will review this work and make a recommendation, coordinating with G-ED, QEC, and OSA. (Recently the Optical Society of America-OSA, has set up a special committee within its Laser Technical Group-LTG to prepare definitions of laser terms.)

A list of graphical symbols concerning lasers and masers has been prepared for approval by the IEC. G. Shapiro reports that after adoption by the IEC, he intends to submit them for consideration by IEEE.

(4) An article in the last G-MTT Newsletter discussed the long-standing muddle on alphabetical designations of waveguide bands. This appears to be a problem of the microwave industry, not IEEE. However, G-MTT is willing to help. (See articles in Opinions and Letters to the Editor columns of this issue - - Editor)

(5) The IEEE Standards Committee Task Force submitted their report in June 1969. The abstract of their recommendations is attached. One of the significant items is the recommendation that new standards be published in the appropriate Group Transactions.

Proposal for Revision of Standard on Waveguide
and Waveguide Component Measurements

The MTT Waveguide Standards Committee proposes to prepare an IEEE publication entitled "Recommended Practices for Waveguide and Transmission Line Measurements."

The proposed document is to be a revision and updating of 59 IRE 2.S1 "IRE Standards on Antennas and Waveguides: Waveguide and Waveguide Component Measurements, 1959." It is the intention to arrange the document into an updated format to give a clear presentation of the relationships of measured quantities and measurement methods to each other. Latest measurement techniques will be added and existing methods updated. The document, because of its scope, will remain as a summary with a bibliography of easily available references.

Definitions for terms used in the document will be included as before and updated. Whenever possible, definitions will be used from the IEEE Dictionary and IEEE Standards published or in preparation.

Coordination with IEC and IEEE Groups, particularly Instrumentation and Measurements, will be maintained to receive the latest information and avoid duplications. Cognizance will be taken of any corresponding work by USASI, EIA and similar groups.

REPORT OF STANDARDS
COORDINATING COMMITTEE
TO THE G-MTT
ADMINISTRATIVE COMMITTEE

by R.W. Beatty



This report is concerned with (1) activities of the Waveguide Standards Committee and its subcommittees, (2) a new Committee on Standards for Microwave Magnetics, (3) Laser Standards, (4) Waveguide "alphabet soup," and (5) I. Easton's Ad Hoc Committee on Standards.

(1) The Waveguide Standards Committee (P. Loth, Chmn.) has communicated with G-CT and G-I&M standards committee chairman in an effort to obtain any information, either published or in preparation, that should be considered in order to minimize duplication or conflict.

The proposal for the revision of the IRE Standard on waveguide and waveguide component measurements was approved with minor changes and has been forwarded to the IEEE Standards Committee (copy attached).

A document on components definitions prepared by the Boston subcommittee is now undergoing review.

IEEE Standards Committee Task Force

ABSTRACT OF SPECIFIC RECOMMENDATIONS

The Task Force recommends:

That resources allocated to standardization activities in the form of Headquarters Staff support be significantly increased (Section 2.2);

That the Standards Committee be directly represented on the Board of Directors through its Chairman should the proposed organization of technical activities be adopted (Section 2.3);

That approval of all Standards and their publication be delegated to the Standards Committee (Section 2.4);

That IEEE make certain that its relationship with the International Electrotechnical Commission and the International Standards Organization be on the basis of cooperation, not competition (Section 3.3);

That appointments to other standardizing bodies be the responsibility of the Standards Committee (Section 3.5);

That the Groups be made aware of and accept the necessity for the generation of Standards publications within their sphere of interest (Section 4.0);

That the Standards Committee address itself to matters of policy and to the monitoring of Group activities in the standards area (Section 5.0);

That the Standards Committee develop a program for recognizing those who have made major contributions to the IEEE standardization program (Section 5.2);

That new Standards normally be published in the appropriate Group Transactions (Section 6.0).

IEEE International Convention

Microwave Technical Applications Sessions - 1970:

Status Report

1. Final Program

As reported earlier the "special" microwave sessions are now two in number and are part of the Technical Applications Sessions at the Coliseum in March 1970. The sessions are on Microstrip and Semiconductor Devices. The final firm programs are detailed in the attached control sheets which will be used by the IEEE in preparing its advance programs for the 1970 convention.

2. Facilities

The efforts of F. Arams and the G-MTT Adcom protest to the IEEE resulted in an improvement of facilities. The Technical Applications Sessions will now be held on the fourth floor of the Coliseum with space for attendance of 350. The location will be next to the Film Theater. The extra space and high ceilings permit normal projection facilities. The large screen display system will still be used and authors are being urged to utilize it for demonstrations or playbacks of videotape presentations. The improved facilities are encouraging to those involved in trying to prepare a superior program.

3. Publication of Papers

Authors will have a two page summary of their papers in the Convention Digest. In addition authors are encouraged to reproduce more extensive versions at their own expense for distribution at the session.

4. Date of "Special Microwave Sessions"

The Microwave Sessions at the Coliseum will be held on Tuesday, March 24, 1970. Therefore a GMTT Adcom meeting on Monday, March 23 would be ok.

Other sessions related to MTT include the one on Microwave Integrated Circuits, organized by V. Gelnovatch which will be held on Wednesday afternoon, March 25, at the Hilton, and one on High Power Solid State Microwave Sources which will be held Wednesday morning, March 25, at the Hilton.

5. Company Listings

Our plan to assemble and distribute a listing of companies and products for the two subject areas was dropped because the IEEE decided it was commercial and violated the IEEE charter.

6. Recommendations

The plans of G-MTT for "special" microwave sessions in 1971 should be integrated with the plans of the 1971 Tech. Program Committee which probably will carry on the determination of the 1970 Committee to build up a broad program of Technical Applications Sessions at the Coliseum.

John M. Osepchuk

Organizer

1970 Microwave Technical Application Sessions

**INTERNATIONAL MICROWAVE
POWER INSTITUTE**



G-MTT MEMBERSHIP
GIVEN OPPORTUNITY TO
AFFILIATE WITH IMPI.

by William C. Brown

Members of IMPI, the International Microwave Power Institute, established in 1966 to promote the application of microwaves for industrial processing, power transmission, and other non-information uses of microwaves are now eligible for admission to the MTT Group with affiliate status. This action was formally taken by the IEEE Executive Committee in response to the recommendation of the MTT AdCom. Pleased with this action, the IMPI Board of Governors has voted a reciprocal arrangement for MTT members if they wish to also become members of IMPI.

The International Microwave Power Institute is a world-wide society of those interested in furthering the non-communication uses of microwave

energy for industrial, domestic, and research use. IMPI publishes the Journal of Microwave Power which is a widely recognized technical quarterly publication covering topics in Chemistry, Food, Forest Products, Biology, Biomedicine, Dielectrics, Electronic and Microwave Instrumentation, Microwave Power Transmission, and scientific installations using large amounts of microwave power.

The IMPI organization also organizes and sponsors an annual International Symposia on Microwave Power to provide a meeting ground and clearing house of information and ideas for a large number of users, vendors, designers, and researchers of microwave software and hardware for industrial and domestic use. The next International Symposia will be held on October 7-9, 1970 at the Kurhaus Hotel, The Hague, Netherlands. (See IMPI Call For Papers elsewhere in this Newsletter.)

Heading up the executive directorate of the IMPI organization are Wayne R. Tinga, President, and Beverly Kumpfer, Executive Vice President. The Journal of Microwave Power is edited by W. A. Geoffrey Voss, a past president and one of the founding members of the Board of Governors. The Board of Governors, chaired by John Olander, is responsible for policy-setting for the IMPI organization. Other members of the Board of Governors are W. C. Brown, D. J. Goerz, Jr., M. A. K. Hamid, C. M. Olsen, and R. F. Schiffmann.

The affiliation between the two technical organizations provides a number of benefits for the members of both groups and provides an avenue for closer cooperation between these two societies. At the present time, the MTT TC-5 technical committee consisting of Saul Rosenthal, M. C. Horton, and William Brown (Chairman) is active in establishing liaison with the IMPI organization and in promoting similar technical interests within MTT.

To encourage a growing interchange of information and ideas between MTT and IMPI, the IMPI Board of Governors has voted to offer a first year membership in IMPI at a reduced rate of \$10.00 to all members of MTT. This offer includes a subscription to the Journal of Microwave Power and full membership privileges. For those MTT members interested in taking advantage of this initial offer, a membership application form is supplied below.

TO: International Microwave Power Institute
Post Office Box 4204, Station D
Vancouver 9, British Columbia
CANADA

I wish to take advantage of the special offer being made to MTT members by IMPI* (International Microwave Power Institute) and enclose my check in the amount of \$10.00 for a first year membership in IMPI. It is understood that this fee includes a year's subscription to the Journal of Microwave Power and all other membership privileges. I am now a member of MTT but not a member of IMPI.

Name _____ Position _____ Company _____
Dept. _____ Address _____
Zip Code _____ Country _____

*Make all checks payable to IMPI in U.S. Dollars.

Computer Aided Design and Application of Devices (CADAD)

by
W. E. Newell,
CADAD Chairman, G-ED

The newly formed CADAD Committee of the IEEE Electron Devices Group held its first meeting on October 29, 1969, in Washington, D. C. with 21 in attendance. The subject of the meeting was device modeling in computer programs for circuit analysis. The morning session was devoted to capsule summaries of current efforts in this field, and included reports by P. E. Love of the U. K. Atomic Energy Authority, R. R. Puttcamp of the Harry Diamond Laboratories, J. M. Anderson of the Air Force Weapons Lab, R. H. Dickhaut of Dynetics, N. O. Sokal of Design Automation, H. K. Gummel of Bell Telephone Labs, and J. J. Kalinowski of Battelle Memorial Institute. During the afternoon, two task forces headed by F. A. Lindholm of the University of Florida and R. B. Schilling of RCA pondered questions related to the feasibility of standards on terminology, measurement techniques, and model configurations for bipolar transistors, and to the economics and possible sites of a data bank to disseminate model parameter information.

Tentative conclusions reached include the following:

1. Progress is being hindered by the lack of standards in model terminology and measurement procedures.
2. The value of all existing, publicly available model parameter data is open to serious question because of the lack of backup information on measurement procedures used, range of validity, methods of extracting model parameters from measured data, etc.
3. To be of maximum usefulness, the data bank should be backed by a source of competent professional consultation which is available to the user (for an additional charge) when needed. The availability of data for a nominal charge to cover distribution costs would be of little value if this backup were not available. No government or non-profit organization willing and able to supply this competence was suggested. Cooperation of the government and IEEE in encouraging an appropriate private company to administer such a data bank would require careful delineation of ground rules, but might be the best way to solve the problem.

The next meeting of the CADAD Committee is planned for February 17, 1970, in Philadelphia in connection with the International Solid State Circuits Conference.



OPINIONS



GMTT FOR THE SEVENTIES

By: D. D. King

Like components, predictions can be passive or active. A variety of new developments already are reshaping microwave technology, and more can be seen on the horizon. Integrated circuits, acoustic devices, laser techniques, among others, might be expected to influence the GMTT and its members. Less predictable are future trends in research support, educational policy, and the role of advanced technology in our complex society. The sum total of any such forecasts offers little solace to stand-patters. Both GMTT and its individual members clearly can expect the 1970's to be a decade of significant change. Whether such change is beneficial or not depends in large measure on actions taken, both individually and collectively. Here is where active predictions are needed.

Each individual must make his own plans, but what about GMTT? For the past year, I have filled a box in the organization chart of GMTT AdCom labeled "Long Range Planning." The only visible contribution from this box has been a revision of the GMTT Constitution giving more room for growth with advancing technology, but without unfair incursion on other IEEE Groups. This secures some options, but suggests no actions. Before I relinquish my post, I want to remedy the deficiency.

To maintain our tradition of drawing new techniques from progress in physics, we must be alert to the first sparks of originality. Easy access to group discussion, and prompt presentation of recent results at meetings stimulates new combinations of ideas. Timely technical sessions, and above all, timely special issues of the Transactions capture for our members the salient features of new technology while there is still much to be gained. Initiative in generating sessions on live topics and in authoritative publication can put us into new fields in time for the greatest benefits, both collectively and individually.

For the majority of our members, frontiersmanship is not a way of life. The refinement and application of existing technology provides the core for our industry, and our education. This core consists largely of hardware. Our publications and symposia probably underemphasize the importance of actual equipment design and performance. For balanced strength in the field, hardware — and related computer software — must not be neglected.

Beyond the purely technical aspects of progress lies the emergent dialogue between engineering and social-economic problems. The effect of cuts in research budgets and redirection of programs on GMTT cannot be denied. Before we can react intelligently to social and economic pressures on GMTT, and on the engineering profession, we must know our own minds. The correct response is by no means clear at present. By serious and open discussion we may arrive at such a response. Certainly, no progress can be made by refusing to communicate with each other about our role in the dynamic world of the 70's.

The prediction for GMTT in the seventies calls for action — in simulating new technology, in strengthening the practical aspects of our work, and in reaching for a professional response to the challenges facing us from the outside.

WAVEGUIDE BAND STANDARDIZATION

By: M. M. Brady

R. W. Beatty has pointed out that there is a pressing need for a universal waveguide nomenclature system. What with the proliferation of nomenclature systems for all sorts of devices and components, a waveguide nomenclature system without meaning is doomed to failure in the long run, no matter how clear and concise its order at birth. The British RCSC system is a case in point. It originally was a simple consecutive numerical system starting with WG-1 (EIA WR-1800) and ending with WG-28 (EIA WR-8). The addition of smaller waveguides was no problem; they became WG-29 through WG-32 (EIA WR-7 through WR-3). But then the system began to break down. WG-9 and WG-11 designated British sizes not commonly used internationally. Now obsolescent, these sizes have been "replaced" by their nearest neighbors, which have been designated WG-9A (EIA WR-340) and WG-11A (EIA WR-229). Sizes larger than WG-1 had to be numbered with zeros. The order of the system has been disrupted; with future amendments or expansions, it will lose all of its original simplicity. The point is that no matter how well ordered a numerical or alphabetical system may be at birth, further developments are bound to ruin its beauty in later life.

Like all codes, nomenclature lacking information content is difficult to remember. How many engineers not directly working with resistors and capacitors can remember the color code without resorting to old (and often vulgar) mnemonics? Who can devise a mnemonic for 38 waveguide sizes?

The only sensible way out is to use a system in which the designations contain information. In principle, the EIA system is best; given a strange waveguide, you measure its internal broad dimension in inches to get its WR number. However, as W. F. Snyder points out, the WR system does not lend itself to the metric system except by changing all numbers. As more countries adopt the metric system, the WR system may well find itself restricted to US domestic use. The IEC system, on the other hand, is

attractive because of its independence achieved by numbering all waveguides, no matter what their geometrical cross section, by the center frequency for their lowest order dominant mode. The IEC system is easy to remember without mnemonics or keys. Its designations are independent of measurement systems or languages (alphabets vary, even within the Indo-European family of languages). It can be expanded or amended to include new waveguide sizes without ruining any of its original beauty.

We don't buy "A Tires", "B Tires" or "C Tires" for cars — we use meaningful size designations. Why not be equally as simple in waveguides? The IEC System is there. Use it.

(See Letters to the Editor for further comments — — Editor)



By: J. B. Horton



CHAPTER ACTIVITIES

The National Lecturer continues to be popular with the Chapters and there are times when I think we should consider having two Lecturers.

Dr. Harold Sobol, 1970 National Lecturer, reports that he is now scheduled to talk at twelve Chapters. Tentatively, his schedule is:

Syracuse	February 5
Orlando	February 12
North New Jersey	February 26
Phoenix	March 16
Tucson	March 17
Houston	March 18
Milwaukee	April 7
Connecticut	April 15
St. Louis	May 19
Chicago	September 15
Orange County	October 6
San Diego	October 7

Dr. Sobol's talk is entitled "Microwave Integrated Circuits", and the abstract is:

"The state-of-the-art of microwave integrated circuits (MICs) has advanced significantly in the past several years. Nearly every medium and low-power microwave function has been performed with MICs. The various technologies and circuit techniques used in current MICs will be discussed. Electrical and material design

considerations will be given. Examples of circuits illustrating the different approaches to integrating microwave circuits will be shown. Examples of subsystems and systems constructed with MIC components will be presented."

Dr. R. W. Damon, 1969 National Lecturer, spoke at fourteen Chapter meetings and from all reports was well received by all. For those who missed his talk, his has been invited to present it in part at the 1970 Solid State Circuits Conference (February 19, 1:30 pm in the Annenberg Auditorium). Our thanks to Dr. Damon for an excellent job as 1969 National Lecturer.

Six Chapters have reported Chapter sponsored symposia. Boston, North New Jersey, Washington and San Francisco are planning one-day meetings, and Chicago and Dallas are sponsoring Microwave sessions in conjunction with National Conferences. The Boston meeting will concern phase shifters (Richard Sparks: 617/274-7100); North New Jersey plans an MIC technology meeting (G. Dipiazza: 201/386-6050, C. T. Wu: 201/386-4678; Washington will have a meeting on MIC fabrication, emphasizing applications (Larry Whicker: 301/765-6349; Will Workman: 301/948-6370); San Francisco plans a Dollar Seminar on Microwave Communications (Dave Adams: 415/969-9304); Chicago plans sessions on millimeter wave acoustics at the 1970 NEC (Bob Knox: 312/225-9630 X 4007, A.P. van den Heuvel: 312/225-9630); Dallas plans a microwave session on device and MIC technology at the 1970 SWIEEEO (Frank Emery: 214/238-3315 Britt Vincent: 214/341-2100).

News about our two Chapters being organized is good. The Atlanta Chapter has been approved by the IEEE Executive Committee as a joint AP-MTT Chapter (Pete Rodrigue). Lionel Davis reports that the Houston group is expected to be formed by March 1970.

During the last six months Al Clavin and I have been gathering information about ADCOM committees and Chapter officers. We have compiled this information into a booklet which will be mailed to all G-MTT members during January 1970. The booklet is entitled "1970 G-MTT Committee Directory." The Directory will contain the addresses of Group Officers, ADCOM members, editors, committee members, Chapter chairmen, etc., as well as current information on G-MTT activities.

Looking to 1970, I see a closer tie of Chapter activities to ADCOM and G-MTT national activities. With the student paper prize set for the 1971 Symposium, talk of a G-MTT College scholarship, the new W.W. Hansen Award, and an increased number of local chapter symposia, chapter members and particularly chapter chairmen will play even a larger role in G-MTT affairs. I look forward to being a part of these activities in 1970, and wish you a good year.

GUIDE TO EMPLOYEE PERFORMANCE APPRAISAL

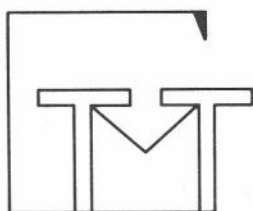
	Outstanding "A"	Above Average "B"	Average "C"	Below Average "D"	Unsatisfactory
Performance Factors	Far Exceeds Job Requirements	Exceeds Job Requirements	Meets Job Requirements	Needs Some Improvement	Does Not Meet Minimum Requirements
Quality	Leaps Tall Buildings With a Single Bound	Must Take Running Start to Leap Over Tall Buildings	Can Only Leap Over a Short Building or Medium With No Spires	Crashes Into Buildings When Attempting to Jump Over Them	Cannot Recognize Buildings at All — Much Less Jump
Timeliness	Is Faster Than a Speeding Bullet	Is AsFast As a Speeding Bullet	Not Quite As Fast As a Speeding Bullet	Would you Believe, a Slow Bullet?	Wounds Self With Bullets When Attempting to Shoot Gun
Initiative	Is Stronger Than a Locomotive	Is Stronger Than a Bull Elephant	Is Stronger Than a Bull	Shoots the Bull	Smells Like a Bull
Adaptability	Walks on Water Consistently	Walks on Water in Emergencies	Washes with Water	Drinks Water	Passes Water in Emergencies
Communication	Talks With God	Talks With the Angels	Talks to Himself	Argues With Himself	Loses These Arguments
Comprehension	Designs New Circuitry	Reads Schematics	Reads Playboy	Looks at Pictures in Comic Books	Frequently is Bitten by Seeing-Eye Dog

SYMBOL CONTEST

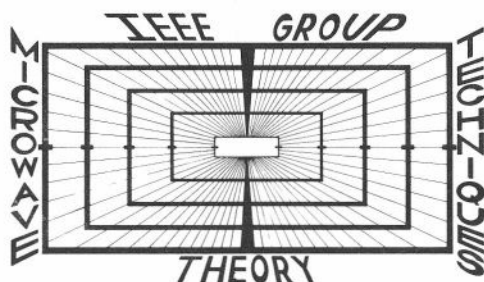
For the last three issues, our readers have submitted suggestions for a symbol to be used for all G-MTT correspondence, meetings, and publicity. With a few exceptions, those submitted are repeated below to refresh your memory. Please select your preference and send a postcard or letter to your Editor at the address on page 1 (or phone 213-883-2400, extension 1778).

Some of the ideas could not receive final consideration because of legal restrictions. We have been informed that the IEEE logo  is registered and can not be altered in any way; the Smith Chart is a registered logo for a microwave trade journal, hence is ineligible.

Give these symbols your consideration; select one you would prefer to see representing your Group and let us know, today!



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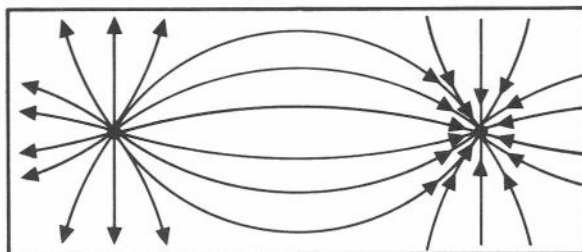
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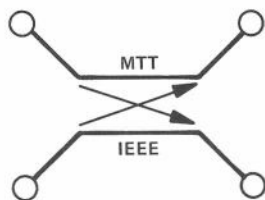
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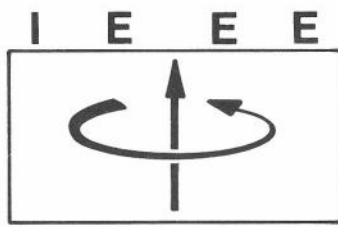
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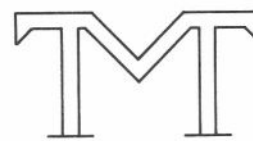
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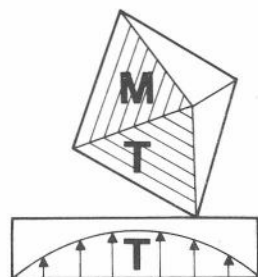
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CHAPTER NEWS



ATLANTA CHAPTER

Past Meetings

Date: October 15, 1969
 Location: Hewlett-Packard Auditorium
 Attendance: Twenty-Six
 Speaker: Dr. R. W. Damon
 Affiliation: Sperry Rand Research Center
 Abstract: "Preteronics - Springs, Magnets and Microwaves"

BALTIMORE CHAPTER

Past Meetings

Date: October 2, 1969
 Location: Social Security Administration Auditorium
 Speaker: Mr. Paul Barritt
 Affiliation: NASA Goddard
 Abstract: Microwave Communications Aspects of the Apollo 11 Moon Voyage

Date: December 1969
 Location: Social Security Administration Auditorium
 Speakers: Mr. J. Frank
 Mr. E. V. Byron
 Affiliation: Johns Hopkins University
 Abstract: "Phased Array Aperture Matching Techniques," Mutual Coupling, and Waveguide Array Simulators and Dummy Arrays for Element Pattern Measurements

Future Meetings

Date: January 8, 1970
 Location: Social Security Building, Main Lobby Entrance, Security Boulevard (Beltway Exit 17)
 Speakers: Mr. Robert P. Moore
 Mr. Mervyn C. Hoover, Jr.

Affiliation: Naval Weapons Center, Corona Laboratories, Corona, California
 Abstract: "Airborne Microwave, Radio Metric Systems"
 Date: February 5, 1970
 Location: Social Security Building, Main Lobby Entrance, Security Boulevard (Beltway Exit 17)
 Speaker: Mr. R. Lodwig
 Affiliation: Wheeler Laboratories
 Abstract: "Microwave Communication for High Speed Trains"

Newly Formed Companies

CENTRON, Division of KELTEC INDUSTRIES, subsidiary of Aiken Industries organized by Messrs Terry Olver and Robert Frost formerly of Westinghouse Defense and Space Center.

Centron employs seven people. They are presently under contract to Defense Electronic Inc. for design of telemetry transmitters. Centron will be engaged in the design and manufacture of solid state amplifiers, oscillators, frequency synthesizers and telemetry components. They are located at 148 S. Azar Avenue in Glen Burnie, Maryland.

BOSTON CHAPTER

Past Meetings

Date: September 30, 1969
 Attendance: Sixty-Nine
 Location: Sylvania
 Speaker: Mr. F. Sterzer
 Affiliation: RCA
 Abstract: Microwave Solid State Sources and Amplifiers

CONNECTICUT CHAPTER

Past Meetings

Date: November 18, 1969
 Attendance: Fifteen
 Location: Machlett Labs
 Speaker: Mr. Steven March
 Affiliation: Microphase Corporation
 Abstract: A brief review of the theory and characteristics of micro-strip couplers and power

dividers was presented. The use of overlay structures and the resultant improvements in the performance of the couplers and dividers was discussed.

DALLAS CHAPTER

Past Meetings

Date: October 15, 1969
 Attendance: Fifty-Two
 Location: Dallas Power & Light Northeast Service Center
 Speaker: Mr. Ed Cabrera
 Affiliation: Microphase Corporation
 Abstract: "Ultrabroadband Components in Microstrip"

FLORIDA CHAPTER

Past Meetings

Date: October 16, 1969
 Attendance: Twenty-Six
 Location: Ramada Inn
 Speaker: Mr. Ned Farinholt
 Affiliation: Texas Instruments, Inc.
 Abstract: Mera Phased Array Radar Antenna and Recent MIC Innovations

Date: November 20, 1969
 Location: Remada Inn
 Speaker: Mr. Wally Wallingford
 Affiliation: Collins Radio
 Abstract: Apollo Communications

LOS ANGELES CHAPTER

Past Meetings

Date: December 4, 1969
 Speaker: A. J. Simmons
 Title: Design and Fabrication of Passive Millimeter-Wave Components and Subsystems.
 Abstract: Exploitation of the 30-100 GHz region by systems designers now appears to be beginning in earnest. Manufacturing tolerances for obtaining the order of magnitude tolerance improvement as compared to the 3-10 GHz region have been developed and are well in hand so that

component and subsystem performance comparable to that obtained at the lower microwave frequencies is obtainable.

MILWAUKEE CHAPTER

Past Meetings

Date: September 15, 1969
 Attendance: Sixty-Eight
 Location: Milwaukee School of Engineering
 Speaker: Dr. Richard W. Damon
 Affiliation: Sperry Rand Research Center
 Abstract: Pretersonics - Springs, Magnets, and Microwaves

Date: October 7, 1969
 Attendance: Twenty-Three
 Location: Todd Wehr Chemistry Building, Marquette University
 Speaker: Dr. Kaneyuki Kurokawa
 Affiliation: Bell Telephone Laboratories
 Abstract: Bulk Semiconductor High Speed Functional Devices

Date: November 11, 1969
 Attendance: Forty-Four
 Location: Marquette University
 Speaker: Dr. John R. Szeden
 Affiliation: Westinghouse Research Laboratories
 Abstract: Minstor (T.M.) Semiconductor Memory Elements

NEW JERSEY CHAPTER

Past Meetings

Date: October 15, 1969
 Attendance: Forty-Five
 Location: Arnold Auditorium, Bell Labs
 Speaker: Dr. G. Bernard
 Affiliation: Yale University
 Abstract: "How are Antennas and Propagation Related to Insect Eyes?"

PHILADELPHIA CHAPTER

Past Meetings

Date: October 16, 1969
 Attendance: Twenty-Five
 Location: Sherro's Restaurant, Pennsauken, New Jersey
 Speaker: Dr. R. W. Damon
 Affiliation: Sperry Rand Research Center
 Abstract: Pretersonics - Springs, Magnets, Microwaves

PHOENIX CHAPTER

Past Meetings

Date: October 13, 1969
 Attendance: Sixteen
 Location: Bull Pen Restaurant
 Speaker: Dr. Richard W. Damon
 Affiliation: Sperry Rand Research Center
 Abstract: Pretersonics - Springs, Magnets, and Microwaves

Date: November 10, 1969
 Attendance: Twenty-Six
 Location: Bull Pen Restaurant
 Speaker: Victor Rumsey
 Affiliation: University of California at San Diego
 Title: Frequency Independent Antennas
 Abstract: Professor Rumsey gave an excellent talk on the Fundamentals of Frequency Independent Antennas. Log periodic and spiral configurations were treated and possibilities for future antenna types discussed.

SAN DIEGO CHAPTER

Past Meetings

Date: October 14, 1969
 Attendance: Twenty-Two
 Location: Naval Electronics Laboratory Center, San Diego
 Speaker: Mr. James A. Bunker
 Affiliation: Microwave Associates
 Abstract: Microwave Integrated Circuits have burst upon us within the last four years. This new technology is struggling to

find its place in the microwave world. The trials, tribulations and promise of M. I. C.'s have microwave component and system companies alike striving to master this new transmission line medium. The potential low production costs of this circuit technique excites all who can foresee possible military and public consumer markets for it. In the meantime, many of us are struggling on a day to day basis to reproduce the unit that worked so well last week. Fabrication, soldering, bonding, in-process testing and packaging techniques present obstacles to the design engineer that are extremely challenging.

Personals

Dr. Jerry Shaffner has joined Ryan Electronics from Motorola in Phoenix, Arizona.
 L. J. Cutrona is now at KMS Industries in San Diego. He was previously with KMS Industries in Ann Arbor, Michigan.

SCHENECTADY CHAPTER

Past Meetings

Date: October 20, 1969
 Attendance: Twenty-Seven
 Location: General Electric Company
 Speaker: Dr. Richard W. Damon
 Affiliation: Sperry Rand Research Center
 Abstract: Pretersonics

SEATTLE CHAPTER

Past Meetings

Date: October 21, 1969
 Attendance: Twenty
 Location: Bannan Auditorium
 Speaker: Mr. R. W. Sutton
 Affiliation: The Boeing Co.
 Abstract: Aircraft Communication/Surveillance Via Satellite at L-Band

SOUTHEASTERN MICHIGAN CHAPTERPast Meetings

Date: October 21, 1969
 Attendance: Fifteen
 Location: Lawrence Institute of Technology
 Speaker: Dr. Ralph Levy
 Affiliation: Microwave Development Laboratories
 Abstract: Recent Advances in Passive Microwave Components

Date: November 18, 1969
 Location: Bendix Research Laboratories
 Speaker: Mr. Carl F. Augustine
 Affiliation: Bendix Research Laboratories
 Abstract: Liquid Crystal Electromagnetic Field Detectors: Their Design and Use in Microwave Imaging and Holography.
 Liquid crystals are cholesterol derivatives that are neither liquid nor crystal, but exhibit some properties of both states. They are of interest primarily because of their unusual ability to scatter different colors of light as a function of temperature. The process is reversible and chemical adjustments may be made in compounding the liquid crystals so that the color change occurs over very narrow temperature ranges centered about some desired average temperature. They are, therefore, useful as a display mechanism for various types of transducers that convert incident energy into heat.

Future Meetings

Date: January 20, 1970
 Location: Ann Arbor
 Abstract: Electron Devices topic

Date: February 26, 1970
 Location: Ann Arbor
 Abstract: Joint Meeting with the Section sponsored by G-AP/MTT/ED and G-VT (Vehicular Technology)

Date: April 14, 1970
 Location: Ann Arbor
 Speaker: Professor Authur A. Ksienski
 Affiliation: Electro-Science Lab
 Ohio State University
 Abstract: Electron Devices Topic

Future Meetings

Date: January 20, 1970
 Location: A. E. White Auditorium
 The University of Michigan
 Speakers: Ronald G. Neale and David L. Nelson
 Affiliation: Energy Conversion Devices, Inc., Troy, Michigan
 Subject: Ovonic Threshold Switches
 Abstract: Ovonic switches are based on a phenomenon observed in various types of disordered semiconducting materials which exhibit a rapid and reversible transition from a highly resistive to a highly conductive state effected by an electric field. The devices are of two types: the Ovonic Threshold Switch (OTS) and the Ovonic Memory Switch (OMS). The OMS differs from the OTS in that the OMS will remain in its conductive state after removal of applied voltage, thereby exhibiting non-volatile memory, while the OTS reverts back to the off state.

Personals:

We wish to congratulate three of our local Chapter members who take on new national Group responsibilities this year:

G-MTT AdCom Chairman Dr. J. H. Bryant, Omni Spectra, Inc.
 G-AP AdCom Chairman Prof. Ralph Hiatt, Univ. of Mich.
 G-AP AdCom Vice Chairman Prof. Chen To Tai, Univ. of Mich.

Chapter Officers
 Chairman: P. C. Goodman, Omni Spectra, Inc., Farmington, Michigan

Vice Chairman: C. P. Tresselt
 Bendix Research Laboratories
 Southfield, Michigan

Secretary/Treasurer: W. R. Curtice
 The University of Michigan
 Ann Arbor, Michigan

Trident Editor: D. G. Gartzke,
 Omni Spectra, Inc.,
 Farmington, Michigan

ST. LOUIS CHAPTERPast Meetings

Date: October 21, 1969
 Attendance: Fifteen
 Location: Washington University
 Speaker: Mr. Richard L. Kelly
 Affiliation: Emerson Electric Co.
 Abstract: Tropospheric Scatter Systems

Date: November 18, 1969
 Attendance: Sixteen
 Speaker: Mr. Hugh A. Hair
 Affiliation: Anaren Microwave, Inc.
 Abstract: "Stripline Integrated Circuits and Their System Applications"
 This presentation is intended to provide the system engineer with an understanding of the building blocks available (and their limitations) for the realization of certain multi-purpose stripline integrated circuits.

New Officers

Chairman: Paul Safran
 Chesterfield, Missouri

Vice Chairman: Reid Vann
 Kirkwood, Missouri

Secretary: Robert C. Peirson
 Rolla, Missouri

Program Chairman: William E. Hord
 Florissant, Missouri

Publicity Chairman: Art Lind
 St. Louis, Missouri

Membership Chairman: Jim Abernathy
 Ferguson, Missouri

AP Norm Brennecke
Representative: Florissant, Missouri
ED Henry Guckel
Representative: Ferguson, Missouri
MTT Fred Rosenbaum
Representative: Clayton, Missouri

WASHINGTON, D. C. CHAPTER

Past Meetings

Date: October 14, 1969
Attendance: Sixteen
Location: Harry Diamond Labs
Speaker: Dr. John de Klerk
Affiliation: Westinghouse Research
Laboratories
Abstract: The Application of Elastic
Surface Waves to Microwave
Devices



ANNOUNCEMENTS

1970 IEEE INTERNATIONAL SOLID- STATE CIRCUITS CONFERENCE

The proper level of governmental support for science and the role of government in technological innovation will be underscored in a keynote address on Science in the Seventies--- The Policy Issues -- at ISSCC 70 by Dr. Hubert H. Heffner, Deputy Director of the Office of Science and Technology, Executive Office of the President.

The talk will complement sixty-six papers on worldwide solid-state technology progress by over 150 scientists, engineers and educators that will be presented at the 1970 IEEE International Solid-State Circuits Conference on the campus of the University of Pennsylvania and the Sheraton Hotel, Philadelphia, February 18-20.

Scheduled for the American portion of the program are such key subject areas as avalanche diode circuits, displays and storage, semiconductor memories, microwave transistor amplifiers, CAD and device modeling, and new device and circuit techniques; also consumer applications, logic and interface, acoustic and transferred electron circuits, linear circuit techniques, and photosensors and low-level sensing.

Additionally, technology for integrated electronics will be featured in a four paper invited session covering applications of cylindrical domains, supported by a motion-picture analysis, the impact of reliability requirements on LSI technology, mask making, and microwave IC technology.

Speakers from Belgium, The Netherlands, Japan, Canada, France and Germany will discuss metal-alumina-silicon transistor read-only memories, integrated MOS and bipolar analog delay lines, IC design layouts, pressure-sensitive Schottky barrier transistor-switching for keyboard applications, and channel formation in IGFETs. Papers will also reveal such overseas developments as monolithic supply polarity-independent amplifiers, color TV horizontal deflection and power supply circuitry, wideband CW amplification in X-band with Gunn diodes, trapping effects in MOS photosensing arrays, and circuit elements for MOS ICs.

The ISSCC 70 preregistration fee for IEEE members is \$20.00; nonmembers, \$25.00. Fees at the conference will be \$25.00 for IEEE members, and \$30.00 for nonmembers. Programs, with registration forms, can be obtained from H. G. Sparks, or Lewis Winner, 152 West 42nd Street, New York, N.Y. 10036.

1970 CONFERENCE ON PRECISION ELECTROMAGNETIC MEASUREMENTS

The seventh biennial Conference on Precision Electromagnetic Measurements will be held June 2-5, 1970, at the Boulder Laboratories of the National Bureau of Standards, Boulder, Colo.

In keeping with current measurement needs, the Conference will include emphasis on the rapidly developing field of precise measurements

at very low temperatures, in addition to the traditional fields of DC, LF, HF, and microwave. Papers from the Conference will be published, as in previous years, in a special issue of IEEE Transactions on Instrumentation and Measurement.

1970 INTERNATIONAL IEEE/G-AP SYMPOSIUM, 14-16 September 1970

FALL USNC/URSI MEETING, 15-17 September 1970

To be held at
The Ohio State University
Columbus, Ohio 43210

URSI and IEEE G-AP technical programs will be separately arranged except for appropriate coordination. Papers are solicited in all theoretical, experimental and developmental fields of interest to

URSI Commissions:

- I. Radio Measurement Methods and Standards
- II. Radio Propagation in Non-Ionized Media
- III. Ionospheric Radio
- IV. Magnetospheric Radio
- VI. Radio Waves and Transmission of Information [Note June 1 deadline]

The deadline for Commissions I, II, III, and IV is June 22, 1970. The deadline for Commission VI is June 1, 1970. Originals and two copies of abstracts of 200 words should be submitted stating Commission preference.

G-AP under the following topics:

Antenna Theory
Antenna Designs and Implementations
Array Technology
Electromagnetic Theory
Numerical Methods in Electromagnetics
Radio, IR, and Optical Propagation
Scattering and Diffraction (Radio, IR, Optical)
Radio and Radar Astronomy
Plasmas and Their Electromagnetic Effects

A 400-600 word summary of any paper for presentation at G-AP sessions should be submitted before June 1, 1970.

to
Dr. Curt A. Levis
P.O. Box 3115
The Ohio State University,
Columbus, Ohio 43210



AT NEWPORT BEACH, CA

**2nd
CALL
FOR
PAPERS**

**G-MTT
1970**

International Microwave Symposium

The 1970 IEEE G-MTT International Microwave Symposium will be held on May 11 - 14, 1970 at the Newporter Inn, Newport Beach, California.

The symposium will be a comprehensive unclassified technical program covering the important new developments pertinent to the field of microwave theory and techniques.

Original papers are solicited on subjects in the following areas:

- Computer oriented microwave field theory and practice.
- Microwave microelectronics
- Solid state sources and devices.
- Noise in solid state devices and systems
- Microwave integrated circuits
- Microwave physics and materials
- Microwave acoustics
- Microwave aspects of optoelectronics and holography
- Microwave signal processing
- Ferrite devices
- Microwave power engineering
- Millimeter wave components and systems
- Microwave components and measurement techniques

Authors must submit five copies of each summary and abstract in English. The abstract should contain approximately 20 - 50 words with no illustrations. Summaries are to be 500 - 1000 words in length with a maximum of six (6) illustrations, appropriate to a 20 minute paper. Since papers will be selected on the basis of the summaries, they must clearly describe what new and significant results have been obtained, supported by illustrations where appropriate.

All material should be mailed by January 30, 1970 to:

Dr. Raymond H. DuHamel
Chairman, Technical Program Committee
Granger Associates
1601 California Avenue
Palo Alto, California 94304

Authors will be notified of acceptance by February 20, 1970.



Instructions for All Authors:

The text should be typed with elite type single spaced on white 8-1/2" x 11" paper. The title should be centered in capital letters one inch from the top of the first page. The authors and complete organization affiliation should be two lines below the title and the text should start four lines below this. Left and right margins should be 1-1/2 inches. A one-inch margin should be left at the top and bottom of all pages. Use a double space between paragraphs. An author will retain the right to submit his complete paper to a journal of his choice for formal publication.

G-MTT TRANSACTIONS PLANS

SPECIAL ISSUE ON

MICROWAVE CIRCUIT ASPECTS

OF AVALANCHE DIODE

AND TRANSFERRED ELECTRON DEVICES

The IEEE Transactions on Microwave Theory and Techniques plans to devote a special issue to Microwave Aspects of Avalanche Diode and Transferred Electron Devices, to be published in November 1970. The purpose of this special issue is to focus attention on circuit approaches in research and development of solid-state microwave components and subsystems based upon these new device technologies.

Papers and correspondence reporting new and significant developments in the field are solicited. In addition, several review papers will be invited to place the state of the art in perspective. Contributions to this special issue should be concerned mainly with circuit techniques, device-circuit interactions and the dependence of circuit performance upon semiconductor device design and measurable parameters. Papers dealing primarily with device physics or fabrication are more appropriate to other journals.

Some suggested topics on which contributions are solicited are but need not be limited to the following:

1. Application of avalanche diodes and transferred electron devices to oscillators, amplifiers, frequency converters and other uses, in any mode of operation.
2. Theoretical and experimental investigations of noise phenomena, including circuit techniques for enhancement or reduction and device-circuit interactions which influence noise generation.
3. Techniques for frequency and power control and stabilization.
4. Frequency and amplitude modulation techniques and circuits for electronic tuning.
5. Circuits for generation, amplification and conversion at millimeter-wave frequencies.
6. Equivalent circuit representation and measurement.
7. Computer-aided circuit design.
8. Multiple-device combining techniques for achieving higher power.
9. Design and fabrication of microwave integrated circuits using these devices.
10. Novel circuits and device-circuit structures such as distributed and traveling wave amplifiers, etc.

Length and style for papers should be in accordance with the "Information for Authors" published in the Transactions. Three copies of each complete manuscript should be submitted for review not later than April 15, 1970, to the Guest Editor, Mr. A. H. Solomon, Sylvania Electric Products, Inc., 100 Sylvan Road, Woburn, Massachusetts 01801.

UNITED STATES NATIONAL COMMITTEE

International Scientific Radio Union
(URSI)

The 1970 USNC/URSI-IEEE Spring Meeting will be held on April 16-19, 1970 at the Statler Hilton Hotel, Washington, D. C.

The meeting will be held in cooperation with the following IEEE Groups:

Antennas and Propagation
Circuit Theory
Geoscience Electronics
Information Theory
Instrumentation and Measurement
Microwave Theory and Techniques

The following Commissions will hold technical sessions:

- Commission 1 - Radio Measurement
Methods and Standards
- Commission 2 - Radio and Nonionized
Media

- Commission 3 - On the Ionosphere
- Commission 4 - On the Magnetosphere
- Commission 5 - Radio and Radar
Astronomy
- Commission 6 - Radio Waves and
Transmission
Information
- Commission 7 - Radio Electronics

Abstracts:

Send original abstract and two copies to:

Dr. Francis S. Johnson,
Secretary USNC/URSI
University of Texas at Dallas
P. O. Box 30365
Dallas, Texas 75230

DEADLINE: February 2, 1970

A block of rooms has been reserved at the Statler Hilton Hotel. Advanced registration and hotel reservation cards will be mailed with the Preliminary Program.

1970 MICROWAVE POWER SYMPOSIUM

IMPI's Fifth Annual Microwave Symposium will be held at the Hotel Kurhaus, Scheveningen, Holland (The Hague) on October 7, 8, 9, 1970.

Original papers are being solicited that represent new contributions to microwave applications in the following areas:

Properties of Materials -- Food and
Biological

Properties of Materials -- Non-Food

Microwave Induced Chemical
Processes

Applicator Theory and Techniques

Industrial Microwave Systems

Microwaves in the Food Industry

Microwave Power Generation

Medical Applications and Biological
Effects

Authors are requested to submit a 40-word abstract and a 500-word summary of their paper. The summary must include specific information since papers will be selected based on the summary content.

Deadline for all submissions is May 31st, 1970

The 500-word summary is to be submitted on 8-1/2 x 11" single side, double-spaced typewritten paper. Author's name, affiliation, complete return address and telephone contact must appear on the first page. Abstracts of selected papers will appear in the Symposium program booklet and summaries will be printed in a Symposium digest.

Please forward five clear copies of both summary and abstract with a reproducible set of essential figures, to the Technical Program Chairman:

W. A. G. Voss
Electrical Engineering Dept.
University of Alberta
Edmonton, Alberta
Canada

The Symposium is under the general chairmanship of D. J. Goerz, Jr., Bechtel Corporation, 50 Beale Street, San Francisco, Calif. 94119, USA, telephone 415-764-5329.

All inquiries regarding Symposium matters other than technical program should be addressed to the Symposium Chairman.



PERSONALITIES

122 OUTSTANDING PROFESSIONAL CONTRIBUTORS HONORED BY IEEE

The Board of Directors of the Institute of Electrical and Electronics Engineers (IEEE) has elevated 122 members of the Institute to the grade of Fellow. The grade of Fellow of IEEE is the highest attainable and is conferred by invitation only and only upon persons of outstanding qualifications and achievements in their particular fields.

The Fellow elections announced by IEEE's Board of Directors become effective as of January 1, 1970, and Fellow Award Certificates will be presented by the local Section of IEEE to which each new Fellow belongs. Special recognition of the awards will also be made by IEEE's President at the Institute's Annual Banquet, to be held March 25, 1970 during the IEEE International Convention and Exhibition in New York City.

Among the more than 160,000 members of IEEE, those who have received the distinction of Fellow Grade reflect the world-wide scope of the Institute and its members, since they live and work in many countries as well as in the United States. New Fellow members of G-MTT are:

F. S. Barnes
Boulder, Colorado

H. N. Chait
Tarzana, California

R. A. Chipman
University of Toledo
Toledo, Ohio

H. W. Cooper
Hyattsville, Maryland

M. R. Donaldson
St. Petersburg, Florida

R. S. Engelbrecht
Bell Telephone Labs
New Providence, New Jersey

H. I. Ewen
Weston, Maryland

Virgilio Floriani
Pres. Telettra S P A
Mortara, Italy

R. N. Ghose
Los Angeles, California

Walter L. Glomb
Nutley, New Jersey

H. S. Jones, Jr.
Washington, D. C.

Kazue Kitagawa
% The Maruta Shobo-Osaka C P O
Osaka, Japan

B. J. Leon
Purdue University
Lafayette, Indiana

Gordon H. Rawcliffe
University Walk
Bristol, England

A. S. Robinson
Radio Corp. of America
Moorestown, New Jersey

H. A. Rosen
Santa Monica, California

R. F. Soohoo
Davis, California

CONGRATULATIONS TO OUR NEW FELLOWS

DR. JOHN V. N. GRANGER IS NEW PRESIDENT OF IEEE

Dr. John V. N. Granger, Chairman of the Board of Granger Associates at Palo Alto, California, has been elected by the voting members to be President of the IEEE for 1970. His election was announced today by IEEE's Board of Directors. He succeeds Dr. F. Karl Willenbrock, Provost of the Faculty of Engineering and Applied Sciences at the State University of New York, Buffalo.

The Directors of IEEE also announced the election by the voting members of Dr. James H. Mulligan, Jr. as Vice President, 1970.

Dr. Mulligan is Executive Secretary of the National Academy of Engineering in Washington, D.C. When the Institute's Annual Assembly meets in January, 1970, two additional Vice Presidents for 1970 will be elected.

Dr. Granger is the author of numerous published papers on aircraft antennas and airborne communications. He received the Eta Kappa Nu award as the "Outstanding Young Electrical Engineer" for 1952, and the IRE "Pacific Electronics Achievement Award" for 1955. He is a Fellow of the IEEE and a Fellow of the Electronics Institution of East Africa.

DR. HAROLD I. EWEN RECEIVES IEEE AWARD IN MEASUREMENT

The Morris E. Leeds Award for outstanding contribution in the field of electrical measurement has been awarded for 1970 to Dr. Harold I. Ewen, of Ewen Knight Corporation at East Natick, Massachusetts. In making the award, the IEEE cited Dr. Ewen "for contributions to the design of sensitive radiometric systems, and for the co-discovery of the 21cm spectral line of interstellar hydrogen."

Harold I. Ewen received the B.A. Degree in 1943 from Amherst College, Amherst, Massachusetts, and the M.A. and Ph.D. Degrees in Physics from Harvard University, Cambridge, Massachusetts, in 1948 and 1951, respectively. His doctorate research at Harvard, under E. M. Purcell, led to the detection of the 21cm interstellar hydrogen line. He was appointed a Member of the Harvard Faculty in 1951. With B. J. Bok, he taught the first

graduate course in Radio Astronomy given in the United States. He has been an Associate of Harvard since 1952.

In 1952, he founded the Ewen Knight Corporation. As Director of Technical Operations at Ewen Knight, he has made several significant contributions to the design of radio telescopes and passive microwave systems for a variety of remote sensing applications, including radiometric sextants, radar antenna system calibration, atmospheric noise measurements, satellite navigation, clear air turbulence detection, and atmospheric ozone profile measurements. These are covered in several publications and patents.

BOOK REVIEW



by Nathan Pelter
REVIEW EDITOR

Handbook of Radar Measurement,
by Barton, David K., and Harold R. Ward,
Prentice Hall, Inc., Englewood Cliffs,
New Jersey,
1969, 426 pages, illus, \$18.00

Barton and Ward present a wealth of radar information for the system engineer - information never before contained in one volume. By intentionally ignoring the "d" in radar, the authors have been able to emphasize the measurement theory, that is, the estimation of the parameters of angle, range, doppler and others. Derivatives of range above the first are not discussed in any detail which is satisfactory since they are more meaningfully discussed in sonar applications.

The index is rather short for a handbook (one of my pet peeves); however, the glossary is appreciated especially since thirty-eight different lower-case sigmas are listed with appropriate subscripts or, in one case, superscript. The bibliography is adequate with a few glaring omissions, although direction in the text to the original source material is not at all thorough. Organization of the text is good, although in one case, a subtopic titled, "Measurements on Non-coherent Pulse Train" (p. 123) falls in the chapter titled, "Doppler Measurement in Noise."

The handbook approach to radar system design is certainly of greater interest to those whose systems operate in a benign environment (implying that thermal noise can be termed benign). Although the area of waveform design and processing for combating such malignancies such as ground, rain, and sea clutter is presented, it is necessarily quite general. By reason of the unclassified nature of the book, other malignancies cannot even be alluded to, and it is in this regard where one wonders whether a handbook for radar design is of much use. Fortunately, you cannot always tell a book by its title and therefore the term, handbook, as applied to this book may be a little restrictive and should not scare away those terribly creative engineers who are "beyond" the level of handbook engineering. The subject of radar measurement is, of course, too large for any book to be comprehensive and yet cover the material in sufficient detail. Thus any criticism that is made stating that this book does not cover certain areas in sufficient detail such as, radar measurement in sample data systems or systems having range-doppler coupling, can only be interpreted to mean that the authors did not intend to cover these areas in great detail.

Unfortunately, the authors do not always point the way to the books that do discuss these areas in greater detail.

Overlap of the material in this book with that in Barton's earlier work, "Radar System Analysis" is maintained at a respectable level so that both volumes can command a respectful place on the radar designer's bookshelf. Since 96 pages of the 426-page book are taken up by Appendix A, "Antenna Patterns and Illumination

Functions," this section alone might be a major reason for the purchase of the book, especially in light of the application to waveform design. Barton and Ward have teamed to provide another useful compendium of radar information and the dedication page of the book clearly states why it was possible to write the book. The determination of the reason "why" will be left as an exercise for the reader. Thus by letting everyone read the dedication for himself, he will be introduced to a book on radar measurements which he himself may also judge to be useful in his work.

Reviewer: James J. Clemens
Hughes Aircraft Co.
Canoga Park,
California



LETTERS TO THE EDITOR

Editor, MTT Newsletter:

--- At the MTT Ad-Com meeting in September, John Bryant, Chairman Elect of Ad-Com invited me to write a history of GMTT. I accepted and told John that it would take about 1 year to complete. If any of your readers have information that might be pertinent to the history, I would appreciate it if they would send it to me at Sage Laboratories, Inc., 3 Huron Drive, Natick, Massachusetts, 01760.

Very truly yours,

Theodore S. Saad

Editor, MTT Newsletter:

Dr. Daniel Varon has consented to serve as Vice-Chairman of the G-MTT Technical Committee on Computer-Oriented Microwave Practices until May, when I plan to retire as Chairman.

Dan, who was formerly at Bell Laboratories, is now with the Dial-Data Corporation, 429 Watertown Street, Newton, Mass. 02158, phone (617) 244-2560. I expect he will take over most of the executive functions of COM-COMP.

I would like to thank Dan for agreeing to take on this responsibility; I hope each of you will give him your fullest cooperation.

W.J. Getsinger

Editor, MTT Newsletter:

--- Thank you for the two copies of the July 1969 issue of the Microwave Theory and Techniques Newsletter. Actually I received both copies on 19th August 1969, although one (10¢ postage) was postmarked 1st July and the other (14¢ postage) was postmarked 8th July. I presume the former was sent by third class mail and the latter by first class mail.

Yours sincerely,

G. K. Cambrell

Editor, MTT Newsletter:

--- I propose that the relocation of the CADAR Newsletter under the protective wing of G-ED be announced in the immediately following issues of CADAR, G-CT, G-C, C-ED, G-MTT, and G-PMP Newsletter. The announcement should emphasize that any IEEE member may receive the CADAR Newsletter for the asking (address requests to the TAB office) and that the Newsletter list will be the basis of special announcements for future activities such as workshops. This procedure is perfectly proper under the IEEE policy on small "invitational" meetings and would give you an immediate reduction of 1:10 or 1:20 from the total memberships of all the Groups listed to the voluntarily composed lists of active workers.

Sincerely,

Richard M. Emberson

R. W. Beatty

Chairman, G-MTT Standards
Coordinating Committee

On the question of Standardizing on waveguide band designations, I'm delighted to correct some opinions and a statement of mine made in May of 1961. At that time I served as a Technical Advisor to the U.S. National Committee of the IEC in the field of waveguides and since this time Max Michaelson of Raytheon has occupied this spot and Gus Shapiro of National Bureau of Standards operates for the U.S.N.C. (and the world) the Secretariat of this waveguide committee SC46B.

Since my recommendation to use the EIA Waveguide nomenclature, the IEC has formally adopted and published a very simple waveguide designation scheme based on frequency which eliminates the need for either inch or metric conversions and this system has been in place now for over 5 years.

Although the alphabetical designation of waveguide sizes is a handy scheme the confusion in this area is rampant as well as competitive, and it is virtually impossible now to use an alphabetical designation.

The IEC scheme has the advantage that it does not depend on inch dimensions which are a problem in metric countries nor on metric dimensions but, on the basic frequency band that is involved in the waveguide. Since the IEC is supported in this country by ANSI (formerly USASI) and the IEEE is a member of ANSI let's go on record for the G-MTT endorsing the IEC Recommendation 153 and I refer to Brady's article in Microwave's July 1967, as perhaps one of the finest cross reference tables of its type.

Even my editorial in the May 61 issue of the Microwave Journal showed the IEC recommendations but, they were, at that time, not finalized, and it was on this basis that I recommended the EIA system which for the U.S. as an inch country was a satisfactory alternate; but, with the world wide adoption of the IEC scheme and virtually no possibility for installing still another scheme, I should like to recommend very strongly the adoption of the IEC recommendation.

Copies of the IEC Publication are available from the American National Standard Institute, 1430 Broadway, New York, N.Y. 10018, and the following IEC Publication and their prices are listed for information of the G-MTT Members.

IEC Publication No.

153-1 (1964) Hollow Metallic Waveguide, Part I: General Requirements and Measuring Methods	\$ 3.95
153-2 (1964) Hollow Metallic Waveguides, Part II: Relevant Specifications for Ordinary Rectangular Waveguides, including Amendment 1 (C83.10-1963)	5.10
Amendment 1 (1968), sold separately	1.80
153-3 (1964) Hollow Metallic Waveguides, Part III: Relevant Specifications for Flat Rectangular Waveguides	3.30
153-4 (1964) Hollow Metallic Waveguides, Part IV: Relevant Specifications for Circular Waveguides, including Amendment 1 (C83.19-1958)	5.70
Amendment 1 (1968), sold separately	2.40
153-5 (1968) Hollow Metallic Waveguides Part V: Relevant Specifications for Rectangular Waveguides with Circular Outside Cross-Section	2.80
153-6 (1967) Hollow Metallic Waveguides, Part VI: Relevant Specifications for Medium Flat Rectangular Waveguides	3.00
154-1 (1964) Flanges for Waveguides, Part I: General Requirements and Measuring Methods	2.65
154-2 (1968) Flanges for Waveguides, Part II: Relevant Specifications for Flanges for Ordinary Rectangular Waveguides	12.00

154-3 (1968) Flanges for Waveguides, Part III: Relevant Specifications for Flanges for Flat Rectangular Waveguides	4.80
154-4 (1969) Flanges for Waveguides, Part IV: Relevant Specifications for Flanges for Flat Rectangular Waveguides	8.40

(Since ANSI and the IEC derive a substantial part of their income from the sale of standards, please do not duplicate outside of your own organization.)

Tore N. Anderson
Manager, RF Connector Products
Winchester Electronics

Mr. Tore N. Anderson, Chairman
Committee on RF Connectors

Dear Tore:

Many thanks for sending me a copy of your letter concerning standardization of waveguide band designations. The list of IEC publications dealing with the subject will be valuable to anyone interested in standardization.

Do you think that anyone is interested in standardizing on an alphabetical scheme? As you mention, such schemes are handy, and probably will not be dropped in favor of the IEC, or EIA, or other schemes. The industry was able to agree on standards for high precision coaxial connectors, although there was plenty of competition and confusion in that area. Perhaps they might agree on an alphabetical scheme for standardization of waveguide bands. At least for rectangular waveguide. If not, then I fear that the present situation will remain and your "waveguide alphabet soup" will continue to be commercially available.

R.W. Beatty, Chairman
G-MTT Standards
Coordinating Committee

R.W. Beatty, Electrical Engineer
National Bureau of Standards
Room 4065
Boulder, Colorado 80302

Thanks very much for your letter of November 25th, and your search for a possibility of using an alphabetical scheme for waveguide designation.

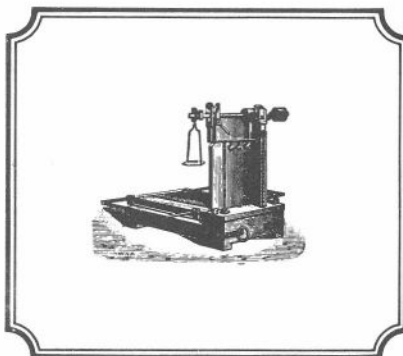
I feel, this would be very much out of order in light of the IEEE position with respect to ANSI and the IEC. So I strongly recommend the GMTT Standards Co-ordinating Committee discontinue any effort to designate waveguide on an alphabetical basis.

I do feel, however, that the use of terms such as X Band and S Band will be with us forever and that there might be some basis for an informal frequency oriented alphabetical scheme which would only be a colloquial type reference and one for which exact engineering reference would not be made.

This could also tie into the conventional nomenclature for frequency ranges such as VHF and UHF and I propose a limited number of initials L, S, C, X, and K Band being the principle initials that would be used and would designate approximate frequency bands.

If any such standard were published then I think proper reference should be made to published standards on waveguide and a clear distinction called out.

Cordially yours,
Tore N. Anderson



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