

TECHNICAL PROGRAM

1966 G-MTT INTERNATIONAL SYMPOSIUM

MAY 16 - 19, 1966

CABANA MOTOR HOTEL, PALO ALTO, CALIFORNIA

INTRODUCTORY SESSION **9:00 A.M. Monday May 16**

WELCOMING REMARKS

P. D. Lacy, Chairman, Steering Committee, 1966 International G-MTT
Microwave Symposium
E. N. Torgow, Chairman, G-MTT National Administrative Committee

SESSION I SOLID-STATE DESIGN **Monday A.M. May 16**

Chairman: L. Lewin
Standard Telecommunication Laboratories, Harlow, England

I-1	GaAs POST-THRESHOLD MICROWAVE AMPLIFIER, MIXER, AND OSCIL-	
9:20	LATOR, Basil W. Hakki, Bell Telephone Laboratories	1
I-2	QUANTITATIVE COMPARISON OF SOLID-STATE MICROWAVE DETECTORS,	
9:40	A.M. Cowley and H.O. Sorensen, hp Associates	7
I-3	ULTIMATE NOISE FIGURE AND CONVERSION LOSS OF THE SCHOTTKY	
10:00	BARRIER MIXER DIODE, M.R. Barber and R.M. Ryder, Bell Telephone	
	Laboratories	13
I-4	SOME SELECTED TOPICS IN BRITISH SOLID-STATE RESEARCH, L. Lewin,	
10:50	Standard Telecommunication Laboratories (Invited)	18
10:20	COFFEE BREAK	
I-5	IMPROVED INTERMODULATION REJECTION IN MIXERS, J. H. Lepoff and	
11:20	A.M. Cowley, hp Associates	19
I-6	PERFORMANCE CHARACTERISTICS OF CW SILICON AND GaAs AVALANCHE	
11:40	DIODE OSCILLATORS, F.A. Brand, V.J. Higgins, and J.J. Baranowski, Electronic Components Laboratory, U.S. Army Electronics Command	23

SYMPOSIUM LUNCHEON **12:15 - 1:45 P.M.**

KEYNOTE ADDRESS

Dr. Hubert Heffner, Associate Provost for Research, Stanford University

SESSION II**Monday P.M. May 16****AMPLIFIERS, MULTIPLIERS, AND CONVERTERS**

Chairman: Carl Blake
Lincoln Laboratories, Lexington, Mass.

II-1	MICROWAVE SOLID-STATE SOURCES, B. C. De Loach, Bell Telephone	
2:00	Laboratories (Invited)	28
II-2	INSTABILITIES IN VARACTOR MULTIPLIERS, D. B. Leeson, Applied	
2:45	Technology, Inc.	30
II-3	THEORY AND MEASUREMENTS OF NOISE IN VARACTOR HARMONIC	35
3:05	GENERATOR SOURCES, M. E. Hines and J. G. Ondria, Microwave Associates	
3:25	COFFEE BREAK	
II-4	PRACTICAL APPLICATION OF A POSITIVE RESISTANCE UP-CONVERTER	
3:55	FOR ULTRA-LOW-NOISE AMPLIFICATION, E. Sard, B. Peyton, and	
	S. Okwit, Airborne Instruments Laboratory	41
II-5	A 1200 MEGABITS / SEC, GRAY CODE, ANALOG TO DIGITAL CONVERTER,	
4:15	R. E. Fisher, Bell Telephone Laboratories	46
II-6	BROADBAND FREQUENCY TRANSLATORS, F. S. Coale, H. M. Weil, and	
4:35	P. M. La Tourrette, Melabs	52
II-7	INJECTION-LOCKED OSCILLATORS AS AMPLIFIERS FOR ANGLE-	60
4:55	MODULATED SIGNALS, H. L. Stover and R. C. Shaw, Bell Telephone Labs	

SESSION III**Monday Evening May 16****LINEAR PARTICLE ACCELERATORS**

Chairman: W. K. H. Panofsky
Stanford Linear Accelerator Center

III-1	THE RF DRIVE SYSTEM FOR THE STANFORD TWO-MILE LINEAR	67
7:30	ACCELERATOR, G. A. Loew, Stanford Linear Accelerator Center (Invited)	
III-2	MICROWAVE APPLICATIONS OF SUPERCONDUCTIVITY, Perry B. Wilson,	
8:15	Hansen Laboratories, Stanford University (Invited)	69
III-3	ACCURATE PHASE LENGTH MEASUREMENTS OF LARGE MICROWAVE	
9:00	NETWORKS, J. N. Weaver and R. Alvarez, Stanford Linear Accelerator	76

SESSION IV

Tuesday A.M. May 17

FILTERS AND COUPLERS

Chairman: S. B. Cohn
Rantec Corp., Calabasas, California

IV-1	SYNTHESIS OF DISTRIBUTED ELLIPTIC-FUNCTION FILTERS FROM LUMPED-CONSTANT PROTOTYPES, R. Levy and I. Whiteley, Leeds University (Invited)	83
9:00		
IV-2	THE FIELD DISPLACEMENT FILTER -- A NEW FAMILY OF DISSIPATIVE WAVEGUIDE FILTERS, Nikolai Eberhardt, Lehigh University	90
9:45		
IV-3	THEORETICAL AND PRACTICAL APPLICATIONS OF CAPACITANCE MATRIX TRANSFORMATIONS TO TEM NETWORK DESIGN, R.J.Wenzel, Bendix Research Laboratories	94
10:05		
10:25	COFFEE BREAK	
IV-4	OPTIMAL DESIGN OF MATCHING NETWORKS FOR MICROWAVE TRANS-ISTOR AMPLIFIERS, F.E. Emery, M.O'Hagen, and S.D. Nolte, Texas Instruments	101
10:55		
IV-5	FILTER REQUIREMENTS FOR NANOSECOND DIODE SWITCHING, R.V. Garver and T.H. Mak, Harry Diamond Laboratories	108
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IV-6	COUPLED-TRANSMISSION-LINE DIRECTIONAL COUPLERS WITH COUPLED LINES OF UNEQUAL CHARACTERISTIC IMPEDANCES, E.G. Cristal, Stanford Research Institute	114
11:35		
IV-7	THE DESIGN AND CONSTRUCTION OF BROADBAND, HIGH-DIRECTIVITY 90° COUPLERS USING NON-UNIFORM LINE TECHNIQUES, C.P. Tresselt, Bendix Research Laboratories	120
11:55		

SESSION V

Tuesday P.M. May 17

INTEGRATED CIRCUITS

Chairman: I. H. Solt
Fairchild Semiconductor, Mountain View, California

V-1	SURVEY OF INTEGRATED CIRCUITS WITH IMPLICATIONS FOR MICRO-WAVES, R. L. Pritchard, Stanford University (Invited)	126
2:00		
V-2	CERAMIC MICROSTRIP FOR MICROWAVE HYBRID INTEGRATED CIRCUITRY, B.T. Vincent, Jr., Texas Instruments	128
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V-3	INTEGRATED MICROWAVE TUNNEL DIODE DEVICE, H. C. Okean, Bell Telephone Laboratories	135
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3:15	COFFEE BREAK	

V-4	INTEGRATED MICROWAVE CONTROL DEVICES, W. J. Moroney and	
3:45	A. Botka, Microwave Associates, Inc.	142
V-5	A LOW-LOSS 1-NANOSECOND 1-WATT X-BAND SWITCH, R. W. Dawson	
4:00	and B. C. De Loach, Bell Telephone Laboratories	146
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4:15	Microwave Associates, Inc.	151

SESSION VI

Tuesday Evening May 17

MICROWAVES ABROAD

Chairman: W. W. Mumford
 Bell Telephone Laboratories, Whippny, New Jersey

VI-1	GUIDED-WAVE RESEARCH IN BRITISH UNIVERSITIES, P. J. B. Clarri-	
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	B. Yazgan, Glasgow University, Scotland (Invited)	158
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9:15	WESTERN EUROPE, M. M. Brady, Aksjeselskapet NERA, Norway	
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SESSION VII

Wednesday A.M. May 18

ULTRAMICROWAVE AND OPTICAL TECHNIQUES

Chairman: A. Gardner Fox
 Bell Telephone Laboratories, Holmdel, New Jersey

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	GUIDES, T. Nakahara, Sumitomo Electric Ind., Japan (Invited)	164
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	Polytechnic Institute of Brooklyn	179
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11:45	Y. Suematsu, K. Iga, and S. Ito, Tokyo Institute of Technology, Japan	184

SESSION VIII

Wednesday P.M. May 18

MICROWAVE TECHNIQUES

Chairman: R. W. Beatty
 National Bureau of Standards, Boulder, Colorado

VIII-1	ELECTROMAGNETIC MOMENTUM AS A TOOL IN MICROWAVE	
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2:45	HIGH QUALITY VARACTOR DIODES, G. D. Vendelin and S. A. Robinson,	
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3:00	OF ELECTRON DENSITY AND RELAXATION TIME, S. Lederman and	
	E. F. Dawson, Polytechnic Institute of Brooklyn	202
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4:30	RATE OF HIGH TEMPERATURE GASES IN A SHOCK TUBE, J. B. Chown,	
	W. C. Taylor, and T. Morita, Stanford Research Institute	210
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4:45	CAVITY, R. E. Post and A. G. Potter, Iowa State University	214

SYMPORIUM BANQUET

Wednesday Evening May 18

7:00 - 10:00 P.M.

1965 IEEE G-MTT MICROWAVE PRIZE

Hendrik Bosma

Philips Research Laboratories, Eindhoven, Netherlands

BANQUET SPEAKER

Prof. John Brown, University College, London, England

"Technical Education in Developing Countries"

SESSION IX

Thursday A.M. May 19

FERRITE PHASE SHIFTERS

Chairman: Max Weiss

Aerospace Corporation, El Segundo, California

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IX-1	A FAST FERRITE MILLIMETER LATCHING SWITCH, R. A. Stern and 9:00 J. P. Agrios, Electronic Components Lab, U.S. Army Electronics Command	219
IX-2	CIRCULARLY POLARIZED PHASE SHIFTER FOR USE IN PHASED ARRAY 9:15 ANTENNAS, M. C. Mohr and S. Monaghan, Raytheon Company	224
IX-3	A SLOW WAVE DIGITAL FERRITE STRIP TRANSMISSION LINE PHASE 9:30 SHIFTER, R. R. Jones, Westinghouse	230
IX-4	A MINIATURIZED C-BAND DIGITAL LATCHING PHASE SHIFTER, 9:45 J. K. Parks, B. R. Savage, L. J. Lavedan, and J. Brown, Jr., Sperry Microwave Electronics Company	235
IX-5	A RECIPROCAL TEM LATCHING FERRITE PHASE SHIFTER, J. W. Simon, 10:00 W. K. Alverson, and J. E. Pippin, Scientific-Atlanta, Inc.	241
10:15	COFFEE BREAK	
IX-6	MICROWAVE FERRITES FOR PHASE SHIFTING APPLICATIONS, 10:45 J. J. Green, Raytheon Research Division (Invited)	248
IX-7	A COUPLED-MODE DESCRIPTION OF THE REGGIA-SPENCER PHASE 11:30 SHIFTER, C. R. Boyd, Rantec Corp.	250
IX-8	RECIPROCAL LATCHING FERRITE PHASE SHIFTER, E. Schlomann, 11:45 M. Harris, and J. J. Green, Raytheon Research Division	256

SESSION X**Thursday P.M. May 19****FERRITE CIRCULATORS AND SWITCHES**

Chairman: Perry Vartanian
Melabs, Palo Alto, California

X-1	THEORETICAL ASPECTS OF 3-PORT JUNCTION CIRCULATORS,	
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3:45	10 MICROSECOND; TEMPERATURE-STABLE, F. Betts, D. H. Temme,	
	and J. A. Weiss, M.I.T. Lincoln Laboratories	275
X-5	THEORETICAL DESIGN OF STATIC AND LATCHING FERRITE 3-PORT	
4:00	AND 4-PORT SYMMETRICAL WAVEGUIDE CIRCULATORS, L. E. Davis,	
	Rice University	281
X-6	THE FOUR-PORT SINGLE JUNCTION CIRCULATOR IN STRIP LINE,	
4:15	C. E. Fay and W. A. Dean, Bell Telephone Laboratories	286
X-7	ANALYSIS OF A GROUNDED JUNCTION CIRCULATOR, M. Omori,	
4:30	Bell Telephone Laboratories	291

The Steering Committee of the 1966 G-MTT International Symposium and the Administrative Committee of the G-MTT wish to express their sincere appreciation to the U. S. Army Research Office and to the Office of Naval Research for funding travel expenses of several of the invited speakers from universities abroad, and thus contributing greatly to the success of the Symposium. They are also grateful to those agencies and companies in other countries who have provided generous financial assistance that has enabled other invited speakers to participate in the Symposium.