

1987 MTT Symposium Digest

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Ziegfeld Room: Opening Ceremony

8:30 a.m. – 10:00 a.m. Tuesday, June 9, 1987

Welcome

Mr. Steve March
Dr. Dave McQuiddy
Dr. Rey Kagiwada

Keynote Address

Mr. Les Besser

Session B

Ziegfeld Room: Joint with Monolithics Symposium – Non-Linear and Power Circuits

10:30 a.m. to Noon Tuesday, June 9, 1987

Chairman D R Chen, Microwave Monolithics, Inc
Co-Chairman Z J Lemnios, Ford Microelectronics, Inc

B-1 Nonlinear Modeling for MMICs (Invited)

10:30 a.m. Don Estreich
Hewlett-Packard, Microwave Technology Division,
Santa Rosa, CA

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M C Horton
MCH Associates
Thousand Oaks, CA

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T. Nishikawa, K. Wakino, K. Tsunoda, Y. Ishikawa
Murata Manufacturing Co., Ltd
Kyoto, Japan

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Y. Kobayashi, and K. Kubo
Department of Electrical Engineering
Saitama University
Urawa, Saitama, Japan

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K A Zaki and C Chen
Electrical Engineering Department
University of Maryland
College Park, MD
A E Atia
Comsat Corporation,
950 L'Enfant Plaza S W
Washington, DC

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R R Bonetti and A E Williams
Comsat Laboratories
Clarksburg, MD

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C I Mobbis
Filtromic Components, Ltd
Shipley, UK

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T. Kawai, and F. J. Rosenbaum
Washington University,
St. Louis, MO

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M. A. Khatibzadeh, R. J. Trew and I. J. Bahl*
Electrical and Computer Engineering Department
North Carolina State Univ
Raleigh, NC
*ITT-GTC, Roanoke, VA

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C. Guo*, M. Caminade**, D. Rousset*, A. Cessey**, J. Obregon*,
and A. Bert**
*IRCOM Université de Limoges, France
**Thomson Composants DHM, Massy, France

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MESFET Amplifier: Simulation and Experiment
G W Rhyne and M B Steer
Department of Electrical and Computer Engineering
North Carolina State University,
Raleigh, NC

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M. Gayral, E. Noyola, R. Quere, J. Rousset, J. Obregon
Université de Limoges, France

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I. Wolff
Dept of Elect. Engr
Duisburg University, FRG
and H. Kapusta, Siemens AG, Munchen, FRG

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Ziegfeld Room: Joint with Monolithics Symposium

– Low Noise Techniques Tuesday, June 9, 1987

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Co-Chairman S. Moghe, Pacific Monolithics

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C. Nishimoto, R. LaRue, S. Bandy, N. Day, J. Eckstein, C. Webb,
C. Yuen, and G. Zdzisuk
Varian Research Center,
Palo Alto, CA

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K. G. Wang and S. K. Wang
Hughes Aircraft Company
Torrance, CA

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Avantek, Inc
Santa Clara, CA

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P. Jean, V. Pauker, and P. Dautriche
Laboratoires D'Electronique Et De Physique Appliquée
Limeil-Brevannes, France

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Chairman C. Buntschuh, Narda Microwave

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S. Fieduszko
Ford Aerospace and Communications Co
Western Development Laboratories
Palo Alto, CA

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Ziegfeld Room: MMW Technology and Applications
8:30 a.m. to 10:00 a.m. Wednesday, June 10, 1987

Chairman J Horton, TRW

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Gable 5, 6, 7 Room: Microwave Measurements
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Chairman H George Oltman, Jr, Tecom Industries

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Gable 3, 4 Room: Communications Systems

Wednesday, June 10, 1987

Chairman Peter G Petrelis, TRW

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Session N

Ziegfeld Room: – Focused Session – Advances in Millimeter Wave Systems (60-230 GHz)

10:30 a.m. to Noon Wednesday, June 10, 1987

Chairman James C Wiltse, Georgia Tech Research Institute

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Chairman Stephen F Adam, Adam Microwave Consulting, Inc

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O-3 11:10 a.m.	A New Automated Noise and Gain Parameter Measurement System V A Hirsch and T H Miers Ball Aerospace Systems Division Boulder, CO	517	Q-9 Fast Settling, Low Noise Ku Band Fundamental Bipolar VCO A P S Khanna Avantek, Inc Santa Clara, CA	579
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			Q-12 Microwave Resistance of Gallium Arsenide and Silicon P-I-N Diodes R Caverly Southeastern Mass University N Dartmouth, MA and G Hiller M/A-COM Semiconductor Products Burlington, MA	591

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P-3 11:10 a.m.	Self Adaptive Bandpass Filters with Applications to 'Frequency Set-On' Oscillators J D Rhodes Filtromic Components Ltd Charlestown, UK	539	Q-15 Wide-Band True Time Delay Phase Shifter Device P R Herczfeld, A Daryoush Drexel University, Philadelphia, PA M Kiehl Thomas & Betts, Raritan, NJ S Siegel RCA, David Sarnoff Lab, Princeton, NJ and R Soref RADC/ESO Hanscom AFB, MA	603
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Session Q

Garland Ballroom: Open Forum II

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Q-1	Multioctave Multithrow Active Switches D L Dunn, P G Asher, and C D Chang Hughes Aircraft Company Torrance, CA	549	Q-17 Filled Image Guide for Millimeter-Wave Circuits M Q Shu and D H Jiang Peking University Beijing, People's Republic of China	611
Q-2	A Comparative Study of TEGFET and MESFET Large Signal Characteristics and Saturation Mechanisms M Weiss Thomson Semiconductors, Orsay, France and D Pavlidis University of Michigan, Ann Arbor, MI	553	Q-18 A Tunable Grating Impedance Transformer J D Xu Northwestern Polytechnical University Xian Shaanxi, China	*
Q-3	Comparative Study of Phase Noise in HEMT and MESFET Microwave Oscillators M Pouyssegur LAAS du CNRS, Toulouse, France J Gratfeul, J F Sautereau Université Paul Sabatier, Toulouse, France and J P Fortea Centre Nat D Etudes Spatiales, Toulouse, France	557	Q-19 A Novel Technique for Evaluation and Integration of Connectorless (Drop-In) Microwave Components D Herstern General Microwave Corporation Amityville, NY	613
Q-4	A GaAs Monolithic 6 GHz Low-Noise Amplifier for Satellite Receivers R Mott COMSAT Laboratories Clarksburg, MD	561	Q-20 Coupling Between Hybrid Mode Dielectric Resonators K A Zaki and C M Chen Electrical Engineering Department University of Maryland College Park, MD	617
Q-5	Miniature Gain Block for Satellite Communication Transceivers A Fahy, R Brown and E Belohoubek RCA Laboratories Princeton, NJ	565	Q-21 Exact Calculation of Scattering Parameters of the Coplanar - Slot Transition in a Unilateral Finline Technology O Pilon, J P Lefevre, V F Hanna CNET, Issy-Les-Moulineaux, France and J Citerne Laboratoires Structures Rayonnantes, Rennes Cedex, France	621
Q-6	A GaAs Microwave MESFET with Extremely Low Distortion G G Zhou, T. Curtis and R Chen Gould Inc Microwave Products Division San Jose, CA	569	Q-22 Analysis of VLSI Interconnect Structures L Carn, Q Xu, and K J Webb University of Maryland College Park, MD and J A McClintock Martin Marietta Labs Baltimore, MD	625
Q-7	The Deformable-Channel Model-A New Approach to High-Frequency MESFET Modeling F Crowne, A Eskandarian, H B Sequeira and R Jahkete Martin Marietta Laboratories, Gamma Monolithics Baltimore, MD	573	Q-23 Towards a Unified Efficient Algorithm for Characterizing The Planar Periodic Waveguides K Wu and P Saguet Laboratoire D'Electromagnetisme Et Optique Guidée E N S R G Grenoble, France	629
Q-8	Lead-Line Analysis in the Frequency Domain with Distributed Amplifier Design Examples M L Salib, D E Dawson, and H K Hahn Westinghouse Electric Corp Baltimore, MD	575	Q-24 Centering and Tolerancing the Components of Microwave Amplifiers A MacFarland, J Purvisance Department of Electrical Engineering University of Idaho Moscow, Idaho and D Loescher, K Diegert, and T Ferguson Sandia National Laboratories Albuquerque, NM	633

Q-25	Analysis of Discontinuities in Optical Waveguides J B Davies and B M A Rahman University College London, UK	637	Q-41	Computer Aided Design Models for Unilateral Finlines with Finite Metallization Thickness and Arbitrarily Located Slot Widths P Pramanick, R R Mansour COM DEV Ltd. Cambridge, Canada and R H. MacPhie University of Waterloo Ontario, Canada	703
Q-26	Optical Crosstalk Due to Electrical Coupling in High Speed LINb03 P Perlmutter, J E Baran and Y Silberberg Bell Communications Research Red Bank, NJ	641	Q-42	Puff, an Interactive Microwave Computer Aided Design Program for Personal Computers R C Compton W L Williams, and D B Rutledge Division of Engineering and Applied Science California Institute of Technology Pasadena, CA	707
Q-27	Optoelectronic Generation and Sensing of Millimeter Waves A P DeFonzo and C. Lutz University of Massachusetts Amherst, MA	645	Q-43	An Automatic Decomposition Technique for Device Modeling and Large Circuit Design J W Bandler and Q J Zhang Electrical Engineering Department McMaster University Hamilton Canada	709
Q-28	Generation of Kilowatt/Kilovolt Broadband Microwave Bursts with a Single Picosecond Photoconductive Switch H A Saydian, M G Li and C H Lee University of Maryland College Park, MD	649	Q-44	Modeling the Dispersion in a Suspended Microstripline R S Tomar Bolteq Technologies, Inc Carleton Place, Ontario, Canada and A S Dayoush and P R Herczfeld Drexel University Philadelphia, PA	713
Q-29	Large Signal Modulation of Semiconductor Lasers with Optical Feedback for Millimeter Wave Applications V M Contarino Naval Air Development Center Warminster, PA and A S Dayoush and P R Herczfeld Drexel University Philadelphia, PA	653	Q-45	An Almost-Periodic Fourier Transform for Use with Harmonic Balance K S Kundert, G Sorkin and A Sangiovanni-Vincentelli University of California Berkeley, CA	717
Q-30	Optically Controlled Millimeter Wave Phase Shifter in a Metallic Waveguide G Hadjicostas and J Butler Southern Methodist University Dallas, TX and M Scott LTV Aerospace & Def Co Dallas, TX	657	Q-46	Generalized Analysis of E-Plane Septa Discontinuities A Rong, S Li Nanjing Institute of Technology Nanjing, China	721
Q-31	A New Generalised Approach to the Design of Microwave Oscillators Y Xuan and C M Snowden Department of Electrical & Electronic Engineering University of Leeds Leeds, UK	661	Session R Table 5, 6, 7 Room: Guided Waves 1:30 p.m. to 3:00 p.m. Wednesday, June 10, 1987		
Q-32	A Refractory Self-Aligned Gate Process for Monolithically Combined Microwave and Digital GaAs ICs A Geissberger, R Sadler, E Griffin, H Singh, I Bahl and M Drnkwine ITT Gallium Arsenide Technology Center Roanoke, VA	665	R-1 1:30 p.m.	Simple Analytic Formulas for Dielectric Waveguides S T Peng New York Institute of Technology Old Westbury, NY	727
Q-33	Analysis of Multiple-Step Radial-Resonator Waveguide Diode Mounts with Application to IMPATT Oscillator Circuits B D Bates Department of Electrical and Electronic Engineering University of Melbourne Australia	669	R-2 1:50 p.m.	Guidance and Leakage Properties of Offset Groove Guide H Shigesawa, M Tsujii Doshisha University Kyoto, Japan	731
Q-34	Absorbed Power Distribution in Heart Lung System Due to Microwave Irradiation at 750 MHz J Behari School of Environmental Sciences Jawaharlal Nehru University New Delhi, India	673	R-3 2:10 p.m.	A A Oliver Polytechnic University Brooklyn, NY	735
Q-35	Dielectric-Resonator-Stabilized Second Harmonic Ka-Band Microstrip Gunn Oscillator S Zhong-Liang and C Ning Department of Radio Engineering Nanjing Institute of Technology Nanjing, China	677	R-4 2:30 p.m.	P Lampareillo, F Frezza University of Rome "La Sapienza" Rome, Italy	739
Q-36	Edge Corrections for Microstrip Planar Analysis Models H A Burger Goodyear Aerospace Corporation Litchfield Park, AZ	681	R-5 2:50 p.m.	Analysis and Design of Microslab™ Waveguide B Young and T Itoh University of Texas Austin, TX	743
Q-37	Characterization Method and Simple Design Formulas of MCS Lines Proposed for MMICs E Yamashita, K R Li, E Kaneko, and Y Suzuki University of Electro-Communications Tokyo, Japan	685	Session S Ziegfeld Room: - Focused Session - Advances in Millimeter Wave Technology (60-230 GHz) 1:30 p.m. to 3:00 p.m. Wednesday, June 10, 1987		
Q-38	Global Stability Analysis of Microwave Circuits by a Frequency-Domain Approach V Rizzoli Department Di Electronica University of Bologna Bologna, Italy A Neri Fondazione Ugo Bordoni Bologna, Italy	689	S-1 (Invited) 1:30 p.m.	Analysis of Double-Layered Finlines Containing a Magnetized Ferrite M Geshiro On Leave From Ehime University, Ehime, Japan and T Itoh University of Texas Austin, TX	747
Q-39	Analysis Equations for Shielded Suspended Substrate Microstrip Line and Broadside-Coupled Stripline Y Shu, X Qi, Y Wang Department of Radio Engineering Nanjing Institute of Technology Nanjing, China	693	Chairman James C Wiltse, Georgia Tech Research Institute		
Q-40	The Effectiveness of Four Direct Search Optimization Algorithms R W Rhea Scientific Atlanta, Inc. Atlanta, GA	697	Millimeter Wave Material Properties and Measurements G J Simons U S Army Harry Diamond Laboratories Adelphi, MD		

S-2 (Invited) 1:50 p.m.	Advances in HEMT Technology and Applications P M. Smith, P C. Chao, K H G. Duh, L F. Lester B R. Lee and J M. Ballingall General Electric Co Syracuse, NY	749	V-2 3:50 p.m.	Evolution of SAW Technology from Discrete Devices to Functional RF Building Blocks H G. Vollers and D L. Ash RF Monolithics Dallas, TX	793
S-3 (Invited) 2:10 p.m.	Imaging Antenna Arrays D. Rutledge California Institute of Technology Pasadena, CA	*	V-3 4:10 p.m.	Miniature SAW Antenna Duplexer for Portable Telephone M. Hikita, Y. Ishica, T. Tabuchi and H. Kojima Central Research Laboratory Hitachi, Ltd Tokyo, Japan and K. Kurosawa Hitachi Toukai Works Katsuta, Japan	797
S-4 (Invited) 2:30 p.m.	GaAs Schottky Barrier Diodes for High Sensitivity Millimeter and Submillimeter Wavelength Receivers T W. Crowe and R J. Mattauch University of Virginia Charlottesville, VA	753	V-4 4:20 p.m.	Design and Evaluation of UHF Monolithic Film Resonator-Stabilized Oscillators and Bandpass Filters M M. Driscoll, R A. Moore, J F. Rosenbaum Westinghouse Defense and Electronics Center Baltimore, MD and S V. Krishnaswami, and J R. Szedon Westinghouse Research and Development Center Pittsburgh, PA	801

Session T

Ziefeld Room: Invited European Session

3:30 p.m. to 5:00 p.m. Wednesday, June 10, 1987

	Chairman R. Sparks, Raytheon		V-5 4:40 p.m.	Performance of Acoustic Charge Transport Chirp Filters F. Fiegel, R. Martin, and F. Guedin Electronic Decisions, Inc Urbana, IL	805
T-1 (Invited) 3:30 p.m.	Detection of Millimeter and Submillimeter Waves E. Kolberg Chalmers University of Technology Gothenburg, Sweden	759			
T-2 (Invited) 4:00 p.m.	State-of-the-Art of MMIC Technology and Design in West Germany E. Pettenpaul Siemens AG Munich, West Germany	763			
T-3 (Invited) 4:30 p.m.	Modeling of New Microwave Devices G. Salmer Université de Lille France	767			

Session U

Gable 5, 6, 7 Room: Waveguide Discontinuity Structures

3:30 p.m. to 5:00 p.m. Wednesday, June 10, 1987

	Chairman James W. Mink, U S Army Research Office				
U-1 3:30 p.m.	A Dynamic Model for Microstrip - Slotline Transition and Related Structures H -Y. Yang and N G. Alexopoulos Electrical Engineering Department University of California Los Angeles, CA	773	W-1 (Invited) 8:30 a.m.	Optical Generation and Control of Microwaves and Millimeter-Waves C H. Lee Department of Electrical Engineering University of Maryland College Park, MD	811
U-2 3:50 p.m.	Characterization of stripline Crossing by Transverse Resonance Analysis T. Uwano Matsushita Electric Co Osaka, Japan R. Sorrentino University of Rome Tor Vergata Roma, Italy and T. Itoh University of Texas Austin, TX	777	W-2 9:00 a.m.	Microwave Performance of an Optically Controlled AlGaAs/GaAs High Electron Mobility Transistor and GaAs MESFET R N. Simons NRC-NASA Research Associate Cleveland, OH and K. B. Bhasin NASA Lewis Research Center Cleveland, OH	815
U-3 4:10 p.m.	An Improved Multimode Small Aperture/Obstacle Theory M. Guglielmi and A A. Oliner Polytechnic University Brooklyn, NY	781	W-3 9:20 a.m.	A High-Speed Phase Shifter Based on Optical Injection L. R. Brothers and C H. Cox, III MIT Lincoln Laboratory Lexington, MA	819
U-4 4:30 p.m.	An Accurate Analysis of Discontinuities in Dielectric Rectangular Waveguide and its Application to Grating Filters M. Tsuji and H. Shigesawa Department of Electronics Doshisha University Kyoto, Japan	785	W-4 9:40 a.m.	Phase and Frequency Coherency of Multiple Optically Synchronized 20 GHz FET Oscillators For Satellite Communications A S. Daryoush, P R. Herzfeld, R. Glatz Department of Electrical and Computer Engineering Drexel University, Philadelphia, PA and A P S. Khanna Avantek, Santa Clara, CA	823
U-5 4:50 p.m.	Variational Bound Analysis of a Discontinuity in Nonradiative Dielectric Waveguide J C. Olivier and J A G. Malherbe University of Pretoria South Africa	789			

Session V

Gable 3, 4 Room: Microwave Acoustics: Developments & Applications

3:30 p.m. to 5:00 p.m. Wednesday, June 10, 1987

	Chairman Ted Lukaszek, U S Army Labcom				
V-1 3:30 p.m.	Applications of Custom SAW Devices Ronald C. Rosenfeld Sawtek Inc Orlando, FL	*	X-1 8:30 a.m.	Design and Performance of a New Multi Octave High-Gain Amplifier K B. Niclas, R R. Pereira, A J. Graven and A P. Chang Watkins Johnson Company Palo Alto, CA	829
			X-2 8:50 a.m.	A High Performance, Quasi-Monolithic 2-18GHz Distributed GaAs FET Amplifier A. Cappello, T. Alexander, J. Calviello, D. Ward, P. Bié and R. Poman Eaton Corporation/AIL Division Melville, NY	833
			X-3 9:00 a.m.	Operating Characteristics of 2-8 GHz GaAs MESFET Amplifiers at Elevated Case Temperatures to 200 Degrees Centigrade E J. Czyczcz, Jr., J A. Thompson, T R. Krueger and M E. Kretschmar Watkins-Johnson Co Palo Alto, CA	837
			X-4 9:20 a.m.	A 6-18 GHz MMIC Power Amplifier Module Designed for Automated Assembly Fabrication* C A. Sapashe, D L. Green, C D. Palmer, and J S. Pavio Texas Instruments Dallas, TX	841

X-5 9:30 a.m.	A 6 Watt Power GaAs FET for 14.0-14.5 GHz Band Y Kadowaki, S Igi, M Wataze, T Sonoda, K Hayashi, M Yamanouchi, S Takamiya and S Mitsui Mitsubishi Electric Corporation Hoyogo, Japan	845	AA-2 10:50 a.m.	A Monolithic Double Balanced Single Sideband Modulator S D Thompson and A M Pavio Texas Instruments, Inc Dallas, TX	899
X-6 9:40 a.m.	K- and Ka-Band High Efficiency Amplifier Modules Using GaAs Power FETs D Bachtie, J Klatskin, G Taylor, M Eron, S G Liu, R Camisa and H Dudley David Sarnoff Research Center Princeton, NJ	849	AA-3 11:10 a.m.	Passive GaAs FET Switch Models and their Application in Phase Shifters L C Upadhyayula, R L Camisa, G. Taylor, S N Subbarao and S G Liu RCA Laboratories Princeton, NJ	903
			AA-4 11:20 a.m.	A Non-Linear Design and Optimization Procedure for GaAs MESFET Oscillators T J Brazil and J O Scanlan Department of Electrical Engineering University College Dublin, Ireland	907
			AA-5 11:40 a.m.	High Performance GaAs C-Band and Ku-Band MMIC Oscillators S Moghe and T Holden Pacific Monolithics, Inc Sunnyvale, CA	911

Session Y

Gable 5, 6, 7 Room: Solid State Devices/Circuits I

8:30 a.m. to 10:00 a.m. Thursday, June 11, 1987

Chairman Michael Dydyk, Motorola

Y-1 8:30 a.m.	Silicon Bipolar MMIC for Frequency-Conversion Application up to 20 GHz L Kipnis Avantek, Inc Santa Clara, CA	855			
Y-2 8:50 a.m.	Frequency Stability of L-Band Two-Port Dielectric Resonator Oscillators M Loboda, T E Parker, and G K. Montress Raytheon Research Division Lexington, MA	859	BB-1 10:30 a.m.	Multi-Watt Power Generation at Millimeter-Wave Frequencies Using Epitaxially-Stacked Varactor Diodes P W Staeker, M E Hines, F Occhiali and J F Cushman M/A Com Inc Burlington, MA	917
Y-3 9:10 a.m.	Solid State MM-Wave Oscillators with Large Tuning Range K Jacobs, and B Vowinkel University of Cologne West Germany	863	BB-2 10:50 a.m.	A New Reversible Varactor Frequency Halver/Double Device Z Nativ Rafael State of Israel Armament Development Authority Haifa, Israel	921
Y-4 9:20 a.m.	Varactor-Tuned Microstrip Ring Resonators K Chang, S Martin, and F Wang Department of Electrical Engineering Texas A & M University College Station, TX	867	BB-3 11:10 a.m.	Measurements and Modeling of Kinetic Inductance Microstrip Delay Lines J M Pond, J H Claes and W L Carter Naval Research Laboratory Washington, DC	925
Y-5 9:40 a.m.	A Multi-Diode Cavity Power Combiner Using State-of-the-Art Pulsed Gunn Diodes B E Sigmund Motorola Government Electronics Group Tempe, AZ and M Ayyagari MA/COM Semiconductor Burlington, MA	871	BB-4 11:30 a.m.	A 100 GHz SIS Quasiparticle Mixer with 10 DB Coupled Gain A V Rasanen, D C Crete, P L Richards and F L Lloyd* Department of Physics University of California Berkeley, CA *National Bureau of Standards Boulder, CO	929

Session Z

Gable 3, 4 Room: - Focused Session -

Optical Techniques for Microwave Applications II

10:30 a.m. to Noon Thursday, June 11, 1987

Chairman N R Dietrich, AT&T Labs

Z-1 (Invited) 10:30 a.m.	Microwave Measurements of GaAs Integrated Circuits Using Electrooptic Sampling K J Weingarten, R Majdy-Aky, M J W Rodwell, D M Bloom and B A Auld Stanford University Stanford, CA	877			
Z-2 11:00 a.m.	Picosecond Reflectometry Technique for On-Chip Characterization of Millimeter-Wave Semiconductor Devices C Rauscher Naval Research Laboratory Washington, DC	881	CC-2 1:50 p.m.	A 35 GHz Electronically Steered Line Array R J Lang and B J Edward General Electric Company Syracuse, NY	937
Z-3 11:20 a.m.	Direct Fiber Optic Transmission of a Wideband Multi-Carrier, Microwave Signal Spectrum to and from Satellite Earth Station Antennas J W Carlin, J E Bowers, A C Chrapko and S Boopathi AT&T-Bell Laboratories Holmdel, NJ	885	CC-3 2:10 p.m.	An Ultraminiature 5-10 GHz, 2 Watt Transmit Module for Active Aperture Application J Pierro and R Clouse Eaton Corp / AIL Division Melville, NY	941
Z-4 11:40 a.m.	Optical Feedback on Linearity Performance of 1.3 μ m DFB and Multimode Lasers Under Deep Microwave Modulation W I Way and M M Choy Bell Communications Research Red Bank, NJ	889	CC-4 2:30 p.m.	Microstrip FED Planar Frequency Multiplying Space Combiner S Nam, T Uwano, and T Itoh Department of Electrical and Computer Engineering University of Texas Austin, TX	945

Session AA

Ziegfeld Room: Non-Linear FET Applications

10:30 a.m. to Noon Thursday, June 11, 1987

Chairman E C Nienhke, Westinghouse Electric Corp

AA-1 10:30 a.m.	A GaAs MESFET Balanced Mixer with Very Low Intermodulation Stephen A Maas The Aerospace Corp Los Angeles, CA	895			
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Session BB

Gable 5, 6, 7 Room: Solid State Devices/Circuits II

10:30 a.m. to Noon Thursday, June 11, 1987

Chairman Clifford Krown, Naval Research Lab

BB-1 10:30 a.m.	Multi-Watt Power Generation at Millimeter-Wave Frequencies Using Epitaxially-Stacked Varactor Diodes P W Staeker, M E Hines, F Occhiali and J F Cushman M/A Com Inc Burlington, MA	917
BB-2 10:50 a.m.	A New Reversible Varactor Frequency Halver/Double Device Z Nativ Rafael State of Israel Armament Development Authority Haifa, Israel	921
BB-3 11:10 a.m.	Measurements and Modeling of Kinetic Inductance Microstrip Delay Lines J M Pond, J H Claes and W L Carter Naval Research Laboratory Washington, DC	925
BB-4 11:30 a.m.	A 100 GHz SIS Quasiparticle Mixer with 10 DB Coupled Gain A V Rasanen, D C Crete, P L Richards and F L Lloyd* Department of Physics University of California Berkeley, CA *National Bureau of Standards Boulder, CO	929

Session CC

Gable 3, 4 Room: Phased and Active Array Techniques

1:30 p.m. to 3:00 p.m. Thursday, June 11, 1987

Chairman Eugene H Gregory, Hughes Aircraft Co

CC-1 1:30 p.m.	A 2 Watt GaAs TX/RX Module with Integral Control Circuitry, For S-Band Phased Array Radars C R Green, A A Lane, P N Tombs, R Shukla, P D Cooper J R Suffolk, and J A Sparrow Plessey Research Caswell Ltd Caswell, UK	933
CC-2 1:50 p.m.	A 35 GHz Electronically Steered Line Array R J Lang and B J Edward General Electric Company Syracuse, NY	937
CC-3 2:10 p.m.	An Ultraminiature 5-10 GHz, 2 Watt Transmit Module for Active Aperture Application J Pierro and R Clouse Eaton Corp / AIL Division Melville, NY	941
CC-4 2:30 p.m.	Microstrip FED Planar Frequency Multiplying Space Combiner S Nam, T Uwano, and T Itoh Department of Electrical and Computer Engineering University of Texas Austin, TX	945
CC-5 2:40 p.m.	Low Cost Cartop Phased Array Steering G Schaffner Teledyne Ryan Electronics San Diego, CA	949

Session DD

Ziegfeld Room: HEMT/MESFET Applications

1:30 p.m. to 3:00 p.m. Thursday, June 11, 1987

Chairman B D Geller, Comsat Corporation

DD-1 1:30 p.m.	Bias-Dependent Microwave Characteristics of an Atomic Planar- Doped AlGaAs/InGaAs/GaAs Double Heterojunction MODFET Y K Chen, D C Radulescu, G W Wang, A N Lepore, P J Tasker and L F Eastman School of Electrical Engineering Cornell University Ithaca, NY	899
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DD-2 1:50 p.m.	FETs and HEMTs at Cryogenic Temperatures – Their Properties and Use in Low-Noise Amplifiers M W Popiel and S Weinreb National Radio Astronomy Observatory Charlottesville, VA	955	FF-2 3:50 p.m.	Impact of Dielectric Loss Tangent on the Performance of Millimeter Wave Ferrite Circulators G R Harrison, S B Thompson, J T Vaughn Electromagnetic Sciences, Inc Norcross, GA and G P Rodrigue School of Electrical Engineering Georgia Institute of Technology Atlanta, GA	989
DD-3 2:10 p.m.	Reliability of Low-Noise Microwave HEMT Using by MOCVD K Tanaka, H Takakuwa, K Togashi, Y Kato and S Watanabe Sony Corp Kanagawa, Japan	*			
DD-4 2:20 p.m.	Predicting Long Term Frequency Drift in FET Oscillators Using Device Modeling K K Agarwal and C Ho Telecommunication Division Rockwell International Corp Dallas, TX	959	FF-3 4:00 p.m.	Full Wave Analysis of Slot Line and Coplanar Waveguide on a Magnetic Substrate E El-Sharawy and R W Jackson University of Massachusetts Amherst, MA	993
DD-5 2:40 p.m.	Harmonic Reaction Amplifier – A Novel High-Efficiency and High-Power Microwave Amplifier S Nishiki and T Nojima NTT Electrical Communications Laboratories Take Yokosuka-Shi, Kanagawa-Ken, Japan	963	FF-4 4:10 p.m.	Magnetostatic Waves in a Normally Magnetized Waveguide Structure M Radmanesh GMI Engineering & Management Institute Flint, MI and C M Chu and G I Haddad University of Michigan Ann Arbor, MI	997

Session EE

Gable 5, 6, 7 Room: Solid State Devices/Circuits III

1:30 p.m. to 3:00 p.m. Thursday, June 11, 1987

Chairman Robert L Eisenhart, Hughes Aircraft Co

EE-1 1:30 p.m.	AlGaAs/GaAs Heterojunction Bipolar Transistors with 4W/mm Power Density at X Band B Bayraktaroglu, N Camilleri, H D Shih, and H G Tserng Texas Instruments Dallas, TX	969	FF-5 4:20 p.m.	Energy Storage Effect in MSSW Metal-Finger Reflectors T S Cheng Bell Communications Research Red Bank, NJ and J P Parekh and H S Tuan Department of Electrical Engineering State University of New York Stony Brook, NY	1001
EE-2 1:50 p.m.	Millimeter Wave Heterojunction MITATT Diodes N S Dogan, J R East Department of Electrical Engineering Washington State University Pullman, WA M E Elta and G I Haddad The University of Michigan Ann Arbor, MI	973			
EE-3 2:10 p.m.	Improved Performance of Fundamental and Second Harmonic MMW Oscillators Through Active Device Doping Concentration Contouring J Ondra Marconi Electronic Devices Ltd Lincoln, England and R L Ross U S Army Electronic Technology and Devices Laboratory Fort Monmouth, NJ	977			
EE-4 2:30 p.m.	W-Band Microstrip Oscillator Using InP Gunn Diode D R Singh Defense Systems Division Honeywell Inc Minnetonka, MN	981			

Session FF

Gable 3, 4 Room: Microwave Ferrites

3:30 p.m. to 5:00 p.m. Thursday, June 11, 1987

Chairman W E Hord, Microwave Applications Group

FF-1 3:30 p.m.	A New Type of Fast Switching Dual-Mode Ferrite Phase Shifter W E Hord, C R Boyd, Jr and D Diaz Microwave Applications Group Santa Maria, CA	985	GG-1 3:30 p.m.	HEMT Low-Noise Amplifier for Ka-Band M A G Upton, P M Smith and P C Chao General Electric Co Syracuse, NY	1007
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Session GG

Gable 5, 6, 7 Room: HEMT Amplifiers and Devices

3:30 p.m. to 5:00 p.m. Thursday, June 11, 1987

Chairman Bert Benson, Benson & Associates

GG-1 3:30 p.m.	HEMT Low-Noise Amplifier for Ka-Band M A G Upton, P M Smith and P C Chao General Electric Co Syracuse, NY	1007
GG-2 3:50 p.m.	Broadband HEMT Amplifier for 26.5-40 GHz K Shiba, B. Abe, S Horii and K Kamei Toshiba Corporation Kawasaki, Japan	1011
GG-3 4:10 p.m.	A Four Stage V-Band MOCVD HEMT Amplifier W Yau, E T Watkins, S K Wang, K Wang and B Katskin Hughes Aircraft Company Torrance, CA	1015
GG-4 4:30 p.m.	Super Low-Noise HEMTs with a T-Shaped Gate Structure S Asai, K Joshi, Y Hirachi and M Abe Fujitsu Laboratories Ltd Atsugi, Japan	1019
GG-5 4:40 p.m.	Reliability of Super Low Noise HEMTs K Hayashi, T. Sonoda, T Yamaguchi, K Nagahama, S Takamiya, S Mitsui, and M Yamanouchi Mitsubishi Electric Corp Itami, Japan	1023