

Technical Program Contents

Session A: Plenary Session Program

Cervantes Convention Center
Room 120

Tuesday, 4 June, 1985

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| 8:00 | Steering Committee Chairman's Welcome | Dr. Fred Rosenbaum |
| 8:05 | MTT-S President's Welcome | Harlan Howe |
| 8:10 | Remarks | Dr. Bruno Weinschel |
| 8:20 | Technical Program Overview | Dr. William Hord |
| 8:25 | Introduction of Plenary Session | Dr. R. A. Moore |
| | | |
| 8:30 | The Future of Microwave Engineers: From the Technical Perspective | Dr. Merrill Skolnik |
| 9:00 | From the Professional/Industrial Perspective | Dr. David Leeson |
| 9:30 | From the Economic Perspective | Dr. Stephen Honickman |

Session B: Monolithic Receiver Circuits*

10:30 am to Noon

Tuesday, 4 June, 1985

Chairman: C. Huang, Anadigics, Morristown, NJ
Co-Chairman: R. Kagiwada, TRW, Redondo Beach, CA

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| 11:20 am B-3 | A GaAs Double-Balanced Dual-Gate FET Mixer IC for UHF Receiver Front-End Applications K. Kanazawa, M. Kazumura, S. Nambu, G. Kano, I. Teramoto Matsushita Electric Corp., Osaka, Japan | 60 |
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* Joint Session of MTT-S and MW&MMW
Monolithic Symposia

Session C: Biomedical Aspects of Microwaves

10:30 am to Noon

Tuesday, 4 June, 1985

Chairman: J. C. Lin, University of Illinois at Chicago, Chicago, IL

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10:30 am to Noon

Tuesday, 4 June, 1985

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North Andover, MA

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Indian Telephone Industries, Bangalore, India
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Nanjing Research Institute of Electronic Technology, Nanjing, China

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Tuesday, 4 June, 1985

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Co-Chairman: A. Chu, M/A-COM, Burlington, MA

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*Joint Session of MTT-S and MW&MMW Monolithic Symposia

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Chairman: C. M. Krowne, Naval Research Laboratory
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Chairman: K. K. Agarwal, Rockwell International, Dallas, TX

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3:30 pm to 5:00 pm

Tuesday, 4 June, 1985

Chairman: J. M. Owens, University of Texas, Arlington, TX

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8:30 am to 10:00 am

Wednesday, 5 June, 1985

Chairman: E. C. Niehenke, Westinghouse Electric Corp.,
Baltimore, MD

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10:30 am to Noon

Wednesday, 5 June, 1985

Chairman: S. J. Temple, Raytheon Co., Bedford, MA

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Wednesday, 5 June, 1985

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10:30 am to Noon

Wednesday, 5 June, 1985

Chairman: A. G. Cardiasmenos, Raytheon Co., Bedford, MA

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Lexington, MA

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Wednesday, 5 June, 1985

Chairman: G. R. Thoren, Raytheon Co., Bedford, MA

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| S-16 | Analysis and Synthesis of Guides with Closely Spaced Discontinuities B. L. Harris, P. E. Mayes University of Illinois, Urbana, IL | 499 |
| S-17 | Stokes Vector Representation of the Six-Port Network Analyzer: Calibration and Measurement T. Oishi COMSAT, Washington, DC W. K. Kahn George Washington University, Washington, DC | 503 |
| S-18 | Short Millimeter-Wave Region High Accuracy Power Meter with Self-Calibration Function M. Sasaki, T. Nunotani SPC Electronics Corp., Tokyo, Japan T. Inoue, I. Yokoshima Electrotechnical Laboratory Ibaraki, Japan | 507 |

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| S-19 | A Simple Network Analog Approach for the Quasi-Static Characteristics of General Lossy, Anisotropic, Layered Structures V. K. Tripathi, R. J. Bucolo Oregon State University, Corvallis, OR | 511 |
| S-20 | $TM_{0\gamma\delta}$ Mode of Cylindrical Dielectric Resonators: Applications to Microwave Filters B. Byzery, P. Guillon Lab. de Communications Microondes et Optiques, Limoges, France | 515 |
| S-21 | Collinearly Excited Edge-Coupled Resonators K. W. Reed, A. K. Reddy, W. A. Davis University of Texas, Arlington, TX | 519 |

Session T: Solid State Device Topics

3:30 pm to 5:00 pm

Wednesday, 5 June, 1985

Chairman: J. F. White, M/A-COM, Inc., Burlington, MA

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|------------------------------|---|------------|
| 3:40 pm T1 | 20 GHz GaAs IMPATT Diode Development for Solid-State Transmitter M. J. Delaney, M. H. Jones, C. Sun TRW, Redondo Beach, CA | 525 |
| 4:00 pm T-2 | Controlled Bias Preheating for Variable Duty Factor IMPATT Transmitter R. L. Eisenhart, R. S. Robertson Hughes Aircraft Co., Canoga Park, CA | 529 |
| 4:20 pm T-3 | High Speed Varactor Tuned Notch Filter M. Mehdizadeh, B. Smilowitz General Microwave Corp., Farmingdale, NY | 531 |
| 4:40 pm T-4 | Dynamic Diode Mixer Damage Measurements R. V. Garver, C. Fazi, H. Bruns Harry Diamond Labs, Adelphi, MD | 535 |

Session U: Low Noise HEMT Amplifiers

8:30 am to 10:00 am

Thursday, 6 June, 1985

Chairman: R. L. Camisa, RCA, Princeton, NJ

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|----------------|--|-----|
| 8:40 am U-1 | X-Band Noise Parameters of HEMT Devices at 300K and 12.5K S. Weinreb, M. Pospieszalski National Radio Astronomy Observatory, Charlottesville, VA | 539 |
| 8:50 am U-2 | Low Noise Amplifiers using Two Dimensional Electron Gas FETs T. Mochizuki, K. Honma, K. Handa W. Akinaga, K. Ohata NEC Corporation, Yokohama, Japan | 543 |
| 9:00 am U-3 | Broadband HEMT and GaAs FET Amplifiers for 18-26.5 GHz K. Shibata, B. Abe, H. Kawasaki, S. Horii, K. Kamei Toshiba Corporation, Kawasaki, Japan | 547 |
| 9:20 am U-4 | A 20 GHz Peltier-Cooled Low-Noise HEMT Amplifier M. Iwakuni, M. Niori, T. Hamabe, T. Saito, H. Kurihara, K. Jyoshin, M. Mikuni Fujitsu Laboratories, Kawasaki, Japan | 551 |
| 9:40 am U-5 | 36.0 - 40.0 GHz HEMT Low Noise Amplifier M. Sholley, J. Berenz, K. Nakano, R. Sawires, A. Nichols, J. Abell TRW, Redondo Beach, CA | 555 |

Session V: Continuous and Discontinuous Microstrip Structures

8:30 am to 10:00 am

Thursday, 6 June, 1985

Chairman: J. W. Mink, U.S. Army Research Office
Research Triangle Park, NC

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|----------------|--|-----|
| 8:30 am V-1 | A Perturbation Theory for Microstrip Propagation R. E. Collin, B. Kretch Case Western Reserve University, Cleveland, OH | 561 |
| 8:50 am V-2 | Surface Wave Losses at Discontinuities in Millimeter Wave Integrated Transmission Lines R. W. Jackson, D. M. Pozar University of Massachusetts, Amherst, MA | 563 |

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| 9:10 am V-3 | Millimeter-Wave Diplexers with Printed Circuit Elements Y. C. Shih, L. Q. Bui, T. Itoh Hughes Aircraft Co., Torrance, CA University of Texas at Austin, Austin TX | 567 |
| 9:30 am V-4 | Microstrip Discontinuity Modelling for Millimetric Integrated Circuits P. B. Katehi University of Michigan, Ann Arbor, MI N. G. Alexopoulos University of California, Los Angeles, CA | 571 |
| 9:50 am V-5 | Convergence of Numerical Solutions of Open-Ended Waveguide by Modal Analysis and Hybrid Modal-Spectral Techniques J. A. Encinar, J. M. Rebollar Universidad Politécnica de Madrid, Madrid, Spain | 575 |

Session W: Network Analyzer Techniques

8:30 am to 10:00 am

Thursday, 6 June, 1985

Chairman: H. G. Oltman, Jr., Hughes Aircraft, Canoga Park, CA

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|------------------------------|--|------------|
| 9:00 am W-2 | Pulse Network Analyzer D. L. Landt, R. J. Weber Rockwell International, Collins Div., Cedar Rapids, IA | 581 |
| 9:10 am W-3 | Vector Method of Characterizing Nonlinearity in Microwave Power Devices W. J. Thompson, K. K. Agarwal Rockwell International, Dallas, TX | 585 |
| 9:30 am W-4 | Calibrating a Six-Port Reflectometer using Three Known Loads M. E. Bialkowski, G. S. Woods James Cook University of North Queensland, Townsville, Australia | 589 |
| 9:50 am W-5 | Waveguide Star Junction used in Ka Band Dual Six Port Measurements M. Riazat, G. Zdasiuk Varian Central Research, Palo Alto, CA | 593 |

Session X: FET Applications

10:30 am to Noon

Thursday, 6 June, 1985

Chairman: F. N. Sechi, RCA Laboratories, Princeton, NJ

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|-------------------------------|--|------------|
| 10:40 am X-1 | Miniature Ceramic Circuit Components for Ku Band Receivers B. Dornan, G. Lan, P. Goldgeier, P. Pelka, F. Sechi RCA Laboratories, Princeton, NJ | 597 |
| 11:00 am X-2 | A 4.5 to 18 GHz Phase Shifter D. C. Boire, J. E. Degenford, M. Cohn Westinghouse Electric Corp., Baltimore, MD | 601 |
| 11:10 am X-3 | A Practical Microwave Travelling-Wave MESFET Gate Mixer O. S. A. Tang, C. S. Aitchison Chelsea College, University of London, London, U.K. | 605 |
| 11:20 am X-4 | Broadband and Broad Dynamic Range GaAs Dual-Gate MESFET Linearizer for TWTA and SSPA used in Satellite Transponder M. Kumar, J. C. Whartenby, H. J. Wolkstein RCA Laboratories, Princeton, NJ | 609 |
| 11:30 am X-5 | 30 dB of AGC from an FET B. R. Hallford Rockwell International, Dallas, TX | 613 |

Session Y: Waveguiding Structures

10:30 am to Noon

Thursday, 6 June, 1985

Chairman: N. G. Alexopoulos, Univ. of California, Los Angeles, CA

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| 10:30 am Y-1 | Leakage from a Gap in NRD Guide A. A. Oliner, S. T. Peng, K. M. Sheng Polytechnic Institute of New York, Brooklyn, NY | 619 |
| 10:50 am Y-2 | Microwave Network Representation of Discontinuity in Open Dielectric Waveguides and its Applications to Periodic Structures H. Shigesawa, M. Tsuji, K. Takiyama Doshisha University, Hyoto, Japan | 623 |

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| 11:10 am Y-3 | Scattering of Surface Waves by Nonuniform Waveguides S. T. Peng, S. J. Xu New York Institute of Technology, Old Westbury, NY F. K. Schwering U.S. Army CECOM, Fort Monmouth, NJ | 627 |
| 11:30 am Y-4 | Finite Element Analysis Applied to Gyroelectrically Loaded Waveguiding Structures N. Mohsenian, T. J. Delph, D. M. Bolle Lehigh University, Bethlehem, PA | 631 |
| 11:50 am Y-5 | On the Question of the Dyadic Operation of Dyadic Green's Functions at the Source Region P. Shenggen Shanghai University, Shanghai, China | 635 |

Session Z: Microwave Measurements

10:30 am to Noon

Thursday, 6 June, 1985

Chairman: S. F. Adam, Adam Microwave Consulting, Los Altos, CA

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|-------------------------|--|------------|
| 10:40 am Z-1 | An Improved Method of Mixer Noise Figure Measurement as Applied to Beam Lead Schottky Diodes at 94 GHz F. Azan, P. Boireau, J. Lacombe Thomson-CSF, Orsay, France | 639 |
| 11:00 am Z-2 | Quasi-Optical Slot Ring Mixer Noise Figure Measurements K. D. Stephan, G. Perks University of Massachusetts, Amherst, MA | 643 |
| 11:20 am Z-3 | Dynamic Measurement of Complex Permittivity and Temperature During Microwave Heating M. R. Ollivon C.N.R.S., Thiais, France | 645 |
| 11:30 am Z-4 | Measurement of TDC in Engine by Microwave Technique T. Yamanaka, M. Esaki, M. Kinoshita Toyota, Aichi, Japan | 647 |
| 11:40 am Z-5 | A Novel Cavity Resonator Measurement Method for Leaky Waveguides A. A. Oliner, J. S. Myung Polytechnic Institute of New York, Brooklyn, NY | 651 |

Session AA: Solid State Device Applications - Non FET

1:30 pm to 3:00 pm

Thursday, 6 June, 1985

Chairman: C. Buntschuh, Narda Microwave Corp., Hauppauge, NY

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| 1:40 pm AA-1 | Linear Analog Hyperabrupt Varactor Diode Phase Shifters E. C. Niehenke, V. V. DiMarco, A. Friedberg Westinghouse Electric Corp., Baltimore, MD | 657 |
| 2:00 pm AA-2 | A Reflective Diode Linearizer for Spacecraft Applications A. Katz, R. Sudarsanam, D. Aubert RCA Astro, Princeton, NJ | 661 |
| 2:20 pm AA-3 | An Experimental Linearized Power Upconverter for SSB Signals E. H. Löser Institute für Hochfrequenztechnik, Braunschweig, W. Germany | 665 |
| 2:40 pm AA-4 | A Simple Integrated Matching Element for SIS Quasiparticle Mixers A. V. Räisänen, W. R. McGrath, P. L. Richards University of California, Berkeley, CA F. L. Lloyd NBS, Boulder, CO | 669 |

Session BB: Microwave Integrated Circuit Techniques

1:30 pm to 3:00 pm

Thursday, 6 June, 1985

Chairman: E. F. Belohoubek, RCA Labs, Princeton, NJ

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|-----------------|---|-----|
| 1:40 pm BB-1 | An Experimental Investigation of Microstrip Properties on Soft Substrates from 2 to 40 GHz R. R. Romanofsky, K. B. Bhasin, G. E. Ponchak, A. N. Downey, D. J. Connolly NASA Lewis Research Center, Cleveland, OH | 675 |
| 1:50 pm BB-2 | Modelling and Measurement of Microstrip Transmission Line Structures P. R. Shepherd, P. Daly University of Leeds, Leeds, UK | 679 |
| 2:00 pm BB-3 | A New Slotline-Microstrip Frequency Halver G. A. Kalivas, R. G. Harrison Carleton University, Ottawa, Canada | 683 |

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| 2:20 pm BB-4 | Microstrip Mixer Design with Image Cancellation and Low Conversion Loss C. Ansorge Technische Univ. Hamburg-Harburg, Hamburg, W. Germany | 687 |
| 2:30 pm BB-5 | Small Size VCO Module for 900 MHz Band Using Coupled Microstrip-Coplanar Lines K. Kawamoto, K. Hirota, N. Niizaki Hitachi, Ltd., Yokohama, Japan Y. Fujiwara, K. Ueki Hitachi Denshi, Ltd., Tokyo, Japan | 689 |
| 2:40 pm BB-6 | Frequency Agile Circular Microstrip Antennas G. L. Lan, D. L. Sengupta University of Michigan, Ann Arbor, MI | 693 |

Session CC: Computer-Aided Design Techniques for Linear Circuits

1:30 pm to 3:00 pm

Thursday, 6 June, 1985

Chairman: S. L. March, Compact Software, Round Rock, TX

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| 1:40 pm CC-1 | A CAD Solution to the Generalized Problem of Noise Figure Calculation V. Rizzoli, A. Lipparini University of Bologna, Bologna, Italy | 699 |
| 2:00 pm CC-2 | A SPICE Model for Multiple Coupled Microstrips and Other Transmission Lines V. K. Tripathi Oregon State University, Corvallis, OR J. B. Rettig Tektronix, Inc., Beaverton, OR | 703 |
| 2:20 pm CC-3 | MIDAS, A New Microwave/RF CAD Program D. Rhodes, S. Perlow RCA Laboratories, Princeton, NJ | 707 |
| 2:40 pm CC-4 | A Novel CAD Tool and Concept Compatible with the Requirements of Multilayer GaAs MMIC Technology R. H. Jansen University of Duisburg, Duisburg, West Germany | 711 |

Addendum

3:30 pm to 5:30 pm

Tuesday, 4 June, 1985

- H-9** **The Design and Performance of a Double Balanced Mixer Using FETs** **717**
S. J. Nightingale, M. A. G. Upton, N. V. Dandekar
General Electric Company, Syracuse, New York

3:30 pm to 5:30 pm

Wednesday, 5 June, 1985

- S-7** **A Superlinearly Convergent Minimum Algorithm for** **721**
Microwave Circuit Design
J. W. Bandler, W. Kellerman, K. Madsen
McMaster University, Hamilton, Canada

8:30 am to 10:00 am

Thursday, 6 June, 1985

- W-1** **A Broadband Homodyne Network Analyser With** **725**
Binary Phase Modulation
U. Gärtner, B. Scheik
Institut für Hoch- und Höchstfrequenztechnik,
Ruhr-Universität Bochum,
Bochum, Federal Republic of West Germany