

# 1986 MTT Symposium Digest

## TABLE OF CONTENTS

### Technical Program Contents

| Session A: Opening Ceremony |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Room 307/308/309            | Convention Center                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Monday, June 2, 1986 |
| 8:30 am to 10:00 am         | <b>Presentation of Colors with Live Band</b><br><b>Presentation of State and Country Flags</b> by the 46 MTT-S chapters<br><b>Welcome, E. Niehenke, Symposium Chairman, R. Knerr, MTT-S President, M. Cohn, Technical Program Chairman</b><br><b>Proclamation of International Microwave Week in Baltimore and Maryland Live Satellite Transmission to West Germany, Prof. H. Groll, Technical University of Munich</b><br><b>Keynote Address, Dr. J. L. Charyk, Founder of COMSAT</b> |                      |

| SESSION B: Guided Wave Structures I |                                                                                                                                                                                                                           |                      |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Room 310                            | Convention Center                                                                                                                                                                                                         | Monday, June 2, 1986 |
|                                     | Chairman: A. K. Sharma, RCA/David Sarnoff Research Center                                                                                                                                                                 |                      |
| 10:30 am B-1                        | <b>The Nature of the Leakage from Higher Modes on Microstrip Line</b><br>A. A. Oliner, K. S. Lee<br>Polytechnic Institute of New York, Brooklyn, NY                                                                       | 57                   |
| 10:50 am B-2                        | <b>Uniaxial and Biaxial Substrate Effects on Uniform Finlines and Finline Step Discontinuities</b><br>H. Y. Yang, N. G. Alexopoulos<br>University of California, Los Angeles, CA                                          | 61                   |
| 11:10 am B-3                        | <b>Slow-Wave Characteristics of Ferromagnetic Semiconductor Microstrip Line</b><br>H. Ogawa, T. Itoh<br>The University of Texas, Austin, TX                                                                               | 65                   |
| 11:20 am B-4                        | <b>Effects of Transition Waveguide on Dielectric Waveguide Directional Couplers</b><br>S. T. Xu, S. J. Peng<br>New York Institute of Technology, Old Westburg, NY<br>F. K. Schwering<br>U.S. Army CECOM, Ft. Monmouth, NJ |                      |
| 11:30 am B-5                        | <b>Mutual Interference Between the Guided Wave and the Leaky Wave Regions and its Effects on the Performance of Dielectric Grating Filters</b><br>M. Tsuji, H. Shigesawa<br>Doshisha University, Kyoto, Japan             | 69                   |

| SESSION C: Low Noise Techniques |                                                                                                                                                                    |                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Room 307/308/309                | Convention Center                                                                                                                                                  | Monday, June 2, 1986 |
|                                 | Chairman: V. Sobolov, Honeywell, Inc. (PSC)                                                                                                                        |                      |
| 10:30 am C-1                    | <b>20 GHz-Band Low-Noise HEMT Amplifier</b><br>K. Shibata, K. Nakayama, M. Ohtsubo, H. Kawasaki, S. Hori, K. Kamei<br>Toshiba Corporation, Kawasaki, Japan         | 75                   |
| 10:50 am C-2                    | <b>Low Frequency Noise Measurements of GaAs FETs</b><br>A. N. Riddle, R. J. Trew<br>North Carolina State University, Raleigh, NC                                   | 79                   |
| 11:00 am C-3                    | <b>Highly Stabilized, Ultra-Low Noise FET Oscillator with Dielectric Resonator</b><br>G. Lan, E. Mykietyn, E. Hoffman, F. Sechu<br>RCA Laboratories, Princeton, NJ | 83                   |
| 11:20 am C-4                    | <b>Dielectric Resonator Oscillators at 4, 6 and 11GHz</b><br>K. R. Varian<br>Rockwell International, Dallas, TX                                                    | 87                   |
| 11:30 am C-5                    | <b>Bipolar Transistor Ku-Band Oscillators with Low Phase-Noise</b><br>C. Ansoorge<br>Technische Universität, Harburg, FRG                                          | 91                   |
| 11:50 am C-6                    | <b>Dielectric Resonator Oscillators Using GaAs/(Ga,Al) As Heterojunction Bipolar Transistors</b><br>K. K. Agarwal<br>Rockwell International, Dallas, TX            | 95                   |

| SESSION D: IMPATTS |                                                                                                                                                                                                                                                                         |                      |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Room 317           | Convention Center                                                                                                                                                                                                                                                       | Monday, June 2, 1986 |
|                    | Chairman: E. D. Cohen, Space and Naval Warfare Systems Command                                                                                                                                                                                                          |                      |
| 10:30 am D-2       | <b>Low Cost Modular 100 Watt Peak, 10% Bandwidth Microstrip Impatt Amplifier</b><br>J. F. Cushman, M. E. Hines<br>M/A-COM Inc., Burlington, MA                                                                                                                          | 101                  |
| 11:50 am D-3       | <b>110 Watt Wideband Microstrip IMPATT Combiner/Amplifier</b><br>B. E. Sigman, T. W. Van Alstyne<br>Motorola, Inc., Tempe, AZ                                                                                                                                           | 105                  |
| 11:10 am D-4       | <b>Indirect Sub-Harmonic Optical Injection Locking of a Millimeter Wave IMPATT Oscillator</b><br>A. Daryoush, P. Herzfeld<br>Drexel Univ., Philadelphia, PA<br>A. Rosen, A. Sharma<br>RCA, Princeton, NJ<br>V. Contario<br>Naval Air Development Center, Warminster, PA | 109                  |

| SESSION E: Guided Wave Structures II |                                                                                                                                                                                                                   |                      |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Room 310                             | Convention Center                                                                                                                                                                                                 | Monday, June 2, 1986 |
|                                      | Chairman: S. T. Peng, New York Institute of Technology                                                                                                                                                            |                      |
| 1:30 pm E-1                          | <b>Analysis and Measurements of Nonradiative Dielectric Waveguide Bends</b><br>T. Yoneyama, H. Tamaki<br>University of the Ryukyus, Nishihara, Okinawa, Japan<br>S. Nishida<br>Tohoku University, Sendai, Japan   | 115                  |
| 1:50 pm E-2                          | <b>Effects of Air Gap and Finite Metal Plate Width on NRD Guide</b><br>H. Shigesawa, M. Tsuji<br>Doshisha University, Kamikyo-Ku, Kyoto, Japan<br>A. A. Oliner<br>Polytechnic Institute of New York, Brooklyn, NY | 119                  |
| 2:10 pm E-3                          | <b>Effect of Complex Modes on Finline Discontinuities</b><br>A. S. Omar, K. Schunemann, J. Piotrowski<br>Technische Universität, Hamburg, FRG                                                                     | 123                  |
| 2:30 pm E-4                          | <b>A Combined Experimental and Theoretical Characterisation of Discontinuities in Unilateral Finlines</b><br>A. Beyer, D. Kother, I. Wolff<br>Duisburg University, Duisburg, FRG                                  | 127                  |
| 2:40 pm E-5                          | <b>Finite Element Analysis of Slow-wave Schottky Printed Line</b><br>C.-K. Tzuang, Q. Zhang, T. Itoh<br>University of Texas, Austin, TX                                                                           | 131                  |

| SESSION F: Passive Components |                                                                                                                                                                                     |                      |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Room 307/308/309              | Convention Center                                                                                                                                                                   | Monday, June 2, 1986 |
|                               | Chairman: J. J. Bahl, ITT/GTC                                                                                                                                                       |                      |
| 1:30 pm F-1                   | <b>Broadband Dielectric Waveguide 3-dB Couplers Using Asymmetrical Coupled Lines</b><br>P. K. Ikalainen, G. L. Matthaei, M. M. Monte<br>University of California, Santa Barbara, CA | 135                  |
| 1:50 pm F-2                   | <b>Printed Circuit Hybrid-Ring Directional Coupler for Arbitrary Power Divisions</b><br>A. K. Agrawal, G. F. Mucke<br>RCA, Missile and Surface Radar Division, Moorestown, NJ       | 139                  |
| 2:00 pm F-3                   | <b>Design and Performance of a Wideband Multilayer Feed Network</b><br>M. D. Abouzahr<br>MIT Lincoln Laboratory, Lexington, MA                                                      | 143                  |
| 2:20 pm F-4                   | <b>A New N-Way Broadband Planar Power Combiner/Divider</b><br>W. Yau, Y. C. Shah, J. M. Schellenberg<br>Hughes Aircraft Company, Torrance, CA                                       | 147                  |
| 2:30 pm F-5                   | <b>An Octave-Wide Matched Quarterwave Impedance Transformer</b><br>F. C. de Ronde<br>Bath University, Bath, Avon, England                                                           | 151                  |
| 2:50 pm F-6                   | <b>Matched, Dual Mode Square Waveguide Corner</b><br>P. K. Park, R. L. Eisenhart, S. E. Bradshaw<br>Hughes Aircraft Company, Canoga Park, CA                                        | 155                  |

| SESSION G: Oscillator Topics |                                                                                                                                                                                                                   |                      |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Room 317                     | Convention Center                                                                                                                                                                                                 | Monday, June 2, 1986 |
|                              | Chairman: P. Stacker, MIT Lincoln Laboratory                                                                                                                                                                      |                      |
| 1:30 pm G-1                  | <b>Inter-Injection-Locked Oscillators with Applications to Spatial Power Combining and Phased Arrays</b><br>K. D. Stephan, J. Hubert<br>University of Massachusetts, Amherst, MA                                  | 159                  |
| 1:50 pm G-2                  | <b>A 10 GHz Space Power Combiner with Parasitic Injection Locking</b><br>R. Dinger, D. White, D. Bowling<br>Naval Weapons Center, China Lake, CA                                                                  | 163                  |
| 2:10 pm G-3                  | <b>Planar Radial Resonator Oscillator</b><br>M. Dydik<br>Motorola Inc., Scottsdale, AZ                                                                                                                            | 167                  |
| 2:30 pm G-4                  | <b>Frequency/Temperature Compensated Millimeter Wave Oscillators and Broadband VCO's in Lumped Element and Printed Circuit Forms</b><br>L. D. Cohen, N. Kung, Jr.<br>Eaton Corporation/AIL Division, Melville, NY | 169                  |

| Session H: MM-Wave Oscillators |                                                                                                                         |                      |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------|
| Room 317                       | Convention Center                                                                                                       | Monday, June 2, 1986 |
|                                | Chairman: M. Dydik, Motorola, Inc.                                                                                      |                      |
| 3:30 pm H-1                    | <b>A mm-Wave Microslab® Oscillator</b><br>H. B. Sequeira, J. A. McIntock<br>Martin Marietta Laboratories, Baltimore, MD | 175                  |
| 3:50 pm H-2                    | <b>A High Q Cavity Stabilized Gunn Oscillator at 94 GHz</b><br>H. Barth<br>AEG Aktengesellschaft, Ulm, FRG              | 179                  |

|                                                 |                                                                                                                                                                                                                |                      |                                |                                                                                                                                                                                                                                                                             |                       |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 4:30 pm<br>H-3                                  | <b>Barium Ferrite-Indium Phosphide MM-Wave Oscillators</b><br>Y S Lau<br>Varian Solid State, Santa Clara, CA<br>D Nicholson<br>Hewlett-Packard, Santa Rosa, CA                                                 | 183                  | J-14                           | <b>Analysis Method for Generalized Suspended Strip Lines</b><br>E Yamashita, K Atsuki<br>University of Electro-communications, Tokyo, Japan<br>M Nakajima<br>Tokyo Keiki Co Ltd Tokyo, Japan                                                                                | 261                   |
| 4:30 pm<br>H-4                                  | <b>Dual Output Stabilised Gunn Oscillator for Finlines</b><br>U Goebel, K Grunpe<br>Technische Universität, Hamburg, FRG                                                                                       | 187                  | J-16                           | <b>New Types of 3-dB Directional Couplers of Microstrip Transmission Lines</b><br>L Dongtuan<br>Nanjing Research Institute of Electronics Technology,<br>Nanjing, People's Republic of China                                                                                | 265                   |
|                                                 |                                                                                                                                                                                                                |                      | J-17                           | <b>Accurate Characterisation and Modelling of Transmission Lines for GaAs MMICs</b><br>H J Finlay, J A Jenkins, I G Eddison<br>Plessey Research Limited, Caswell, Towcester, Northants, U K<br>R H Jansen<br>University of Duisburg Duisburg, FRG                           | 267                   |
| <b>Session I: Special International Session</b> |                                                                                                                                                                                                                |                      |                                |                                                                                                                                                                                                                                                                             |                       |
| Room 307/308/309 Convention Center              |                                                                                                                                                                                                                | Monday, June 2, 1986 |                                |                                                                                                                                                                                                                                                                             |                       |
|                                                 | Chairman R A Sparks, Raytheon                                                                                                                                                                                  |                      | J-18                           | <b>An Analysis of EM Wave Circuit Problems By Network-Boundary Element Method</b><br>F Zheng-He<br>Qinghua University, People's Republic of China                                                                                                                           | 271                   |
| 3:30 pm<br>I-1<br>(Invited)                     | <b>Optoelectronic Technology and Devices in Europe</b><br>R Bates<br>University of Ghent, Ghent, Belgium                                                                                                       | 193                  |                                |                                                                                                                                                                                                                                                                             |                       |
| 3:50 pm<br>I-2<br>(Invited)                     | <b>Millimeter Wave Hybrid Integrated Circuits</b><br>J Citerne<br>University Rennes, Rennes, France                                                                                                            | 197                  |                                | <b>Novel Concepts</b>                                                                                                                                                                                                                                                       |                       |
| 4:10 pm<br>I-3<br>(Invited)                     | <b>Microstrip CAD in Europe</b><br>F Gardiol<br>Ecole Polytechnique Federale, Lausanne, France                                                                                                                 | 203                  | J-19                           | <b>Symmetric Test Fixture Calibration</b><br>E R Ehlers<br>Hewlett-Packard Co., Santa Rosa, CA                                                                                                                                                                              | 275                   |
| 4:30 pm<br>I-4<br>(Invited)                     | <b>Millimetre Wave Devices and System Work in Europe</b><br>J Forrest<br>Marconi Defense Systems Ltd., UK                                                                                                      | *                    | J-20                           | <b>Microwave Transmission Line Frequency Discriminators</b><br>H G Cho<br>Kookmin University, Seoul, Korea<br>C W Lee<br>Seoul National University, Seoul Korea                                                                                                             | 279                   |
| 4:50 pm<br>I-5<br>(Invited)                     | <b>Microwave Research in China</b><br>W Lin<br>Chengdu Institute of Radio, Chendu, Peoples' Republic of China                                                                                                  | 207                  | J-21                           | <b>Multilayer Planar Structures for High Directivity Directional Coupler Design</b><br>M Hornio, F Medina<br>Universidad de Sevilla, Sevilla, Spain                                                                                                                         | 283                   |
| <b>Session J: Open Forum I 3:30 pm-5:30 pm</b>  |                                                                                                                                                                                                                |                      |                                |                                                                                                                                                                                                                                                                             |                       |
| Room 200 Level Convention Center                |                                                                                                                                                                                                                | Monday, June 2, 1986 |                                |                                                                                                                                                                                                                                                                             |                       |
|                                                 | Chairman D C Buck, Westinghouse                                                                                                                                                                                |                      |                                | <b>Session K: Solid State Topics</b>                                                                                                                                                                                                                                        | Tuesday, June 3, 1986 |
|                                                 | <b>Finline</b>                                                                                                                                                                                                 |                      | 8:30 am<br>K-1                 | <b>Subharmonically and Fundamentally Pumped Slotline Quasioptical Mixer</b><br>C M Jackson, C Sun<br>TRW Electronics and Defense, Redondo Beach, CA                                                                                                                         | 293                   |
| J-1                                             | <b>Efficient Analysis of Finline with Finite Metallization Thickness</b><br>J K Piotrowski<br>Warsaw Technical University, Warsaw, Poland                                                                      | 213                  | 8:50 am<br>K-2                 | <b>50 Watt/CW Diode Tuned UHF Filter</b><br>G DiPiazza<br>M/A-COM, Lowell, MA                                                                                                                                                                                               | 297                   |
| J-2                                             | <b>Asymmetrical Structure Fin-Line: An Alternative for Spatial Applications</b><br>J M Goutoule, P Espes, P Fraise<br>ATES, Toulouse, France<br>P Combes<br>Université Paul Sabatier, Toulouse, France         | 217                  | 9:10 am<br>K-3                 | <b>High Dynamic Range Video Detector</b><br>R W Shullady<br>American Electronic Laboratories, Inc., Lansdale, PA                                                                                                                                                            | 301                   |
| J-4                                             | <b>Modeling of the Apparent Characteristic Impedance of Finned-Waveguide and Finline</b><br>P Pramanick, P Bharti<br>University of Ottawa, Ottawa, Ontario, Canada                                             | 225                  | 9:30 am<br>K-4                 | <b>Varactor Frequency Halvers with Enhanced Bandwidth and Dynamic Range</b><br>R G Harrison<br>Carleton University, Ottawa, Ontario, Canada<br>W D Cornish<br>Telemus Electronic Systems Inc., Ontario, Canada                                                              | 305                   |
| J-5                                             | <b>Analysis of Finline Discontinuities</b><br>Y-Y Chen, S-F Li<br>Nanjing Institute of Technology, Nanjing, China                                                                                              | 229                  |                                |                                                                                                                                                                                                                                                                             |                       |
| J-6                                             | <b>Millimeter-wave QPSK Modulator in Fin Line</b><br>G B Gajda, C J Verver<br>Communications Research Centre, Ottawa, Ontario, Canada                                                                          | 233                  |                                | <b>Session L: Microwave Systems I</b>                                                                                                                                                                                                                                       | Tuesday, June 3, 1986 |
| J-22                                            | <b>A FET Amplifier in Fin Line Technique</b><br>J L'Ecuier, G B Gajda, W J R Hoefer<br>Communications Research Centre, Ottawa, Ontario, Canada                                                                 | 287                  | Room 307/308 Convention Center | Chairman J B Knorr, Naval Postgraduate School                                                                                                                                                                                                                               |                       |
|                                                 | <b>Dielectric Resonators/Waveguides</b>                                                                                                                                                                        |                      | 8:30 am<br>L-1                 | <b>Millimeter-Wave Imaging Sensor</b><br>W. J. Wilson, R. J. Howard, A. C. Ibbott, G. S. Parks, W. B. Ricketts<br>Jet Propulsion Laboratory, Pasadena, CA                                                                                                                   | 311                   |
| J-3                                             | <b>Analysis of the Coupling Coefficient Between a Cylindrical Dielectric Resonator and a Fine-Line</b><br>F Hernández-Gil<br>Telefónica, Madrid, Spain<br>J Pérez<br>E T S Ing Telecomunicación, Madrid, Spain | 221                  | 8:50 am<br>L-2                 | <b>A Distributed Array Antenna System for Space Applications</b><br>R W Shaw<br>Lockheed-EMSCO, Houston, TX                                                                                                                                                                 | 315                   |
| J-7                                             | <b>Broadband Dielectric Waveguide Coupler and Six-Port Network</b><br>F Zheng-He<br>Tsing-hua University, Beijing, People's Republic of China                                                                  | 237                  | 9:10 am<br>L-3                 | <b>High Efficiency 4GHz SSPA for Space Application</b><br>G Gatti, G Turgeon, L Duque, J Zaichowsky, R Dion<br>Spar Aerospace Ltd., Quebec, Canada                                                                                                                          | 319                   |
| J-8                                             | <b>Design Charts for Shielded Dielectric Rod and Ring Resonators</b><br>Y. Kobayashi, S. Nakayama<br>Saitama University, Saitama, Japan                                                                        | 241                  | 9:30 am<br>L-4                 | <b>A Compact 4GHz Linearizer for Space Use</b><br>S Kitazume, H Ogawa, R Inada<br>NEC Corporation, Yokohama, Japan                                                                                                                                                          | 323                   |
| J-9                                             | <b>Coupling of Dielectric Resonators to Rectangular Waveguides</b><br>K A Zaki, C Chen<br>University of Maryland, College Park, MD                                                                             | 245                  |                                | <b>Session M: Distributed FET Amplifiers and Circuits</b>                                                                                                                                                                                                                   | Tuesday, June 3, 1986 |
|                                                 | <b>Filters</b>                                                                                                                                                                                                 |                      | Room 309/310 Convention Center | Chairman S J Temple, Raytheon Co                                                                                                                                                                                                                                            |                       |
| I-10                                            | <b>Computed-Aided Tuning of Microwave Filters</b><br>L Accatino<br>CSELT—Centro Studi e Laboratori Telecomunicazioni, Torino, Italy                                                                            | 249                  | 8:30 am<br>M-1                 | <b>A Distributed 1-12 GHz Dual-Gate FET Mixer</b><br>T S Howard and A M Pavio<br>Texas Instruments, Inc., Dallas, Texas                                                                                                                                                     | 329                   |
| I-11                                            | <b>Realization of Dual-Mode Longitudinal Filters with Arbitrary Polarization of Input and Output Ports</b><br>J Frenna<br>COM DEV Ltd., Cambridge, Ontario, Canada                                             | 253                  | 8:50 am<br>M-2                 | <b>Internal Microwave Propagation and Distortion Characteristics of Traveling-Wave Amplifiers Studied by Direct Electro-Optic Sampling</b><br>M J W Rodwell, K J Weingarten, D M Bloom<br>Stanford University, Stanford, CA<br>M Riazat<br>Varian Associates, Palo Alto, CA | 333                   |
| J-12                                            | <b>Dynamic Analysis of Microstrip Lines on Anisotropic Substrates</b><br>M R G Maia, A G d'Assunção<br>Fed Univ of Rio Grandedo Norte, Brazil<br>A J Giarola<br>State Univ of Campinas, Brazil                 |                      | 9:10 am<br>M-3                 | <b>Coplanar Waveguides Used in 2-18 GHz Distributed Amplifier</b><br>M Riazat, S Bandy, G Zdzisuk<br>Varian Central Research, Palo Alto, CA                                                                                                                                 | 337                   |
| J-13                                            | <b>Analysis of E-Plane Circulators by Eigenvalue Measurements</b><br>U Goebel, Ch Schublich<br>Technische Universität Hamburg, FRG                                                                             | 257                  | 9:20 am<br>M-4                 | <b>A 2-18 GHz Travelling Wave Lossless Two-Port Combiner</b><br>D Levy, A Noblet, Y Bender<br>Thomson-CSF, Malakoff, France                                                                                                                                                 | 339                   |
|                                                 |                                                                                                                                                                                                                |                      | 9:30 am<br>M-5                 | <b>A Complete Small Size 2 to 30 GHz Hybrid Distributed Amplifier Using a Novel Design Technique</b><br>P Gamand<br>Laboratoire d'Electronique et de Physique Appliquée, Limeril-Brevannes, France                                                                          | 343                   |

|                                                  |                                                                                                                                                                                                                      |                                                 |                |                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |                                                                                     |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Session N: Filters for Satellite Applications    |                                                                                                                                                                                                                      | Tuesday, June 3, 1986                           |                | 2:20 pm<br>R-5                                                                                                                                                                                                                                                                                          | Advances in Low-Cost Component Manufacturing: AvanteK's Die Manufacturing Facility<br>K. Crowley<br>AvanteK, Inc., Newark, CA                                     | 433                                                                                 |
| Room 317                                         | Convention Center                                                                                                                                                                                                    | Chairman: H.C. Bell, WAVECOM/LORAL              |                |                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |                                                                                     |
| 10:30 am<br>N-1                                  | An 8-Pole Quasi-Elliptic Function Filter Realized in 3 Dielectric Resonator Cavities<br>W. C. Tang<br>COM DEV Ltd., Cambridge, Ontario, Canada                                                                       | 349                                             | 2:40 pm<br>R-6 | Low Cost TO Packages for High Speed/Microwave Applications<br>D. A. Larson, D. E. Heckaman, J. A. Frisco, D. A. Haskins<br>Harris Corp., Melbourne, FL                                                                                                                                                  | 437                                                                                                                                                               |                                                                                     |
| 10:50 am<br>N-2                                  | Elliptic Bandpass Filters Using Four TM <sub>10</sub> Dielectric Rod Resonators<br>Y. Kobayashi, H. Furukawa<br>Saitama University, Urawa, Saitama, Japan                                                            | 353                                             | 2:50 pm<br>R-7 | Plug-in 11 GHz LNA Module with Ground Plane Tuner<br>B. R. Hallford<br>Rockwell International, Richardson, TX                                                                                                                                                                                           | 441                                                                                                                                                               |                                                                                     |
| 11:10 am<br>N-3                                  | Realization of an Exact 5-Pole Elliptic Function Filter Employing Dielectric Loaded Triple-Dual-Mode Cavity Structure<br>D. Su<br>COM DEV Limited, Cambridge, Ontario, Canada                                        | 357                                             |                |                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |                                                                                     |
| 11:30 am<br>N-4                                  | Analysis of Antipodal Ridge Waveguide Structure and Application on Extremely Wide Stop-band Lowpass Filter<br>A. M. K. Saad, J. D. Miller, A. Mitha, R. Brown<br>MA Electronics Canada, Mississauga, Ontario, Canada | 361                                             |                |                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |                                                                                     |
| Session O: Microwave Systems II                  |                                                                                                                                                                                                                      | Tuesday, June 3, 1986                           |                | Room 309/310                                                                                                                                                                                                                                                                                            | Convention Center                                                                                                                                                 | Session S: GaAs FET Amplifiers<br>Chairman: M. Kumar, Microwave Semiconductor Corp. |
| Room 307/308                                     | Convention Center                                                                                                                                                                                                    | Chairman: G. L. Heiter, AT&T Bell Labs          |                | 1:30 pm<br>S-1                                                                                                                                                                                                                                                                                          | 5 GHz 20Watt GaAs FET Amplifier for MLS<br>K. Hirai, H. Takamatsu, S. Morioka, N. Tomita<br>Toshiba Corp., Kawasaki, Japan                                        | 447                                                                                 |
| 10:30 am<br>O-2                                  | A MM-Wave Miniaturized Phase-Lock Source for Low Noise Receiver Applications<br>L. Bui, R. Hennequin, N. Ton<br>Torrance Research Center, Torrance, CA                                                               | 367                                             | 1:50 pm<br>S-2 | High Efficiency One, Two, and Four Watt Class B FET Power Amplifiers<br>J. R. Lane, R. G. Freitag, J. E. Degenford, M. Cohn<br>Westinghouse, Baltimore, MD                                                                                                                                              | 451                                                                                                                                                               |                                                                                     |
| 11:50 am<br>O-3                                  | Gigahertz Bandwidth Multibit Phase Sampling and Reconstruction of Microwave Signals<br>D. G. D. Clark, G. B. Wordsworth<br>THORN EMI Central Research Laboratories, United Kingdom                                   | 371                                             | 2:00 pm<br>S-3 | 2-watt and 5-watt internally Matched GaAs FETs for 10.7-11.7 and 14-14.5 GHz Bands<br>M. Avsarala<br>AvanteK Inc., Milpitas, CA                                                                                                                                                                         | 455                                                                                                                                                               |                                                                                     |
|                                                  |                                                                                                                                                                                                                      |                                                 | 2:10 pm<br>S-4 | A Low Phase Noise MMIC/Hybrid 3.0W Amplifier at X-Band<br>T. Dao, S. Huettner, A. Platzler<br>Raytheon Company, Bedford, MA                                                                                                                                                                             | 459                                                                                                                                                               |                                                                                     |
|                                                  |                                                                                                                                                                                                                      |                                                 | 2:20 pm<br>S-5 | 60 and 70 GHz (HEMT) Amplifiers<br>M. Sholley, A. Nichols<br>TRW, Redondo Beach, CA                                                                                                                                                                                                                     | 463                                                                                                                                                               |                                                                                     |
| Session P: Microwave Systems II                  |                                                                                                                                                                                                                      | Tuesday, June 3, 1986                           |                |                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |                                                                                     |
| Room 309/310                                     | Convention Center                                                                                                                                                                                                    | Chairman: F. N. Sechi, Microwave Power Research |                |                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |                                                                                     |
| 10:30 am<br>P-1                                  | An Accurate FET Modelling from Measured S-Parameters<br>H. Kondoh<br>Hewlett-Packard Co., Santa Rosa, CA                                                                                                             | 377                                             |                |                                                                                                                                                                                                                                                                                                         | Session T: Open Forum II 3:30 pm-5:30 pm<br>Chairman: D. C. Buck, Westinghouse                                                                                    | Tuesday, June 3, 1986                                                               |
| 10:50 am<br>P-2                                  | RF Nonlinear Device Characterization Yields Improved Modeling Accuracy<br>M. A. Smith, T. S. Howard, K. J. Anderson, A. M. Pavio<br>Texas Instruments Inc., Dallas, TX                                               | 381                                             |                |                                                                                                                                                                                                                                                                                                         | Magnetostatic Waves                                                                                                                                               |                                                                                     |
| 11:10 am<br>P-3                                  | Model-Extrapolate S-parameters Design of mm-wave GaAs FET Amplifiers<br>L. Dearden, G. Miner<br>Brigham Young University<br>M. Sayed, Hewlett-Packard                                                                | 385                                             | T-1            | Magnetostatic-Wave Propagation in a Yttrium Iron Garnet (YIG)-Loaded Waveguide<br>M. Radmanesh, C. M. Chu, G. I. Haddad<br>The University of Michigan, Ann Arbor, MI                                                                                                                                    | 469                                                                                                                                                               |                                                                                     |
| 11:30 am<br>P-4                                  | Characterization and Design of GaAs MESFETs for Broadband Control Applications<br>R. J. Gutmann<br>Rensselaer Polytechnic Institute, Troy, NY<br>D. Fryklund, D. Menzer<br>M/A-COM, Burlington, MA                   | 389                                             | T-2            | Magnetostatic Forward Volume Wave Straight Edge Resonators<br>K.-W. Chang, W. Ishak<br>Hewlett-Packard Laboratories, Palo Alto, CA                                                                                                                                                                      | 473                                                                                                                                                               |                                                                                     |
| 11:40 am<br>P-5                                  | Large-Signal Narrow Band Quasi-Black-Box Modeling of Microwave Transistors<br>F. Filiconi, A. Manbroni, V. A. Monaco<br>Universita di Bologna, Bologna, Italy                                                        | 393                                             | T-3            | A Ku Band MSW Delay Line<br>D. A. Willems and J. M. Owens<br>ITT Corporation, Fort Wayne, IN                                                                                                                                                                                                            | 477                                                                                                                                                               |                                                                                     |
|                                                  |                                                                                                                                                                                                                      |                                                 | T-4            | Compact Magnetostatic Wave Channelizer<br>M. R. Daniel, J. D. Adam<br>Westinghouse R & D Center, Pittsburgh, PA                                                                                                                                                                                         | 481                                                                                                                                                               |                                                                                     |
|                                                  |                                                                                                                                                                                                                      |                                                 |                |                                                                                                                                                                                                                                                                                                         | FET Nonlinearities                                                                                                                                                |                                                                                     |
|                                                  |                                                                                                                                                                                                                      |                                                 | T-5            | Frequency Conversion in General Nonlinear Multiport Devices<br>V. Rizzoli, A. Lipparini<br>University of Bologna, Bologna, Italy<br>C. Cecchetti<br>Fondazione Ugo Bordon, Bologna, Italy                                                                                                               | 485                                                                                                                                                               |                                                                                     |
| Room 317                                         | Convention Center                                                                                                                                                                                                    | Chairman: C. M. Kudva, COM DEV Ltd.             |                | T-6                                                                                                                                                                                                                                                                                                     | Prediction of Wideband Power Performance of MESFET Devices Using the Volterra Series Presentation<br>C. E. Law, C. S. Atchison<br>King's College, London, England | 487                                                                                 |
| 1:30 pm<br>Q-1                                   | A Simple Experimental Technique For Determining Coupling Between Dielectric Resonators<br>J. C. Brand<br>Motorola Inc., Scottsdale, AZ                                                                               | 399                                             | T-7            | Microwave Device Modelling Using Efficient I <sub>1</sub> Optimization: A Novel Approach<br>J. W. Bandler, S. H. Chen, S. Dayavad<br>McMaster University, Hamilton, Canada                                                                                                                              | 491                                                                                                                                                               |                                                                                     |
| 1:40 pm<br>Q-2                                   | 800MHz Band Face-Bonding Filter Using Dielectric B D L S<br>Nishikawa, K. Wakino, J. Hattori, Y. Ishikawa, Murata Mfg. Co. Ltd., Kyoto, Japan                                                                        | 403                                             | T-8            | Thermal Characterization of Microwave Power FETs Using Nematic Liquid Crystals<br>M. M. Minot<br>AvanteK Inc., Milpitas, CA                                                                                                                                                                             | 495                                                                                                                                                               |                                                                                     |
| 2:00 pm<br>Q-3                                   | Two path Cutoff Waveguide Resonator Filters with Attenuation Poles<br>H. Shigesawa, M. Tsuji, K. Takiyama<br>Doshisha University, Kyoto, Japan                                                                       | 407                                             | T-9            | Determination of the Transfer Function of a Nonlinear Circuit for Prediction of Intermodulation Characteristics<br>J. R. Fayos, S. J. Nightingale<br>General Electric Company, Syracuse, NY                                                                                                             | 499                                                                                                                                                               |                                                                                     |
| 2:10 pm<br>Q-4                                   | Varactor Tuned Bandpass Filters Using Microstrip-Line Ring Resonators<br>M. Makimoto, M. Sagawa<br>Matsushita Research Institute, Tokyo, Japan                                                                       | 411                                             | T-11           | Full Characterization of GaAs Power MESFET and Accurate Load-Pull Contours Prediction<br>M. Lajugie<br>Thomson-CSF, Malakoff, France/UFR des Sciences de Limoges, Limoges, France<br>F. Grossier<br>Thomson Semiconducteurs, Massy, France<br>A. Silbermann, Y. Bender<br>Thomson-CSF, Malakoff, France | 503                                                                                                                                                               |                                                                                     |
| 2:30 pm<br>Q-5                                   | A Bandstop Filter Constructed in Non-Radiative Dielectric Waveguide<br>J. C. Olivier, J. A. G. Malherbe<br>University of Pretoria, South Africa                                                                      | 415                                             |                |                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |                                                                                     |
| Session R: Focused Session—Manufacturing Methods |                                                                                                                                                                                                                      | Tuesday, June 3, 1986                           |                |                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |                                                                                     |
| Room 307/308                                     | Convention Center                                                                                                                                                                                                    | Chairman: G. Klein, Westinghouse                |                | T-12                                                                                                                                                                                                                                                                                                    | A Microwave Powered, Long Duration, High Altitude Platform<br>W. C. Brown<br>Weston, MA                                                                           | 507                                                                                 |
| 1:30 pm<br>R-1<br>(Invited)                      | Cost Reduction in Manufacturing Microwave Components<br>R. M. Malbon<br>AvanteK Inc., Santa Clara, CA                                                                                                                | 419                                             | T-22           | Simulation of Intermodulation Distortion in MESFET Circuits with Arbitrary Frequency Separation of Tones<br>G. W. Rhyne, M. B. Steer<br>North Carolina State University, Raleigh, NC                                                                                                                    | 511                                                                                                                                                               |                                                                                     |
| 1:50 pm<br>R-2                                   | Automated Interconnect on GaAs Integrated Circuits<br>J. S. Pavio, D. Bretzke<br>Texas Instruments, Dallas, TX                                                                                                       | 423                                             |                |                                                                                                                                                                                                                                                                                                         | Power Combining                                                                                                                                                   |                                                                                     |
| 2:00 pm<br>R-3                                   | Advances in Low-Cost Manufacturing—Quasi Thin Film Technology Produces Low-Loss MIC Components<br>M. Leitner, R. Vahldieck<br>Bolnet Technologies Inc., Ontario, Canada                                              | 427                                             |                |                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |                                                                                     |
| 2:10 pm<br>R-4                                   | A Comparison of Thin Film and Thick Film Ku-Band Amplifiers<br>A. M. Pavio, L. L. Cook<br>Texas Instruments, Inc., Dallas, TX                                                                                        | 431                                             | T-13           | A 19-Watt Isolated Power Divider Via the TE <sub>01</sub> Circular Waveguide Mode Transition<br>M. H. Chen<br>TRW, Redondo Beach, CA                                                                                                                                                                    | 513                                                                                                                                                               |                                                                                     |

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|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| T-14                                                                                                     | 30-Way Radial Power Combiner for Miniature GaAs FET Power Amplifiers<br>E Belobouek, R Brown, H Johnson, A Fathy, D Bechtel, D Kalokitis, E Mykietyn<br>RCA Laboratories, Princeton, NY     | 515                     | 9 10 am<br>W-2   | Optical Injection Locking of FET Oscillators Using Fiber Optics<br>D C Buck, M A Cross<br>Westinghouse Electric Corporation, Baltimore, MD                                                                   | 611 |
| Microwave Optical Interactions                                                                           |                                                                                                                                                                                             |                         | 9 30 am<br>W-3   | Comparison of Indirect Optical Injection Locking Techniques of Multiple X-Band Oscillators<br>P Wahi, Z Turski<br>LORAL-ATL, Lanham, MD<br>A S Daryoush, P R Herzfeld<br>Drexel University, Philadelphia, PA | 615 |
| T-15                                                                                                     | Power Transfer Between Single-Mode and Multi-Mode Optical Fibers<br>H S Huang, H-C Chang, J-S Wu<br>National Taiwan University, Taipei, Taiwan                                              | 519                     |                  |                                                                                                                                                                                                              |     |
| T-16                                                                                                     | Flat Microwave Responses of Directly Modulated Laser Diodes<br>M C R Carvalho, A A de Salles<br>CETUC-PUC/RJ, Rio de Janeiro, Brazil                                                        | 523                     |                  |                                                                                                                                                                                                              |     |
| T-17                                                                                                     | A Microwave-to-Optical Transducer<br>L F Jelsma<br>Lawrence Livermore National Laboratory, Livermore, CA                                                                                    | 527                     |                  |                                                                                                                                                                                                              |     |
| Millimeter Waves                                                                                         |                                                                                                                                                                                             |                         | 8 30 am<br>X-1   | A Broadband, Electric-Field Probe Using Resistively Tapered Dipoles, 100 kHz-18 GHz<br>M Kanda, L D Driver<br>National Bureau of Standards, Boulder, CO                                                      | 621 |
| T-18                                                                                                     | Design and Performance of the Millimeter Wave DBR Gunn Oscillators<br>L Zong-Wen, Z Wen-Xun<br>Nanjing Institute of Technology, Nanjing, Jiangsu, PRC                                       | 531                     | 8 50 am<br>Y-2   | An Automated Measurement Technique for Measuring Amplifier Load-pull and Verifying Large-Signal Device Models<br>M Pierpont, R D Pollard, J R Richardson<br>The University of Leeds, Leeds, U K              | 625 |
| T-23                                                                                                     | Analysis of Optically Controlled Microwave/Millimeter Wave Device Structures<br>R N Simons, K B Bhasin<br>National Aeronautics & Space Administration, Lewis Research Center, Cleveland, OH | 551                     | 9 10 am<br>X-3   | Direct Calibration and Measurement of Microstrip Structures on GaAs<br>P R Shepherd, R D Pollard<br>The University of Leeds, Leeds, U K                                                                      | 629 |
| Novel Components                                                                                         |                                                                                                                                                                                             |                         | 9 30 am<br>X-4   | A System for Performing Ultra High Resolution Backscatter Measurements of Splashes<br>J P Hansen<br>Naval Research Laboratory, Washington, DC                                                                | 633 |
| T-19                                                                                                     | A Combined MMIC/MIC 8-Channel Receive Only Phased Array Demonstrator Operating in I/J Band<br>G King, S J Flynn<br>Marconi Defence Systems Limited, Stanmore, UK                            | 535                     |                  |                                                                                                                                                                                                              |     |
| T-20                                                                                                     | Medium Power S-Band Rotary Field Ferrite Phase Shifters<br>W E Hord, C R Boyd, Jr., C M Oness<br>Microwave Applications Group, Santa Maria, CA                                              | 539                     |                  |                                                                                                                                                                                                              |     |
| T-21                                                                                                     | Improved Computer-Aided Synthesis Tools for the Design of Matching Networks for Wide-band Microwave Amplifiers<br>D J Mellor<br>Hewlett Packard Company, Meridian, ID                       | 543                     |                  |                                                                                                                                                                                                              |     |
| Session U: Microwave Acoustics and Magnetostatics                                                        |                                                                                                                                                                                             |                         | 8 30 am<br>Y-1   | A Ka-Band Microstrip Integrated Circuit FMCW Transceiver<br>T N Trinh, E Benko, W S Wong<br>Hughes Aircraft Company, Torrance, CA                                                                            | 639 |
| Room 307/308                                                                                             | Convention Center<br>Chairman T Lukaszek, US Army LABCOM                                                                                                                                    | Tuesday, June 3, 1986   | 8 50 am<br>Y-2   | A Ka-Band Dual-Channel Tracking Receiver Converter<br>M A Smith, A M Pavio, B Kim<br>Texas Instruments, Inc., Dallas, TX                                                                                     | 643 |
| 3:30 pm<br>U-1<br>(Invited)                                                                              | Microwave Acoustic Devices in Systems<br>B R McAvoy<br>Westinghouse, Pittsburgh, PA                                                                                                         | 557                     | 9 00 am<br>Y-3   | Printed-Circuit Ka-Band Mixer with Compact Filter for Step-Tuned LO<br>P J Meier<br>Eaton Corp., Melville, NY                                                                                                | 645 |
| 3:50 pm<br>U-2                                                                                           | An Overview on Japanese Manufacturing of SAW Devices<br>S Fujishima<br>Murata Mfg., Co., Japan                                                                                              | 561                     | 9 20 am<br>Y-4   | A Planar Log-Periodic Mixenna for Submillimeter-wave Astronomy<br>P H Siegel<br>National Radio Astronomy Observatory, Charlottesville, VA                                                                    | 649 |
| 4:00 pm<br>U-3                                                                                           | Saw Convolvers and Signal Processing in a Packet Radio<br>J Fischer, J Cafarella, G Flynn<br>MIT Lincoln Laboratory, Lexington, MA                                                          | 565                     |                  |                                                                                                                                                                                                              |     |
| 4:20 pm<br>U-4                                                                                           | Wide Band RF Channelization Using Frequency-Dependent Beam Steering of Focused Bulk Acoustic Waves<br>F Sabet-Peyman, K Chau, I C Chang<br>Litton, Sunnyvale, CA                            | 569                     |                  |                                                                                                                                                                                                              |     |
| 4:30 pm<br>U-5                                                                                           | MSSW Transversal Filters Based on Current Weighting in Narrow (10 $\mu$ m) Transducers<br>Y J Ataiyan, J M Owens, K W Reed, R L Carter, W A Davis<br>Univ of Texas, Arlington, TX           | 575                     |                  |                                                                                                                                                                                                              |     |
| 4 40' pm<br>U-6                                                                                          | A Novel MSW Programmable Barker Code/Decoder<br>S H Talisa, J D Adam, T W O'Keefe<br>Westinghouse, Pittsburgh, PA                                                                           | 579                     |                  |                                                                                                                                                                                                              |     |
| Session V: GaAs FET Oscillators, Doublers and Mixers                                                     |                                                                                                                                                                                             |                         | 11 10 am<br>Z-2  | Limitations on Switching Speed in Wideband Semiconductor Lasers<br>R S Tucker, J M Wiesenfeld, P M Downey, J E Bowers<br>AT&T Bell Laboratories, Holmdel, NJ                                                 | 655 |
| Room 309/310                                                                                             | Convention Center<br>Chairman E J Crescenzi, Jr., Watkins-Johnson                                                                                                                           | Tuesday, June 3, 1986   | 11 30 am<br>Z-3  | Linearity Characterization of Connectorized Laser Diodes Under Microwave Intensity Modulation by AM/AM and AM/PM Measurements<br>W I Way, A Afrashteh<br>Bell Communications Research, Red Bank, NJ          | 659 |
| 3:30 pm<br>V-1                                                                                           | Design of a Novel FET Frequency Doubler Using a Harmonic Balance Algorithm<br>R Gilmore<br>Schlumberger, Houston, TX                                                                        | 585                     |                  |                                                                                                                                                                                                              |     |
| 3:50 pm<br>V-2                                                                                           | Highly Stable 35 GHz GaAs FET Oscillator<br>G S Dow, D Sensiper, J M Schellenberg<br>Hughes Torrance, CA                                                                                    | 589                     |                  |                                                                                                                                                                                                              |     |
| 4:00 pm<br>V-3                                                                                           | A Unified Design of Dielectric Resonator Oscillators for Telecommunication Systems<br>S-W Chen, L-C Chang, J Y Chin<br>Microelectronics Technology, Inc., Hsinchu, Taiwan, R O C            | 593                     |                  |                                                                                                                                                                                                              |     |
| 4:10 pm<br>V-4                                                                                           | A New N FETs Oscillator-Combiner Using Tubular Dielectric Resonators<br>J P Joer, J Obregon<br>Universite de Limoges, Limoges, France                                                       | 597                     | 10 30 am<br>AA-1 | Calibrating a Dual Six-Port or Four-Port for Measuring Two-Ports With Any Connectors<br>C A Huer, G F Engen<br>National Bureau of Standards, Boulder, CO                                                     | 665 |
| 4 20 pm<br>V-5                                                                                           | A Millimeter-wave Self-Oscillating Mixer Using a GaAs FET Harmonic-Mode Oscillator<br>D H Evans<br>Philips Research Laboratories, Redhill, England                                          | 601                     | 10 50 am<br>AA-2 | Integrated Fm-Line 6-Ports for MM-Wave Network Analyzers<br>M Malkomes, R Walsdorf<br>Institute for High Frequency Techniques, Aachen, FRG                                                                   | 669 |
| Session W: Focused Session—Microwave Aspects and Applications of GHz/GBIT Optical Transmission Systems I |                                                                                                                                                                                             |                         | 11 00 am<br>AA-3 | Extension of Six Port Theory and Practice<br>L Kakioubi, R G Bosiso<br>Ecole Polytechnique of Montreal, Montreal, Canada                                                                                     | 673 |
| Room 317                                                                                                 | Convention Center<br>Chairman N R Dietrich, AT&T Bell Labs                                                                                                                                  | Wednesday, June 4, 1986 | 11 20 am<br>AA-4 | Coherent RF Error Statistics<br>R B Dybdal, R H Ott<br>The Aerospace Corporation, El Segundo, CA                                                                                                             | 677 |
| 8 30 am<br>W-1<br>(Invited)                                                                              | Overview of the Applications of Microwave Techniques for Lightwave Systems<br>H Sobol<br>Rockwell Int., Dallas, TX                                                                          | 607                     | 11 30 am<br>AA-5 | Microwave Resonator Circuit Model From Measured Data Fitting<br>W P Wheelless, Jr., D Kafetz<br>University of Mississippi, University, MS                                                                    | 681 |

| Session BB: Passive Circuit Modeling |                                                                                                                      |                                                    |                         | Session FF: Biological Effects & Medical Applications |                                                                                                                                                                     |                                                                                                       |                         |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------|
| Room 307/308                         | Convention Center                                                                                                    | Chairman N G Alexopoulos, UCLA                     | Wednesday, June 4, 1986 | Room 317                                              | Convention Center                                                                                                                                                   | Chairman A Rosen, RCA-David Sarnoff Research Ctr                                                      | Wednesday, June 4, 1986 |
| 10:30 am<br>BB-1                     | Microstrip Filter Design Including Dispersion Effects and Radiation Losses                                           |                                                    | 687                     | 3:30 pm<br>FF-1                                       | A Three-Band Microwave Radiometer System for Noninvasive Measurement of the Temperature at Various Depths                                                           |                                                                                                       | 759                     |
|                                      | P B Katehi<br>The University of Michigan, Ann Arbor, MI<br>L P Dunleavy<br>Hughes Aircraft Company, Torrance, CA     |                                                    |                         |                                                       | S Mizushima, Y Hamamura, T Sugura<br>Shizuoka University, Shizuoka Prefecture, Japan                                                                                |                                                                                                       |                         |
| 10:50 am<br>BB-2                     | Dispersion of Transient Signals in Microstrip Transmission Lines                                                     |                                                    | 691                     | 3:50 pm<br>FF-2                                       | Biological Temperature Retrieval by Scanning Radiometry                                                                                                             |                                                                                                       | 763                     |
|                                      | R L Veghite<br>Ball Aerospace Systems Division, Boulder, CO<br>C A Balanis<br>Arizona State University               |                                                    |                         |                                                       | F Bardati, M Mongiardo, D Solimini, P Tognolatti<br>TI Università di Roma, Italy                                                                                    |                                                                                                       |                         |
| 11:00 am<br>BB-3                     | Characteristics of Multiconductor, Asymmetric, Slow-Wave Microstrip Transmission Lines                               |                                                    | 695                     | 4:10 pm<br>FF-3                                       | Instrumentation for Invasive and Non-Invasive Microwave Hyperthermia of Brain Tumors                                                                                |                                                                                                       | 767                     |
|                                      | T C Mu, H Ogawa, T Itoh<br>The University of Texas, Austin, TX                                                       |                                                    |                         |                                                       | R W Faghlone, F Sterzer<br>RCA Laboratories, Princeton, NJ<br>A Winter, J Laug<br>The Hospital Center at Orange, Orange, NJ                                         |                                                                                                       |                         |
| 11:10 am<br>BB-4                     | Coplanar Waveguide vs. Microstrip for Millimeter Wave Integrated Circuits                                            |                                                    | 699                     | 4:20 pm<br>FF-4                                       | Swept Frequency Measurements of Various Coaxial Antennas in a Feline Brain Model                                                                                    |                                                                                                       | 771                     |
|                                      | R W Jackson<br>University of Massachusetts, Amherst, MA                                                              |                                                    |                         |                                                       | G Neuberth, Nurad Inc<br>M Saleman, Univ of Maryland Hospital<br>Baltimore, MD                                                                                      |                                                                                                       |                         |
| 11:20 am<br>BB-5                     | Discontinuities in Fin-Lines on Semiconductor Substrate                                                              |                                                    | 703                     | 4:30 pm<br>FF-5                                       | Energy Distribution Patterns Within Limb Models Heated with a Mini Annular Phased Array (MAPA) Applicator                                                           |                                                                                                       | 775                     |
|                                      | K Uhde<br>Technische Universität Hamburg, FRG                                                                        |                                                    |                         |                                                       | J L Guerin-Kern<br>National Institutes of Health, Bethesda, MT, INSERM, France<br>M J Hagmann, C K Charny, R L Levin<br>National Institutes of Health, Bethesda, MT |                                                                                                       |                         |
|                                      | Session CC: Optical Devices for Microwave Applications                                                               |                                                    |                         | 4:40 pm<br>FF-6                                       | Cytogenetic Observations on Microwave Exposed Bovine Lymphocytes                                                                                                    |                                                                                                       | 779                     |
| Room 317                             | Convention Center                                                                                                    | Chairman K T Yano, TRW                             | Wednesday, June 4, 1986 |                                                       | B Bisceglia, G d'Ambrosio, D DiBerardino, M B Lioi, M R Scarfi<br>University of Naples, Naples, Italy                                                               |                                                                                                       |                         |
| 1:30 pm<br>CC-1                      | 10 GHz RF Fiber Optic Links                                                                                          |                                                    | 709                     |                                                       | Session GG: Analytical and Numerical Methods                                                                                                                        |                                                                                                       |                         |
|                                      | C M Gee, I L Newberg, G D Thurmond, H W Yen<br>Hughes Research Laboratories, Malibu, CA                              |                                                    |                         | Room 310                                              | Convention Center                                                                                                                                                   | Chairman T Itoh, University of Texas-Austin                                                           | Wednesday, June 4, 1986 |
| 1:50 pm<br>CC-2                      | A 1GBIT/S Optical/Electrical Input Monolithic GaAs Transmitter I.C.                                                  |                                                    | 713                     | 3:30 pm<br>GG-1                                       | An Improved Transmission Matrix Formulation of Cascaded Discontinuities and its Application to E-plane Circuits                                                     |                                                                                                       | 785                     |
|                                      | M P Walton, P R Haugen, S L Palmquist<br>Honeywell, Bloomington, MN                                                  |                                                    |                         |                                                       | R R Mansour, R H MacPhie<br>University of Waterloo, Waterloo, Ontario, Canada                                                                                       |                                                                                                       |                         |
| 2:10 pm<br>CC-3                      | Heterojunction Bipolar Phototransistor for Monolithic Photoreceiver Operating at 140 Mbit/s                          |                                                    | 717                     | 3:50 pm<br>GG-2                                       | Three Dimensional Finite-Element Formulation for Finline Discontinuity Programs                                                                                     |                                                                                                       | 789                     |
|                                      | H Wang, J L Lievin, C Bacot, C Chevalier, D Ankr<br>Centre National d'Etudes des Télécommunications, Bagneux, France |                                                    |                         |                                                       | O Pççn, V Fouad Hanna<br>Centre National d'Etudes des Télécommunications, Issy-Les-Moulineaux, France<br>J Citerne<br>I N S A , Rennes Cedex, France                |                                                                                                       |                         |
| 2:30 pm<br>CC-4                      | Self-Oscillating GaAs FET Demodulator and Downconverter for Microwave Modulated Optical Signals                      |                                                    | 721                     | 4:10 pm<br>GG-3                                       | The Time Domain Finite Difference Method and its Application                                                                                                        |                                                                                                       | 793                     |
|                                      | C Rauscher, L Goldberg, A M Yurek<br>Naval Research Laboratory, Washington, D C                                      |                                                    |                         |                                                       | D H Choi, W J R Hoefer<br>University of Ottawa, Ottawa, Ontario, Canada                                                                                             |                                                                                                       |                         |
|                                      | Session DD: Ferrites                                                                                                 |                                                    |                         | 4:30 pm<br>GG-4                                       | Proposal of Surface-wave Planar Circuit, Formulation of its Planar Circuit Equations and its Practical Application                                                  |                                                                                                       | 797                     |
| Room 310                             | Convention Center                                                                                                    | Chairman J E Pippin, Electromagnetic Sciences Inc. | Wednesday, June 4, 1986 |                                                       | J Hsu, T Anada, F Enguchi<br>Kanagawa University, Yokohama-shi, Japan                                                                                               |                                                                                                       |                         |
| 1:30 pm<br>DD-1                      | Simultaneous Dual-Polarization Ferrite Phase Shifter                                                                 |                                                    | 727                     |                                                       | Session HH: Joint with Monolithics Symposium—Microwave Amplifiers                                                                                                   |                                                                                                       |                         |
|                                      | W E Hord, C R Boyd, Jr<br>Santa Maria, CA                                                                            |                                                    |                         | Room 307/308/309                                      | Convention Center                                                                                                                                                   | Chairman R Gold, Adams-Russell Co., Burlington, MA<br>Co-Chairman V Nair, Motorola, Inc., Phoenix, AZ | Wednesday, June 4, 1986 |
| 1:50 pm<br>DD-2                      | Temperature Insensitive Dual-Mode Phase Shifter                                                                      |                                                    | 731                     | 2:15 pm                                               | Chairman's Introduction                                                                                                                                             |                                                                                                       |                         |
|                                      | H Asao, M Matsunaga, F Takeda<br>Mitsubishi Electric Corporation, Kanagawa Prefecture, Japan                         |                                                    |                         | 2:20 pm<br>HH-1                                       | High Performance Monolithic Power Amplifier Using a Unique Ion Implantation Process                                                                                 |                                                                                                       | 803                     |
| 2:00 pm<br>DD-3                      | An Adjustable-Phase Power Divider                                                                                    |                                                    | 735                     |                                                       | S K Wang, K G Wang, C D Chang<br>Hughes Aircraft Co., Torrance, CA                                                                                                  |                                                                                                       |                         |
|                                      | C R Boyd, Jr<br>Microwave Applications Group, Santa Maria, CA                                                        |                                                    |                         | 2:40 pm<br>HH-2                                       | A Low Cost, 3-7 GHz, 1/2 Watt MMIC GaAs Amplifier                                                                                                                   |                                                                                                       | 807                     |
| 2:20 pm<br>DD-4                      | Broadband Stripline Circulator                                                                                       |                                                    | 739                     |                                                       | S B Moghe, R Genn<br>Pacific Monolithics, Sunnyvale, CA                                                                                                             |                                                                                                       |                         |
|                                      | E Schloemann, R E Blight<br>Raytheon Research Division, Lexington, MA                                                |                                                    |                         | 3:20 pm<br>HH-3                                       | A Power Distributed Amplifier Using Constant-R Networks                                                                                                             |                                                                                                       | 811                     |
| 2:40 pm<br>DD-5                      | Isolators in Finline Technique                                                                                       |                                                    | 743                     |                                                       | E M Chase, W Kennan<br>Avantek, Inc., Santa Clara, CA                                                                                                               |                                                                                                       |                         |
|                                      | Ch Schieblch, U Goebel<br>Technische Universität, Hamburg, FRG                                                       |                                                    |                         | 3:40 pm<br>HH-4                                       | A Stable 2-26.5 GHz Two-Stage Dual-Gate Distributed MMIC Amplifier                                                                                                  |                                                                                                       | 817                     |
|                                      | Session EE: Joint with Monolithics Symposium—Opening Session                                                         |                                                    |                         |                                                       | J Ott<br>Hewlett-Packard Co., Santa Rosa, CA                                                                                                                        |                                                                                                       |                         |
| Room 307/308/309                     | Convention Center                                                                                                    | Chairman R Sudbury—MIT Lincoln Lab                 | Wednesday, June 4, 1986 | 4:00 pm<br>HH-5                                       | A High Gain, Monolithic Distributed Amplifier Using Cascode Active Elements                                                                                         |                                                                                                       | 821                     |
| 1:30 pm<br>EE-1                      | Welcome                                                                                                              |                                                    | 749                     |                                                       | R Larue, S Bandy, G Zdziusik<br>Vanan Associates, Palo Alto, CA                                                                                                     |                                                                                                       |                         |
|                                      | R Sudbury, Symposium Chairman<br>Y Ayasli, Technical Program Chairman                                                |                                                    |                         | 4:20 pm<br>HH-6                                       | A High Performance 2-18.5 GHz Distributed Amplifier, Theory and Experiment                                                                                          |                                                                                                       | 825                     |
| 1:40 pm<br>EE-2<br>(Invited)         | DOD Microwave and Millimeter-Wave Monolithic Integrated Circuits (MIMIC) Program                                     |                                                    | 753                     |                                                       | T McKay<br>Teledyne MMIC, Mountain View, CA<br>R Williams<br>Texas Instruments, Dallas, TX                                                                          |                                                                                                       |                         |
|                                      | E Maynard<br>DOD OUSDRE, Washington, D C                                                                             |                                                    |                         |                                                       |                                                                                                                                                                     |                                                                                                       |                         |