1995 International Microwave Symposium

Workshops

Sunday, May 14, 1995

(Convention Center, Hall A1)

Number	Time/Room	Title
WSFA	8:00 am–5:00 pm (CC, Hall A1)	ICs for Wireless Communications

Monday, May 15, 1995

(Convention Center)

WMFB	8:00 am–5:00 pm (CC, Room 20B)	System Applications of High Temperature Superconductors and Cryogenic Electronics
WMFC	8:00 am–5:00 pm (Room 20C)	Advances in Traveling Wave Tube Technology
WMFD	8:00 am–5:00 pm (Room 20E)	Modeling of Microwave Filters and Passive Components
WMHE	8:00 am–5:00 pm (Room 20F)	Automated Circuit Design Using Electromagnetic Simulators
WMHF	8:00 am-5:00 pm (Room 20G)	Photonic Guided Wave Structures
WMHG	8:00 am-5:00 pm (Room 21)	Field Theoretical Problems for Wireless Technology
WMHH	8:00 am–12:00 noon (Room 23A)	Recent Advances in Microwave and mm-Wave Oscillator Design
WMHA	1:00 pm–5:00 pm (Room 20A)	Chaos in Microwave Systems
WMHI	1:00 pm–5:00 pm (Room 20D)	Packaging Technology

1995 International Microwave Symposium

Workshops

Friday, May 19, 1995

(Convention Center)

Number	Time/Room	Title
WFFA	8:00 am–5:00 pm (Room 10C)	Silicon RF Technologies
WFFB	8:00 am–5:00 pm (Room 12A)	GaAs HBTs: Devices, Circuits and Reliability
WFFC	8:00 am–5:00 pm (Room 11A)	Microwave Vehicular Technology
WFFD	8:00 am–5:00 pm (Room 11B)	Advances in Microwave and mm-Wave Synthesizer Technology
WFFE	8:00 am–5:00 pm (Room 12B)	CAD Design Methodology for Commercial Applications
WFFF	8:00 am–5:00 pm (Room 12C)	Design Approaches for IC Antenna Modules
WFFG	8:00 am–5:00 pm (Room 11C)	Power Devices and MMICs for Wireless and Military Applications
WFFH	8 am–5:00 pm (Room 10A)	MIMIC Hardware Description Language and Standards
WFHI	8 am–12:00 noon (Room 10B)	Microwave Applications of Ferroelectric Ceramics

Workshops

WFFA: Silicon RF Technologies

Date:	Friday, May 19, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Hall 10C
Sponsor:	MTT-6 Microwave and Millimeter-Wave Circuits Committee
Organizers:	Susan R. Taub, NASA Lewis Research Center Anand Gopinath, University of Minnesota Arye Rosen, David Sarnoff Research Center
Chairman:	Susan R. Taub, NASA Lewis Research Center
Speakers:	Anant K. Agarwal, Westinghouse P. Asbeck, University of California, San Diego Natalino Camilleri, Motorola Steven Campbell, University of Minnesota Christian Kermarrec, Analog Devices A. Khatibzadeh, Texas Instruments J. Jui, Daimler Benz Bernard Meyerson, IBM Peter Russer, Techn, Universitat Munchen Kenneth J. Sleger, US Naval Research Laboratory Susan Reinecke Taub, NASA Lewis Research Center Ran-Hong Yan, Bell Laboratories

Abstract:

Historically silicon has not been considered a viable microwave material for two reasons; the lack of high frequency active devices and the tremendous dielectric losses of silicon substrates at microwave frequencies. However, recently silicon and silicon-germanium (SiGe) devices have been developed that operate well over 60 GHz. Also, it has been demonstrated that high resistivity silicon wafers have dielectric losses that rival those of GaAs, which now means that silicon RF circuits are becoming a viable alternative to GaAs and InP circuits. This workshop focuses on the various material, device and circuit issues faced by silicon RF application designers in terms of the many silicon RF technologies now being developed. These technologies include SiGe, SOI, high-resistivity silicon and high frequency silicon devices. Issues from material-to-device-to-circuit development are covered.

Workshops

WFFB: GaAs HBTs: Devices, Circuits and Reliability

Date:	Friday, May 19, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Room 12A
Sponsors:	MTT-6 Microwave and Millimeter-Wave ICs MTT-7 Microwave and Millimeter-Wave Devices
Organizers:	Fazal Ali, Westinghouse—ATD Burhan Bayraktaroglu, Westinghouse—ATD Aditya Gupta, Westinghouse—ATD Rolf Jansen, Jansen Microwave
Speakers:	Peter Asbeck, U.C. San Diego Y. Itoh, Furukawa Tom Kierl, Quantum Epitaxial Design Burhan Bayraktaroglu, Westinghouse Aiden Higgins, Rockwell Madjid Hafizi, Hughes Aaron Oki, TRW Tim Henderson, Texas Instruments Dimitris Pavlidis, University of Michigan Aditya Gupta, Westinghouse Hans Hartnagel, Univbersity of Darmstadt Dominique Pons, Thomas CSF Kajuhiko Honjo, NEC Shinji Hara, Sharp Corporation

Abstract:

GaAs heterojunction bipolar transistors (HBT) are emerging as key technology for precision analog/digital circuits, power amplifiers, low phase-noise oscillators, multifunction MMICs, frequency dividers and millimeter-wave circuits. This workshop provides the latest information on the HBT devices performance and enhancements and their circuit applications. Various circuit and system insertion examples are presented and discussed. In addition, invited speakers will share their findings about the reliability of HBT devices and implications for system insertion. Audience participation is strongly encouraged.

Workshops

WFFC: Microwave Vehicular Technology

Date:	Friday, May 19, 1995
Time:	8:00 am to 5:00 pm
Location:	Convention Center, Room 11A
Sponsor:	MTT-16 Microwave Systems, Subcommittee on Vehicular Technology
Chairman:	Rahul Dixit, TRW—Transportation Electronics
Organizers:	Richard A. Sparks, ANRO Engineering Inc. Rahul Dixit, TRW—Transportation Electronics
Speakers:	Jerry Will, Vorad Safety Systems Inc. Gerry Brand, Hughes Aircraft Co. Mike Shulman, Ford Motor Co. Antoine Obeika, TRW William Leasure, Federal Highway Crash Avoidance, DOT Gabriel Rabeez, University of Michigan Speaker from Japan, to be announced Speaker from Europe, to be announced

Abstract:

Currently, the electronic content in automobiles is 12 to 15 percent. Over the next few years, this is expected to grow to over 20 percent, which amounts to billions of dollars. Much of this growth will be in microwave and mm-wave products that will focus on convenience and safety. While there is a substantial effort at the infrastructure development through IVHS initiative, this workshop focuses on the application of mm-wave technology of mm-wave vehicle components. Motivation and needs, market size, regulatory issues and the required technology push are summarized. The key to achieving affordable microwave and mm-wave products is the technology's maturity and product development. The presentations focus on antenna technology, processor algorithms, and driver and vehicle interface.

Workshops

WFFD: Advances in Microwave and Millimeter-Wave Synthesizer Technology

Date:	Friday, May 19, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Room 11B
Sponsors:	MTT-6 Microwave and Millimeter-Wave Integrated Circuits MTT-1 Computer-Aided Design
Organizer & Chairmen:	Arvind K. Sharma, TRW/S&EG Frank Sullivan, Raytheon
Speakers:	Ulrich Rohde, Compact Software Rolf Dalichow, Hewlett-Packard Greg Chao, TRW Aaron Oki, TRW P. Russer, FBH Berlin

Abstract:

Among signal processing components, synthesizers provide an important function. In the past, they have been developed using silicon transistors, MESFETs and heterojunction bipolar transistors (HBT) at microwave frequencies, and high electron mobility transistors (HEMT) at both microwave and millimeter-wave frequencies. However, due to recent advances in material and device processing techniques, HBT technology is emerging as a potential alternative to silicon, since it can provide low cost and high performance synthesizer MMICs for various military and commercial communication systems. This workshop presents in-depth tutorial discussions, as well as state-of-the-art reviews on synthesizer architectures and components. It addresses design methodologies, assembly, package, test reliability ande cost aspects. It provides discussions on device modeling and circuit simulation techniques for RF components. It stimulates those uninitiated in the area, and also provides a forum for discussions for those already familiar with it. Current bottleneck issues, possible solutions and future directions in the design of synthesizers at microwave and millimeter-wave frequencies are discussed. Participants will be strongly encouraged to explain their views and share their experiences.

Workshops

WFFE: CAD Design Methodology for Commercial Applications

Date:	Friday, May 19, 1995
Time:	8:00 am to 5:00 pm
Location:	Convention Center, Room 12B
Sponsor:	MTT-1—Computer-Aided Design
Organizer:	Dr. Anthony M. Pavio, Motorola, Inc.
Chairmen:	Dr. Anthony M. Pavio and John Sevic
Speakers:	Dan Millicker, HP/Avantek Jaime Tenedorio, Diablo Research Ray Pengelly, Raytheon Michael Golio, Motorola Steve Bingham, TriQuint Semiconductor Anthony Pavio, Motorola John Bandler, Optimization Systems Associates John Sevic, Motorola Tom McKay, Samsung

Abstract:

The Commercial Microwave business has been growing explosively in recent years with some products experiencing growth rates in excess of 100% per annum. This increase in demand for communication products has placed stringent demands on both the design teams and manufacturing organizations of many product suppliers. However, the design and manufacturing skills needed to effectively compete in the commercial microwave arena are not widespread. Although the design methodology is well understood for "performance driven" design, the use of modern CAD tools for the design of commercial products, which are not just performance driven, is relatively new. This workshop will focus on such items as time-to-market, yield optimization, linear and nonlinear device modeling, cost, manufacturability and performance. In addition, the design methodology used to develop commercial products with emphasis on high volume design techniques, Si MMIC design, and commercial GaAs design methods, will be investigated.

Workshops

WFFF: Design Approaches for Integrated Circuit-Antenna Modules

Date:	Friday, May 19, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Room 12C
Sponsors:	MTT-1 Technical Committee on CAD MTT-15 Technical Committee on Microwave Field Theory
Organizers:	K.C. Gupta, University of Colorado Peter Hall, University of Birmingham, UK
Chairman:	K.C. Gupta, University of Colorado
Speakers:	Tatsuo Itoh, UCLA K.C. Gupta, University of Colorado Peter Hall, University of Birmingham, UK Zoya Popovic, University of Colorado Albert Papiernik, Universitè de Nice, France Eikichi Yamashita, University of Electro-Communications, Japan

Abstract:

Integration of microwave circuits and antennas into single modules has been made possible by common technological features of microwave integrated circuits and printed microstrip antennas. This innovation represents a significant step in further miniaturization of RF and microwave modules for a variety of applications, including active phased arrays and wireless communication systems. This workshop discusses various design approaches applicable for integrated circuit-antenna modules. Both approximate and rigorous approaches are presented. Deliberations in the workshop emphasize the design procedures and not the optimum architecture(s) for any specific applications per se. Two classes of configurations significant for the theme of the workshop include where antenna and circuit interact only through transmission line(s) but modify each other's performance, and where the antenna and IC interact both through circuits and near fields. Discussion will bring out areas of research and development needed in this field. Workshop participants are encouraged to contribute their views and comments during the open forum session in the afternoon.

Workshops

WFFG: Power Devices and MMICs for Wireles and Military Applications

Date:	Friday, May 19, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Room 11C
Sponsors:	MTT-7 Microwave and Millimeter-Wave Solid State Devices MTT-5 Microwave High-Power Techniques
Organizers:	Madhu S. Gupta, Hughes Aircraft Co. Jitendra Goel, TRW
Speakers:	M. Golio, Motorola S. Maas, Nonlinear Consulting J. Schellenberg, Schellenberg Associates A. Oki, TRW J. Day, Synergistics Unlimited P. White, Raytheon

Abstract:

Much effort is currently being directed at increasing the efficiency of power devices and MMICs; in addition, devices and chips are being designed to operate with low DC bias voltages. The low voltage and high efficiency operation features are important in commercial and communication applications for battery operation of portable equipment, and for low battery drain. In military applications, such as airborne phased-arrays, high efficiency is important due to the power dissipation in the large number and high density of active elements, and the resulting problem of heat removal. Advances in the technology and low voltage high efficiency devices and circuits for microwave power amplifiers will be presented in this workshop. The scope of the workshop is broad, extending from developments in new devices and circuit design techniques, to the system requirements and trade offs.

Workshops

WFFH: MIMIC Hardware Description Language (MHDL) and Standards

Date:	Friday, May 19, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Room 10A
Sponsor:	MTT-1 Computer-Aided Design
Organizer:	Barry Perlman, Army Research Laboratory
Chairman:	David Rhodes, Army Research Laboratory
Speakers:	Ross Hicks, Compact Software Dave Barton, Intermetrics Doug Dunlap, Intermetrics Mark Kahrs, Rutgers University Rob Rutenbar, Carnegie Mellon University

Abstract:

MHDL is being developed to provide a hardware description language for the analog/microwave regime, including an interface to VHDL. The scope of the language encompasses support for a full range of CAD tools from high-level synthesis through test and manufacturing data support, including those elements necessary for behavioral modeling and simulator support. As currently defined, MHDL extends a functional definition style to include multiple inheritance, flexible connection semantics, configuration and constraint statements in a parameterized hierarchical structure.

This workshop provides an overview of the language, and a discussion of activities that relate to the creation of demonstration software and the process of standardization. Technical issues and positions from interested parties will be presented and discussed. Software will be made widely available for industrial review. Potential users and interested parties are encouraged to get involved and support this endeavor.

Workshops

WFHI: Microwave Applications of Ferroelectric Ceramics

Date:	Friday, May 19, 1995
Time:	8:00 am to 12:00 noon
Location:	Convention Center, Room 10B
Sponsor:	MTT-6 Microwave and mm-Wave Integrated Circuits
Organizers:	C. Jackson, TRW C. Buntschuh, Microwave Engineering Services
Speakers:	J. Pond, Naval Research Lab. R. Babbitt, US Army Research Lab. Electronics & Power Directorate S. Sengupta, US Army Research Lab Materials Directorate L.C. Sengupta, US Army Research Lab Materials Directorate R.M. Yandrosfski, SCT Inc. G.A. Koepf, SCT Inc. C.H. Mueller, SCT Inc. D. Collier, United Technologies, Norden Systems D. Galt, University of Colorado R. Wolfson, Hughes Aircraft Company A. Kain, TRW

Abstract:

In the past decade, ferroelectric ceramics have become common in dielectric resonator oscillators and filters, utilizing their high-Q, high dielectric constant properties. Recent advances in ceramic and thin-film deposition technologies for DRAM and superconductive aplications have resulted in new ferroelectrics with vboltage-variable dielectric constants at room temperature, which will have interesting potential for applications in microwave circuit components, such as tunable resonators and filters, variable delay lines and phase-shifters. This workshop covers the basic physics and materials science of ferroelectric ceramics and thin films, innovative circuit applications and modeling for CAD packages.