MTT-S PANEL SESSIONS

PMOA: Low Voltage, Low Power Consumption RFICs: It's Sooo ... EASY!

Date: Monday, June 17, 1996

Time: 12:00–1:30 PM

Location: Moscone Convention Center, Room 102

Sponsors: MTT-6, Microwave and Millimeter-wave Integrated Circuits
1996 MMWMC Symposium TPC

Organizers: Fazal Ali, Westinghouse
Mike Golio, Motorola

Moderators:
Fazal Ali
Mike Golio

Panelists: Bob Trew, Case Western University
Nan Lei Wang, Etron Integrated Circuits
Mike Golio
Jim Griffiths, Raytheon ADC
Pete Bachert, RF Micro Devices
Julio Costa, Motorola SPS

The basic RFIC components (RF switches, LNAs, mixers and power amplifiers) required for the wireless communication markets operating in the 800 MHz to 2.5 GHz frequency range are undergoing a revolutionary change in terms of DC power consumption. On both the research and production front, the reduced power consumption in ICs is recognized as a key competitive advantage. Next to low cost, the minimum power consumption is the most critical distinguishing feature that can be offered by wireless circuit designers because it translates into smaller, lighter batteries and longer battery lifetime. This discussion considers different device technologies and circuit techniques suitable for reducing DC power especially in receiver and power amplifier portions of the RFICs. Should it be a HEMT, HBT, MESFET, Si BJT, SiGe HBT, MOSFET or ??????.

PTUB: Design Issues for Silicon-based RF/Microwave Integrated Circuits

Date: Tuesday, June 18, 1996

Time: 12:15–1:35 PM

Location: Moscone Convention Center, Room 120/123

Sponsors: MTT-6, Microwave and Millimeter-wave Integrated Circuits
MTT-7, Microwave and Millimeter-wave Solid State Devices

Organizers: Gailon Brehm, Texas Instruments
Larry Dunleavy,
University of South Florida

Moderator: Larry Dunleavy

Panelists: Mike Wyatt, Honeywell S & Strategic Systems
David Lovelace, Motorola
Kirk Ashby, AT&T Bell Labs
Ali Khatibzadeh, Texas Instruments
David J. Pedder, GEC Plessey Ltd.
Natalino Camilleri, Advanced Micro Devices

Despite the fact that silicon transistors generally have poorer microwave performance than compound semiconductor transistors and that the silicon substrate is a more lossy transmission line medium, RF/microwave ICs are being developed in silicon for numerous applications in the cost-driven consumer and commercial wireless market. IC design issues facing designers using silicon technology are addressed. Approaches being used for Si RF/MW range from simply using existing high volume processes with perhaps improved transistor performance (Si or SiGe) to developing new processes based on high resistivity Si substrates.

Panelists will address the following and related questions:

1. How is the impact of losses on passive elements performance being addressed?
2. How are models for passive elements obtained?
3. What new processing approaches are most promising, short and long term? (SiGe, high resistivity si, SOS and micromachining)
4. How reliable are Si active device models, and how are they constructed?
5. Which circuit elements are the greatest challenge to model?
6. What are the merits of various RF/microwave deisgn libraries.

MTT-S PANEL SESSIONS

PTUC: System Applications of Millimeter-wave Integrated Circuits - When?

Date: Tuesday, June 18, 1996

Time: 12:15–1:35 PM

Location: Moscone Convention Center, Room 121/124

Sponsor: MTT-6, Microwave and Millimeter-wave ICs

Organizers: James C. Wiltse, Georgia Tech Research Institute
Edward C. Niehenke, Westinghouse Electric Corp.

Moderator: Lamberto Raffaelli, Arcom

Panelists: Larry Brockman, Lockheed Martin
Holger Meinel, Daimler Benz AG
John Horton, TRW
Edward C. Niehenke
A.P.S. (Paul Khanna), Hewlett Packard Co.

Millimeter-wave systems have inherent advantages over lower frequency systems, such as small size and the ability to locate objects accurately for commercial and military applications. In recent years, millimeter-wave integrated circuits have been developed for use in telecommunications, radar, radiometry, automotive and missile guidance applications. These examples are discussed as they are appearing in the US and overseas, and an indication of how widespread and extensive the new applications are expected to be is provided.

PWED: Effective CAD: A Dilemma of Models!

Date: Wednesday, June 19, 1996

Time: 12:15–1:35 PM

Location: Moscone Convention Center, Room 120/123

Sponsor: MTT-1 Computer-Aided Design

Organizer: John W. Bandler,Optimization Systems Assoc. Inc.

Panelists: Fritz Arndt, Technische Universität Bremen
John Bandler
Mike Golio, Motorola
Anthony M. Pavio, Motorola
Robert Sorrentino,Università degli studi di Perugia
Chris Snowden, University of Leeds

Device and circuit modeling methodologies aimed at low cost design and manufacture are addressed, including automated performance- and yield-driven design optimization of microwave and mm-wave circuits with accurate EM simulations invoked within the optimization loop. Concepts such as the hybrid mode matching/circuit theory approach, the classical adjoint network method, the feasible adjoint sensitivity technique, hybrid visualization-aided EM modeling and the recent space mapping technique promise to accelerate design optimization exploiting EM/physical simulators. As a result, CAD and modeling of engineering devices, circuits and systems will reach a previously undreamed of level of precision and computational efficiency. These concepts are founded on empirical engineering modeling, circuit theory and field theory, which embody expert knowledge accumulated over many years.

Issues:

1. Why is electromagnetic optimization necessary?
2. A dilemma: physical, physics-based or circuit modeling?
3. Is statistical device modeling necessary?
4. Tradeoffs: cut and try, visualization and user-friendliness
5. The eternal issue: classical or numerical design methodologies

PTHE: Solderless Interconnects for Microwave Modules - Is it Possible?

Date: Thursday, June 20, 1995

Time: 12:15–1:35 PM

Location: Moscone Convention Center, Room 120/123

Sponsors: MTT-12, Microwave and Millimeter-wave Packaging
MTT-16, Microwave Systems, Phased and Active Arrays

Organizers: Rick Sturdivant, Hughes Aircraft Company
John Wooldridge, Hughes Aircraft Company

Panelists: John Costello, Cadance Electronic Design
Mark Hauhe, Hughes Electronics
John Reddick, Texas Instruments
Randy Duprey, TRW
Daniel Whitmore, Technet

Solderless interconnects can offer low cost, miniaturized, dependable connection and can result in lower assembly cost. As a result, they have been used for sometime in digital and low frequency systems, such as computer hard disk drives. New requirements of electronic systems like wireless, automotive and airborne radar are driving unique connectors and packaging approaches to be considered. Therefore, solderless interconnects have recently been proposed for use in high density microwave packages. In fact, they are seen as a key enabling technology in some phased-array radar systems. Unfortunately, little is known about solderless interconnects in the microwave community.

Panelists will address the following and related issues:

1. What are solderless interconnects?
2. Do they offer cost and manufacturing benefits?
3. Why are they better than solder connections?
4. What is the electrical performance at microwave and mm-wave?
5. How reliable are solderless interconnects?