

1993 IEEE MTT-S International Microwave Symposium Digest

Volume 2



June 14-18, 1993
Atlanta, Georgia



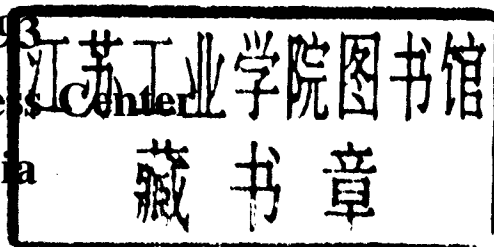
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SYMPOSIUM DIGEST**

Volume 2

**June 14-18, 1993
Georgia World Congress Center
Atlanta, Georgia**



**WAYMOND R. SCOTT, JR.
PUBLICATIONS CHAIRMAN**

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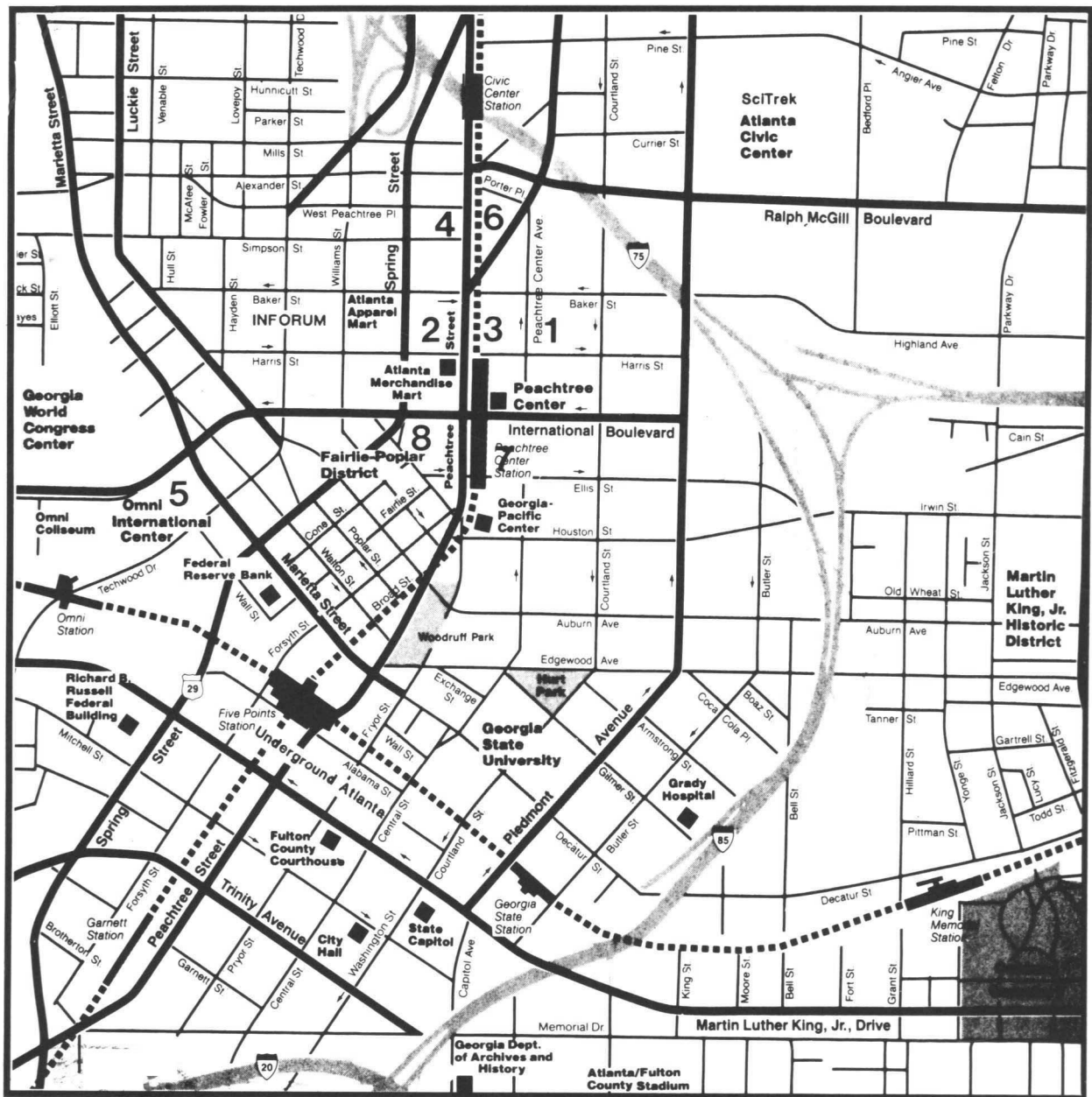
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4	INN AT THE PEACHTREE
5	OMNI HOTEL AT CNN CENTER
6	QUALITY INN HABERSHAM
7	THE RITZ CARLTON
8	WESTIN PEACHTREE PLAZA

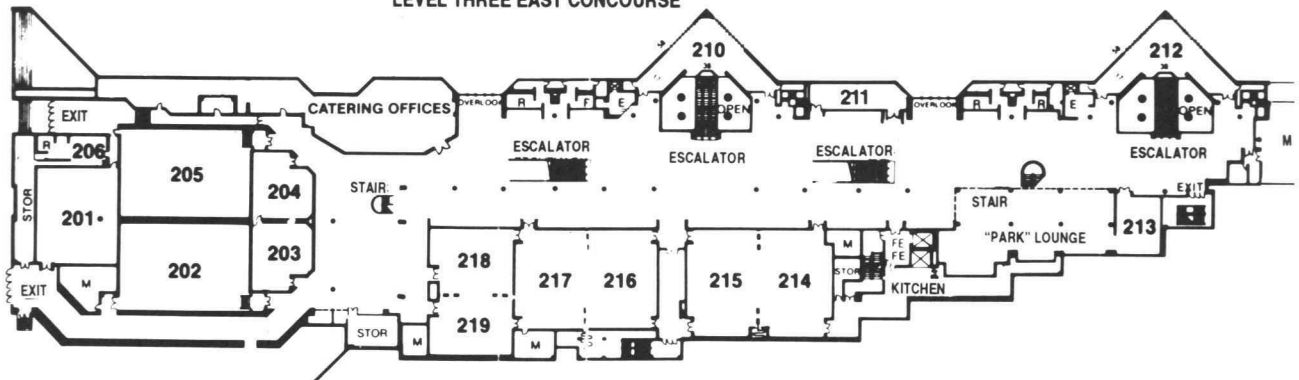
MEETING AND FUNCTION ROOMS

* See box on the right for other locations

GEORGIA WORLD CONGRESS CENTER

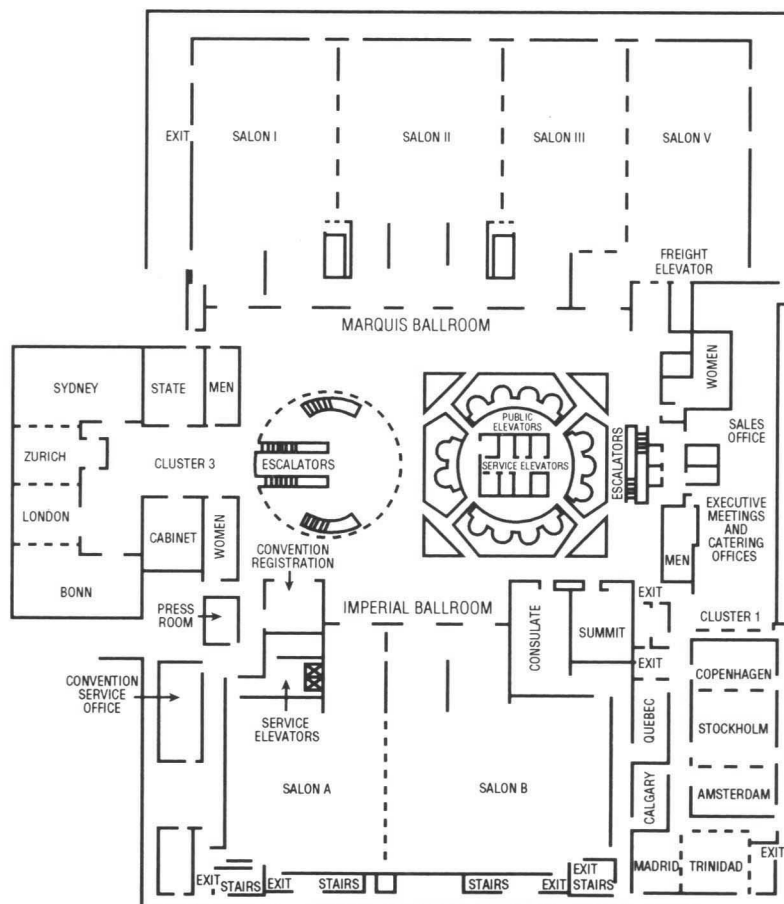


LEVEL THREE EAST CONCOURSE



LEVEL TWO EAST CONCOURSE

ATLANTA MARRIOTT MARQUIS





1993 IEEE MTT-S International Microwave Symposium Digest

Panel Sessions

MTT-S Panel Sessions

Panel Sessions

PSWA: Multifunction MMIC Design: Issues and Tradeoffs

Date: June 16, 1993
Time: 12:00 PM–1:30 PM
Location: Rooms 304/305, GWCC
Sponsor: MTT-6 Microwave and mm-Wave Integrated Circuits
Organizers: Fazal Ali, Westinghouse-ATL
Yalcin Ayasli, Hittite Microwave
Raymond Pengelly, Compact Software
Moderator: Fazal Ali, Westinghouse-ATL
Speakers: Christian Kermarrec, M/A-COM
Don Estrieck, Hewlett-Packard
Phil Wallace, Anadigics
Peter Katzin, Hittite Microwave
Ray Pengelly, Compact Software
Jim Degenford, Westinghouse-ATL
Masayoshi Aikawa, NTT

Abstract:

Recent advances in GaAs MMIC technology developments have resulted in a shift from the design of single function GaAs ICs to more complex multifunction MMICs offering higher levels of integration. From GaAs IC design perspective, tradeoffs between bandwidth, performance, frequency, noise figure, output power, gain/insertion loss and port isolation of several functional blocks are critical. Insertion of these MMICs in practical systems presents major design challenges in overall system architecture definition, component selection and MMIC packaging. This panel session will discuss the design, process and test tradeoff issues, and limitations relevant to the implementation of multiple functions in a single chip for commercial and military applications.



1993 IEEE MTT-S International Microwave Symposium Digest

Technical Program Contents



1993 IEEE MTT-S International Microwave Symposium Digest

Technical Sessions

1993 IEEE MTT-S International Microwave Symposium—Schedule of Events

SUNDAY, JUNE 13	Registration 5:00 PM–9:00 PM MMWMC Reception 7:00 PM–10:00 PM		Georgia World Congress Center, Level Two, East Concourse Stockholm, Copenhagen and Amsterdam Rooms, Marriott Marquis Hotel	
MONDAY, JUNE 14	Registration 8:00 AM–5:00 PM Georgia World Congress Center, Level Two East Concourse			
8:00 AM–5:00 PM	WSMA High T _c Superconductivity in MW Systems Room 202	WSME MW Device and Circuit CAD Room 218		
	WSMB MW Generation & Its Commercial Appls Room 304	WSMF Wireless Communications Via Lightwaves Room 219		
	WSMC Ultra Low Noise Microwave Sources Room 305	WSMG Mobile Communications-Satellite Systems Room 205		
	WSMD Ps and Fs EM Pulses: Room 306	WSMK Critical Issues in Experimental Validation Room 307		
8:00 AM–12:00 PM	WSMH Filters & Multiplexers for Mobile Comm Room 215	WSMI Material Measurements Room 217		
1:00 PM–5:00 PM	WSMJ Electromagnetic Wave Interaction with Water and Moist Substance Room 217			
6:00 PM–8:00 PM	<i>Microwave Journal</i> / MTT-S Reception SCITREK			
8:30 AM–5:00 PM	MMWMC Symposium Georgia World Congress Center			
TUESDAY, JUNE 15	Registration 8:00 AM–5:00 PM Georgia World Congress Center, Level Two East Concourse			
9:00 AM–10:30AM	Plenary Session Richard Snelling and John Day Georgia World Congress Center, Auditorium			
	AUDITORIUM	ROOM 216/217	ROOM 202	ROOM 218/219
11:00AM–12:00 PM	B: Advanced MMIC Technology	C: Intelligent Vehicle Highway Systems (<i>Special Session</i>)	D: Microwave Power Module (MPM) (<i>Special Session</i>)	E: Manufacturing Methods, Production and Packaging
12:00 PM–1:30 PM	PSTA Direct Broadcast Satellite (DBS) Market Technology and Trends		Rooms 306/307	
	PSTB MMICs in Commercial Markets		Rooms 304/305	
1:30 PM–3:00 PM	F: Broadband MMIC Circuits (<i>Joint with MMWMC</i>)	G: mm-Wave Systems and Techniques	H: Miniaturized and Active Filters	I: Status of Microwave Ferrite Technology (<i>Special Session</i>)
2:30 PM–5:00 PM	Interactive Forum I W.H. Prather Georgia World Congress Center Ballroom			
3:30 PM–5:00 PM	J: MMIC Control Circuits (<i>Joint with MMWMC Symposium</i>)	K: Analysis of Quasi-Planar and Quasi-Optical Structures	L: High Q Filters for Communication Systems	M: Ferrite and Non-Reciprocal Semiconductor Devices
8:00 PM–10:00 PM	RSTA High Efficiency MMIC, Power Amplifiers Salon I	RSTC Markets & Apps of MW Digital/DSP Circuits Salon III		
	RSTB GPS/GLONASS Applications Salon II	RSTD Innovative Use of Computers in Education Salon IV		
WEDNESDAY, JUNE 16	Registration 8:00 AM–5:00 PM Georgia World Congress Center, Level Two, East Concourse			
	ROOM 202	ROOM 216/217	ROOM 218/219	ROOM 205
8:30 AM–10:00 AM	N: Phased Arrays I	O: mm-Wave Amplifier and Receiver Technology	P: Solid-State Devices and Circuits	Q: Developments in Global Communications (<i>Focused Session</i>)
10:30 AM–12:00 PM	S: Phased Arrays II	T: Nonlinear Modeling and Analysis	U: Solid-State Oscillators	V: Wireless LANs (<i>Focused Session</i>)
12:00 PM–1:30 PM	PSWA: Multifunction MMIC Design Rooms 304/305			
1:30 PM–3:00 PM	X: High Speed Fiber-Optic Links-Systems	Y: Field Theoretic CAD	Z: Low Noise mm-Wave Receivers	AA: Microwave Systems Consumer and Commercial Applications
2:30 PM–5:00 PM	Interactive Forum II W.H. Prather Georgia World Congress Center Ballroom			
3:30 pm - 5:00 pm	CC: High Speed Fiber-Optic Link-Components	DD: CAD of Passive Components	EE: Receivers Components	FF: Selected Russian Microwave Technologies
	GG: Biological Effects and Medical Application			
	Industry Reception 5:30 PM–7:15 PM Symposium Banquet 7:30 PM–10:00 PM		Marriott Marquis Ballroom Marriott Imperial Ballroom	
THURSDAY, JUNE 17	Registration 8:00 AM–5:00 PM Georgia World Congress Center, Level Two, East Concourse			
	ROOM 218/219	ROOM 202	ROOM 216/217	ROOM 215
8:30 AM–10:00 AM	HH: Device Modeling and CAD	II: Coupling and Packaging Effects	JJ: High Power Sources and Control Components	KK: Microwave Measurements
10:30 AM–12:00 PM	LL: Superconducting Filters	MM: New Structures and Leaky Modes	NN: Microwave Integrated Circuits	OO: Microwave Probe Measurements
1:30 PM–3:00 PM	RR: Superconducting Subsystem Technology	QQ: Optical Characterization and Device Modeling	PP: Transistor Power Amplifiers I	SS: EM Analytical and Numerical Techniques I
3:30 PM–5:00 PM	VV: Acoustic Filters and Resonators	UU: Simulation and CAD Frameworks	TT: Transistor Power Amplifiers II	WW: EM Analytical and Numerical Techniques II
FRIDAY, JUNE 18	Registration 8:00 AM–5:00 PM Marriott Marquis, Conference Level			
	ARFTG Conference 8:30 AM–5:00 PM Marriott Marquis Hotel			
8:00 AM–5:00 PM	WSFA MW HBTs and HEMTs Bonn & London	WSFC Modeling of MW Packages & Interconnects Salon IV, Marriott		
	WSFB Combined Simulation Salon III, Marriott	WSFD Designing Power MMICs: Salon A, Marriott		
8:00 AM–12:00 PM	WSFE Civil MW Packaging Sydney, Marriott	WSFF Atmospheric Transmission Effects Summit, Marriott		

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Technical Program Contents

Session A

(Plenary)

World Congress Center Auditorium

9:00 a.m. to 10:30 a.m.

Tuesday, June 15, 1993

Chairman: G.P. Rodrigue

“The Global Reach of Microwaves”

Speakers: John Day, Consultant, Strategies Unlimited

Richard Snelling, Retired Executive Vice President, Bell South Telecommunications

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Session B

(Joint with MMWMC Symposium)

Advanced MMIC Technology Auditorium

11:00 a.m. to 12:00 p.m.

Tuesday, June 15, 1993

Chairman: M. Kumar—Paramax Systems Corp., Great Neck, NY

Co-Chairman: W. C. Niehaus—AT&T Bell Laboratories, Reading, PA

- | | | |
|-------------------|--|-----------|
| B-1: | A Highly-Efficient 7-Watt 16 GHz Monolithic Pseudomorphic HEMT Amplifier | 87 |
| 11:00 a.m. | H.Q. Tserng and P. Saunier | |
| B-2: | The Inductive Connection Effects of a Mounted SPDT in a Plastic SO8 Package | 91 |
| 11:20 a.m. | F. Ndagijimana, J. Engdahl, A. Ahmadouche and J. Chilo | |
| B-3: | An MMIC Linearized Amplifier Using Active Feedback | 95 |
| 11:40 a.m. | J.C. Pedro and J. Perez | |

Session C

(Special Session)

Intelligent Vehicle Highway Systems

Room: 216/217

11:00 a.m. to 12:00 p.m.

Tuesday, June 15, 1993

Chairman: R.A. Sparks—Anro, Lexington, MA

- | | | |
|-------------------|--|------------|
| C-1: | Intelligent Vehicle Highway Systems: Challenge for the Future | 101 |
| 11:00 a.m. | J.M. Sussman | |
| C-2: | Spectrum Allocations for IVHS | * |
| 11:30 a.m. | D.J. Chadwick | |
| C-3: | Potential System Architectures for IVHS | * |
| 12:00 p.m. | M.F. McGuire | |

*Paper not available at time of printing.

Session D
(Special Session)

Microwave Power Modules (MPM)
Room: 202

11:00 a.m. to 12:00 p.m. **Tuesday, June 15, 1993**

Chairman: R.K. Parker—Naval Research Laboratory, Washington, DC

- | | | |
|-------------------|--|------------|
| D-1: | Introduction to the MPM: What It Is and Where it Might Fit | 107 |
| 11:00 a.m. | R.H. Abrams, Jr. and R.K. Parker | |
| D-2: | MPM Applications: A Forecast of Near—and Long—Term Applications | 111 |
| 11:20 a.m. | L. Cosby | |
| D-3: | MPM Technology Developments: An Industry Perspective | 115 |
| 11:40 a.m. | J.A Christiansen, T.J. Grant, P.M. Lally, P. Puri, G. Dohler and S. Ludvik | |

Session E

Manufacturing Methods, Production and Packaging
Room: 218/219

11:00 a.m. to 12:00 p.m. **Tuesday, June 15, 1993**

Chairman: T.C.Cisco—Hughes Aircraft Company, El Segundo, CA

- | | | |
|-------------------|--|------------|
| E-1: | Inexpensive Mixers for Hi-Rel Commercial Markets | 121 |
| 11:00 a.m. | H. Kaylie and R. Setty | |
| E-2: | Efficient Statistical Analysis of Microwave Circuit Performance Using Design of Experiments | 123 |
| 11:20 a.m. | K.L. Virga and R.J. Engelhardt Jr. | |
| E-3: | Computer Based Methods for Production Tuning of Microwave Components | 127 |
| 11:30 a.m. | D.E. Stoneking | |
| E-4: | Electrical Characterization of Packages for Use with GaAs MMIC Amplifiers | 131 |
| 11:40 a.m. | S.R. Smith and M.T. Murphy | |

Session F

(Joint with MMWMC Symposium)

Broadband MMIC Circuits

Auditorium

1:30 p.m. to 3:00 p.m.

Tuesday, June 15, 1993

Chairman: D. Meharry—Lockheed-Sanders, Nashua, NH
Co-Chairman: H.-L. Hung—COMSAT Laboratories, Clarksburg, MD

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1:50 p.m.	M. C. Tsai	
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2:10 p.m.	M. Gillick and I.D. Robertson	
F-4:	A Highly Compact, Wideband GaAs HEMT X-Ku Band Image-Reject Receiver MMIC	149
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Session G

Millimeter-Wave Systems and Techniques

Room: 216/217

1:30 p.m. to 3:00 p.m.

Tuesday, June 15, 1993

Chairman: A.J. Gasiewski—Georgia Tech, Atlanta, GA

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1:40 p.m.	H.M. Harris, A. Torabi, R.W. McMillan, C.J. Summers, J.C. Wiltse, S.M. Halpern and D.W. Griffin	
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2:50 p.m.	E.M. Godshalk	

*Paper not available at time of printing.

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Miniaturized and Active Filters

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Tuesday, June 15, 1993

Chairman: Y.-C. Shih—Hughes Aircraft Company, Los Angeles, CA

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Session I

Special Session-Status of Microwave Ferrite Technology

Room: 218/219

1:30 p.m. to 3:00 p.m.

Tuesday, June 15, 1993

Chairman: J.E. Pippin—Electromagnetic Sciences, Inc., Norcross, GA

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	Y. Murakami	

*Paper not available at time of printing.

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2:30 p.m. to 5:00 p.m.

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