



**1997
IEEE GaAs IC
SYMPOSIUM**

Program

Presenting:

**Technology Debate
for High-Growth
Communication Markets**

Oct 12 - Oct 15, 1997

**The Anaheim Marriott
Anaheim, California**



**CO- SPONSORED BY
The IEEE Electron Devices Society,
The IEEE Microwave Theory and
Techniques Society
and
The IEEE Solid-State Circuits Society**

SYMPOSIUM

SATURDAY, OCTOBER 11, 1997

REGISTRATION (Short Course & Primer Course Only)

SUNDAY, OCTOBER 12, 1997

REGISTRATION (Short Course & Primer Course Only)

Continental Breakfast for Short Course

SHORT COURSE: "IC Technologies for Wireless Applications Beyond 2000"

GaAs Reliability Workshop

Short Course Lunch

REGISTRATION for Symposium (and Primer Course until 5:30)

PRIMER COURSE: "Basics of GaAs ICs"

Symposium Opening Reception

MONDAY, OCTOBER 13, 1997

REGISTRATION

Continental Breakfast

SYMPOSIUM OPENING

SESSION A: Plenary Session

PANEL SESSION 1: Will PHEMTs and InP HEMTs survive in your ICs?

VENDOR PRODUCT FORUM 1

SESSION B: Wireless Power Amplifiers and System Linearity

SESSION C: High Performance FET Technology

GaAs IC Technology Exhibition Opening Reception

SEMI Compound Semiconductor Standards Committee Meeting

TUESDAY, OCTOBER 14, 1997

REGISTRATION

Continental Breakfast

GaAs IC TECHNOLOGY EXHIBITION

SESSION D: High Performance A/D Converters

SESSION E: High Speed Data Switching ICs

SESSION F: Advanced Devices & HBT Technology

Exhibition Luncheon

PANEL SESSION 2: Linear, Efficient, Portable PCS Power Amps

PANEL SESSION 3: Active Device Modeling: User Perspectives

SESSION G: Reliability & Transient Phenomena

SESSION H: High Speed Digital Applications & Late News

Symposium Theme Party

WEDNESDAY, OCTOBER 15, 1997

REGISTRATION

Continental Breakfast

SESSION I: Optical Interconnects and Receivers

SESSION J: 40Gb/s Optical Communication ICs

SESSION K: Device Technology & High Performance Circuits

PANEL SESSION 4: 40 Gb/s (and beyond) TDM for

Optical Fiber Communication Systems

VENDOR PRODUCT FORUM 2

SESSION L: Millimeter Wave Integrated Circuits

Close of Symposium

Visit us on the World-Wide Web at:

AT A GLANCE

6:00 p.m.-8:00 p.m.	Ballroom Foyer
7:00 a.m.-8:00 a.m.	Ballroom Foyer
7:00 a.m.-7:45 a.m.	Ballroom Foyer
8:00 a.m.-4:30 p.m.	Marriott Hall NE
8:00 a.m.-5:00 p.m.	Orange County Ballroom 4 & 5
12:00 p.m.-1:30 p.m.	Marriott Hall NW
5:00 p.m.-8:00 p.m.	Ballroom Foyer
5:30 p.m.-8:30 p.m.	Marriott Hall NE
6:00 p.m.-9:00 p.m.	Marriott Hall NW
7:00 a.m.-5:00 p.m.	Ballroom Foyer
7:00 a.m.-8:00 a.m.	Ballroom Foyer
8:10 a.m.-8:30 a.m.	Marriott Hall N
8:30 a.m.-11:30 a.m.	Marriott Hall N
12:35 p.m.-2:05 p.m.	Marriott Hall NW
12:35 p.m.-2:05 p.m.	Marriott Hall NE
2:20 p.m.-5:00 p.m.	Marriott Hall NW
2:20 p.m.-5:00 p.m.	Marriott Hall NE
5:00 p.m.-7:00 p.m.	Marriott Hall Center
8:00 p.m.-10:00 p.m.	TBA
7:00 a.m.-5:00 p.m.	Ballroom Foyer
7:00 a.m.-8:00 a.m.	Marriott Hall Center
7:00 a.m.-4:00 p.m.	Marriott Hall Center
8:30 a.m.-10:00 a.m.	Marriott Hall NW
10:30 a.m.-12:00 noon	Marriott Hall NW
8:10 a.m.-12:00 noon	Marriott Hall NE
12:00 noon-1:30 p.m.	Marriott Hall Center
1:40 p.m.-3:10 p.m.	Marriott Hall NE
3:30 p.m.-5:00 p.m.	Marriott Hall NE
1:50 p.m.-3:10 p.m.	Marriott Hall NW
3:30 p.m.-4:50 p.m.	Marriott Hall NW
7:00 p.m.-10:00 p.m.	Marriott Hall N
7:00 a.m.-12:00 noon	Ballroom Foyer
7:00 a.m.-8:00 a.m.	Ballroom Foyer
8:10 a.m.-9:40 a.m.	Marriott Hall NE
10:00 a.m.-11:30 a.m.	Marriott Hall NE
8:10 a.m.-11:30 a.m.	Marriott Hall NW
12:30 p.m.-2:00 p.m.	Marriott Hall NE
12:30 p.m.-2:00 p.m.	Marriott Hall NW
2:10 p.m.-4:40 p.m.	Marriott Hall NE
4:40 p.m.	

CHAIRMAN'S MESSAGE

On behalf of the Executive and Technical Program Committees of the 1997 GaAs IC Symposium, I am pleased to invite you to join us in Anaheim California for our 19th annual meeting. We are delighted to present the Technology Debate for High Growth Communications Markets. How will we construct 40 GB/s Fiber systems? How can we make the most linear Power Amp with the longest talk time? Anyone associated with high speed communications products needs to come to our conference to get the complete technology picture.

Bill Stanchina and the Technical Program Committee have organized an excellent program that will provide a clear view of the present technology capabilities, and stimulate considerable debate about the future. Power Amplifiers for wireless applications, high speed digital communications, high speed computing, and device technology and reliability will be featured in the paper sessions, and panel sessions. We are especially thrilled with the quality of the sixteen Invited papers that form the framework of the twelve technical sessions.

Top industry experts will present the Short Course, "IC Technology for Wireless Communications beyond 2000" offered Sunday. Organized by Mark Wilson, the course leads off with an overview of technology requirements. The complete technology course covers ion implanted and epitaxial MESFET, HBT, PHEMT, and silicon RF MOS.

Our two Vendor Product Forums have become one of our most popular features because they provide technical coverage of the latest products hitting the streets. The four Panel sessions are the place to debate what makes the best linear power amplifier, how to simulate a circuit, what makes the most reliable PHEMT device, or how to build a 40GB/s communication system!

Another popular feature that has become a tradition at the Symposium is the Primer Course. This is the perfect introduction to the next three days for those new to GaAs, or just want to get a better grasp of the basics.

To complement the full technical program, we have provided some time for social interactions as well as an opportunity to interact with the exhibitors while catching up with the newest technology available on the market. The Sunday evening Opening Reception is the place to renew friendships and make new acquaintances. The GaAs Technology Exhibition opens Monday evening where exhibitors will introduce you to new products on display. The Tuesday night Theme party will be conveniently held at the hotel; be prepared for lots of great food and entertainment.

For the first time this year we have guaranteed the Exhibition Luncheon, held Tuesday. This interaction between the exhibitors and the attendees greatly enhances the Technology Exhibition. To make this possible we have begun a program for corporate benefactors to help support the Symposium. This year I would especially like to thank Anadigics, and RF Micro Devices for their support.

Anaheim is a beautiful place in October, and is an easy drive to many Southern California attractions, including Disneyland, Knotts Berry Farm, and of course the beaches. This is the perfect time to bring the family along, extend your stay and have some fun before or after the Symposium.

Join us at the 1997 IEEE GaAs IC Symposium. You won't want to miss this one!

Phil Wallace
Chairman
1997 IEEE GaAs IC Symposium

CORPORATE BENEFACTORS

This year, we are proud to announce the beginning of the GaAs IC Symposium Corporate Benefactors program. Under this scheme, companies in our area can show their support of the Symposium by making contributions towards the cost of some of our social events. Having this backing helps maintain the quality of the Symposium as well as allowing companies an opportunity for some tasteful promotional activities.

This year's Benefactors are:

ANADIGICS
and
RF Micro Devices

We thank them for being our first Benefactors, and look forward to continued support from the corporate sector in future years.

GENERAL INFORMATION

IEEE GaAs IC Symposium Oct 12 - Oct 15, 1997 The Anaheim Marriott Anaheim, California

REGISTRATION

	<u>Advance</u> (Received by Sept. 12)	<u>Regular</u> (After Sept 12 or at Symp.)
Symposium Registration		
IEEE Member	\$310	\$375
Non-IEEE	\$370	\$415
Student	\$99	\$110
Special 1-day Registration (sessions only, no digest or social)		
IEEE Member	\$190	\$190
Non-IEEE	\$215	\$215
Short Course	\$340	\$370
GaAs IC Primer Course		
Regular Registration	\$160	\$160
Student Registration	\$60	\$60
Technical Digest Only	\$60	\$60
Short Course Notes Only	\$80	\$80
Primer Course Notes Only	\$50	\$50
Panel Session Buffet Lunch (Mon. and Wed.)		
	\$17.50/day	\$17.50/day
Extra Reception Ticket	\$25	\$25
Extra Theme Party Ticket	\$50	\$50

The full Symposium registration fee includes: attendance at all technical sessions and panels, one copy of the Technical Digest, continental breakfasts and morning and afternoon coffee breaks. Also included are admittance to: the Sunday Opening Reception, the GaAs IC Technology Exhibition Opening Reception on Monday and all exhibits, the Vendor Product Forum, and the exciting Tuesday evening Theme Party. The special 1-day registration fee, however, does not include the digest and social activities. Additional copies of the

Technical Digest and of the Short Course Notes will be available for purchase at the Symposium.

For **ADVANCE REGISTRATION**, complete the enclosed Advance Registration Form with your remittance of the appropriate fee (check or credit card) **BY SEPTEMBER 12, 1997** to:

Ms. Jaelene Slaven
Registrar, 1997 IEEE GaAs IC Symposium
c/o IEEE
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
USA
Tel: (908) 562-3875
FAX (908) 981-1203
email: j.slaven@ieee.org

The remittance is payable by checks in U.S. dollars only by personal/company check drawn on a U.S. bank, U.S. currency traveler's checks, or international money order. Checks must be made payable to "1997 IEEE GaAs IC Symposium" and must be encoded with the bank number, account number, and check number. Credit cards (Visa/Mastercard only) may also be used. Bank drafts from non-U.S. banks and foreign currency are unacceptable and will be returned.

We urge you to pre-register in order to reduce your costs and to simplify your check-in at the Symposium. Your Technical Digest and registration materials will be ready for you at the Advance Registration Desk.

Registration Center:

The Symposium Registration Center will be operating with the following hours:

Short & Primer Course Registration, only

Saturday, October 11	6:00 p.m. - 8:00 p.m.
Sunday, October 12	7:00 a.m. - 8:00 a.m.,
Sunday, October 12	5:00 p.m. - 5:30 p.m. (primer)

Symposium Registration

Sunday, October 12	5:00 p.m. - 8:00 p.m.
Monday, October 13	7:00 a.m. - 5:00 p.m.
Tuesday, October 14	7:00 a.m. - 5:00 p.m.
Wednesday, October 15	7:00 a.m. - 12:00 noon

Check the "Symposium at a Glance" for the location of the registration center.

Refund Policy:

Please note that after September 19, 1997, your Advance Registration fee, Short Course fee, GaAs IC Primer fee, and fees for additional Symposium Technical Digest, Panel Session Lunch ticket fees, or Reception/Party ticket fees are not refundable. Full refunds less \$50 handling fee will be granted for cancellations received in writing by September 19, 1997. The letter to the Symposium Registrar (see address at IEEE above) requesting the refund should state the preregistrant's name and to whom the refund check should be made payable. All refunds will be processed after the Symposium. **NO PRE-REGISTRATION REFUNDS WILL BE GRANTED AFTER SEPTEMBER 19, 1997.**

ACCOMMODATIONS

Hotel Reservations:

A block of rooms has been reserved at special rates for Symposium participants at the Anaheim Marriott. We ask you to please support the Symposium (and more fully enjoy all the activities) by staying at this hotel, our Symposium headquarters and location of all our technical sessions. The Anaheim Marriott offers superior hospitality, luxurious accommodations, and will be an outstanding site for this year's Symposium.

The Anaheim Marriott is ideally located in sunny southern California with easy access to airports and area attractions. Adjacent to the Anaheim Convention Center, the Anaheim Marriott is just two blocks from Disneyland Park and a convenient drive to Pacific Ocean beaches, Knott's Berry Farm, Universal Studios, and Hollywood. Each of the 1,039 guest rooms, including 18 parlors and 36 suites, is richly furnished and promises an array of luxurious conveniences. All guest rooms feature two telephones, remote control cable TV with free and pay movies, and individual climate control. Recreation facilities include a connecting indoor/outdoor pool, an outdoor pool, two whirlpools, two saunas, health club, and game room, with tennis courts and golf nearby. The Anaheim Marriott offers commercial airport limousine service, a Hertz desk, complete business center, concierge/activities desk, guest laundry, valet service, gift shop, unisex hair salon, and self and valet parking. Restaurants and Lounges include Allie's All American Grill with a casual California atmosphere, JW's elegant gourmet continental cuisine, a Pizza Hut, Gourmet Bean Cafe, and Gambits as well as Pool/Lobby bars for relaxing drinks, light food and appetizers, and conversation. All Symposium sessions and exhibits will be located at the Anaheim Marriott.

Room reservations should be made as soon as possible and no later than September 12, 1997 to hold a room at the special Symposium rates. Both single (at \$139 per night) and double (at \$159 per night) room accommodations are available. These rates do not include state and local taxes. A limited number of rooms have been set aside for U.S. government employees. To make a reservation, please complete the enclosed hotel reservation form and mail it with one night's deposit (check or major credit card) to:

Reservations
Anaheim Marriott
700 West Convention Way
Anaheim, California 92802 USA
Tel: (714) 748-2490
Fax: (714) 748-2449

You may also make your reservations by telephone; however, be certain to request the SPECIAL GROUP RATE FOR THE "IEEE GaAs IC Symposium." Reservations not accompanied by one night's deposit are subject to cancellation. After the September 12 deadline, reservations will be confirmed on a space available basis at higher rates. If you cancel your hotel reservation 72 hours prior to your scheduled arrival, your deposit will be refunded. The check-in time is 3:00 p.m. or later, and the check-out time is 12 noon.

TRANSPORTATION

Special Airfares:

Special discounted airfares for the 1997 GaAs IC Symposium have been negotiated with Continental United and US Airways.

Continental is offering 13% off coach fares, and a 8% discount off the lowest available special super-saver fare. Where super saver fares or Saturday night stays are not applicable, Continental is offering zone fares. United is offering 10% off coach fares, and a 5% discount off the lowest available special super-saver fares. US Airways is offering 10% off coach fares, and a 5% discount off the lowest available special super-saver fare. As with Continental, US Air is also offering zone fares. Restrictions apply and airfares are guaranteed to be lowest available when ticketed. Special rates have also been negotiated with Hertz car rental agency.

Travel arrangements using the designated air carriers, or the carrier of your choice can be made through IEEE Travel Services by calling (800) TRY-IEEE, (800-879-4333) within the US. Outside the US, call (908) 562-5387 between the hours of 8:30 a.m. and 5:30 p.m. EST. Monday through Friday. When calling, please advise the Travel Counselor that you are traveling in connection with the GaAs IC Symposium.

Airport Transportation:

In order of increasing distance from the Anaheim Marriott, service is available from four airports: John Wayne/Orange County Airport--16 miles or 25 minutes, Long Beach Airport--20 miles or 30 minutes, Ontario Airport--27 miles or 45 minutes, Los Angeles International Airport--31 miles or 60 minutes. Taxi, shuttle, and limousine service is available from each of the airports with costs ranging from \$15 to \$45 each way.

If driving from the John Wayne/Orange County Airport: Exit airport onto 55 North to I-5 North. Exit Katella Avenue. Left (West) to Harbor Boulevard. Turn Left on Harbor to Convention Way. Turn right. Hotel is on left.

If driving from Los Angeles International Airport: Take Century Boulevard to I-405 South to 22 East. Exit Harbor Boulevard North and continue to Convention Way. Turn left. Hotel is on left.

ADDITIONAL INFORMATION

Message Desk:

A Symposium Message Desk will be in operation in the Registration Center (Ballroom Foyer) during registration hours from Sunday, October 12 at 5:00 p.m. through Wednesday, October 15 at noon. Please advise callers who wish to reach you during the day to ask the hotel operator for the IEEE GaAs IC Symposium Message Desk. The phone number is (714) 750-8000. Please check the message board periodically during the Symposium

Distribution of Relevant Information:

The GaAs IC Symposium will provide an officially designated area near the registration desk to serve as the proper display area for those in need of space to disseminate free material relevant to the GaAs IC industry. Printed material of any form will not be allowed to indiscriminately proliferate the registration area, hallways, lobbies, or other gathering areas, in proximity to the Symposium, technical sessions, evening social activities, panel sessions, or the exhibition.

Meeting Room Locations:

The Short Course, Primer Course, technical sessions, panel discussions, exhibition, vendor product forums, and social activities will take place at The Anaheim Marriott. Please refer to the

"Symposium at a Glance" (inside front cover) and hotel map (inside back cover) for specific room locations.

No Photographic and/or Recording Equipment:

Note that no photographic or recording equipment will be permitted at any time during the technical sessions of the IEEE GaAs IC Symposium.

Breakfasts:

On Sunday, a continental breakfast will be available for Short Course registrants only in the Ballroom Foyer. On Monday, Tuesday, and Wednesday, there will be a complimentary continental breakfast for all Symposium attendees. These will be held in Ballroom Foyer on Monday, Marriott Hall Center on Tuesday (in the GaAs IC Technical Exhibition Hall), and the Ballroom Foyer on Wednesday.

Buffet Lunches:

An optional buffet lunch will be available prior to the Panel Sessions on Monday, October 13th from 11:30 a.m.-12:30 p.m, and on Wednesday October 15th from 11:30 a.m.-12:25 p.m. in the Marriott Hall. Lunch tickets may be purchased for \$17.50 per lunch at registration, or by checking the appropriate box on the registration form.

Coffee Breaks:

The location of the coffee breaks will be as follows:

Short Course Registrants (only)--

Sunday, October 12:

Marriott Hall Foyer

Primer Course Registrants (only)--

Sunday, October 12:

Marriott Hall Foyer

Symposium Registrants--

Monday, October 13:

Marriott Hall Foyer

Tuesday, October 14:

Marriott Hall Center

Wednesday, October 15:

Marriott Hall Foyer

Symposium Social Events:

OPENING RECEPTION

A welcoming reception will be held in Marriott Hall NW on Sunday evening October 12th from 5:00 p.m. to 8:00 p.m. Come greet old friends, and meet some new ones while making plans for dinner and the week's activities. Light hors d'oeuvres will be served along with wine, beer and soft drinks. One free admission is included with full Symposium registration. Additional tickets may be purchased at the registration center for \$25.

EXHIBITION OPENING RECEPTION

Our exhibitors are hosting a special opening reception Monday night from 5:00 p.m. to 7:00 p.m. This event, to be held in Marriott Hall Center, is free to all Symposium participants.

EXHIBITION LUNCH

On Tuesday, at 12 noon, there will be an Exhibition Luncheon in Marriott Hall Center. The Exhibition Lunch is free to all Symposium participants. This event offers a perfect opportunity to visit with our exhibitors, and ask questions, make deals, or just find out what is going on in our industry over lunch!

SYMPOSIUM THEME PARTY

Join us Tuesday, October 14, from 7:00 PM to 10:00 PM for the traditional Symposium Theme Party. This year's event will be a colorful Mexican Fiesta in Marriott Hall North. Mexico is the home of happy parties, bold colors, and wonderful food, and our Mexican Fiesta is no exception. The street signs will direct you to Rosarita Beach, Ensenada, and Tijuana, all places where the streets are filled with people in a party mood. The smell of fajitas, carne asada, and carnitas will drive you crazy as everyone will be wanting another helping of the joyous array of Mexican foods. As the Marriachis entertain you, this happy occasion (and the Margarita Stations) will bring smiles and laughter to all you amigos. One admission to the Symposium Theme Party is included with full Symposium registration. Additional guest tickets may be purchased at the registration center for \$50.

Anaheim Attractions:

Southern California offers an abundance of amusement park attractions and other outdoor activity. The Anaheim Marriott offers a free trolley to Disneyland Park, just two blocks away. It is fifteen minutes to Knott's Berry Farm, 50 minutes to Universal Studios, 45 minutes to downtown Los Angeles, 75 minutes to downtown San Diego, and 90 minutes to Palm Springs. The concierge will arrange trips to Pacific

Ocean beaches and area attractions, or set up reservations on nearby tennis courts or golf courses.

Weather:

Southern California offers a perfect climate for this year's Symposium. Temperatures are typically in the 70° range in the daytime, and 60° range at night. If you're planning to be outdoors for a significant amount of time, bring some suntan lotion.

SYMPOSIUM HIGHLIGHTS

Technical Program:

This year's high quality technical program focuses on III-V compound semiconductor integrated circuits and their associated technologies. The program explores the utilization of these technologies in analog, microwave, millimeter-wave, digital, mixed-signal, and optoelectronic ICs. Featured components of the program are: 61 regular and invited papers; the Short Course, "Technologies for Wireless Applications Beyond 2000;" the GaAs IC Primer Course (for those wishing to get better acquainted with III-V IC technology and to set the stage for this year's technical sessions); and 4 thought-provoking Panel Sessions. A dominant theme running through the Symposium is "The Technology Debate for High Growth Communications Markets." In the commercial arena, we are once again pleased to present 2 Integrated Circuit Vendor Product Forums (announcing the latest in III-V IC products) and the Technology Exhibition. We've tried to arrange the sessions to minimize overlap of common interests while providing opportunities for informal discussions.

This year's Technical Sessions truly reflect the international scope of the Symposium with nearly 50% of the papers coming from outside the USA. Similarly we have expert Panel Session participants coming from around the globe to provide a broad perspective on four controversial and thought-provoking topics:

1. Comparison of GaAs PHEMT and InP HEMT reliability
2. Choosing the optimal technology for linear, efficient PCS power amplifiers
3. User's perspectives (and "work-arounds") on commercial circuit simulators
4. Technological approaches to best obtain TDM optical fiber communications at 40 Gb/s and beyond.

We hope you will share in our excitement over this year's outstanding technical program which offers a variety of stimulating sessions and plenty of opportunities to exchange ideas (and phone numbers) with new business associates and old friends.

Short Course:

This year the GaAs IC Symposium will present the twelfth in a series of short courses applicable to various aspects of GaAs technology. This year's course entitled "IC Technologies for Wireless Applications Beyond 2000" will consist of a series of tutorial and exemplary presentations and will be held Sunday, October 12 from 8:00 a.m. to 4:30 p.m.

This one day course is designed to provide participants with insights into the technology underlying IC design for wireless. Instructors are experts from leading companies in the field.

Because space is limited, ADVANCE REGISTRATION FOR THIS COURSE IS ENCOURAGED. Registration includes attendance at the course, a book of materials prepared by the short course team, a continental breakfast, lunch, and two refreshment breaks. Please note the deadline for Advance Registration is September 12, 1997. For additional information, please contact the Short Course Coordinator:

Mark Wilson
Motorola SPS
Tel (602) 413-6046
Fax (602) 413-5748

Registration for the course is as noted in "Symposium at a Glance". A limited number of Short Course notes will be available after the course for purchase by Symposium registrants, subject to availability. The cost is \$80.

GaAs IC Primer Course:

The GaAs IC Symposium will again offer an introductory-level class, "Basics of GaAs ICs," intended for professionals in the electronics industry with little or no previous experience in GaAs integrated circuits. The class will emphasize both analog/microwave and digital ICs and applications. The material is designed to provide a brief overview of concepts and issues unique to GaAs ICs so that participants will be better able to profit from the Symposium Technical Program. The class is taught by Donald B. Estreich, a Hewlett-Packard manager with 19 years experience in design and application of GaAs analog and microwave ICs, and Steven Long, a University of California, Santa Barbara professor, also with 19 years experience in GaAs IC development. The class will be held Sunday evening, October 12, from 5:30 p.m. to 8:30 p.m.

The registration fee of \$160 for professionals and \$60 for students includes attendance at the class, a handout containing copies of the overheads, and an extensive reference list. Because space is limited, **ADVANCE REGISTRATION IS HIGHLY RECOMMENDED**. For additional information, please contact the Primer Course Coordinator:

Brad Cole
M/A COM
Lowell, Mass.
Tel:(508) 656-2761

Registration for the class is as noted in "Symposium at a Glance". A limited number of copies of the handouts will be available to Symposium registrants, subject to availability. The cost is \$50.

Panel Sessions:

This year we have four exciting Panel Sessions spread over the 3 days of the technical sessions. These are intended to be timely, thought-provoking, educational, and possibly even controversial. The topics are as follows:

Panel Session 1:

"Will PHEMTs and InP HEMTs Survive in Your Circuits?"

Monday, October 13; 12:35 pm - 2:05 pm

Panel Session 2:

"Linear, Efficient, Portable PCS Power Amplifiers: S/dBc GaAs Technology Battle."

Tuesday, October 14; 1:40 pm - 3:10 pm

Panel Session 3:

"Active Device Modeling: User's Perspectives on Commercial Circuit Simulators."

Tuesday, October 14; 3:30 pm - 5:00 pm

Panel Session 4:

"40 Gb/s (and beyond) -- TDM for Optical Fiber Communication Systems."

Wednesday, October 15; 12:30 pm - 2:00 pm

Please see the "Symposium Program" section later in this brochure for more complete descriptions of each of these Panel Sessions (listed according to their day and time).

Vendor Product Forums:

The 1997 Vendor Product Forums, coordinated by Tim Henderson of TI, will provide an opportunity for potential customers, business partners, or other interested parties to learn about some of the latest

GaAs IC products available for wireless communication applications. Two lunch-time forums will be held this year; one on Monday, October 13 from 12:35 p.m. to 2:05 p.m., and one on Wednesday, October 15 from 12:30 p.m. to 2 p.m.

Because of the overwhelming interest in ICs for microwave communications markets, both of the sessions will focus on these types of products.

GaAs IC Technology Exhibition:

The 1997 GaAs IC Technology Exhibition will be held concurrently with the IEEE GaAs IC Symposium on October 13 and 14 in the Marriott Hall Center Ballroom, and it is open to all Symposium registrants. The Exhibition features a wide variety of companies who sell state-of-the-art compound semiconductor integrated circuits and well as companies who sell critical products and services to the III-V IC industry. The early list of exhibitors already includes:

Airtron Division of Litton
Aixtron, Inc.
Anritsu Wiltron
Ansoft Corp.
Cascade Microtech, Inc.
CHA Industries
Epitronics Corp.- An ATMI Company
Freiberger Compound Materials
Hitachi Cable America
HP-EESOF
III-V's Review
Kopin Corp.
M/A-COM an AMP Company
Oki Semiconductor
Picogiga Inc.
Quantum Epitaxial Devices Inc.
Roos Instruments
Solid State Equipment Corp.
Sumitomo Electric USA, Inc.
TLC Precision Wafer Technology, Inc.
VG Semicon

The Exhibition will feature informative and interesting displays with corporate representatives on hand between the hours of 5:00 pm and 8:00 pm on Monday, October 13 and 7:00 am and 5:00 pm on Tuesday, October 14. The Exhibition will also host the Exhibition Opening Reception on Monday evening from 5:00 until 7:00 and the Exhibition Luncheon from noon until 1:30 pm on Tuesday. All coffee breaks on Tuesday will be held in the exhibition.

There is still time for additional organizations to participate in the Exhibition. Interested parties should contact Mr. Harry Kuemmerle of VIP Meetings & Conventions, Pacific Palisades, CA at (310) 459-4691, Fax (310) 459-0605.

Late-Breaking News Papers:

We have solicited papers containing late-breaking news for the Symposium Program. The times and locations of these presentations will be posted at the Symposium, as well as on the GaAs IC Symposium Website at

<http://www.eecs.umich.edu/VLSI/GAASIC>

In addition, extended abstracts for these papers will appear in the Symposium Digest.

Technical Digest:

Extra copies of the Technical Digest can be purchased by Symposium registrants through Advance Registration. A limited number of digests will also be available for sale at the Registration Desk after 1:00 p.m. on Tuesday, October 14. The cost of the digest if ordered through Advance Registration or purchased on-site is \$60. A limited number of digests from previous years will be available for \$25. Digests will

also be available after the Symposium by mail from the IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854

Outstanding Paper Award:

The 1997 IEEE GaAs IC Symposium will institute a new feature, an Outstanding Paper Award. All contributed regular papers (i.e. not including invited papers) will automatically be considered as candidates this year. Symposium attendees will have an opportunity to provide feedback through a Symposium questionnaire as well as Session Chairpersons. The award winner will be publicly announced shortly after this year's Symposium, with the award formally presented at next year's GaAs IC Symposium in Atlanta.

SHORT COURSE

Sunday, October 12, 1997
The Anaheim Marriott Hotel
Marriott Hall NE
8:00 a.m. - 4:30 p.m.

"IC Technologies for Wireless Applications Beyond 2000"

Course Coordinator: Mark Wilson

Motorola SPS

Tempe, AZ

Tel. (602) 413-6046

FAX (602) 413-5748

Short Course Description

This year's short course will address important issues around technology choices for wireless ICs. The market for wireless equipment stresses ever-improving performance and talk-time from ever smaller, lighter and more reliable units. Following an introduction to wireless systems and an analysis of present realities and future trends by George Norris, each instructor will present a critical appraisal of one of the contending technologies: Implanted MESFETs; epitaxial FETs and HEMTs; HBTs and Silicon.

Trends to be discussed include the operating frequency, power supply voltages, integration level and of course, cost. The technology drivers are efficiency, power density and linearity, with the inevitable extension to passive elements, interconnect and packaging. Device parametric reproducibility and reliability also play an important part.

For each technology we will consider the features and capabilities, and how they impact the applications, as well as considering the technology roadmap and how it fits with the application trends.

Instructors for the Short Course

George Norris *Motorola*

Pat Fowler *ANADIGICS*

Stan Shanfield *Raytheon*

Kevin Kobayashi *TRW*

Vincent Ho *Rockwell*

In the unlikely event that a listed instructor is unable to participate, an alternate instructor may be substituted.

Who Should Attend

The Short Course is open to anyone interested in learning about the high performance integrated circuits being utilized for future generations of wireless products. The course will be most directly useful to IC designers and users. Managers, technologists, manufacturers, and technical sales people with an interest in acquiring more in-depth knowledge of the RF circuits forming the core of emerging wireless systems will also benefit.

Short Course Schedule

The Short Course will be held on Sunday, October 12, starting with a continental breakfast in the Marriott Hall Foyer. Instruction will begin promptly at 8:00 a.m. in Marriott Hall NE. Lunch will be provided for all Short Course attendees at noontime in Marriott Hall NW. There will be morning and afternoon refreshment breaks. The course will end at 4:30 p.m.

Short Course Pre-Registration

So that we may plan properly for attendance, we encourage you to pre-register for the short course. A limited number of registrations will be available on-site immediately prior to the start of the course. The price for the Short Course is \$340 for those that pre-register, and \$370 for those that register on-site. This will include the lectures, a book of Course Notes, and continental breakfast, lunch, and morning and afternoon refreshments. Additional copies of the Course Notes may be purchased for \$80 each.

GaAs IC PRIMER COURSE

Sunday, October 12, 1997
The Anaheim Marriott Hotel
California Room 3
5:30 p.m. - 8:30 p.m.

"Basics of GaAs ICs"

Course Coordinator: **Brad Cole**
MA/COM, Lowell, MA
(508)656-2761

Instructors: **Stephen I. Long**
University of California
Santa Barbara, CA

Donald B. Estreich
Hewlett-Packard
Santa Rosa, CA

Course Objective and Description:

The symposium will again offer the popular primer course "Basics of GaAs ICs," which is an introductory-level class intended for engineers and managers who have little or no experience in GaAs IC technology, circuit design, or applications. The course will address both digital and analog/RF/microwave circuits. III/V materials, MOS and bipolar devices, and fabrication technology will also be covered to provide needed background information. The presentation will be tailored to provide the specific background needed for participants to understand and appreciate the papers presented in the Symposium Technical Program, including a glossary of those all-important acronyms. Comparisons among GaAs technologies, and between these and silicon, will be made throughout, as a number of GaAs integrated circuits and their applications are described.

Instructors Stephen I. Long and Donald B. Estreich each have over 19 years of experience working with GaAs ICs. Copies of their viewgraphs and an extensive bibliography will be distributed to all Primer Course registrants. Discussion time will provide an opportunity for participants to have questions answered by the instructors.

Course Agenda:

5:30 p.m. Introduction
5:35 p.m. GaAs History, Materials, and Processes
6:00 p.m. Device Operation
6:30 p.m. Discussion
6:40 p.m. Break
6:50 p.m. Digital Circuits
7:30 p.m. Analog/RF/Microwave Circuits

8:10 p.m. Summary and Discussion

8:30 p.m. Close

OTHER MEETINGS

1997 GaAs Reliability Workshop:

The twelfth annual workshop on GaAs Reliability, sponsored by JEDEC Committee JC-50 and EIA, in cooperation with the Electron Devices Society of the IEEE, will be held on Sunday, Oct. 12, 1997, from 8:00 a.m. to 5:00 p.m. in the Orange County Ballroom 4 & 5.

The workshop will bring together researchers, manufacturers, and users of GaAs devices. Papers presenting the latest results, including work-in-progress, and new developments in all phases of GaAs reliability will be presented. Potential authors are asked to submit 7 copies of a one to two page comprehensive summary, suitable for a 15 minute presentation to Dr. Wallace T. Anderson, Naval Research Laboratory, Code 6835, Washington, DC 20375, (202) 767-1755. While the deadline is August 5, 1997, late news papers are also invited.

To pre-register, mail your name, address and phone number with a \$75 check to: EIA/JEDEC, JC-50 Workshop, 2500 Wilson Boulevard, Arlington, VA 22201-3834 by Oct. 15, 1997. Registration includes a full day of GaAs reliability presentations, two breaks, a luncheon, and a copy of the Digest of Papers. Late registration will also be available from 7:30 a.m. to 8:30 a.m. on October 12. For further information, contact: Anthony A. Immorlica, Jr., Lockheed Sanders Corporation, 65 Spitbrook Road, NHQ6-1551, Nashua, NH. (603) 885-3599.

SEMI Compound Semiconductor Standards Committee Meeting:

The next SEMI Compound Semiconductor Standards Meeting is scheduled for Monday, Oct. 13, from 5:00-7:00 p.m., in Plaza G during the Symposium.

The SEMI Compound (GaAs, InP) Semiconductor Standards Committee would like to invite 1997 IEEE GaAs IC Symposium attendees interested in the development of internationally approved standards for Wafer Specifications (GaAs, dimensions/orientation, electrical properties), Epitaxy Layer Specifications, non-destructive mobility measurements, eddy current probe measurement resolution, test methods for etch pit density (EPD), room temperature resistivity mapping and investigations of electronic data interchange (EDI) codes for wafer marking to attend the next Compound Semiconductor meeting. SEMI and ASTM have held joint meetings for over 3 years and continue to develop test methods and specifications as a cooperative effort.

Based in Mountain View, Calif., Semiconductor Equipment and Materials International (SEMI) is an international trade association serving 1,700 companies and participating in the \$55 billion semiconductor and flat panel display equipment and materials markets. SEMI maintains offices in Austin, Beijing, Brussels, Hsinchu, Moscow, Tokyo, Seoul, Singapore, Boston, and Washington, D.C.

For additional information, please contact:

Co-Chair James Oliver
Northrop-Grumman
P.O. Box 1521 M/S 3K13
Baltimore, MD 21203
Phone/Fax: (410)765-0117 / (410)765-7370

Co-Chair Russ Kremer
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2853 Janitell Road

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Phone/Fax: (719)540-099 / (719)540-0994

Senior Standards Engineer
Ms. Kate Dettenrieder
SEMI
805 East Middlefield Road
Mountain View, CA 94043
Phone/Fax: (415)940-7997 / (415)940-7943

SYMPOSIUM PROGRAM

Monday, October 13, 1997

REGISTRATION AND CONTINENTAL BREAKFAST

7:00 a.m. - 5:00 p.m.

Registration - Ballroom Foyer

7:00 a.m. - 8:00 a.m.

Continental Breakfast - Marriott Hall Foyer

SYMPOSIUM OPENING

8:10 a.m. - 8:30 a.m.

Marriott Hall N

1997 Symposium Chairman

Phil Wallace, *ANADIGICS, Warren, NJ*

1997 Technical Program Chairman

Bill Stanchina, *Hughes Research Lab., Malibu, CA*

SESSION A: PLENARY SESSION

8:30 a.m.

Marriott Hall N

Chairpersons: James Komiak, *Sanders, a Lockheed-Martin Co.*,
Richard Brown, *University of Michigan*

8:30 a.m.

A.1 **W-CDMA: AN APPROACH TOWARD NEXT GENERATION MOBILE RADIO SYSTEM, IMT-2000**
(Invited Paper), Y. Furuya, *NEC Corp., Tokyo, Japan*

9:00 a.m.

A.2 **GaAs IN THE BROADBAND INFRASTRUCTURE** (Invited Paper), J. Jakobson, *Tele Danmark, Tranbjerg, Denmark*

9:30 a.m.

A.3 **GaAs TECHNOLOGY RIDES THE WIRELESS WAVE**
(Invited Paper), E. Lum; *Dataquest/Gartner Group, San Jose, CA*

10:00 a.m. - 10:30 a.m.

Coffee Break

10:30 a.m.

A.4 **DESIGN OF THE TERA MTA COMPUTER SYSTEM**
(Invited Paper), M. Howard, *Tera Computer Co., Seattle, WA.*

11:00 a.m.

A.5 **III-V COMPOUND SEMICONDUCTOR MOSFETS USING $\text{Ga}_2\text{O}_3(\text{Gd}_2\text{O}_3)$ AS GATE DIELECTRIC**, F. Ren, M. Hong, J. Kuo, W. Hobson, J. Lothian, H. Tsai, J. Lin, J. Mannaerts, J. Kwo, S. Chu, Y. Chen & A. Cho, *Bell Laboratories, Lucent Technologies, Murray Hill NJ.*

11:30 a.m.

End of Session A

BUFFET LUNCH

11:30 a.m. - 12:30 p.m.

Monday, October 13, 1997

PANEL SESSION 1:

WILL PHEMTS AND InP HEMTS SURVIVE IN YOUR CIRCUITS?

12:35 p.m. - 2:05 p.m.

Marriott Hall NE

Organizer & Moderator:

Kenneth J. Russell, *The Aerospace Corp., Los Angeles, CA.*

Katerina Hur, *Hewlett-Packard Co., Santa Rosa, CA.*

This panel will discuss issues affecting the reliable application of PHEMT and InP HEMT technology in various systems. These technologies will be compared to the MESFET, from a reliability point of view, to forecast where unique failure mechanisms, or increased sensitivity to old failure mechanisms, may occur. Drift and degradation in performance, as well as catastrophic failure, will be addressed. Environmental sensitivity of these new technologies will be discussed. Industry experience with the PHEMT and InP HEMT technology will be examined to help answer the following questions:

What is required to make PHEMTs and InP HEMTs reliable?

Is it more device development, or circuit or package modifications?

What reliability criteria should be applied for different applications (space, wireless, instruments, etc.)?

How do we demonstrate these criteria?

What future government/industry activity, if any, is needed to insert these technologies into systems successfully?

Panel Members:

Lisa Aucoin	<i>Raytheon</i>
Michael Delaney	<i>Hughes</i>
James Hwang	<i>Lehigh University</i>
Sammy Kayali	<i>Jet Propulsion Laboratory</i>
Kazuhiko Onda	<i>NEC</i>
Paul Saunier	<i>Texas Instruments</i>
Lawrence Studebaker	<i>Hewlett Packard</i>
Alan Swanson	<i>Sanders</i>
C. S. (Chan) Wu	<i>TRW</i>

VENDOR PRODUCT FORUM 1

12:30 p.m. - 2:00 p.m.

Marriott Hall NW

Chairman:

Tim Henderson, *Texas Instruments, Dallas, TX.*

The 1997 Vendor Product Forum will provide an opportunity for potential customers, business partners, or other interested parties to learn about some of the latest GaAs IC products available for wireless communication applications.

Because of the overwhelming interest in ICs for microwave communications markets, both of the sessions will focus on these types of products. Participants in this year's Vendor Product Forum are among the leaders in the industry. Today's speakers include representatives from:

Honeywell

Rockwell

Anadigics

Siemens

TRW

Monday, October 13, 1997

SESSION B: WIRELESS POWER AMPLIFIERS & SYSTEM LINEARITY

2:15 p.m.

Marriott Hall NW

Chairpersons: Brad Nelson, *Pacific Monolithics*
Mitchell Shifrin, *Hittite Microwave Corp.*

2:20 p.m.

B.1 **LINEARITY REQUIREMENTS FOR DIGITAL WIRELESS REQUIREMENTS** (Invited Paper), S-W Chen, *Qualcomm Inc*

2:50 p.m.

B.2 **CURRENT PACKAGING TREND FOR WIRELESS TECHNOLOGY** (Invited Paper), D. Monthei, *TriQuint Semiconductor*

3:20 p.m. -3:40 p.m.

Coffee Break

3:40 p.m.

B.3 **A HIGH EFFICIENCY NORMALLY-OFF MODFET POWER MMIC FOR PHS OPERATING UNDER 3.0 V SINGLE-SUPPLY CONDITION**, T. Kunihisa, T. Yokoyama, M. Nishijima, S. Yamamoto, M. Nishitsuji, K. Nishii, M. Nakayama & O. Ishikawa, *Matsushita, Osaka, Japan*

4:00 p.m.

B.4 **PREDICTION OF HBT ACPR USING THE GUMMEL POON LARGE SIGNAL MODEL**, D. Teeter, S. Bouthillette, A. Platzker, A. Forbes & S. Lichwala, *Raytheon, Andover, MA.*

4:20 p.m.

B.5 **A LOW DISTORTION AND HIGH EFFICIENCY HBT MMIC POWER AMPLIFIER WITH A NOVEL LINEARIZATION TECHNIQUE FOR p/4 DQPSK MODULATION**, T. Yoshimasu, M. Akagi, N. Tanba & S. Hara, *Sharp Corp. Nara, Japan*

4:40 p.m.

B.6 **SINGLE LOW VOLTAGE SUPPLY OPERATION GaAs POWER MESFET AMPLIFIER WITH LOW-DISTORTION GAIN-VARIABLE ATTENUATOR FOR 1.9 GHz PERSONAL HANDY PHONE SYSTEMS**, M. Nagaoka, H. Wakimoto, T. Seshita, K. Kawakyu, Y. Kituara, A. Kameyama & N. Uchitomi, *Toshiba, Kawasaki, Japan*

5:00 p.m.

End of Session B

SESSION C: HIGH PERFORMANCE FET TECHNOLOGY

2:15 p.m.

Marriott Hall NE

Chairpersons: Katerina Hur, *Hewlett-Packard*
Byung-jong Moon, *Vitesse*

2:20 p.m.

C.1 **DEVICE AND PROCESS OPTIMIZATION FOR A LOW VOLTAGE ENHANCEMENT MODE POWER**

HETEROJUNCTION FET FOR PORTABLE APPLICATIONS, J. Huang, E. Glass, B. Bernhardt, J. Abrokwah, M. Majerus, E. Spears, J. Parsey, D. Scheitlin, R. Droopad, L. Mills, K. Hawthorne & J. Blaugh, *Motorola, Tempe AZ.*

Monday, October 13, 1997

2:40 p.m.

C.2 **RADIATION HARDENED COMPLIMENTARY GaAs(CGaAsTM)**, M. LaMacchia, J. Abrokwah, B. Bernhardt, D. Foster, B. Crawford, B. Mathes, & T. McGuire, *Motorola, Scottsdale, AZ.*, T. Weatherford, *US Naval Postgraduate School, Monterey, CA*

3:00 p.m.

C.3 **HIGH PERFORMANCE 19 GHz BAND GaAs FET SWITCHES USING LOXI MESFETs**, A. Kanda, S. Kodama, T. Furuta, N. Nittono, T. Ishibashi & M. Muraguchi, *NTT, Kanagawa, Japan*

3:20 p.m. - 3:40 p.m.

Coffee Break

3:40 p.m.

C.4 **INFLUENCE OF T-GATE SHAPE AND FOOTPRINT LENGTH ON PHEMT HIGH FREQUENCY PERFORMANCE**, H. Brech, T. Grave, *Siemens, Munich, Germany*, T. Simlinger & S. Selberherr, *TUV, Vienna, Austria*

4:00 p.m.

C.5 **0.1 μ m DOUBLE-DECK-SHAPED GATE HJFET TECHNOLOGY WITH REDUCED GATE FRINGING CAPACITANCE FOR ULTRA-HIGH-SPEED ICs**, S. Wada, J. Yamazaki, M. Ishikawa & T. Maeda, *NEC Corp. Tsukuba Japan*

4:20 p.m.

C.6 **INVESTIGATIONS OF DOUBLE RECESSED HIGH POWER DENSITY PHEMTs FOR MICROWAVE POWER APPLICATIONS**, W. Marsetz, A. Hülsmann, T. Kleindienst, S. Fischer, M. Demmler, T. Fink, K. Köhler & M. Schlechtweg, *Fraunhofer Inst., Freiburg, Germany*

4:40 p.m.

C.7 **NOISE REDUCTION OF PHEMTs WITH PLASMALESS SiN PASSIVATION BY CATALYTIC CVD**, R. Hattori, G. Nakamura, *Mitsubishi, Itami, Japan*, S. Nomura, *ANELVA Corp. Tokyo, Japan*, T. Ichise, J. Masuda & H. Matsumura *Japan Adv. Inst. of Sci. & Techn., TatsunoKuchi, Japan*

5:00 p.m.

End of Session C

GaAs Technology Exhibition
Opening Reception
Marriott Hall Center
5:00 p.m - 7:00 p.m.

Tuesday, October 14, 1997

REGISTRATION AND CONTINENTAL BREAKFAST

7:00 a.m. - 5:00 p.m.

Registration - Ballroom Foyer

7:00 a.m. - 8:00 a.m.

Continental Breakfast - Marriott Hall Foyer

SESSION D: HIGH PERFORMANCE A/D CONVERTERS

8:30 a.m.

Marriott Hall NW

Chairpersons: Zachary Lemnios, *MIT Lincoln Lab.*
Neng-Haug Sheng, *Rockwell.*

8:30 a.m.

D.1 **DEVELOPMENT OF HIGH PERFORMANCE ANALOG-TO-DIGITAL CONVERTERS FOR DEFENSE APPLICATIONS** (Invited Paper), J. Murphy, *DARPA/ETO, Washington, DC.*

9:00 a.m.

D.2 **A 1 GS/s, 11-b TRACK-AND-HOLD AMPLIFIER WITH <0.1 dB GAIN LOSS**, R. Yu, N-H. Sheng, K. Cheng, G. Gutierrez, K-C. Wang & M-F. Chang, *Rockwell Science Center, Thousand Oaks, CA.*

9:20 a.m.

D.3 **5 GHz ?-? ANALOG TO DIGITAL CONVERTER WITH POLARITY ALTERNATING FEEDBACK COMPARATOR**, T. Miyashita, M. Nihei, Y. Watanabe, *Fujitsu, Atsugi, Japan,* & A. Olmos, *Sao Paulo University, Sao Paulo, Brazil*

9:40 a.m.

D.4 **BANDPASS DELTA-SIGMA MODULATOR WITH 800 MHz CENTER FREQUENCY**, A. Jayaraman, P. Asbeck, *U. of California, San Diego, CA.* K. Nary, *Celerix, Inc.,* S. Beccue, *Practical Sciences Inc.,* & K-C. Wang, *Rockwell Science Center*

10:00 a.m.

End of Session D

10:00 a.m. - 10:30 a.m.

Coffee Break

SESSION E: HIGH SPEED DATA SWITCHING ICs

10:30 a.m.

Marriott Hall NW

Chairpersons: Gary McCormack, *TriQuint*
Mehran Mokhtari, *Royal Inst. Techn. Stockholm.*

10:30 a.m.

E.1 **GaAs ICs FOR 10 Gb/s ATM SWITCHING**, (Invited Paper) A. Nunez, R. Sarmiento, R. Esper-Chain, J. Jakobsen, J. Lopez, J. Montiel, V. Armas, F. Tobajas & S. Martel, *U. of Las Palmas de Gran Canaria, Gran Canaria, Spain*

11:00 a.m.

E.2 **A HIGH SPEED & HIGH PRECISION 64x33
CROSSPOINT SWITCH IC**, R. Savara, *TriQuint, Hillsboro,
OR.*

Tuesday, October 14, 1997

11:20 a.m.

- E.3 **A 10 Gb/s 12x12 CROSSPOINT SWITCH IMPLEMENTED WITH AlGaAs/GaAs HETEROJUNCTION BIPOLAR TRANSISTORS**, A. Metzger, P. Asbeck, *UCSD, La Jolla, CA*, C. Chang, K-C. Wang, K. Pedrotti, A. Price, A. Campana, D. Wu, J. Liu, *Rockwell Sci. Center, Thousand Oaks, CA*, & S. Beccue, *PSI, Oxnard, CA*

11:40 a.m.

- E.4 **LOW-POWER-CONSUMPTION 10 Gb/s GaAs 8:1 MULTIPLEXER/1:8 DEMULTIPLEXER**, N. Yoshida, M. Fujii, T. Atsumo, K. Numata, S. Asai, M. Kohno, H. Oikawa, H. Tsutsui & T. Maeda, *NEC Corp. Kawasaki, Japan*

12:00 noon.

End of Session E

SESSION F: ADVANCED DEVICES & HBT TECHNOLOGY

8:10 a.m.

Marriott Hall NE

Chairpersons: Matt Hoppe, *TRW*
Titus Wandinger, *Watkins-Johnson*

8:10 a.m.

- F.1 **RESONANT TUNNELING CIRCUIT TECHNOLOGY: HAS IT ARRIVED** (Invited Paper), A. Seabaugh, B. Brar, T. Broekaert, G. Frazier & P. van der Wagt, *Texas Instruments, Dallas, TX*

8:40 a.m.

- F.2 **SUPERCONDUCTIVE ELECTRONICS - A HIGH SPEED AND LOW POWER TECHNOLOGY COMPLEMENTING III-V** (Invited Paper) M. Laung, J. Spargo & A. Silver *TRW, Redondo Beach, CA*

9:10 a.m.

- F.3 **GaAs MEMS DESIGN USING 0.2 μ m HEMT MMIC TECHNOLOGY**, R. Ribas, N. Bennouri, J. Karam & B. Courtois, *MCS Group, TIMA Lab., Grenoble, France*

9:30 a.m.

- F.4 **SUPER-SMALL AND LOW-POWER FRONT-END HIC USING MBB TECHNOLOGY FOR 1.9GHz BANDS**, (Invited Paper), T. Nakatsuka, J. Itoh, T. Yoshida, M. Nishitsuji, T. Uda, T. Kunihisa, H. Masato & O. Ishikawa, *Matsushita, Osaka, Japan*

10:00 a.m. - 10:30 a.m.

Coffee Break

10:30 a.m.

- F.5 **PRODUCTION & COMMERCIAL INSERTION OF InP HBT INTEGRATED CIRCUITS** (Invited Paper), D. Streit, A. Gutierrez-Aiken, J. Cowles, L. Yang, K. Kobayashi, L. Tran, T. Block & A. Oki, *TRW, Redondo Beach, CA*

11:00 a.m.

- F.6 **DEVICE TECHNOLOGY OF InP/InGaAs HBTs FOR 40Gb/s OPTICAL TRANSMISSION APPLICATION**, H.

Masuda, K. Ouchi, A. Terano, H. Suzuki, K. Watanabe, T. Oka,
H. Matsubara & T. Tanoue, *Hitachi, Tokyo, Japan*

11:20 a.m.

F.7 **50 GHz BANDWIDTH BASE-BAND AMPLIFIERS USING GaAs-BASED HBTs**, Y. Suzuki, H. Shimawaki, Y. Amamiya, N. Nagano, T. Niwa, H. Yano & K. Honjo, *NEC Corp., Tsukuba, Japan*

11:40 a.m.

F.8 **EFFECTS OF ELECTROSTATIC DISCHARGE ON GaAs-BASED HBTs**, T. Henderson, *TI, Dallas, TX*

Tuesday, October 14, 1997

12:00 noon.

End of Session F

Exhibition Lunch
Marriott Hall Center
12:00 noon. - 1:30 p.m.

**PANEL SESSION 2: LINEAR, EFFICIENT,
PORTABLE PCS POWER AMPLIFIERS: S/dBc
GaAs TECHNOLOGY BATTLE**

1:40 p.m.

Marriott Hall NE

Organizers/Moderators: Hausila Singh, *ITT*
Fazal Ali, *Nokia*

Reliable, low cost and linear power amplifiers are needed for portable PCS applications. It is important that these amplifiers are very efficient to provide longer talk time. Several GaAs based technologies are being utilized to develop power amplifiers for PCS applications. It is not known at this moment which technology is favorite? A technology will be the winner if it provides reliable, linear power amplifier with lowest cost and highest performance. The panel members, who are actively involved in PCS power amplifier development, will address linearity, efficiency, reliability, and cost for their technology of choice

Panel Members:

Jon Jorgenson *RF Micro Devices*
Ken Weller *Rockwell International*
Damian McCann *Celeritek*
Joe DeMoura *Anadigics*
Ray Pengelly *Raytheon*

3:10 p.m. - 3:30 p.m.

Coffee Break

PANEL SESSION 3: ACTIVE DEVICE MODELING: USERS' PERSPECTIVES ON COMMERCIAL CIRCUIT SIMULATORS

3:30 p.m.

Marriott Hall NE

Organizer/Moderator: Robert Anholt, *Gateway Modeling*

One of the curses of bandgap engineering is that it has provided us with so many different types of transistor technologies that the active device models available in commercial circuit simulators must struggle to keep up. This panel explores users' experiences with commercial RF and SPICE simulators. Mike Golio (Rockwell) will speak on quantifying large-signal model performance, device characterization requirements and coping with process variations. Micheal Schlechtweg (Fraunhofer Inst.) will compare analytical and table-based models for HEMTs with respect to accuracy, simulation time and robustness. To deal with over four types of transistor technologies, Texas Instruments supports Libra models for foundry customers. Martin Jones (TI) will describe the frustrations and limitations of this approach. Paul White (Raytheon) will also discuss experiences with supporting active device models in RF simulators. Finally Dave Smith (TriQuint) will describe his experiences supporting the implementation of the TriQuint FET model (TOM) by commercial SPICE simulators

Panel Members:

Mike Golio	<i>Rockwell</i>
Michael Schlechtweg	<i>Fraunhofer Inst.</i>
Martin Jones	<i>TI</i>
Paul White	<i>Raytheon</i>
Dave Smith	<i>TriQuint</i>

Tuesday, October 14, 1997

SESSION G: RELIABILITY AND TRANSIENT PHENOMENA

1:50 p.m.

Marriott Hall NW

Chairpersons: Jan-Erik Mueller, *Siemens AG*
Albert Baca, *Sandia National Lab*

1:50 p.m.

G.1 **AlGaAs/GaAs HBT RELIABILITY: DEPENDENCE ON MATERIAL AND CORRELATION TO BASEBAND NOISE**, B. Bayraktaroglu, G. Dix, *Northrop Grumman Corp., Baltimore, MD.*, S Mohammadi & D. Pavlidis, *University of Michigan, Ann Arbor, MI*

2:10 p.m.

G.2 **SUBSTRATE-INDUCED GATE LAG IN ION-IMPLANTED GaAs MESFETs**, J. Bao, X. Du, M. Shirakov, R. Leoni & J. Hwang, *Lehigh University, Bethlehem, PA*

2:30 p.m.

G.3 **DEGRADATION EFFECTS INDUCED BY HOT CARRIERS AND HIGH CHANNEL TEMPERATURE IN PSEUDOMORPHIC GaAs MILLIMETER WAVE POWER HEMTs**, Y. Chou, D. Leung, Y. Chen, R. Lai, C. Wu, R. Kono, P. Liu, J. Scarpulla, D. Streit, *TRW, Redondo Beach, CA*, Z. Wang & G. Li, *University of California, Irvine, CA*

2:50 p.m.

G.4 **CONDUCTANCE DLTS ANALYSIS OF THE CORRELATION BETWEEN POWER SLUMP AND GATE LAG**, R. Leoni, J. Bao, X. Du, M. Shirakov & J. Hwang, *Lehigh University, Bethlehem, PA*

3:10 p.m.

End of Session G

3:10 p.m. - 3:30 p.m.

Coffee Break

SESSION H: HIGH SPEED DIGITAL APPLICATIONS

3:30 p.m.

Marriott Hall NW

Chairpersons: Gary McCormack, *TriQuint*
Chung-Yi Su, *Hewlett-Packard*

3:30 p.m.

H.1 **AN ULTRA-LOW-POWER-CONSUMPTION HIGH-SPEED GaAs 256/258 DUAL-MODULUS PRESCALAR IC**, T. Maeda, S Wada, M. Tokushima, M. Ishikawa, J. Yamazaki & M. Fujii, *NEC, Ibaraki, Japan*

3:50 p.m.

H.2 **A PACKAGED 3 GHz TIMING INTERFACE UNIT FOR A LASER ALTIMETER SYSTEM**, D. Jani, C. Chang & K. Wang, *Rockwell Science Center, Thousand Oaks, CA*

4:10 p.m.

End of Session H

Tuesday, October 14, 1997

Symposium Theme Party
Marriott Hall North
7:00 p.m. - 10:00 p.m.

Wednesday, October 15, 1997

REGISTRATION AND CONTINENTAL BREAKFAST

7:00 a.m. - 12:00 noon

Registration - Ballroom Foyer

7:00 a.m. - 8:00 a.m.

Continental Breakfast - Marriott Hall Foyer

SESSION I: OPTICAL INTERCONNECTS AND RECEIVERS

8:10 a.m.

Marriott Hall NE

Chairpersons: Mike Roberts, *M/A COM*
John Sitch, *Nortel*

8:10 a.m.

1.1 **PARALLEL OPTICAL INTERCONNECTIONS FOR GIGABYTE/s DATA COMMUNICATION** (Invited Paper),
A. Yuen, *Hewlett-Packard, Palo Alto, CA*

8:40 a.m.

1.2 **LONG WAVELENGTH MSM-HEMT AND PIN-HEMT PHOTORECEIVERS GROWN ON GaAs**, V. Hurm, W. Benz, W. Bronner, T. Fink, T. Jakobus, G. Kaufel, K. Köhler, Z. Lao, M. Ludwig, C. Moglestue, B. Raynor, J. Rosenzweig, M. Schlechtweg & A. Thiede, *Fraunhofer Inst., Freiburg, Germany*

9:00 a.m.

1.3 **LOW POWER COMPONENTS FOR 1 Gb/s OPTICAL COMMUNICATIONS: A SINGLE-CHIP 10-CHANNEL OPTICAL RECEIVER AND A CLOCK RECOVERY CIRCUIT**, R. Hickling, R. Kot, M. Yagi, T. Van Dinh, *TechnoConcepts Inc., Newbury Park, CA*, R. Nagarajan, W. Sha & R. Craig, *SDL Inc., San Jose, CA*

9:20 a.m.

1.4 **AN InP HBT LOW POWER RECEIVER IC INTEGRATING AGC AMPLIFIER, CLOCK RECOVERY CIRCUIT AND DEMULTIPLEXER**, M. Yung, J. Jensen, G. Raghaven, M. Hafizi, R. Walden, K. Elliott, M. Kardos, Y. Brown, M. Montes, H. Sun, W. Stanchina, *Hughes, Malibu, CA*, & M. Rodwell, *UCSB, Santa Barbara, CA*

9:40 a.m.

End of Session I

9:40 a.m. - 10:00 a.m.

Coffee Break

SESSION J: 40Gb/s OPTICAL COMMUNICATION ICs

10:00 a.m.

Marriott Hall NE

Chairpersons: John Sitch, *Nortel*
Mike Roberts, *M/A COM*

10:00 a.m.

- J.1 **HIGH SPEED HBT CIRCUITS FOR UP TO 40 Gb/s OPTICAL COMMUNICATION** (Invited Paper), K. Runge, R. Yu, S. Beccue, P. Thomas, P. Zampardi, R. Pierson & K. Wang, *Rockwell Science Center, Thousand Oaks, CA*

10:30 a.m.

- J.2 **InP/InGaAs HBT ICs FOR 40 Gb/s OPTICAL TRANSMISSION SYSTEMS**, H. Suzuki, K. Watanabe, K. Ishikawa, H. Masuda, K. Ouchi, T. Tanoue & R. Takeyari
Hitachi, Tokyo, Japan

Wednesday, October 15, 1997

10:50 a.m.

- J.3 **A InP DHBT TECHNOLOGY FOR HIGH BITRATE OPTICAL COMMUNICATIONS CIRCUITS**, J. Godin, P. André, J. Benchimol, P. Desrousseaux, A. Duchenois, A. Konczykowska, P. Launay, M. Meghelli & M. Riet, *France Télécom-CNET-DTD, Bagneux, France*

11:10 a.m.

- J.4 **HIGH POWER MODULATOR DRIVER ICs UP TO 30 Gb/s WITH AlGaAs/GaAs HEMTs**, Z. Lao, A. Thiede, U. Nowotny, M. Schlechtweg, V. Hurm, W. Bronner, M. Rieger-Motzer, J. Hornung, G. Kaufel & A. Hülsmann, *Fraunhofer Inst., Freiburg, Germany*

11:30 a.m.

End of Session J

SESSION K: DEVICE TECHNOLOGY & HIGH PERFORMANCE CIRCUITS

8:10 a.m.

Marriott Hall NW

Chairpersons: David Dening, *RF Micro Devices*
John Heaton, *Sanders - A Lockheed-Martin Co.*

8:10 a.m.

- K.1 **IS SiGe THE FUTURE OF GaAs FOR RF APPLICATIONS?**, (Invited Paper), J. Moniz, *IBM, Hopewell Junction, NY*

8:40 a.m.

- K.2 **A HIGH PERFORMANCE GaAs MMIC UP CONVERTER WITH AN AUTOMATIC GAIN CONTROL AMPLIFIER**, H. Ma, S. Fang, F. Lin, K. Tan, *Institute of Microelectronics, Singapore*, H. Shibata, *Telecommunications Group, Tokyo, Japan*, A. Tamura & H. Nakamura, *OKI Techno Centre (Singapore) Pte Ltd, Singapore*

9:00 a.m.

- K.3 **BIDIRECTIONAL ANALOG 8x8 SWITCH MATRIX WITH LARGE INPUT SIGNAL AND OVER 1 GHz BANDWIDTH**, E. Sokolowska, G. Fortin, N. Belabbes, M. Gagnon, C. Roy & B. Kaminska *École Polytechnique, Montréal, Canada*

9:20 a.m.

- K.4 **SUB-1.3 dB NOISE FIGURE DIRECT-COUPLED MMIC LNAs USING A HIGH CURRENT-GAIN 1 μ m GaAs HBT TECHNOLOGY**, K. Kobayashi, L. Tran, M. Lammert, T. Block, P. Grossman, A. Oki & D. Streit, *TRW, Redondo Beach, CA*

9:40 a.m. - 10:00 a.m.

Coffee Break

10:00 a.m.

K.5 **CMOS RF: NO LONGER AN OXYMORON** (Invited Paper), T. Lee, *Stanford University, Stanford, CA*

10:30 a.m.

K.6 **A 5.5 GHz FRACTIONAL FREQUENCY SYNTHESIZER IC**, C. Dorio, T. Humes, H. Nothoff, G. Chao, A. Lai & A. Oki *TRW, Redondo Beach, CA*

10:50 a.m.

K.7 **TUNABLE HIGH-Q MMIC ACTIVE FILTER BY NEGATIVE RESISTANCE COMPENSATION**, H. Wu & Y. Chan, *National Central University, Chungli, Taiwan, ROC*

11:10 a.m.

End of Session K

Wednesday, October 15, 1997

11:30 a.m. - 12:25 p.m.

BUFFET LUNCH - Available in Marriott Hall Foyer

PANEL SESSION 4: 40 Gb/s (AND BEYOND) TDM FOR OPTICAL FIBER COMMUNICATION SYSTEMS

12:30 p.m. - 2:00 p.m.

Marriott Hall NE

Organizer & Moderator:

Mehran Mokhtari, *Royal Institute of Technology, Stockholm, Sweden*

40 Gb/s systems seem to be well on their way to becoming a reality, as demonstrated by the number of papers at the symposium this year. The question still remains however, as to whether 40 Gb/s TDM systems can ever become a "practical" reality. If the answer is yes, then where is the limit? How fast can TDM ultimately go?

Building 40 Gb/s TDM systems poses a new set of problems that extend beyond the design methods used for lower rate systems. Every circuit element, including the interconnect between devices, becomes a complex circuit at 40 Gb/s. The weak link may not be the IC, but the signal path from one chip to the next. Even the test methods to verify performance are being stretched to their limits. Although the results to date look promising, can all the problems be solved?

The panelists will present their views on the achievements to date and the challenges that remain. Topic areas will include a debate over the best technologies (HEMT, HBT, etc.), the competition from Si, packaging and interconnect issues, and where the line between TDM and WDM will finally come to rest.

Panel members will include:

Dr. J. Godin, *CNET*

Dr. T. Otsuji, *NTT*

Prof. M. Rodwell, *UCSB*

Dr. K. Runge, *Rockwell*

VENDOR PRODUCT FORUM 2

12:30 p.m. - 2:00 p.m.

Marriott Hall NW

Chairman:

Tim Henderson, *Texas Instruments, Dallas, TX*

The 1997 Vendor Product Forum will provide an opportunity for potential customers, business partners, or other interested parties to learn about some of the latest GaAs IC products available for wireless communication applications. Because of the overwhelming interest in ICs for microwave communications markets, both of the sessions will focus on these types of products. Participants in this year's Vendor Product Forum are among the leaders in the industry. Today's speakers include representatives from:

TriQuint

Raytheon

Hewlett-Packard

Texas Instruments

Celeretek

Wednesday, October 15, 1997

SESSION L: MILLIMETER WAVE INTEGRATED CIRCUITS

2:10 p.m.

Marriott Hall NE

Chairpersons: Mohammad Madihian, *NEC*
Sanjay Moghe, *Northrop Grumman*

2:10 p.m.

L.1 **GaAs MMICs FOR CELLULAR BROADBAND WIRELESS INFRASTRUCTURE: A SYSTEM PERSPECTIVE** (Invited Paper), C. Buck, P. Lombardelli, M. Pomeroy, *Phillips Broadband Networks, Manchester, UK*

2:40 p.m.

L.2 **MILLIMETER-WAVE HBT MMIC SYNTHESIZERS USING SUBHARMONICALLY INJECTION-LOCKED OSCILLATORS**, E. Suematsu, M. Yagura, A. Yamada, J. Twynam, K. Kishimoto, Y. Zhu, K. Sakuno, M. Hasegawa & H. Sato, *Sharp Corp., Tenri, Japan*

3:00 p.m.

L.3 **A 77 GHz T/R MMIC CHIP SET FOR AUTOMOTIVE RADAR SYSTEM**, K. Kamozaiki, N. Kurita, W. Hioe, T. Tanimoto, H. Ohta, T. Nakamura & H. Kondoh, *Hitachi, Tokyo, Japan*

3:20 p.m. - 3:40 p.m.

Coffee Break

3:40 p.m.

L.4 **Ka- & W-BAND MMICs ON MICROWAVE AND MILLIMETERWAVE DEVICE ARRAYS (MMDA) USING 0.1 μ m T-GATE PHEMT**, J. Mondal, G. Dietz, K. Vu, K. Peterson, R. Haubenstricker, K. McReynolds, P. Laux, S. Moghe, *Northrop Grumman Corp., Rolling Meadows, IL*, P. Rice, *Alliant Tech Systems, Clearwater, FL*, & L. Aina, *M/A COM, Clarksburg, MD*

4:00 p.m.

L.5 **A 1.4 WATT Q-BAND GaAs PHEMT MMIC AMPLIFIER**, S. Nash, A. Platzker, R. Wohlert & C. Liss, *Raytheon, Andover, MA*

4:20 p.m.

L.6 **A 600 GHz PLANAR FREQUENCY MULTIPLIER FEED ON A SILICON DIELECTRIC-FILLED PARABOLA**, M. Kim, B. Fujiwara, D. Humphrey, S. Martin, R. Smith & P. Siegel, *JPL, Pasadena, CA*

4:40 p.m.

End of Session L

Close of Symposium

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