THE INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS, INC.

NORTH JERSEY SECTION

MTT-Society & AP-Society Joint Chapters PRESENTS

35th ANNUAL SYMPOSIUM AND MINI-SHOW

THURSDAY OCTOBER 7, 2021

Hanover Manor, 16 Eagle Rock Ave., East Hanover, NJ 07936. 973-992-7425

MINI SHOW FEATURING LATEST PRODUCTS - (9:30 AM TO 4:30 PM)
TECHNICAL SESSIONS (8:50AM to 5:00 PM)

Time	Topic	Speakers	Title	Affiliation
8:50	Opening Remarks	George Kannell	Technical Chair IEEE MTT/AP	GDMS
9:00-10:00	Public Roles for Technical Experts	Dr. Clinton Andrews	President, IEEE SSIT	Rutgers University
10:00	BREAKFAST BREAK - MINI SHOW EXHIBITION			
10:30-11:00	Multi-Functional UWB Filtering Antennas With Complementary Bandpass and Bandstop Response	Dr. Jawad Siddiqui	Associate Professor	University of Calcutta, India, Royal Military College Canada
11:00-11:30	Integration and Packaging Strategies for Millimeter-Wave CMOS	Dr. Rashaunda Henderson	2022 MTT-S President Elect Associate Professor	University of Texas
11:30-12:00	Advancements and future trends in Modern Antenna Systems for Communications and Sensors	Dr. Yahia Antar	President IEEE AP Professor	Royal Military College of Canada & Queen's University
12:00	LUNCH			
1:00-1:30	Timing and Frequency Distribution using optical fiber	George Conway Jay Darish	Senior Staff Engineers	Linear Photonics
1:30-2:30	Terahertz chip-scale systems	Dr Kaushik Sengupta	Associate Professor Director of IMRL Lab	Princeton University
2:30	BREAK - MINI SHOW EXHIBITION			
3:00-3:30	Understanding Quantum Computing for RF Engineers	Mark Elo	US National Sales Manager	Tabor Electronics
3:30-4:00	TFLE-Thin Film Lumped Elements Filters and Transition Time Converters (TTC) Solutions	Rafi Hershtig	Chief Technology Officer	K&L Microwave
4:00-4:30	Modular Implementation of the latest RFSoC chip from Xilinx	Bob Muro	Embedded Systems AE	Pentek Systems
4:30-5:00	High Power Energy Weapon Systems	Matt Diessner	FAE	Wireless Telecom Group
5:00	Closing remarks	Kirit Dixit	Chair AP/MTT Mini Symposium	Microcom Sales

Registration is on-site. Section Home page: http://sites.ieee.org/northjersey/

ALL ARE WELCOME (IEEE Membership not required). REGISTRATION IS ON-SITE
THERE IS NO CHARGE TO ATTEND THE SYMPOSIUM OR SHOW.
COMPLEMENTARY BREAKFAST / LUNCH INCLUDED FOR ALL.
Attendees will be required to sign a statement indicating full vaccination.
Masks are mandatory except during consumption.

FOR FURTHER INFORMATION

General Event Chair	Kirit Dixit	201-669-7599	kdixit@microcomsales.com
Technical Program Chair	George Kannell	973-261-1421	george.kannell@gd-ms.com
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8:50-9:00	**Opening Remarks**		
	George Kannell	Technical Program Chair	GENERAL DYNAMICS

George Kannell received his MSEE degree from the New Jersey Institute of Technology in 1988.
George is the Senior Product Technology Manager at General Dynamics Mission Systems Telecommunication Products division where he works on the development of innovative RF and Optical communications systems. Previously, George was the RF Systems Manager and Senior Design Engineer at LGS Innovations where he was responsible for development of next generation Wireless Communications systems. He served as an adjunct Professor in Digital Communications at the New Jersey Institute of Technology. Prior to Bell Laboratories, he worked as a Senior Engineer at Ansoft Corporation in Simulation of Communications Systems, Microwave Circuits, RFIC circuits, Bipolar and FET device characterization and software development. Before this, at KDI/Triangle Electronics, he managed an engineering team in the design of Active and Passive Microwave Devices and Subsystems. He's published technical articles, holds several patents and presents at technical conferences. He serves as the Technical Program Chair for the IEEE Region 1. George is a member of Eta Kappa Nu and a Senior Member of the IEEE. George is a recipient of the IEEE Leadership Award and Bell Labs President's Awards.

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9:00-10:00	**Public Roles for Technical Experts**		
	Dr. Clinton Andrews	President, IEEE SSIT	Rutgers University

Will my innovation have unintended consequences?

Engineers and scientists make technological changes that impact the real world. They also receive the blowback when things do not go as planned, and things pretty much never go as planned. This presentation provides a roadmap for anticipating consequences, using historical analogies, systems thinking that includes socioeconomic factors, attention to social practices and how they change, reflective professional practices, and straightforward moral reasoning. The goal of the presentation is to get innovators talking about how to avoid undesirable outcomes in their own work.

Dr. Clinton J. Andrews is a professor, center director, and associate dean for research at the E.J. Bloustein School of Planning and Public Policy, Rutgers University. He was educated at Brown and MIT in engineering and planning and worked previously in the private sector and at Princeton University. He teaches public informatics and planning courses and performs research on how people use the built environment. He publishes both scholarly and popular articles and his books include Humble Analysis: The Practice of Joint Fact-finding, Regulating Regional Power Systems, and Industrial Ecology and Global Change. He recently completed service as co-editor of the Journal of Planning Education and Research, and he remains a member of the editorial board of the Journal of Industrial Ecology. He is a member of the American Institute of Certified Planners and a licensed Professional Engineer. Andrews is a Fellow of AAAS, a winner of IEEE's 3rd Millenium Medal, and current president of the IEEE Society on Social Implications of Technology.

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10:30-11:00	**Multi-Functional UWB Filtering Antennas With Complementary Bandpass & Bandstop Response**		
	Dr. Jawad Siddiqui	Associate Professor	University of Calcutta, India Royal Military College of Canada

New design concepts on multi-functional printed antennas will be discussed in this presentation. The design concepts can be efficiently employed in modern wireless-applications like cognitive radios and software defined radios. One innovative concept is to design a single printed antenna which can be operated as an UWB antenna, frequency-notched UWB antenna and a narrow band antenna. The proof of concept of this filtering capability of the antenna without tampering the radiator or using any additional component is demonstrated successfully. Since the design concept is independent of the radiator geometry, its efficacy can be extended to any printed antenna geometry. A long-standing problem of mutual coupling and port coupling between co-located multiple antennas could be mitigated using this concept. Moreover, the concept of frequency notch and narrowband operations from the same antenna which could be reconfigured to the desired frequency on actuation could help design antenna which provides 'radiation on demand'.

Jawad Yaseen Siddiqui is an Associate Professor in the Institute of Radio Physics and Electronics, University of Calcutta, India. He received his Doctor of Philosophy degree in Radio Physics and Electronics, University of Calcutta in 2005. He worked as a Post Doctoral Fellow at the Royal Military College of Canada and Visiting Researcher at Queen's University, Canada at different periods during 2008-2021. He has more than 150 publications in peer reviewed journals and conferences. His research areas include printed circuits and antennas, radar and nano-photonics. He is a Co-Principal Investigator on Stratosphere Troposphere (ST) Radar Project at the University of Calcutta.

He is a Senior Member of the IEEE and served as Chair for the AP-S and MTT-S Jt. Chapter in IEEE Kolkata Section and SIGHT Chapter, IEEE Kolkata Section. He is R10 Coordinator (CAC) of the IEEE Antennas and Propagation Society. He is currently the IEEE AP-S SIGHT Chair and Member of IEEE Humanitarian Activities Committee. He is a Member of the Management Council, IEEE Smart Village. He is also a Member, MTT-S Meetings and Symposia Committee and Corresponding Member, IEEE Technical Activities Board (CPC).

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11:00-11:30	**Integration and Packaging Strategies for Millimeter-Wave CMOS**		
	Dr. Rashaunda Henderson	2022 MTT-S President Elect Associate Professor	University of Texas

Millimeter-wave CMOS circuits are being developed for consumer products operating up to 100 GHz and beyond. Applications range from 77 GHz automotive radar to spectrometers for gas analysis operating from 200 to 300 GHz. High data rate communication systems for wireless and wireline applications take advantage of the wide bandwidth available at millimeter-wave frequencies. While the design of active components and sub-circuits has been explored by many, there is still a need to provide integration and packaging strategies that remain low in cost and high in performance.

This presentation will cover results related to the integration of CMOS circuits from 150 GHz to 325 GHz using post-CMOS and printed circuit board techniques. A 200GHz to 300 GHz spectrometer design will be presented with interconnect and antenna studies using a post-CMOS process to deposit low loss polymers. In addition results on passive components and antennas designed for a 120 Gbps wireline system will be presented. In this work, on-chip antennas are used to excite a broadband rectangular waveguide. The electromagnetic simulation studies along with measured results will be presented for these two application areas.

Rashaunda Henderson received the B.S.E.E. degree from Tuskegee University, Tuskegee, AL, in 1992, and the M.S. and Ph.D. degrees in electrical engineering from The University of Michigan, Ann Arbor, MI, in 1994 and 1999, respectively. From 1999 to 2007, she worked as a R&D device engineer at Freescale Semiconductor, formerly known as Motorola Semiconductor Product Sector.

Since Fall 2007, she has been investigating novel passive components and integration techniques for millimeter-wave circuits and systems. She advises a team of students in the design, fabrication and characterization of high performance transmission lines, circuits and electronic packages for frequencies operating up to 300 GHz. Dr. Henderson is a senior member of the IEEE.

Rashaunda is active in the MTT-S through MTT-11, the Education Committee and IMS TPRC. She is the treasurer for RWS 2015 and previously served as the Student Paper Contest Co-Chair from 2012-2014.

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11:30-12:00	**Advancements and future trends in Modern Antenna Systems for Communications & Sensors**		
	Dr. Yahia Antar	President IEEE AP Professor	Royal Military College of Canada & Queen's University

Many aspects of our lives are becoming more and more dependent on wireless technology. This trend is exemplified by the massive investment in current and future endeavours, such as 5G,6G technologies, internet of things (IOT) which are enabling fundamentally new applications. A common denominator in many of these new applications is the antenna, which forms the "eyes and ears" of many systems. New developments for advancing the state of the art in antenna technology and associated microwave and millimeter wave circuits to meet future challenges will be needed.
This talk will address some current and new emerging directions of research in antenna systems. This will include new fundamental approaches for antenna analysis, the near fields and electromagnetic energy around antenna systems, and possible implications on future antenna systems design, in what is expected to be an increasingly crowded electromagnetic environment. Finally, a brief introduction of the IEEE Antennas and Propagation Society and available opportunities for research and engineering education will be addressed

Dr. Yahia M.M. Antar (S'73–M'76–SM'85–LF'00) was born in Meit Temmama , Egypt. He received his B.Sc. (Hons.) degree in 1966 from Alexandria University, Alexandria, Egypt, and M.Sc. and Ph.D. degrees from the University of Manitoba, MB, Canada, in 1971 and 1975, respectively, all in electrical engineering. In 1977, he was at the Communications Research Centre in Ottawa, and in May 1979, he joined the Division of Electrical Engineering at the National Research Council of Canada. In 1987, he joined the Department of Electrical and Computer Engineering at the Royal Military College of Canada (RMCC), Kingston where he has held the position of Professor since 1990. He has authored or coauthored over 270 journal papers, several books and chapters in books, over 450 refereed conference papers, holds several patents, has chaired several national and international conferences, and has given plenary talks at many conferences. He has supervised and co-supervised over 90 Ph.D. and M.Sc. theses at the RMC and at Queen's University, several of which have received the Governor General of Canada Gold Medal Award, the Outstanding Ph.D. Thesis of the Division of Applied Science, as well as many Best Paper Awards in journals and at major international symposia. He served as the Chair of CNC, URSI (1999–2008), Commission B (1993–1999), and has held a cross appointment at Queen's University in Kingston since 1990.

Dr. Antar is a Life Fellow of the IEEE, a Fellow of the Engineering Institute of Canada (FEIC), a Fellow of the Electromagnetic Academy, and an URSI Fellow. He has served as Associate Editor of many IEEE and IET Journals and as an IEEE-APS Distinguished Lecturer. In May 2002, he was awarded a Tier 1 Canada Research Chair in Electromagnetic Engineering, which has been renewed in 2009 and again in 2016. In 2003, he was awarded the RMCC "Excellence in Research" Prize, and the RMCC Class of 1965 Teaching Excellence Award in 2012. He was elected to the URSI Board as Vice President in August 2008 and in 2014, and to the IEEE AP AdCom in 2009. He was appointed to the Canadian Defense Science Advisory Board (DSAB) in January 2011. In October 2012, he received the Queen's Diamond Jubilee Medal from the Governor General of Canada in recognition for his contribution to Canada. He is the recipient of the 2014 IEEE Canada RA Fessenden Silver Medal, and the 2015 IEEE Canada J. M. Ham outstanding Engineering Education Award. In May 2015, he received the RMC Cowan Prize for Excellence in Research. He is the recipient of the IEEE-AP-S Chen-To-Tai Distinguished Educator Award for 2017.

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01:00-01:30	**Timing and Frequency Distribution using optical fiber**		
	George Conway Jay Darish	Senior Staff Engineers	Linear Photonics

In RF applications such as radar and electronic warfare, test systems require accurate timing information to be distributed over large campuses or test ranges. This is accomplished through distribution of 1 pulse per second, IRIG or 10 MHz references. RF on fiber provides a convenient way to distribute these signals to multiple locations. The optical fiber provides a low loss transmission medium with no RF interference.

Systems have been designed to compensate for any environmental changes in the optical fiber with an accuracy of less than 500 ps for distances up to 25 km. These units can be cascaded to provide distributed timing references when GPS is not available.

The design of these systems requires careful attention to phase stability and the Allan variance. In this talk we will review the applications and design of this equipment.

George Conway has more than 30 years of experience in designing electronic systems and subsystems for such diverse markets as guided missiles, early cellular phone development, television broadcast transmitters, secure have quick radios, and for the last 20 years developing fiber optic systems for commercial and military applications.

Jay Darish has over 25 years of electrical and mechanical engineering design experience for, telecommunications, space, and military environments. He has developed transmitters, receivers, complete systems, and fiber optic packaging for these markets. He is also an adjunct professor with the Engineering Dept. of Bucks Community College. Prior to his employment with Linear Photonics, he was Vice President of Electronics for Radiant Communications Corporation, and worked in various design and leadership positions with General Electric, Raytheon, Telco Systems Fiber Optics Corporation, ADC Telecommunications, Hewlett-Packard, and Fiber-Span.

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01:30-02:30	**Terahertz chip-scale systems**		
	Dr Kaushik Sengupta	Associate Professor Director of IMRL Lab	Princeton University

Engineers and scientists make technological changes that impact the real world. They also receive the blowback when things do not go as planned, and things pretty much never go as planned. This presentation provides a roadmap for anticipating consequences, using historical analogies, systems thinking that includes socioeconomic factors, attention to social practices and how they change, reflective professional practices, and straightforward moral reasoning. The goal of the presentation is to get innovators talking about how to avoid undesirable outcomes in their own work.

Kaushik Sengupta received the B.Tech. and M.Tech. degrees in electronics and electrical communication engineering from IIT Kharagpur, Kharagpur, India, in 2007, and the M.S. and Ph.D. degrees in electrical engineering from the California Institute of Technology (Caltech), Pasadena, CA, USA, in 2008 and 2012, respectively. In 2013, he joined the Department of Electrical Engineering, Princeton University, Princeton, NJ, USA, as a Faculty Member. His current research interests include high-frequency ICs, electromagnetics, and optics for various applications in sensing, imaging, and high-speed communication.

Dr. Sengupta received the Bell Labs Prize (2017), Young Investigator Program (YIP) Award from the Office of Naval Research in 2017, the DARPA Young Faculty Award (2018), and the E. Lawrence Keys, Jr./Emerson Electric Co. Junior Faculty Award. He was six times selected to the Princeton Engineering Commendation List for Outstanding Teaching in 2014, 2016, 2017, 2018, 2019 and 2020, and received the 'Excellence in Teaching Award' from the School of Engineering at Princeton University in 2018 nominated by the Undergraduate and Graduate Student Council. He is currently serving as a steering committee member of IMS 2021 as workshop co-chair and as a member the MTT-4 Committee on Terahertz technology, and has served on the Technical Program Committee of the IEEE ESSCIRC, IEEE CICC, IEEE ICC and PIERS. He is co-recipient of the 2015 MTT-S Microwave Prize. He is currently serving as a Distinguished Lecturer for IEEE Solid-State Circuits Society (2019-2020), and will serve as a Distinguished Lecturer for IEEE Microwave Theory and Techniques (2021-2023).

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3:00-3:30	**Understanding Quantum Computing for RF Engineers**		
	Mark Elo	US National Sales Manager	Tabor Electronics

Research into Quantum Computers is moving at a frantic pace, and their use for cryptanalysis has caught the attention of many national government and military agencies who are eager to fund further research. A quantum computer differs from computers we use today as it is a device for computation that makes direct use of quantum mechanical phenomena, referred to as superposition and entanglement, that are used to perform operations on data. In a quantum computer information is stored as qubits (quantum bits) as opposed to the bits that we use in conventional computers. In this lecture we will examine quantum computing in terms of understanding what a Qbit is, how to make a Qubit, and how to control and analyze a qubit to perform some basic data manipulation.

Mark Elo is US National Sales Manager for Tabor Electronics. Prior to this, he was a senior technical manager at Tektronix. He began his career as a design engineer in Hewlett-Packard's Microwave Division and has since held various senior positions at Agilent Technologies, Anritsu, Gigatronics and Keithley Instruments in R&D, marketing and business development. Mr. Elo has more than 30 years of test and measurement experience in microwave instrumentation, specializing in the product definition and product realization of RF and microwave frequency synthesis and analysis platforms. He has also held the Chair for the AXIe Marketing Committee, participated in wireless standards, and has published multiple papers.

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3:30-4:00	**TFLE-Thin Film Lumped Elements Filters & Transition Time Converters (TTC) Solutions**		
	Rafi Hershtig	Chief Technology Officer	K&L Microwave

Microwave assemblies are designed at increasing operating frequencies, size reduction and higher level of integration. Microwave filters, in the form of planar Micro-Strip, and/or Suspended-Substrate-Strip-line, consist of very thin line widths and narrow gaps, in the order of 1mil and 0.25mil respectively. With such high resolution and accuracy, Thin Film is often the technology of choice, which can deliver products in timely manner and high quality.
A method for the design and construction of thin-film lumped-element microwave filters is presented. The resulting filters exhibit; Temperature Stability, Broadband Spurious-Free, Size Reduction, High Reliability and Repeatability due to their thin film process on Aluminum Titenate (Al2TiO5) construction. The necessary models for inductors and capacitors are discussed. Data from Wide-Band Multiplexers and Generating Transmission zeros from All Pole structures are presented. With embedded Thin Film Resistor Technology, Non-Reflective Filters with flat Group Delay are designed and manufactured. These filters are used to reduce the overshoot and transition time of instruments and improve the pulsed performance. Thin Film Technology is currently the solution of choice enabling planar filters for 5G and Military outfits.

Rafi Hershtig serves as the CTO for K&L Microwave. Rafi started at K&L Microwave in November of 1988. Rafi is based in the Dover, Delaware Area.

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4:00-4:30	**Modular Implementation of the latest RFSoC chip from Xilinx**		
	Bob Muro	Embedded Systems AE	Pentek Systems

The paradigm shift from discrete components connected via parallel LVDS, or high-speed differential pairs on various mezzanine cards to an FPGA has shifted to a more integrated design. The latest generation of devices includes analog I/O and multi-core ARM processors with high speed PHY protocol components hardened in the FPGA fabric.
This design requires complex, multi-layer PCB modules with phase coherent synchronization, multiple integrated power supplies and advanced signal integrity techniques to provide full use of this SoC (System-on-Chip) technology.
The presentation will illustrate key design criteria to properly implement system-on-chip technology for the latest COTS (Commercial-off-the-Shelf) modules. It will include a brief review of the previous FPGA technology, address advantages of each system and conclude with the latest generation SoC design.
The goal of the presentation is to help engineers navigate design constraints of highly integrated SoC's that need to be included in their systems.

Bob Muro is an Embedded Systems AE with over 25yrs of experience in the Test & Measurement industry specializing in RF & uWave, communications, and digital & analog electronics.

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4:30-5:00	**High Power Energy Weapon Systems**		
	Matt Diessner	FAE	Wireless Telecom Group

The presentation will discuss how using RF Peak Power sensors are a fast and easy way to test the effectiveness of the beam focusing of High-Power Microwave Weapons using phased array or multiple antennas on a static or dynamic target. Monitoring the transmit power of the HPM transmitter using peak power sensors attached to a direction coupler will measure the effective radiated power being transmitted return loss measurements. A RF power sensor attached to the target antenna allows measurements that determine the received power at the target antenna. Using Real time RF Power processing the sensors can determine how dynamic adjustments at the transmitter(s) for target tracking and software accuracy are working by measuring the RF Peak and average power projected onto the target antenna.

Matthew Diessner is Director of Business Development for Boonton Electronics, CommAgility, Holzworth, Microlab and Noisecom all wholly-owned subsidiaries of the Wireless Telecom Group. Before electronics Matt was a Respiratory Therapist where he found his passion for electronics and switching careers. Matt started working with Boonton Electronics back in the late 70's. He has worked and learned while at GE, Tektronix, Anritsu, and Transistor Devices before returning to Wireless Telecom Group 17 years ago. Matt has Industrial Electronics Certification from R.E.T.S, Morris County College ASE in RF Technology, William Paterson University, Business Management Contact Matt at

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5:00	**Closing remarks**		
	Kirit Dixit	**Chair, IEEE North Jersey Section**	**Microcom Sales LLC**

Kirit Dixit is one of the founders of Microcom Sales LLC since 2004 and works as a manufacturer's representative in Metro NY/NJ Area. He was with RFESCO for the past 15 years prior to forming his company in similar capacity. For the prior eight years, he was the area manager for California Eastern Labs, representing NEC RF and Microwave products. He was responsible for the successful development and growth of eastern Canada and the Metropolitan NY/NJ territories. For the three years prior to CEL, Kirit was a Product Marketing Manager for Microwave Semiconductor Corp., in the Hi-Rel Satcom and Military Markets. Kirit received his BSEE in India, and his MSEE Specializing in Microwave from Stevens Institute of Technology, Hoboken, NJ. Kirit has been active in IEEE activities in North Jersey Section and was Co-Chair of APS/MTTS chapter for the past 10 years. He was the Section Chair of the North Jersey section in 2007-2008 and presently volunteering as Chair of North Jersey Minishow since 2000.
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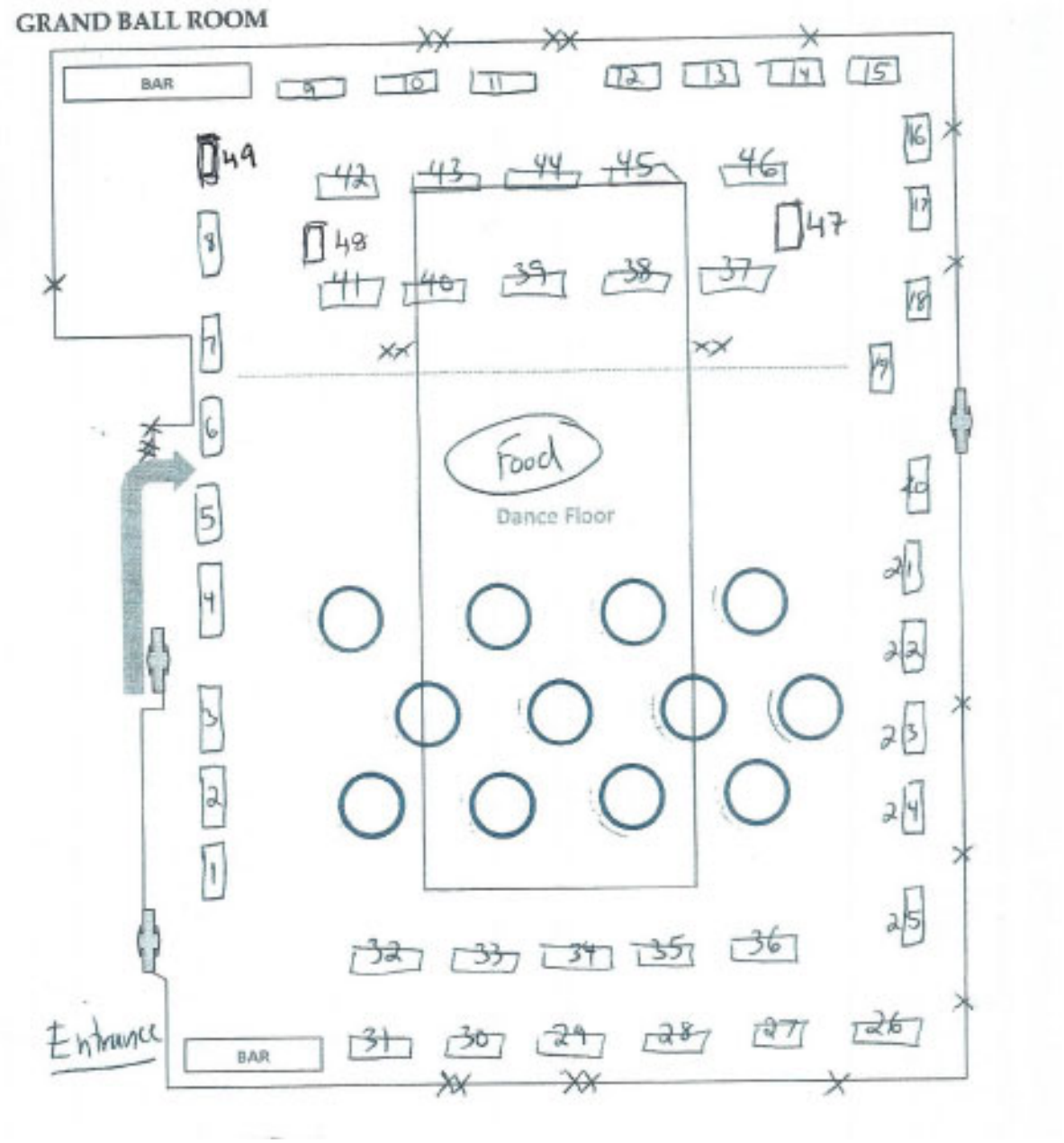
Table #	Company	Table #	Company
1	Keysight Technologies	22	Agile Microwave Technology
2	Pentek Inc.	23	Pickering Interfaces
3	Contech Marketing Assoc.	24	Tektronix
4	TDK-Lambda (Contech)	25	Reactel Incorporated
5	Avalon Equipment Corporation	26	Eltech Sales
6	Amplitude Technical Sales	27	Berkley Nucleonics Corporation
7	Tabor Electrionics	28	Mu-Del Electronics
8	Boonton,Noisecom,Microlab	29	Electro-Automatik Inc
9	Northern Technical Sales	30	Weiss Technik
10	Superior Technical Solutions Corp.	31	AR RF/Microwave Isntrumentation
11	Superior Technical Solutions Corp.	32	Rhode & Schwarz America
12	Meca Electronics Inc	33	MegaPhase LLC
13	Werbel Microwave LLc	34	Synergy Microwave
14	Optimum Metro Sales Inc.	35	Microcom Sales Llc
15	Custom Calibration Solutions	36	Orolia USA, Inc.
16		37	Amplitech
17	RF Alliance	38	
18		39	MHz Marketing Inc.
19		40	Benchmark Lark RF Technology
20		41	RF Electronics
21	Tekmar Sales Inc.		


GRAND BALL ROOM
BAR
Food
Dance Floor
Entrance
BAR