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Employment History

RF DESIGN CONCEPTS, LTD., EXPERT WITNESS, RF DESIGN, TURN KEY SOLUTIONS 02/2012–Present

Principal & Owner

- Subject Matter Expert in RF/Microwave (Wireless) Hardware: RF Power Amplifiers/Transmitters, RF Front-end Modules/Transceivers, Power Management, Electromagnetics (Signal integrity, antennas, filters, etc.), Wireless Charging, Semiconductors, Digital Electronics, Device Packaging
 - Consultant, Satcom SSPA, C-band RFPA– Trak Microwave
 - Consultant, 24 GHz Radar Front-End – The Ohio State University
 - Consultant, Ultra compact high efficiency load adaptable RFPA– Draper Labs
 - Consultant, High voltage MEMS packaging – Bright Silicon (Aspen Microsystems)
 - Consultant, Ultra high efficiency wireless charging– NuCurrent, Inc.
 - Consultant, Ultra high efficiency RF plasma generation– Advanced Energy
 - Consultant, DARPA MIS superconductor fabrication program– Grid Logic, Corp.
 - Consultant, Quantum devices– ColdQuanta, Inc.
 - Consultant, LTCC “RF” module for optical communications– AvoPhotonics, Inc.
 - Consultant, RF front-end module– Trellisware
 - Consultant, Market/System ecology analysis of nascent technologies– Invensas
 - Product Manager (Consultant)– UX Lab, Samsung Electronics
 - Custom Design of RF power amplifier solutions for commercial wireless (cdma, WCDMA, LTE), defense (radar, EW, SIGINT, etc.), medical (MRI, RF ablation), and industrial (RF induction heating, metal sputtering, plasma generation, etc.)
 - Custom Design of DC power management systems, including Switched-mode (Buck, Boost, Buck-boost, etc.) and linear (LDO) power supply designs
- Expert Witness, Patent Litigation & Technical Due Diligence– Fish & Richardson, Wilmer Hale, Kirkland & Ellis, Perkins Coie, Slayden Grubert Beard, Pillsbury Winthrop Shaw Pittman, O’Melveny, Finnegan, Wolf Greenfield, Shelton Coburn, Alston & Bird, Weil, Hoyng Rokh Monegier, Susman Godfrey

MERCURY SYSTEMS, INC., RF POWER AMPLIFIER BUSINESS UNIT

08/2013–03/2014

Technical Director

- Responsible for all aspects of Mercury Systems’ RF Power Amplifier Business Unit
 - Full P&L responsibility for \$2.5M RF Power Amplifier Business Unit
 - Responsible for engineering, sales, manufacturing, and test

- Develop new business opportunities through direct customer contact and proposals (Technical concept, cost models, etc.)
- Lead and manage new product development and sustaining engineering efforts
- Manage development and production schedules, material planning, product testing
- Manage customer relationships

LGS BELL LABS INNOVATIONS, R&D HARDWARE ENGINEERING

05/2011–12/2012

Sr. R&D RF Hardware Engineer (Technical Ladder, Grade 315)

- Development of high power, highly linear and efficient RF transmitter/transceiver solutions supporting major wireless standards (GSM/EDGE, cdma, WCDMA, LTE)
 - First-pass design success of (200W P1dB) 850MHz and (250W P1dB) 900MHz band Doherty RF transmitters
 - First-pass design success of highly linear, thermally compensated TX lineups for 746-960MHz and 1805-2170MHz broadband transmitters
 - Development of high power (46dBm avg), broadband, highly linear RF transmitter
- Technical leadership/project management
 - Coordinate activities of multi-disciplinary teams of RF/electrical engineers, mechanical engineers, drafters, and technicians
 - Insure adherence to proper engineering design practices and manufactureability; Internal design review

AETHERCOMM, INC., ADVANCED DEVELOPMENT GROUP

07/2008–02/2011

Technical Manager/Principal Engineer

- Design Engineering Responsibilities
 - Responsible for complete execution of rapid product development of pulsed/CW, wideband, high power RF transmitters for radar and communications on extremely accelerated schedules per MIL-STD's: Silicon LDMOS, GaAs FET & HBT, and GaN HEMT device technologies
 - Customer specification to top-level design, complete electrical design (RF link budget analysis, RF circuitry, DC power management, control logic, telemetry, fault protection, etc.), bill of materials (BoM), test procedures, and design verification testing
 - Lead, manage, and coordinate activities of multi-disciplinary teams of RF/electrical engineers, mechanical engineers, drafters, and technicians
 - Identify and execute, internal R&D programs, including SBIR's
- Technical Management Responsibilities
 - "Cradle to grave" management of all technical aspects of product development to insure successful, on time delivery of custom RF products
 - Product documentation and design milestone reviews: Compliance matrix, ECN's, test plans (ATP, DVT, TDR), final product approval, and post mortem reports
 - Maintain competent & effective staff through recruitment, mentoring, and performance planning of technical personnel
 - Insure adherence to good engineering design practice and manufactureability; Review designs through all engineering phases

- Support upper management and marketing through customer interaction, speaking in technical forums, and writing technical publications
- Resource & budget planning, allocation, and scheduling of all group activities

SAMSUNG ELECTRONICS, TECHNOLOGY INTELLIGENCE & COLLABORATION

03/2007–07/2008

Section Manager, Technology Strategy Team

- Technical feasibility and business opportunity analysis of bottom-up nanotechnology for next generation digital storage, wearable electronics, and non-lithographic semiconductor technologies
- Market and technology analysis of (low-power wireless) biomedical electronics
- Market and technology analysis of THz imaging for security, healthcare, and industrial applications

RF MICRO DEVICES, INFRASTRUCTURE PRODUCTS GROUP

07/2006–02/2007

Group Leader/Staff Engineer

- Advanced Product Development: GaN HEMT dual carrier UMTS (2.14 GHz WCDMA) Doherty basestation transmitter (240 W max./40 W avg. RF power)
- Led development of scalable GaN HEMT non-linear simulator model
- Project planning, product documentation (PRD, PPA, etc.), and test plan development

NOKIA CORPORATION, NOKIA RESEARCH CENTER

04/2001–03/2006

Senior Research Engineer, Radio Technologies Laboratory

- Advanced RF Research:
 - *RF Circuits*: Complete design, build, test, and system integration of novel LD MOS based Chireix Outphasing (basestation) transmitter for UMTS systems (120W max./20W avg. RF power)
 - *RF Systems*: Development of OFDM RF system simulator (IEEE 802.11a WLAN & ETSI EN-300 744 DVB-T PHY); Baseband PAPR reduction techniques for OFDM radio systems
 - *Power Management*: Complete design, build, and test of high power, high precision, 16 bit digitally-controlled switched-mode power supply
 - *Electromagnetics*: Compact antenna and (metamaterial) filter design
- Project Management:
 - Technical Liaison: Advise on new technologies offered by established and new venture organizations in collaboration with Nokia Ventures and Nokia Mobile Phones New Technology Sourcing
 - Advise and steer corporate funded university research projects
 - Group leader, *Leading Science 8* program, led market research and analysis for “Network and Infrastructure Solutions in Low Average Revenue per User (ARPU) Markets”

WESTERN DIGITAL CORPORATION/ADAPTEC INC.

01/1995–08/1996

Digital Design Engineer, ASIC Design

- Timing Analysis: Static timing analysis of ASIC critical path delays; Custom cell characterization and library generation
- Clock Tree & Pad Cell Drivers: Clock tree timing analysis and design; Custom ASIC pad cell design; Drivers for memory cells
- Power ON Logic: Developed “No re-spin” solution for faulty ASIC ACK/Power Enable
- Meta-stability Analysis: Circuit and system level analysis of meta-stable logic

Academic History

UNIVERSITY OF COLORADO, BOULDER 03/2013–03/2014; 08/2015–08/2016

Adjunct Professor, Department of Electrical, Computer, & Energy Engineering

UNIVERSITY OF CALIFORNIA, SAN DIEGO 08/2004–08/2008

Visiting Scholar (Part-time), Department of Electrical & Computer Engineering

- Established LoA between UC San Diego, Cree Microwave, Inc., and Nokia for collaborative research on the Envelope Tracking (ET) highly linear and efficient transmitter architecture
- Coordination of corporate sponsored research on linear, highly efficient transmitter architectures

UNIVERSITY OF CALIFORNIA, SANTA BARBARA 09/1996–03/2001

Doctor of Philosophy, Electrical & Computer Engineering– Solid-State Electronics (major), Analog/Digital Circuits (minor); Dissertation title: High Efficiency Switched-Mode Power Amplifiers for Wireless Communications

CALIFORNIA STATE UNIVERSITY, FULLERTON 08/1994–01/1996

Master of Science, Electrical & Computer Engineering– Analog/Digital Circuits (major)

UNIVERSITY OF CALIFORNIA, BERKELEY 08/1990–05/1993

Bachelor of Science, Physics

Selected Publications

T. Hung, D. K. Choi, L. E. Larson, P. M. Asbeck, “CMOS Outphasing Class-D Amplifier With Chireix Combiner,” *IEEE Microwave and Wireless Components Letters*, 8:619-621, August, 2007.

I. Hakala, D. K. Choi, L. Gharavi, N. Kajakine, J. Koskela, R. Kaunisto, “A 2.14-GHz Chireix Outphasing Transmitter,” *IEEE MTT Trans*, 4:2129-2138, June, 2005.

D. Qiao, D. Choi, Y. Zhao, D. Kelly, T. Hung, D. Kimball, M. Li, P. Asbeck, “Antenna Impedance Mismatch Measurement and Correction for CDMA Transceivers,” *IEEE MTT-S Digest*, WE3C-4, Long Beach, CA, June, 2005.

D. K. Choi and S. I. Long, “The Effect of Transistor Feedback Capacitance in Class-E Power Amplifiers,” *IEEE Trans. on Circuits and Systems I*, Vol. 50, Issue 12, pp. 1556-1559, December, 2003.

D. K. Choi and S. I. Long, "Finite DC Feed Inductors in Class E Power Amplifiers– A Simplified Approach," *IEEE MTT-S Digest*, TH2D-5, Seattle, WA, June, 2002.

D. K. Choi and S. I. Long, "A Physically Based Analytic Model of FET Class E Power Amplifiers– Designing for Maximum PAE," *IEEE MTT Trans*, 47:1712-1720, September, 1999.

Other Professional/Personal Information

US citizen, US Secret & Top Secret/SCI (In-active) clearance, Senior member IEEE, California State MICRO Fellow (1996), fluent in the Korean language, conversant in the French language.