CREAN™
Accelerating Performance

1200 Lakeway Drive, STE 7
Austin, Texas 78734

512.337.6587
CreanInc.com

CHARLES ABRAHAM

Summary

- Senior RF, Microwave, Analog and Hardware Design Engineer with over 20 years of experience. Efficient and accomplished Electronics Design Engineer, highly skilled in technical development, circuit design, noise reduction, testing, frequency synthesizers, and transmitters / receivers. Work experience in analog / digital / mixed-signal design with expertise in both frequency-domain and time-domain designs, and control systems design.
- +10 years' experience in interference mitigation techniques, and analysis to minimize the effects of co-site interference on various Army Platforms, ability to perform EW and communication systems characterization and provide recommendations to improve system performance, and experience in software development efforts.
- Experienced in analog to digital and digital to analog converters; power supply components and design; analog testing/troubleshooting techniques; signal integrity, PCB board layout, and grounding principles; basic digital design fundamentals, identifies technical problems and hardware development.
- My career has been largely composed of hardware, RF, Microwave, MMIC layout with Cadence Virtuoso layout design tool and analog circuit design, development management, modeling and performance analysis through various measurements, design optimizations and testing.
- I have demonstrated my work at industry-leading companies such as Northrop Grumman, Intelligent Automation, Richardson Electronics and Macom. My strength is being able to take a scientist's idea and develop it into a practical solution. For example, at Intelligent Automation I successfully designed and developed a unique wireless synchronization modem which synchronized the CPE modems to the master unit within less than 1 nanosecond.
- Analyzed RF signal recording (IQ data) and determine modulation type and modulation parameters. Analyzed communications stream and figure out coding, interleaving, scrambling, error correction types. Experienced with OFDM signals. Experienced with Software Defined Radios. Familiarity with LTE and 3G, 4G, and 5G protocols.

Professional Experience

NASA, Greenbelt, MD
June 2021 – March 2022
Senior RF Analog Hardware Circuit Design Engineer – contract

- Designed special RF receiver
- Used latest PADS schematics and board layout software to design the schematics and to create the board layout.
- Included Digital board work design and development using Schematic capture software and Mentor Xpedition experience
- Due to space communication, special parts had to be used
- The noise level was very high on the existing, earlier designed board
- Tested and proved where the noise is coming from
- Designed and developed new circuit and board layout to significantly reduce the noise and fixed other problems that existed on the RF and analog section of the circuit board

System Technology Forum, Ltd., Arlington, VA
November 2020 – May 2021
Subject Matter Expert Engineer – employed

- Technical Expert for 5G standard for DOD

DRS Signal Solutions, Germantown, MD
February 2020 – October 2020
Engineer IV. Senior Engineer - RF – employed

- Successful tested, debugged and fixed several circuit level boards. SIGINT
  - Recommended new circuit level designs for improvements and for less tuning times for new filters
- Successfully tested, debugged, and fixed radio receivers for HF, VHF, UHF and SHF frequency bands
- Involved with the design, development, modification and analysis of RF/Microwave and analog circuits in a broadband frequency range of 20 MHz to 20 GHz. Design modules to include Synthesizers, Exciters, Preselectors, Up/Down Converters, Exciters and link budget analysis.

Alion Science and Technology, Annapolis Junction, MD
June 2018 –January 2020
Lead Analog and RF Design Engineer – employed

- Successful interference mitigation techniques was developed by me, and analysis to minimize the effects of co-site interference on various Army Platforms, ability to perform EW and communication systems characterization and provide recommendations to improve system performance. Knowledgeable in software development efforts to improve the compatibility of vehicle mounted CREW systems with communication radios, and the modeling and simulation expertise to provide a proof of concept for the feasibility of combining multiple multi-tone waveforms RF signals through a single amplifier.
- Tasks included systems engineer, RF engineering and 802.x protocols, RF topics, including power, attenuation, alternative analysis, frequency and band studies, and hardware selection
- developed documentation, including System Engineering Plans, Initial Capabilities Documents, Requirement specifications, Interface Control Documents
- Electronic Warfare analysis, SIGINT
- Signals Intelligence solution
- designed solutions that satisfy system requirements and fulfill functional analysis
- providing direction for the development,
- Tested Phased Array Radar Systems
- Successful RF, Analog and digital circuit design and development by me for special wireless receiver

Omni International, Kennesaw, GA
December 2017 – June 2018
Senior Analog and RF Design Engineer - contract

- Successfully managed to develop a 500W Ultrasonic Homogenizer product using Allegro
- This included from new ideas to design new circuits, all electronics and 500W amplifier
- Concept started with system design, circuits design with schematics and circuit board layout
- Included Digital board work design and development using Schematic capture software and Mentor experience

Syntonics Corp, Columbia, MD
March 2017 – November 2017 - employed on a Project Basis – ended at project completion
Senior RF Design Engineer – employee

- Successfully managed to develop several RF related design and development
- Successfully Re-designed the RF circuits for the TX and RX that interfaces the optical fiber for communication
- Included Digital board work design and development using Schematic capture software and Mentor experience. SIGINT
- recommendations to improve system performance. The RF design had to work for FM and OFDM systems.
- Started to design and develop a 10.5Ghz radar system that is capable of tracking bullets

Iradion, Laser Inc, Smithfield, RI
November 2016 – March 2017 - employed on a Project Basis – ended at project completion
Senior RF Design Engineer – employee

- Successfully managed to develop several RF related design and development
- Found the root cause for the instability of the Lasers
- Successfully designed, fixed and debugged RF circuit designs
- Successfully Designed and developed matching circuit for 600W amplifier
- Successfully Designed and developed a 1.2KW power amplifier for 81Mhz
- Successfully designed and developed +48V DC to +40V DC converter at 20 Amps and developed board layout with PADS
- Included Digital board work design and development using Schematic capture software and Mentor experience

Stanley Black and Decker, Towson, MD
May 2016 – October 2016 - employed on a Project Basis – ended at project completion
Senior RF Design Engineer - employee

- Analyzing and testing several different Real Time Location System products and designing and developing new products

Richardson Electronics, Lafox, IL
December 2013 – May 2016 - employed on a Project Basis – ended at project completion
Senior RF, Analog Design Engineer and Technical Manager - employee

- Successfully managed to develop several projects mostly hardware development
- Successfully designed and developed RF, digital hardware design (including FPGA), filters and PCB board layout with Genesys and Analog component level circuits for 5Mhz to 3Ghz range, including GaN amplifier.
- interference mitigation techniques, and analysis to minimize the effects of co-site interference
- Successfully designed and debugged projects including 6-75KW tube amplifiers, waveguide circuits and waveguide tuners, waveguide windows designs, development and optimization for production at 915 MHz and at 2.45 Ghz.
- Successfully Designed and developed matching box for 2KW amplifier
- Successfully designed and developed 1KW amplifier for 2-30Mhz using Cadence for schematics and PADS for board layout
- Developed and documented RF design requirements, Production and Test Plans and Procedures
- Managed tasks related to the specification, design, manufacture, integration and test of hardware and associated test equipment for subsystems including power systems, command and data handling systems, and communication systems (specific hardware on these tasks may include circuit boards, programmable logic, cabling, mechanical housings, and ground support equipment)
- Built RF amplifiers, tuners and devices for LAM to make the 7nm gate technology
- Performed task baseline planning, schedule and resource management, reporting, and control of task performance
- Included Digital board work design and development using Schematic capture software and Mentor experience
- Determined resource requirements and developed labor and cost estimates to meet task objectives
- Performed “make-buy” trade studies and decisions, and participated in procurement activities, developing statements of work, evaluating proposal submissions, and negotiating with subcontractors
- Managed subcontractor activities including monitoring cost, technical and schedule performance, reviewed and approved invoices, determined and initiated funding
- Monitored and managed task cost performance, developed estimates to complete (ETC) and spending forecasts
- Reviewed technical deliverables to the customer

Northrop Grumman, Linthicum, MD
April 2013 – November 2013 - employed on a Project Basis – ended at project completion
Senior Analog and RF Design, Development and Test Engineer – contract

- Successfully Designed, re-designed hardware, PCB board layout and tested number of analog circuits, filters with Genesys that was built for Quantum computer project.
- interference mitigation techniques, and analysis to minimize the effects of co-site interference on various Army Platforms, ability to perform EW and communication systems characterization and provide recommendations to improve system performance. Expertise with communication radios, and the modeling and simulation to provide a proof of concept for the feasibility of combining multiple multi-tone waveforms RF signals through a single amplifier
- Successfully designed hardware and significantly reduced noise at the receiver thus improved signal quality, such that finally 100% of the data was received without error. Used RF circuit modeling with ADS, Cadence, PADS and HFSS, including schematics design and board layout.
- Successfully created layout MMIC with Cadence Virtuoso layout design tool
- Included Digital board work design and development using Schematic capture software and Mentor Xpedition experience

Avnet, Columbia, MD
May 2012 – December 2012 - employed on a Project Basis – ended at project completion

Field Application Engineer - employee

- Helped design electronic circuits and identify IC components for circuit boards to engineers of several companies. Also researched and recommended the right electronic parts to several customers based on their project.

Consultant
November 2011 – March 2013; - employed on a Project Basis – ended at project completion
Senior RF, Microwave, and hardware Design Engineer & Technical Manager - contract

- Consulted to SoleNet, Inc., to PlugNet Ltd. and to Coherent, Inc
- Successfully managed and designed hardware board layout, schematics and developed RF and Analog component level circuits using Cadence for schematics and PADS for PCB board layout
- Successfully Tested and debugged the RF and Analog circuit boards for communication modems using RF equipment, Spectrum Analyzer, Networks Analyzer, and Oscilloscope. Schematics Capture Cadence ORCAD or Altium, PCB board Layout Mentor PADS or Altium, PSPICE, and Genesys design tools were used.
- Some of the designs were defense and some of them were space related.
- Successfully Designed, PCB board layout for RF and Analog circuit with very fast transmitter driver for photo diode.
- Most project required data acquisition experience, A/D experience, multiplexing systems and analog filter designs. Experienced with RF, microwave circuits and antenna test characterization and interfacing.
- Lumped element and microstrip filter and matching circuits. Broadband mixers, Synthesizers, Amplifiers, contribute to overall product packaging mechanical designed that achieves required RF isolation, heat. OFDM based wireless modem was designed and developed
- experienced with DC power systems (-48VDC) and with +48VDC
- Included Digital board work design and development using Schematic capture software and Mentor Xpedition experience

Intelligent Automation, Inc., Rockville, MD
March 2010 – Oct 2011 - employed on a Project Basis – ended at project completion
Senior Technical Lead Engineer and RF, Analog Design and Test Engineer - employee

- Funded by government grants and based on requirements, successfully designed and developed from abstract ideas several unique and wireless devices including GSM, LTE based system design and implementation with G3 and G4 protocol, frequency bands and modulation.
- Another very successful and unique key project was developed for synchronizing unparalleled wireless modems together with less than 1 nano seconds delay.
- interference mitigation techniques, and analysis to minimize the effects of co-site interference on various Army Platforms, ability to perform EW and communication systems characterization and provide recommendations to improve system performance. Expertise with communication radios, and the modeling and simulation expertise to provide a proof of concept for the feasibility of combining multiple multi-tone waveforms RF signals through a single amplifier.
- OFDM based wireless modem was designed and developed
- This work included system design, hardware design (including XILINX FPGA), circuit and schematics design with Cadence, PADS, filters design with Genesys, selecting the right parts, making a correct PCB board layout and testing and debugging the final prototypes. Included EMI and EMC testing.
- Some of the designs were defense and some of them were space related.
- Included Digital board work design and development using Schematic capture software and Mentor experience

Consultant
June 2009 – March 2010 - employed on a Project Basis – ended at project completion
Senior RF, Microwave, and hardware Design Engineer Technical Manager - contract

- At PluNet Ltd. designed and developed RF, antenna, hardware, (including FPGA), and Analog component level circuits using Cadence for schematics and PADS for PCB board layout for 5 Mhz to 3Ghz range and used Qualcomm chipsets including 2.4 Ghz Wi-Fi, LTE, Land Mobile Radio (LMR) and space applications.
- interference mitigation techniques, and analysis to minimize the effects of co-site interference
- Tested and debugged RF and Analog circuit boards (EMI and EMC also included) and debugged the entire digitally signal processed communication modem.
- Special OFDM based wireless modem was designed and developed
- Tested Wi-Fi product, its protocols and did testing of the same with different routers. The RF design and board layout were done with Genesys (including schematic, linear simulation, optimization, statistical, layout, and data

display capabilities, RF system architecture, circuit synthesis, nonlinear circuit, Synthesis modules for filters, matching networks, oscillators, mixers, transmission lines, equalizers, PLL and signal control).
- Included Digital board work design and development using Schematic capture software and Mentor experience

MA-COM Cobham, Hunt Valley, MD
May 2008 – May 2009 - employed on a Project Basis – ended at project completion
Senior RF, Microwave and Analog Design, Test and Principle Engineer - employee

- Successfully re-designed several wireless products for improved performance, lower cost and smaller size using Cadence for schematics and Mentor PADS for PCB board layout.
- Duties included analyzing with Agilent Advanced Design System (ADS) and filters with Genesys, designing, prototyping, testing (EMI and EMC also included) and developing RF, Microwave, hardware design (including XILINX FPGA), analog and MMIC circuit designs with Cadence Virtuoso, schematic simulation, circuit layout, electro-magnetic simulation, physical verification using HFSS software tools for existing and new wireless receiver products from 1 Mhz to 40 Ghz frequency ranges.
- These included selection of the right low noise amplifier, mixer, gain block amplifier, filters, synthesizers, lumped element, microstrip filter, matching circuits, broadband mixers, IC packages components, cascade analysis and tolerance analysis for low noise figure, for high IP2 and high IP3.
- As Project Engineer, set performance standards for tasks and roles of team members and provided ongoing feedback about their performance.
- Expertise with communication radios, and the modeling and simulation expertise to provide a proof of concept for the feasibility of combining multiple multi-tone waveforms RF signals through a single amplifier
- OFDM based wireless modem was designed and developed
- Kept all stakeholders informed about project progress. Presented technical solutions in a non-technical way to key stakeholders to reach consensus.
- Task included Wideband tuner design, Expertise in the use of test equipment including network analyzers, spectrum analyzers, power meters, noise figure meters and oscilloscopes. Furthermore, Genesys (or equivalent) RF/Microwave design and simulation, ORCAD schematic capture, RF/Microwave printed circuit board layout was developed. Multi-board analog and digital unit level designed and Designed for board level and product level testability
- Included Digital board work design and development using Schematic capture software and Mentor experience

Senior RF and Analog Design and Test Engineer Consultant
PlugNet Ltd, Clarksville, MD, October 2007 – April 2008;

- Successfully designed and developed Wireless RF LTE and Analog circuit boards with board layout in the 900 Mhz to 4 Ghz range, including filters and microwave designs with Genesys (including schematic with Allegro, linear simulation, optimization, statistical, PCB board layout with Mentor PADS, and data display capabilities, RF system architecture, circuit synthesis, nonlinear circuit, Synthesis modules for filters, matching networks, oscillators, mixers, transmission lines, equalizers, PLL and signal control). OFDM based wireless modem was designed and developed
- Included Digital board work design and development using Schematic capture software and Mentor experience

Senior RF and Analog Design and Test Engineer Contractor
System Planning Corporation, Arlington, VA, August 2006 – September, 2007;

Successfully re-designed and re-developed several circuit boards for Phased Array Radar device with Cadence, Mentor, PADS and designed filters with Genesys with new PCB board layout that significantly reduce the noise level on the boards.

- Cleaned up numerous design and development issues including between digital and analog circuits for the Pulsed Radar System including the correct way of grounding using my extensive experience to reduce noise.
- Also conducted extensive EMI and EMC testing.
- Some of the designs were defense and some of them were space related. This project included space flight avionics design, integration, and test.

Senior RF, Microwave, Hardware and DSP Design Engineer and Technical Manager
Wire21, Inc., Burtonsville, MD, January 2000 – July 2006;

- Successfully conducted RF, Analog and DSP design, development from 6 Mhz to 3.5 Ghz frequency band (VHF, UHF circuitry), developments, system and circuit design with Cadence, PADS, testing (EMI and EMC)
- Successfully integrated SCADA system

- Designed filters with Genesys/Eagleware (including schematic, linear simulation, optimization, statistical, layout, and data display capabilities, RF system architecture, circuit synthesis, nonlinear circuit, Synthesis modules for filters, matching networks, oscillators, mixers, transmission lines, equalizers, PLL and signal control) and built prototypes for high speed power line carrier communications. Designed low noise RF receivers, custom LC filters and high wattage 100 W to 1KW amplifiers in the 900 Mhz to 2.4 Ghz range.
- Successfully designed and developed very high speed power line modem and reduced the noise by about 20 dB. Developed unique technology with four new patent applications, including analog video signal processing, and digital signal processing for LAN applications over the AC power lines.
- Developed communication device over the mid-voltage (11-33KV) power line and designed high voltage power supply. Responsibilities included arithmetic and logical unit (ALU) RF Optimization, designing analog and RF circuits, developing OFDM signal processing modulation with VHDL coding using ALTERA FPGA. Managed manufacturing the products, developed ASICS design and developed RF modules.
- Used the internal program tracking system for all development programs. Techniques included error correction codes (in-coding, decoding), modification of synchronization protocols and Ethernet protocol.
- Managed technologies include telecommunications, digital signal processing, software development (embedded, windows, & UNIX), and hardware development.
- In addition, managed entire technical team on project. Prepared and tracked project schedule and budget.
- Included Digital board work design and development using Schematic capture software and Mentor experience

Design Engineer Contractor
Motorola, Inc., Hanover, MD, February 1999 - December 1999;

- UHF and VHF RF Land Mobile Radio (LMR) System design for secured voice communication for all US Embassies. Also defined and selected the best suited filters for each specific design.
- Three dimensional electromagnetic simulation tools and RF propagation software were also used.
- Designed Microwave networks, performed microwave path profile studies, performed RF coverage studies for two-way trunked radio systems, Telecommunications site build-out that included towers, monopoles, equipment buildings, antennas, waveguide, generators, grounding systems

Design Engineer Contractor
Prizm Advanced Communication Electronics, Inc., Elkridge, MD, September 1998 - January 1999;

- Successfully re-designed, re-developed and tested multi-channel digital video using Allegro,
- Designed filters with Eagleware and Ethernet communication over optic fiber and reduced noise by about 20 dB. The old design noise level was so high that even the video monitor showed them.
- Successfully eliminated the noise on the system by re-designing Analog circuits.

Test Engineer
Ericsson, Inc., Cellular Phone Division, Testing Group, Lynchburg, VA, June 1997 - August 1998;

- Conducted testing, measurements, and verification for GSM based PCS, digital cellular phones.
- Labview was also used and ALU RF Optimization. Identified a number of design, parts, test station and documentation related problems.
- Worked with the designers to correct the problems.

Design Engineer
ELCOM Technologies Corp., Malvern, PA, June 1991 till May 1997;

- Successfully conducted system, analog and RF circuit design, testing and prototyping for Company with products in development for high speed analog and digital communications for video, audio,
- Designed filters with Eagleware, with discrete I/O and data using DSP, A/D, D/A converters and hardware design with FPGA.
- Responsibilities included on time product development using team efforts and overseeing all the contracting and manufacturing arrangements.
- ALU RF Optimization were also used.
- Qualified analog devices into low cost high volume products.
- Developed EZLAN, EZTV, and EZPHONE products.
- Based on my design the Company received 2 Ben Franklin Technology Awards and the Most Innovative Product Award.

Computer Skills

- Language Proficiency: PASCAL, "C", Assembly, LabVIEW
- Operating Systems: Windows, MS-DOS, UNIX
- Hardware: IBM PC, Mac, VAX 8650
- Design Tools: Pspice, OrCAD, Eagleware, Genesys, Tango, MATLAB, PADS, Mentor, Cadence, Allegro, Altium, ADS, Mathcad

Education

Bachelor of Science in Electrical Engineering
University of Pennsylvania, Moore School of Electrical Engineering

Technical Papers

- A Novel High-Speed PLC Communication Modem, IEEE/PES
- Customer Premises Layouts demonstration the use of a single common system for video, voice and data distribution in single homes, multiple dwellings and commercial facilities, TIA/TR41.5
- Author of 20 U.S. and international patent applications. 13 U.S. and several EPO patents have been issued.

Additional Information

- U.S.A. Citizen, active TS/SCI clearance, IEEE member, TIA and T1E1 standard committee member.