

## **SUMMARY**

Ten-plus years of multi-disciplinary systems development experience with background in analog & RF hardware engineering, wireless communication systems, architectural design of real-time / DSP systems, power electronics and sensing of various physical parameters. Past work also includes systems engineering & analysis, project management, electro-mechanical engineering, and thermal engineering. Developed systems for a broad range of applications including; scientific instrumentation, wireless telemetry, industrial controls and consumer electronics.

## **BUSINESS MANAGEMENT / COMMUNICATIONS SKILLS**

- Experience with small-business accounting
- Experience with engineering team management
- Experience with project planning and control
- Proficiency in technical writing and presentation

## **HARDWARE ENGINEERING SKILLS**

- Analog circuit design with discrete components and integrated circuits
- RF circuit design with discrete components and RFICs
- Digital circuit design and microcontroller-based hardware design
- PCB design and layout for RF, analog, power and digital systems
- Significant experience with electrical and electronic prototype fabrication

## **SYSTEMS AND FIRMWARE ENGINEERING SKILLS**

- Wireless communications link analysis and system design
- Embedded firmware architecture, design, code-construction and test (C-language)
- Familiarity with systems architecture / engineering for communications, signal processing and control
- Basic electro-mechanical systems engineering and control systems implementation for small systems

## **CAE / PROGRAMMING / SIMULATION SKILLS**

- Analog and RF circuit design, optimization and simulation with SPICE, MATLAB & Eagleware GENESYS
- Signal processing and system simulation with MATLAB and SIMULINK
- Image processing algorithm & system development with MATLAB and C
- Development of technical software applications using Visual Basic (VB6 / VB.NET) or MATLAB

## **EDUCATION**

UNIVERSITY OF MASSACHUSETTS, North Dartmouth, MA

Working towards Master of Science Degree in Electrical Engineering

- Completed coursework as of Sept 2008: Random Signal and System Analysis, RF Circuit Design, Wireless Communication Systems, Semiconductor Device Theory and Smart / Array Antenna Systems

WENTWORTH INSTITUTE OF TECHNOLOGY, Boston, MA

Graduated May 1999

Bachelor of Science Degree in Electromechanical Engineering with Academic Highest Honors

- Cumulative GPA of 3.77
- Scored rare 90 on EIT Exam

## **ACADEMIC AWARDS AND HONORS**

- Elected as Student Commencement Speaker at Wentworth's May 1999 Commencement Ceremony
- Outstanding Electromechanical Engineering Coop Student Award

## **HOBBIES AND INTERESTS**

- Fitness and Nutrition
- On and Off-Road Cycling
- Weight Training
- Indoor Climbing

## PROFESSIONAL EXPERIENCE

Wireless Techniques, LLC  
*President, Chief Engineer*

December 2006 - Present

Summary: Founder and sole manager of a small engineering consulting firm. The firm provides design and implementation services for custom multidisciplinary electronic systems, generally involving communications, signal processing and sensing. Solely responsible for all company profits/losses and project deliveries.

Key Responsibilities:

- Management of two full-time engineers, three part-time employees and one co-op student
- Selection and coordination of subject-matter expert consultants and engineering sub-contractors
- Development of system architectures and development plans for all company programs
- Technical leadership for systems engineering and hardware design for all company programs

Developed systems involving: wireless and wired communications, RF & analog hardware design, sensing, embedded control, analog circuits power electronics, real-time DSP architecture and image-processing.

Significant Project Assignments:

- Responsible for the development of the Phase 2 Automated Training Apparatus machine-vision system for Levin Labs, a Boston-based biology research lab. The system is used to track the motion of small organisms like tadpoles, worms & zebrafish and allow control of the petri-dish lighting. The system allows experimentation on organism learning & behavior mechanisms. The Phase 2 system is ultimately intended for massively parallel implementation with 24 to 96 channels. The key objective is to create a multiplexed and improved version of the single-channel system described below. This system uses the Cognex Insight Micro 1400 integrated DSP + machine-vision camera module instead of a separate DSP and camera. Currently performing system architecture design, systems engineering, analog and embedded hardware design, some embedded firmware development and management of external sub-contractors.
- Responsible for the development of the Phase 1 Automated Training Apparatus machine-vision system for Levin Labs, a Boston-based biology research lab. This system was a single-channel prototype of the petri-dish monitoring - video processing system described above. The system uses an RS-170 analog video camera and BlackFin BF533 DSP to perform image processing. Performed system architecture design & engineering, analog & embedded hardware design, embedded firmware development & image-processing algorithm prototyping. During Phase 1, candidate image processing approaches & algorithms were studied & prototyped in the PC environment prior to DSP implementation. The objective was to obtain low probability of failed detection while maintaining good computational efficiency. The resulting algorithms were then implemented and optimized for the BlackFin BF533 architecture, achieving a frame processing throughput of 8.5 fps.
- Responsible for the development of a custom RF test system for Wayne-Dalton, a garage door opener manufacturer. The system is used to test the wireless link operation as part of a larger highly accelerated stress testing (HASS) system. The HASS system is now part of the customer's production test process. The system contains transmit and receive sections for simulating the keyfob opener RKE link and overhead light links. The transmit section produces an accurate ASK modulated 372 MHz carrier signal using encoded data from a KEELOQ encoder / microprocessor. The receive section receives and demodulates an ASK modulated 433 MHz signal and verifies proper decoding. Performed system architecture design, RF system analysis / design and PCB design. Used Eagleware GENESYS and Excel for RF system analysis and Number-One-Systems Easy-PC for PCB design.

University of Massachusetts, Dartmouth

September 2008 - Present

*Part-Time Visiting Lecturer*

Providing undergraduate senior-level course in practical electronic system design. Course provides an overview of techniques and practical issues involved in the design of a real-world PCB or small system. The course covers the fundamentals of the systems engineering process, component selection, embedded firmware architecture, component parasitics / non-idealities, EMI/RFI & electronics cooling. The course included schematic design, layout and construction of a small PCB project.

LoJack Corporation

April 2004 – December 2006

*Hardware Engineer*

Summary: Responsible for the wireless systems engineering, hardware engineering and firmware engineering aspects of GPS and GSM product development. Applied engineering theory towards:

- GPS navigation system evaluation & integration
- GSM Modem integration and firmware development
- Analog, digital and power conversion circuit design and analysis
- Embedded system design & implementation

Significant Project Assignments:

- Responsible for the design and test of the LoJack Listening Post vehicle recovery network monitoring platform. Designed analog & digital circuitry for power management and system control. Designed, coded and tested embedded microcontroller firmware for wireless communications via GSM modem telemetry.
- Responsible for the LoJack covert-GPS evaluation program to determine the technical feasibility of utilizing GPS receivers in covert automotive installations. Performed data collection and in-depth statistical analysis of GPS data.
- Investigated technical feasibility of a novel low-cost, high-performance GPS-INS (GPS + Inertial Navigation System) design based on a novel GPS receiver architecture. Performed a preliminary evaluation of GPS and INS sensor components candidates. Designed, assembled and tested a system evaluation prototype. Began firmware implementation. Program discontinued due to poor alignment with corporate priorities.
- Designed and simulated a novel multi-resonant switch-mode-power-supply for use in ultra-sensitive and power constrained GPS+GSM telemetry systems. The resulting design was capable of low-noise, ultra-high-efficiency power conversion over wide load current ranges. The design required the development of a novel digital controller to be implemented in CPLD. Performed in-depth simulation with Spice and waveform post-processing in MATLAB. Program discontinued due to poor alignment with corporate priorities.
- Designed and coded a small VB.NET serial communications application for in-house use. The software allowed rapid definition of ASCII serial comm strings for testing communication with external modules and systems.
- Designed and coded a small VB.NET technical reporting application for in-house use. The software allowed rapid report generation for FCC interference studies required for transmitter tower license applications.

SIPPICAN, INC.

February 2001 – March 2004

*Electrical Engineer II, Oceanographic and Meteorological Systems Division*

Summary: Responsible for the RF & Analog engineering aspects new product development. Applied engineering theory towards: analog, digital and RF circuit and system design, PCB layout, heat-transfer, interconnect design, and LOS RF communications link analysis.

Significant Project Assignments:

- Design of Sippican's Next Generation of synthesized FSK transmitters using Analog Device's latest line of integrated transmit ICs with off-chip Class-C power amplification. Used Eagleware GENESYS for PA gain and stability analyses after initial system-level design using MATLAB.
- Design and testing of Sippican's Next Generation radiosonde PCB with an on-board GPS receiver chipset. Responsible for all RF/analog aspects of GPS receiver chipset implementation including design and layout of the RF Front End. Included extensive Eagleware GENESYS modeling for LNA gain & stability analyses.
- Design, prototyping and testing of PCBs for the MKIIA radiosonde and ground station signal-processing system. Designed a custom 1.7 GHz synthesized FSK transmitter as part of overall project effort. Included extensive modeling in MATLAB/Simulink for PLL loop-filter design and VCO design. Implemented single-stub microstrip matching networks on PA and driver amplifier using MATLAB as the primary analysis tool for circuit design.
- Design and implementation of various other analog, digital & RF systems and PCBs. Select examples include linear and switching power converters, sensor interfaces, single board computers, IF demodulators, etc.

ADVANCED THERMAL SOLUTIONS, INC.

May 2000 – January 2001

*Senior Staff Engineer*

Summary: Was responsible for the design and deployment of new thermal instruments. Provided leadership to engineering staff and contract software development staff. Designed, programmed, and deployed a small micro-controller based wind-tunnel control system.

Responsibilities included:

- Design and analysis of analog and digital circuitry for new designs or engineering changes
- Thermal analysis of sub-systems and components as needed for instrument reliability
- Software programming for embedded systems and PC applications, using C & VB

TUF-LITE CORPORATION

May 1998 - January 1999

*Electrical Engineer*

Summary: Designed and programmed a network of microprocessor based control units as part of Tuf-Lite Corporation's automated rotary press design efforts. Duties included microprocessor systems design, controller programming, PCB layout, mechanical design and technical writing.

AUBURN INTERNATIONAL

May 1996 - August 1998

*Electromechanical Engineering Intern, Mfg & Test Department*

Summary: Performed a broad range of technical tasks for the assembly and test of semi-custom Nuclear Magnetic Resonance systems and capacitive flow monitoring systems.

Responsibilities included: Assembly, testing and debugging of analog and digital electronics, including embedded systems and HF circuitry. Assembled various other systems including thermal and pneumatic process control systems, programmable logic control systems and wiring panels. Also performed design and programming of a Cartesian coordinate robotic system for calibration of NMR magnet field strength.

REFERENCES AVAILABLE UPON REQUEST