

Objective

Seeking a firmware/hardware design position in an engineering environment where my ethical commitment, design implementations, and analytical & problem solving skills, contribute to a company's growth and profitability.

Professional Summary

Qualified by years of experience in many aspects of the research and development environment including the design and trouble shooting of complex digital systems. A creative, organized, insightful and resourceful team player with the demonstrated ability to assure conformance to requirements and consistently exceed quality expectations.

Proven ability to work effectively in a fast paced, changing environment. Key areas include:

- Active United States Secret Clearance
- Product process flow down: requirements, specification, design, implementation, simulation, debug & integration
- Thorough simulation testbench development w/functional code coverage and timing verification
- Lab integration & debug of complex digital systems
- FPGA/CPLD: Xilinx, Microsemi/Actel
- Digital Design Tools: ISE/Vivado, Zynq/MicroBlaze/SECMON, QuestaSim, ModelSim, Synplicity, Visual Elite HDL, OrCAD, Libero Designer, Active HDL
- Military: cryptographic/encryption (RESCUE); missile navigation/guidance (MRM); missile warning systems/image processing (AAR47, JATAS & HFI)
- Communications: SATA, Ethernet - IPv4, IPv6, TCP, UDP, 10/100/1G/10G, SONET(OC1-OC192) & PDH(DS1/E1, DS3/E3 & E4)
- Serial communication controllers for USB, ARINC-429, RS422/485, I2C, SPI, etc.
- Custom serial & parallel interface controllers
- Schematic logic design conversion to VHDL
- PCB design
- Laboratory Equipment: SATA Analyzer, Oscilloscopes, Logic Analyzer, Data Generators, Spectrum and Network Analyzers
- Common Operating Sys, Apps & Languages: VHDL, Python, Linux, MS Windows, VxWorks, Visio, Pspice, Matlab, Mathcad, Fortran, C++, Ada, Assembly, HTML

Professional Experience

ABC Technologies, Inc., Tampa, FL (*Hardware/Firmware Design Engineer Consultant*)

2004 – Present

Responsibilities include new design development through generation of HW requirements from customer system level descriptions, development of HW design specification documentation, HW implementation with verification through simulation, and laboratory integration with SW; Sustain & enhancement efforts (modifications) on mature products driven by customer requests to meet dynamic system requirements for both military and communication industries. Examples include:

- Developed the firmware for the FPGA based RESCUE for the US Army/CERDEC Type 1 generic End-Cryptography Unit with multi channel COMSEC device capability. This design implemented Partial Reconfiguration & SECMON technology allowing numerous required field updateable Ethernet & serial protocols and algorithm combinations to be certified by the NSA while using shorter certification cycles.
- Responsible for integrating a SATA controller IP core and an advanced high-speed cryptographic encryption engine into a Xilinx 7-Series Zynq FPGA with an embedded ARM processor and dual lockstep MicroBlazes using Vivado for a custom multi-channel cryptographic high-speed data recorder prototype.
- Responsible for developing the testbench and simulation environment for a multi-channel cryptographic high-speed data recorder. The testbench was developed with the flexibility to independently enable individual tests such that design sub modules could easily be verified as they became developed.
- Designed and implemented an FPGA based USB 2.0 data packet sniffer used to capture specific USB data packets based on PID types and an extensive programmable filter scheme. This design currently has a US Patent pending and is scheduled for production.
- Implemented MPLS (OSI L2.5) feature set on an FPGA based IPv4 Ethernet analyzer for 10/100/1G & 10G rates; Updated same IPv4 Ethernet analyzer to operate on IPv6 data packets including 10/100/1G & 10G rates.

- Implemented ARINC-429 avionics communication controller and Super IO IP core and interface logic for aircraft navigation system, including color video panel, and supporting miscellaneous user interfaces.
- Implemented interface logic to control and communicate with a 65K pixel focal plane array (FPA) image sensor including the necessary cooler controller algorithms.
- Implemented real time image processing functions such as non uniformity pixel correction & compensation (calibration), bad pixel replacement, and pixel gain & offset adjustments to operate on video frame data
- Designed initial VHDL firmware according to DO-254 for a multi-channel TDMA based secure avionics voice communication system which consisted of numerous user interfaces including CODECs, LCD, digital potentiometers, pushbuttons, etc.
- Designed VHDL firmware for a COTS based optical sensor simulator for missile warning system including RS485/RS422 communications controller with FIFOs to handle non RTOS PC GUIs.
- Designed VHDL firmware for custom test fixtures including control register mappings, I2C communications controllers, and the control interfaces necessary to countless serial & parallel peripherals such as EEPROMs, ADCs, DACs, and miscellaneous IP cores, etc.
- Consolidated several obsolescence challenged PCB based products into a single PCB containing Xilinx Virtex 4s, a Xilinx Spartan3E, and a Xilinx V2Pro. Developed all interfacing logic using VHDL.
- Designed and implemented a built in test to exercise a DDR2 memory controller in a Xilinx V4.
- Implemented the ability to measure service disruption times in the digital communication rates of DS1, DS3, E1, E3, and E4 on a legacy product using Xilinx XC4000 family of FPGAs.

ATK Missile Systems Company, Clearwater, FL (*Hardware Engineer*)

2003 – 2005

Responsible for the FPGA design, implementation, and integration, within the military application of a munitions guidance control system. Developed and implemented simulation environments. Extended product life by supporting existing design efforts with continuous feature enhancements.

- Developed VHDL for an Actel FPGA which provided the communication between a TigerSharc DSP and external condition sensors using multiple muxes and analog to digital converters.
- Developed VHDL for multiple COTS development boards which included multiple TigerSharc DSPs and a Xilinx Virtex 2 FPGA to create simulation environments to enable further system component development.
- Developed VHDL in a serial communication system and its loop back counterpart with independent TX & RX rates to perform programming and testing of munitions using two COTS development boards each containing a Xilinx Spartan 2.
- Re-spun a previously pure analog interface PCB to include a Xilinx CPLD and developed its respective VHDL to improve serious performance limitations.
- Developed a semi-active 12-Layer PCB back plane for a multi-stack PC104 based ruggedized portable computer used to program munitions.

Digital Lightwave, Inc., Clearwater, FL (*Hardware Engineer*)

2000 –2002

Responsibilities included new design development and sustaining efforts of existing high speed electrical and optical communication test equipment products. Implemented feature enhancements to current digital designs to satisfy specific customers' requests.

- Implemented an interface to translate separate 32 bit address and data busses of a Motorola 860 to the multiplexed address and data bus for five FPGAs using VHDL in a Lattice CPLD.
- Designed T1 and E1 communication protocol deframers and B8ZS/HDB3 line decoders in order to replace ASICs and conserve board space using VHDL in a Xilinx FPGA.
- Added an APS feature requested by a major customer in the ASA-312's OC3, OC12 and OC48 protocol processors.
- Successfully diagnosed and implemented the resolution of an intermittent final test failure involving the PCMCIA port on the main board in the ASA-312 product, which was delaying production goals.
- Wrote technical documents describing theory of operation, architecture and programming information of system functionality.

Raytheon Systems Company, St. Petersburg, FL (*Software Engineer*)

1999 – 2000

Responsible for verification of feature requirements of new and existing software via test scripts and maintained the software resident on the testbeds, development and maintenance of testbed scripts based on software requirements and SPRs, documentation of software discrepancies and verification of corrective actions via SPRs.

- Updated read/write algorithms involved in PCMCIA flash card accessing to satisfy original card obsolescence.
- Executed automated tests, analyzed and documented results for both the simulated and actual target system environments.
- Acknowledged by senior management for the technical ability of viewing situations from other perspectives and developing solutions in a timely, efficient and cost-effective manner.

Self Employed Electronic Designer, Tampa, FL (*Software/Hardware Engineer*)

1998 – 1999

Determined customers' requirements, designed and implemented suitable prototype, including all mechanical, electrical and software aspects.

- Designed and implemented a circuit board incorporating microprocessors, load cell transducers, A to D converters and LCDs.
- Constructed fully functional prototype including mechanical enclosure, graphic overlay and miscellaneous device interfaces.
- Wrote application software to operate industrial weight scale instrumentation and satisfy customer specific function requests.

Education

BSEE, University of South Florida, Tampa, FL, 1998