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Senior Embedded Hardware and Software Design Engineer End to End Turnkey Product Development Engineer

Experience Highlights	<ul style="list-style-type: none"> • <i>Digital Analog Design</i> • <i>Telecommunications</i> • <i>CPLD/FPGA/ASIC</i> • <i>Verilog, AHDL, VHDL</i> • <i>Verification</i> • <i>Timing Analysis</i> • <i>TCP/IP/UDP</i> • <i>LAPD, L2TP</i> • <i>HDLC Protocol</i> • <i>Sonet Network</i> • <i>FPGA/ CPLD/ PAL</i> • <i>Altera, Xilinx, Lattice IDE</i> • <i>VXWorks, MULTI</i> • <i>Blue Tooth</i> • <i>LED driver</i> • <i>Piezo Electric</i> • <i>High Temperature High Reliability Electronics 150-200C</i> • <i>Synopsys, Simulation</i> • <i>Diagnostics, QC Testing Validation</i> • <i>Perl Scripting</i> • <i>System Testing</i> • <i>LabView</i> • <i>Disk Drive Controller</i> • <i>Low power RF</i> • <i>Buck, Boost, Switching Power Supply, Converter</i> • <i>Motor control</i> • <i>OBD2 Automotive ECU</i> • <i>Labview, Mthlab</i> • <i>PV cell, MPPT</i> 	<ul style="list-style-type: none"> • <i>Macrocode, Assembly, C,C++ Pascal, Protel, Basic, Fortran, Firmware Programming</i> • <i>Disk Controller, Storage</i> • <i>T1 E1 OC3 OC12</i> • <i>System Timing, Simulation Synchronization</i> • <i>Gateway/Tandem/Toll/PBX/ Data Switch, ISO</i> • <i>Sonnet Network</i> • <i>Oscilloscope</i> • <i>Logic, Network Analyzers</i> • <i>Acoustic Communication</i> • <i>A/D, D/A, Digital Filter</i> • <i>ASIC Prototyping</i> • <i>Altera Quartus II Software</i> • <i>Oil & Gas Down Hole Tools</i> • <i>Analog Devices, Lattice, Intel</i> • <i>Shell Programming</i> • <i>ASIC Prototyping Bench Testing</i> • <i>Ethernet controller, Interface</i> • <i>Inter Processor communication</i> • <i>National Instruments, NI</i> • <i>Wireless RF Mesh Network</i> • <i>High Power Driver Circuit</i> • <i>CRC Checking, Correction</i> • <i>Valve control</i> • <i>Free scale DSP MC56F48xx</i> • <i>Firmware Testing, Writing and Executing Test Cases</i> • <i>Low Power Design</i> • <i>HW Board Bring-up</i> • <i>Wireless Zigbee ZLL, ZHA, ZSE, Sub-1GHz transceiver</i> • <i>PIC24HJ128GP502</i> • <i>Linux, Unix, Solaris, SunOs</i> • <i>Solar Inverter, PLC</i> 	<ul style="list-style-type: none"> • <i>Jtag Emulators</i> • <i>Motorola 680x0</i> • <i>PowerPC</i> • <i>Power QUICC</i> • <i>Intel8051/Z80/P CI</i> • <i>Free scale</i> • <i>Team Leadership</i> • <i>People Skills</i> • <i>Trouble shooting</i> • <i>PCB, Hybrid Design</i> • <i>Atmel AVR Consultant</i> • <i>Synplicity</i> • <i>DSP MCU ARM</i> • <i>Automated Test Perl Program</i> • <i>CSU, DPU, DSU</i> • <i>Multi-Processor Design</i> • <i>Project Manager</i> • <i>Matlab, Simulink</i> • <i>I2C, SPI, UART</i> • <i>High Power Driver</i> • <i>TI Delfino DSP TMS320F28335</i> • <i>TI Picollo DSP TMS320F2869</i> • <i>STMicro STM32F407,303 ARM Cortex M4</i> • <i>Atmel Bitcloud Atmega256rfr2</i> • <i>Schematics</i> • <i>PCB Layout</i> • <i>BIOS</i> • <i>Power Line Communication</i>
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EXPERIENCE

Embedded Technology System Solution, Inc. Dallas, TX **Jan. 2004-present**

Senior Embedded Hardware & Software design Engineer

Accepting consultant / contract opportunity and end to end turnkey custom product development for Firmware / Software, Hardware, Device Driver, Functional Validation, Technical Advisor, Technical Sale, Project management.

- Provide Design engineering services for all the companies listed in this resume.
- Designing replacement part for obsolescence devices. Integrated circuit.
- Hardware and Firmware board bring up.
- Wireless Home features and alert system. Designed a low power Zigbee wireless board using Atmega256rfr2 using serial net Atmel stack. Currently working on an improved version using Sub-1GHz technology.

Solexel, Inc. Milpitas, CA **Jan. 2015- Aug. 2015**

Senior Embedded Hardware & Software design Engineer

Subcontractor

Solar system hardware and firmware design. Research and development for the following technologies:

- Sub-1GHz wireless communication
- Data acquisition and control
- IoT hardware and software
- Power line communication (PLC)
- Zigbee wireless communication

NextGenAuto Irving, TX **Aug. 2014- Sept. 2014**

Senior Embedded Hardware & Software design Engineer

Subcontractor

Automotive application wireless Zigbee and OBD2 interface product development.

Part of development team, Developed and build working prototype for custom OBD2 interface and wireless PCB for Automotive application. This was a fast pace development cycle to meet end client production date working 7 days a week to meet the goals.

Working with these technologies, PIC24HJ128, Atmel MCU, CAN, ISO PWM VPW, ISO KWP, J1850 Bus Interface, ECU simulator, PCB fabrication and manufacturing, Contract manufacturing, Hardware and software testing and functional validation.

Flexteronics Plano, TX **Nov. 2013- Apr. 2014**

Senior Embedded Hardware & Software design Engineer

Subcontractor

Wireless Zigbee Firmware development for Zigbee Light Link (ZLL) market.

- Firmware design and testing (writing and executing Firmware test cases). Wireless low power Zigbee remote control application firmware.
- Hardware and Firmware board bring-up.

Cirays, Inc. Dallas, TX **Jun. 2012-Nov. 2013**

Subcontractor, Senior Embedded Hardware & Software Design Engineer

Firmware and algorithm development, hardware support, and functional validation for Cirasys, a power conversion controls company. Project focuses on Cirasys' state space-based, digital nonlinear DC-DC power converter controls for boost and buck-boost converters.

- Implemented and validated this technology on TI C2000 DSP/MCU Delfino (TMS320F28335) and Piccolo (TMS320F2869), and Freescale DSP (MC56F48786, MC56F48xx), STMicro MCU ARM Cortex M4 (STMF407VGT, STMF303), exceeding project requirements by improving performance of algorithms within original schedule.

- Real time intensive Firmware design (C, Assembly) and testing (writing and executing Firmware test cases).
- Hardware and Firmware board bring-up.

Emtec Solution - Embedded Technology System Solution) Plano, TX Dec. 2011-Jun. 2012
Energizer Battery Subcontractor

Senior Embedded Hardware, Firmware, & Software Design Engineer

Engineering Design services for Hardware, PCB Schematics, and Layout.

- High temperature (> 150C) electronics circuit / product design.
- Firmware, Software, Algorithm, and System Design.
- Custom DSP design.
- MCU, FPGA, CPLD, A/D, and D/A.
- Blue tooth wireless, Wireless Mesh Networks 802.14.4, Short distance low power RF Digital filter design.
- Multi-Processor design.
- Smart home product development (Green).
- Custom high performance Electronics (Hardware, Firmware and Software), low power special function IC.
- Sensor and control application.
- Telecommunications Product Development.
- Product Test and Validation.
- Turn key product development and build.
- Firmware design and testing (writing and executing Firmware test cases)
- Hardware and Firmware board bring-up
- MCU, A/D. D/A, LED constant current driver, Analog and digital design
- Design Custom System, hardware, Firmware and software
- Blue tooth wireless, Wireless Mesh Networks 802.14.4, Short distance low power RF
- Green Irrigation System Design
- UPS hardware and firmware development
- New product development, Automotive application
- Firmware design and testing, Writing and executing Firmware test cases
- Hardware and Firmware board bring-up

Emtec Solution (Embedded Technology System Solution) Plano, TX Oct. 2005-Dec. 2011
Halliburton Subcontractor

Energizer Battery Turnkey Project

AMI Semiconductor (ON Semi) Turnkey Project

TAC worldwide Subcontractor

Senior Embedded Hardware & Software design Engineer

- Hardware, Firmware, Software, Algorithm, and System custom design.
- 8051, ARM ,DSP, MCU, A/D. D/A, Analog and digital filter design.
- Wireless communication for down hole sensor application for Oil and Gas wells, High temperature, and High reliability hardware and firmware design.
- Zinc Air Battery technology electronics and control PCB, Firmware.
- Wireless Zigbee 802.15.4, Bluetooth, USB design.
- PC GUI software.
- FPGA and CPLD hardware and Verilog, VHDL design
- LabView (National instrument NI) automated testing, verification, and validation.
- Provided technical assistant for motor controller hardware and firmware.
- Smart LED flash light driver control PCB and firmware design.
- Heated Element Valve controller for small miniature low power devices.
- Firmware design and testing (writing and executing Firmware test cases).
- Mathlab, Simulink modeling and simulation
- Labview setup and automation testing
- Hardware and Firmware board bring-up

DALLAS LOGIC

Subcontractor for AMIS (ON Semi) Plano, TX

2004-2005

Technical Advisor

Subcontractor

Wireless sensor network design, FPGA, CPLD reference design and Eval boards.

Research and development for new product, Customized test and verification systems.

Design and work with our contract manufacture to build the products for our customers.

FPGA Hardware and software design and bench testing, simulation, C and assembly test and application software for ARM, 8051. Subcontractor for AMI semiconductor

- Subcontractor for AMI semiconductor working on 8051 IP Core and its peripheral reference design for the AMIs R8051 ASIC.
- Diagnostics and testing using assembly language and C Programs CAST80515, CAST Z80.
- Functional and timing simulation and design verification using Simplicity, Ruby, Shell programming.
- RTL design and simulation using Verilog, Xilinx and cadence tools.
- VHDL coding and debugging, ASIC prototyping, Bench testing, Verification.
- Using Synopsys, Synplicity Synplify and Mentor tools for simulation for gate level simulation and verification, Testing and debugging ASIC design using FPGA and CPLD on eval boards. Hardware and Firmware board bring-up

BELL NORTHERN RESEARCH / NORTEL NETWORKS Richardson, TX

1980-2003

Technical Advisor

23 years Nortel networks / Bell Northern Research experience in hardware, System, firmware and software design and validation. The experiences are listed below.

NORTEL NETWORKS Richardson, TX

2002-2003

Technical Advisor

Contributed to design, development, verification and support of CDMA 1XRTT Base Station Controller (BSC) Platform and support of the Cell site (BTS). Maintenance data base configuration for the PDSN. Hardware and software, modification and debugging for:

- NT SCIS (L2TP, Messaging, Processor, Ethernet, time switch)
- ESEL (DSP, CDMA voice channels, speech coding) software and hardware modification and debugging. Working with Qualcomm ASIC verification and finding workaround for the issues found.
- CDMA lab support for interfaces to OC3 and T1/E1 links.
- Supported software integration and testing.
- Linux, Unix, Solaris, SunOs trap analysis and RTOS debugging using VxWorkes and Multi2000 to find load crash and build issues.

CDMA design lab Manager and Technical Advisor (2000-2001 support up to 2003)

Responsible for the CDMA design lab equipment's (DMS100, MTX, PBX, BSC, BTS, RF equipment's, CDSU, SUN workstations, *Passport, ATM Network*) and staff.

- Manage lab tech staff daily assignments.
- Scheduled lab resources and communicate system status with the design team
- Provided staff feedback for the year end performance review.
- Project Manager.
- Worked with the team to resolve any technical issue with the TDMA and CDMA MSC, BSC, BTS and any test equipment's like code test emulators and logic analyzer.
- L2TP Protocol, HDLC, Ethernet interface and controller software debugging.
- SONET network optical equipment configuration (Nortel Passport), OC1, OC2, OC192 to T1 and E1, Ethernet Mux testing, debugging. T1, E1, and Ethernet over sonnet protocol
- Linux, Unix, Solaris, Sun Os system Installation and configuration
- Linux, Unix, Solaris, SunOs trap analysis and RTOS debugging RTOS debugging using VxWorkes and Multi2000 to find load crash and build issues.

BELL NORTHERN RESEARCH

Technical Advisor (1993-2000 support up to 2003)

Contributed to design, development, and verification and supported enhanced features for the Nortel TDMA Base Station and Cell site Controller.

- Supported the hardware design team for the Processor board with Motorola 68060 and High Speed Memory to achieve required performance. Integration team.
- Design and implemented the firmware for the RMTC (Cell site controller, Processor 68040) .
- Re-Design and implemented the system timing synchronization software and firmware for the RMTC to fix system timing and reliability issues.
- Provided hardware and software design support to the TDMA design team for the MTX, ICP, ICRM, DSPM, TDMA Dual Mode Radio, Enhanced Time switch (Motorola 56xxx DSP, Constant delay time switch, Base station controller, Cell site controller, DSP Module for TDMA voice-coder resource pull, DSP shelf, circuit pack and interface and control design)
- Automated testing and debugging large switch using Perl and shell program to collect data only on events that are causing issues.
- SS7 signaling protocol software testing and debugging
- LAPD, HDLC protocol, low level link layer interface timing and configuration debugging
- Team leader technical manager
- Hardware and Firmware board bring-up, RTOS trap, crash analysis and debugging

DMS-300, DMS-500 International Gateway Switch Design Support (1993)

Technical Advisor working with the field customer verification team to identify hardware, software and firmware design problem and recommend patches to fix problems and work with designers to propagate the fixes to the source code and schematics.

- Worked on computing module, message processor, time switch, trunk controller, tone receivers, tone senders, T1, E1 links, International tones for signaling.
- Telecommunication central office equipment hardware and software design
- Linux, Unix, Solaris, SunOs trap analysis and RTOS debugging

Enhanced Time Switch (1993 support up to 2003)

Technical Advisor for redesign, verification and support for the Enhanced Time Switch Circuit Pack.

- Addition of new features to double capacity for the peripheral side time slots.
- Enhanced switching capabilities to include peripheral to peripheral switching while preserving end-to-end signaling.
- Supported manufacturing introduction and regulatory testing.
- Design and Implement DTC time slot monitoring tools built into the time switch circuit pack to assist designers for detecting and debugging filed issues (Using Altera EPLD). Hardware in circuit automated test / diagnostics.
- Firmware design and testing, Writing and executing Firmware test cases

ICP, DSPM Team Leader (1988-1992 support up to 2003)

Responsible for design, development, verification, introduction and support for ICP T1/E1 Time Switch for the Nortel TDMA Base Station and Cell Site Controller.

- Combined Processor and Time Switch boards while increasing performance with Motorola 68040 and High Speed Memory. Responsible for the Firmware drivers, system timing synchronization to T1 and worked with the hardware designers as advisor to integrate, review the design and provide suggestion and design problem solving.
- Designed diagnostics software to test 68040 Processor interface CPLD and assist hardware designers to provide hardware design changes to fix problems and enhance the performance and increase the quality of the product.
- Part of the design team to implement dual bank field upgradeable Firmware using the EEPROMs and Lattice CPLD.
- Contributed to the design team to ensured Hot-Insertion of Circuit Board in redundant system, embedded hardware assist diagnostics test circuit, Increase hardware test capability by providing loop back control and test registers in the data path.
- Enhance Time Switch redesign technical advisor to add new features

- Team leader for the DSPM hardware design team. Contribute in the system, architecture, hardware and software design, verification and field issue debugging of the TDMA MSC, BSC, BTS, analog and digital dual mode radio(DRU), Altera FPGA using AHDL.
- Responsible for the TDMA Base Station Controller Product specification.
- Hardware and Firmware board bring-up
- RTOS trap, crash analysis and debugging

Blue Box Fraud Detection using Bit Slice DSP (1987 support up to 2003)

Responsible for redesign of the DSP filters and firmware for a 480 channel SF, MF and DTMF tone receiver for re-origination and Blue Box Fraud Detection feature in the long distance carrier switch (DMS-250).

Responsible for redesign of the Motorola 68HC000 processor firmware and software. (68000 assembly, BNR Pascal, Protel, Micro kernel).

- Re-design the firmware and software to improve real-time, capacity and verify the design for all the time domain and frequency domain specification and speech talk off specification.
- Hardware debugging, prototyping and support. Design change, release documentation, library firmware and software release process.
- Firmware design and testing, Writing and executing Firmware test cases
- RTOS trap, crash analysis and debugging

CMC Message Processor Firmware design (1987-1988)

Micro code firmware design for the CMC message processor connecting the DMS-250 (switch for the long distance service provider) DS30 link (2.5 Mb links) protocol with redundancy link to connect billing server to the DMS-250.

- Responsible for hardware, software and designer system testing and debugging.
- Implemented layer 1, 2 and 3 link protocol firmware and diagnostics logs and trace back.
- Fault recovery and redundant communication link switching algorithm to have continues communication in case of link failure.
- Hardware design engineer for billing server, Redundant and high reliability system.
- Firmware design and testing, Writing and executing Firmware test cases
- Hardware and Firmware board bring-up

Specialized Tone Receiver using Bit Slice DSP (STR) (1987 support up to 2003)

Responsible for the DSP (AMD 2909 Sequencer, 2900 bit slice ALU) daughter board Hardware and Microcode firmware implementing digital filters for a 480 channel DTMF tone receiver for re-origination feature in the long distance carrier switch (DMS-250).

Design team member for the mother board using the Motorola 68HC000 processor to implement control system, messaging and diagnostics, fault recovery.

- Firmware design specification and test specification for speech talk off testing of the DTMF receiver sensitivity during the speech or music or background noise.
- Setup in house meta assembler and define the 48 bits DSP board instructions.
- Digital filter design, Helbert transform, Coefficients in raised-cosine filters and Hilbert, Hamming windows, Real time microcode programming using multi-level pipelined architecture, Designed algorithm to implement 480 DTMF receiver using only 10 Mips custom DSP, usually takes about 160 Mips to do this
- Time and frequency domain processing using multi-processor architecture.
- Design Prime for the firmware, implementing the DSP time domain processing of PCM speech samples, diagnostics code, messaging and all the drivers.
- Hardware debugging, prototyping and support. Design change and release documentation.
- Firmware design and testing, Writing and executing Firmware test cases
- Hardware and Firmware board bring-up
- RTOS trap, crash analysis and debugging

Meridian SL-100 and DMS-100 Disk Subsystem Design (1985-1986 support up to 2003)

Responsible for disk subsystem and controller hardware and microcode firmware design and packaging for the Cellular MTX, DMS-100,250,500, MSL-100.

- Design Prime for Disk subsystem and controller product and commercial specification, Hardware, software and system diagnostics, utility and messaging.
- Design Prime for the disk controller Firmware design (Microcode, Bit slice 2900 family design, Priam disk interface and NT SCIS disk interface).
- Cost reduces the product by %83. Proposed and provided product and commercial specification to introduce this cost reduction to Nortel product.

Danray CTSS4K, 1K, RSS250, PBX, Data switch Hardware Design Support (1982-1985)

Responsible for hardware design modification to the existing circuit packs for the listed telephone switches.

- Design modification to the Memory expansion boxes for the Nova 3 and Point 4 mini computer.
- Resolve field issues and provided hardware, software design solution for the Intersel, Mostak memory expansion boxes
- Hardware design modification to circuit packs in the Danray switches, Memory and CPU interface, speech synthesis, DTMF, MF sender, receiver, subsystem interfaces, 2 wires, 4 wire trunk interface card, disk controller and more. Also support software group to locate software real time issues and propose solutions.
- RTOS trap, crash analysis and debugging

Danray and Nortel Manufacture System Validation, Staging and Testing (1981-1982.5)

Responsible for the system staging, database configuration, testing and repair.

- Test, debug and fix wiring, shelf and subsystem problems for the PBX, CTSS4k,1K.
- Troubleshoot and find hardware failures and replace and repair issues.
- Test Nova, Pint4 mini computer hardware problems. Memory expansion, 2 and 4 wire line interface, voice synthesis, Network switching elements, System cabling and wiring.
- Writing and executing system level test cases

Danray and Nortel Manufacture PC Board Testing and Repair (1980-1981)

Responsible for the testing and debugging of all the circuit packs used in the Danray telephone switches.

- Test debug and fix PC board problems using custom made tester modules and automated test equipment.
- Attend Devry University as a full time student seeking BSEET degree and working full time in the manufacturing at night.

EDUCATION

BSEET, Electronics Engineering Technology, Devry University, Irving, Texas (1982)

Certification:

Atmel Official AVR consultant





<https://www.linkedin.com/pub/pirooz-najafi/8/959/b11>

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- *Strong system, hardware, firmware, software problem solving, troubleshooting*
- *Embedded hardware(PCB, System, Digital, Mixed signal) & software (Real-time).*
- *Experience with Motorola 680x0, PowerPC and PowerQUICC, AMD 2900 Series Bit slice processors, TI TMS320C6000, Motorola 56000, DSP56301, DSP56307*
- *Atmel MCU Atxmega64, Atmega2561, Atmega 128, Atmega 48, Tiny24, Tiny13, ARM, AMBA Bus Interconnect TI Omap. Atmega128rfr1,Atmega256rfr2*
- *Analog Devices ADSP2188, ADSP2189, A2D, D2A, Charge Pump Amplifier*
- *High Performance DSP, Digital Filter design implementation, DTMF, MF, SF, Modem tone detection and generation, SF and N5 international tones, signaling.*
- *Real Time Message processor, DMSY, DMSX, DS30 message protocol, HDLC, LAPD, LAPB, SS7*
- *AMP, CDMA and TDMA cell site, Billing server, MSC system design and support, Memory Controller design and FPGA, CPLD,PAL development, Mentor, ASIC Prototyping*
- *Time switch, Nortel DMS100, DMS250, Billing server, DMS500, DMS300, MTX, XPM, DTC, ICP, DSPM, ICRM, DTC, PDTC, ENET, ECORE, Danray RSS250, PBX, CTSS4000, CTSS1000 PDSN, Passport, ATM Network OC3 Express*
- *System experience, System test, PCB test and repair, Nova and Point4 Mini computer interface and memory Mapper/banking/ECC expansion design. Atmel AVR Consultant, Zigbee IEEE 802.14.4. Zigbee Alliance*
- *Boot loader firmware and software for disk controller and flash load upgrades*
- *Oil and Gas Energy, Down hole tools, High temperature electronics circuit (>150C), Hybrid, Temperature and Pressure Sensors, Hybrid and module, Wire line, Wireless communication, Control, Trigger, Sample, Architecture, Design validation and testing.*
- *Matlab .m file to C code conversion, Matlab model generation and simulation, Matlab digital filter design and coefficient generation. Digital filter design, Fir, IIR filter.*
- *Eagle CAD, PCAD, PADs, Altium Designer, ORCAD, Tools*



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