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OBJECTIVES

Participation in the product design process at the project level and/or at the detailed design level. The opportunity to utilize my creativity and problem solving capabilities.

SUMMARY OF QUALIFICATIONS

- 20(+) yr. Software/Hardware design built on 10 yr. experience in general electronics.
- 15(+) years project engineer level experience.
- Over 6 years in research and development of new products.
- Experienced in Commercial, Industrial, and Military hardware and software.
- Extensive real-time embedded systems knowledge.
- Skills proven through supervision of many project teams.
  (Verifiable through employment history and references).
- Analog/digital/Programmable logic design.
- Extensive PCB schematic and layout experience.
- Have taken many projects from conception to production.

PROFESSIONAL EXPERIENCE

HARDWARE DESIGN:

- Embedded Systems design using:

CISC (Complex Instruction Set Processor)
Motorola: MC68HC11 Series
Motorola: MC68000 Series
National Semiconductor: NSC800
Zilog: Z80, Z180
Texas Instruments: TMS9900
INTEL: 8086, 80386

DSP (Digital Signal Processor)
Texas Instruments: TMS320C31
Analog Devices: ADSP-2105

RISC (Reduced Instruction Set Processor)
ATMEL: MegaAVR103
MicroChip: PIC16C715, PIC16F873

Programmable Logic
XILINX: XC7354 EPLD
LATTICE: ispLSI3192 CPLD

- Analog/Digital and Mixed Signal hardware design (DC/Audio/RF).
- Power Supplies [AC/DC, DC/DC, DC/AC, AC/AC]: Linear/Switching. (Microwatts to 4000 watts).
- High Speed Programmable logic design.
- Printed Circuit Board design/layout: single / multilayer.
- EMI/RFI Design and testing to MIL Standard 461D.
- Custom bus/board design.
- A/D and D/A design.

SOFTWARE/FIRMWARE DESIGN:

Embedded Systems

- C, Assembly, Pascal (Real Time), Forth.
- Low-level device drivers.
- OS design (Various real-time kernels for embedded systems).
- SCADA (Supervisory, Control and Data Acquisition).
- Custom serial communications protocols.
- Process Control.
- Robotics.
- Automated test.

Programmable Logic

- ABEL and SCENARIO Schematic Capture.

General

- C++, C, Assembly, Basic, Pascal, HTML.
- Low-level device drivers.
- Text and Graphic based (GUI) user interfaces.
- Serial port based communication programs.
- Operating Systems: UNIX, Microsoft Windows [2000, ME, 98, 95, 3.1], MSDOS, AMIGADOS, CP/M, TurboDos, QNX.

PARTIAL SOFTWARE LIST:

- General Office: MKS Source Integrity, Microsoft Office, Microsoft Outlook, Microsoft project, Microsoft PowerPoint.
- Simulation and Calculation: MathCad, Pspice.
- Schematic Capture / Circuit Board Layout: ORCAD, Protel, ProBoard, Cadint.
- CAD / Modeling: Pro-Engineer, Visio, AutoCad.
- Programming: Code Composer Integrated development environment, PIC-IDE in circuit debugger and development environment, MPLAB Integrated development environment, multiple Text Editors and Programming environments.

EXAMPLE PROJECTS: (CONTRIBUTED TO BOTH HARDWARE AND SOFTWARE)

- An Electronic Sensor for military helicopters that maintains an internal log of accelerations for future analysis, and enables an airbag system that protects pilot and co-pilot during a crash (CABS - Cockpit AirBag System).
- A battery powered Ultra-Sonic Sensor mounted on a military parachute pack which provides an actuation signal at a specific distance above the landing zone. The signal actuates a device that slows descent rate. The unit included a custom switching power supply to extend battery life.
- A multiple function AM/FM Stereo radio incorporating a DSP that decoded the RDS (Radio Data System) sub carrier on FM radio stations into signals for driving moving message signs, paging, traffic information, etc.
- A control system for a turbine engine installed in a yacht. The system automated the Start/Stop and operation, thus allowing control by means of a simple on/off button and throttle.
- A Load Flow Control system that maintains the flow (and billing) of electric power to Individual cities based on demand in real time.
- An Oil or Gas well Data logging unit.
- A control system that used an embedded Z-80 to pulse width modulate 24 heaters used to stress relieve the welded joints on up to 24 metal pipes simultaneously. Each pipe would be heated, and then cooled to a precise profile. (This was a mobile system, the system automatically adjusted for pipes from one inch to four feet in diameter).
- A 4000-watt 60-Hertz, DC to AC sine wave inverter suitable for powering an entire household from batteries or solar cells. The unit was designed to meet all power grid requirements. An embedded Zilog Z180 microprocessor controlled all functions.

EMPLOYMENT HISTORY

October 2001 - Present: ALDER Engineering, Sedona AZ.
Provides engineering consulting, design, and programming on a contract basis.

Positions held: Engineering Consultant.

Example Projects:

- A module used in fuel-injected cars, which optimizes acceleration by adjusting the fuel mixture on an on demand basis (Embedded PIC 16F873).
- Troubleshooting production startup glitches for the CABS system.
  (See "Sedona Scientific" below for system description).
- Design changes to the CABS system.
  (See "Sedona Scientific" below for system description).
- Design of various web sites.

October 2000 - October 2001: Fire Wind and Rain Technologies LLC, Flagstaff AZ.
Designs and markets electronic products to facilitate the use of alternate energy sources such as Solar Cells and Wind Turbines.

Positions held: Senior Project Engineer

Employed to complete an existing conceptual design, which was in the initial stages. The design consisted of a 4000-watt 60 Hertz, DC to AC sine wave inverter with an input range of 30 to 48 volts DC and an output of 120 volts AC meeting all power grid requirements. The unit was designed around a Zilog Z180 microprocessor.

My responsibilities were:

- Examine power grid requirements and set target specifications for the design.
- Determine all changes to the existing conceptual design required to comply with the target specifications.
- Schedule and implement remaining work (Hardware and Software) required for completing the design.
- All embedded control software. (Written in a mix of C and assembly).
  (This included direct software generation of the stepped sine wave that drives the output stage with real-time amplitude and timing shifts to maintain output voltage and distortion within required specifications during load changes.)
- After prototype testing, identify and implement improvements to optimize and enhance the design.

The units produced were installed at the testing center in Phoenix, AZ maintained by APS, (Arizona Public Service Utility Company). APS concluded that these units produced the best performance of all units tested to date.

EMPLOYMENT HISTORY

June 1996 - September 2000: Sedona Scientific, Sedona, AZ. (A Division of Simula Safety Systems)
Simula Inc. - Designs and markets equipment and materials focused on saving lives, including air bag systems, parachutes, armor, aircraft seating, etc.
Sedona Scientific - Provides new product development of electronic devices used by other Simula divisions.

Positions held: Contract Engineer, Senior Design Engineer, and Senior Project Engineer

Responsibilities have included:

- Hardware and Software design for new products.
- Support software and hardware for production testing.
- Research & Development prototypes, support software and hardware.
- Project management.

Example Designs:

- A Combination Data Recorder and Crash Sensor for use in military helicopters
  (A module used in **CABS** - **C**ockPit **A**irBags **S**ystem)
  Over the life of project, my responsibilities have included:
  - Design of electronics: TMS320C31, 2MB Static, 4MB FLASH Memory, Accelerometer subsystem for crash detection, Double Layer Cap. Backup, triple switching power supplies.
  - PCB schematic design & layout.
  - Support software in "C" and assembly language (Diagnostics / testing).
  - Some system firmware modules. (Low-level drivers and self test routines).
  - EMI/RFI testing support and modifications design. (MIL STD 461D)
  - Design of support software and hardware for production.
  - Project management in later stages.

  NOTE: The CABS system is presently in production and has been in deployed in military helicopters. In addition, the system has won two industry awards (see last page for details).
- A Crash Sensor for Commercial fixed wing aircraft. Responsible for EMI/RFI testing support and modifications to design.
- An ultrasonic ground proximity sensor for use by Army paratroopers.
  Responsible for:
  - Design of electronics (MegaAVR103 based with frequency synthesis).
  - Firmware in assembly language.
  - Project management.

June 1995 - March 1996: Circuit Research Labs INC. Tempe, AZ.
Designs and markets state-of-the-art equipment for use in commercial radio stations around the world.

Positions held: Contract Engineer

Responsible for:

- AM/FM Stereo receiver design.
- ADSP-2105 DSP hardware and software design.
- EPLD hardware interface and firmware design.
- PCB schematic design & layout.
- Mechanical & packaging design.
- User interface design and programming.

EMPLOYMENT HISTORY

1993 - May 1995: InterACTIVE Digital Devices, Inc., Chandler, AZ.
Designs and markets software and electromechanical devices such as joysticks, pedals and steering wheels for use with computerized games.

Positions held: Senior Design Engineer, Senior Project Engineer

Responsible for:

- Hardware and Firmware for many company products.
- Developed drivers to interface company products to work with existing 3rd party software.
- New product research and development.
- PCB schematic design & layout.
- Mechanical & packaging design.
- User interface design and programming

Example Designs include:

- A 68HC11 based Programmable Interface Controller.
- An automated tester (ATE) using an embedded 68HC11 for testing each circuit board as it came off the assembly line and sending a full report to a host computer over a serial port.
- A device selector capable of switching between multiple game port based devices while retaining full functionality on all lines on each device (both analog and digital).

1987 - 1992: Process Control Services Lafayette LA.
Designs and markets computerized real-time control systems for industrial (milling, heat-treating, petroleum production, etc) and utility (power generation, wastewater treatment and drinking water production).

Positions held: Design Engineer, Systems Engineer.

Responsible for design, programming, and installation of the following:

- Computerized "real time" control systems.
- Process control equipment in onshore and offshore applications.
- Wide ranging custom systems from small RTUs (Remote Terminal Units) to a multitasking OS used to control waste water treatment process systems.

1979 - 1986: General Engineering and Construction, Lafayette LA.
Designs and markets computerized real-time control systems for industrial (petroleum production, salt production, asphalt production, etc.) and utility (power generation).

Positions held: Electronic Technician, Systems Specialist and Junior Engineer.

Promoted from hardware design and installation to overall system design, programming and supervising installations.

Example Designs include:

- A LAN communications system of software modules for automated control.
- An interstate power generation/control/monitor/logging system.
- Numerous specialized data acquisition systems.
- An automated oil well testing and logging system.

GENERAL INFORMATION

REFERENCES: Available upon request.

PATENTS

Co-inventor of patent on 3D graphics design and digitizer mouse for C.A.D/C.A.E. computer systems.

EDUCATION

INFORMAL: Extensive self-study enhanced by twenty years of hardware and software design experience. The last 15 years includes extensive system level design and project management.

FORMAL:

- 1998 - Tektronix EMI seminar - certificate of completion.
- 1981 - University of Southwestern LA. - Lafayette, LA.
  COURSE OF STUDY: PL/1 Programming - Program implementation, style and documentation using the PL/1 language.
- 1963-68, Teche Area Vocational Technical School - New Iberia, Louisiana.
  COURSE OF STUDY:Basic and Advanced Electronics, Communications, Radio/TV repair, Basics of computers and transistors.

PERSONAL AWARDS

1999 - Simula Safety Systems Presidents award for outstanding performance.

THE CABS SYSTEM DESIGN RECEIVED THE FOLLOWING AWARDS:

- **2002 - Harry T. Jensen Award:**
  Presented by the American Helicopter Society for designs, which provide an outstanding contribution to the improvement of helicopter reliability, maintainability, or safety through improved design brought to fruition during the preceding year. Awarded on June 12, 2002
- **2002 - Roland Tibbetts Award:**
  Presented by the US Small Business Administration to firms, projects, organizations, and individuals judged to exemplify the very best in SBIR achievement. Selection criteria include the economic impact of the technological innovation, business achievement, effective collaborations, and state and regional economic impact. Awarded in October, 2002

PAPERS

- **1998 - Development of a Crash Sensor for Aircraft Safety System Applications:**
  Presented to the American Helicopter Society. (Co Author)
- **2001 - Eliminating Batteries from Backup Power Applications for Aircraft Safety Systems**:
  Presented at the American Helicopter Society 57th Annual Forum, Washington, DC, May 9-11, 2001. (Co Author)
- **2001 - An acoustic sensor for triggering parachute decelerator systems:**
  Presented at the American Institute of Aeronautics and Astronautics 16th AIAA Aerodynamic Decelerator Systems Technology Conference. May 21-24, 2001 -The Boston Park Plaza Hotel-Boston, Massachusetts (Co Author).
