Rod Washington

Summary

Over 25 years of experience in architecture, design, and implementation of embedded and application software / systems. Awarded recognition as an expert in embedded software.

- Consistently implementing robust, object oriented, UML documented, reusable designs for complex projects with NO software defects found in validation testing or in the field.
- Providing technical project leadership for local and international development teams.
- Creating software / system requirements from marketing / project requirements using use cases.
- Defining software development processes to obtain product certification (IEC 61508-3, UL 1998) using CMMI, CPI, and software development standards (MISRA).
- Teaching classes on Use Cases, Structured Design, Object Oriented Design, Design Patterns, Object Oriented Programming, and Real-Time Prioritized Preemptive Multi-Tasking Kernel Design.

Skills

Languages: C++, C, C#, VB, Assembly, Ada, FORTRAN, Pascal, Forth, Ladder Logic

Processors: MSP430, CC2530, PIC18, TMS320F28xx, MCF5307, MC9S12, TMS320F24xx, ARM7, 68HC16, SAB 80C166, 80286, 80186, 8051, 68HC11, 68000

Operating Systems: Win 32, .NET, ActiveX, COM, MFC, Modicon / TSX / SYMAX PLC, SYS/BIOS, Z-Stack

Methodologies: OOA, OOD, OOP, Agile Development, Design Patterns, Structured Design, Real-Time UML, Yourdon, Shaer-Mellor, Booch, and Rumbaugh Software Modeling and Design

Applications: Digital Signal Processing, Digital Control Systems, Power Electronics, Photovoltaic Inverters, Fuel Cell Inverters, Industrial Communication Networks, AC Motor Drives, AC Motor Predictive Maintenance, PLC I/O, Circuit Breakers, Industrial and Residential Automation

Protocols: ZigBee, TCP/IP, USB, Modbus, FIP, Profibus, CAN, DeviceNet, C-Bus, CEBus, X10, RS232, RS485

Patents / Applications

French Application 1160629	Dynamically Adapting to Changes in Control System Topology	2011
French Application 1160627	Data Synchronization in a Cooperative Distributed Control System	2011
French Application 1160630	Prioritized Controller Arbitration	2011
U.S. Application 13/288671	Wireless Home Energy Monitoring System	2011
U.S. Patent 7,642,676	Contact Verification Method for a Transfer Switch Mechanism	2010
U.S. Patent 7,598,629	Control Circuit for a Remotely Controlled Circuit Breaker	2009
U.S. Patent 7,548,036	DC Motor Mechanical Shock Protection System	2009
U.S. Patent 7,511,474	DC Motor Phase Detection Method for Determining Travel Distance	2009
U.S. Patent 6,944,176	Method And Apparatus for Bit Level Network Data Multiplexing	2005
U.S. Patent 6,249,753	Sensor Signal Conditioner with Calibration	2001
U.S. Patent 5,914,971	Data Error Detector for Bit, Byte or Word Oriented Networks	1999

Presentations

“Programming Guidelines”, Efficient Home, 2012
“System Definition Method - Use Cases in Context”, Efficient Home, 2011
“System Architecture Modeling Method”, Efficient Home, 2010
“Real-Time Multi-Tasking Systems for Embedded Software”, Analytics Forum, 2000
“Analysis of an Effective Embedded Software Development Methodology”, Analytics Forum, 1999

Experience

Schneider Electric - Raleigh, NC 1992 - Present

Sr. Staff Engineer - Level 1 Expert - Embedded Software

- Created system architecture for a residential energy monitoring and control system with utility meter, load center, HVAC, controller, local User I/F, web I/F, and cloud components. Designed system to dynamically evolve from a mini system to a centralized system as installation grows. Worked closely with international marketing to clearly define system functionality and behavior.
- Led firmware team to implement a residential 5 kW transformerless grid-tied solar inverter on a floating point DSP in C. Created firmware development process, requirements, architecture, design, and coding standards necessary to obtain IEC 61508-3 certification.
- Designed and implemented firmware for an advanced thermal protection system for three-phase AC induction motors that estimates rotor and stator temperature from input current and voltage.
- Designed and implemented firmware for a residential intelligent load center that automatically sheds electrical loads before transferring from mains to a standby generator when power is lost.
- Led firmware team to implement a residential 5 kW grid-tied fuel cell inverter on a fixed point DSP in assembly. Designed multi-processor system to also control battery charging and aux power.
- Designed and implemented firmware for a residential arc fault circuit breaker. Created algorithm specification, firmware architecture and design to obtain UL 1998 certification.
- Led firmware team to implement a field test kit for industrial three-phase electronic trip circuit breakers. Designed field upgradable firmware including a database to identify and test the entire circuit breaker line. Implemented a real-time prioritized preemptive multi-tasking kernel in C.
- Designed and implemented firmware for a sensor-less vector AC motor drive on a fixed point DSP.
- Designed and implemented firmware for a CAN communication option card for AC motor drive.
- Led firmware team to implement multiple PC interface cards for an industrial bit-level communication network. Created requirements specification and verification test plan.
- Designed and implemented firmware for a handheld programmer for an industrial bit-level communications network. Implemented a real-time cooperative multi-tasking kernel in C.
- Developed firmware for remote I/O modules for Modicon, Telemecanique, and Square D PLCs.

Teletec Corporation - Raleigh, NC 1989 to 1992

Software Group Leader

- Designed and implemented custom emergency service mobile radio firmware and configuration PC software. Wrote real-time cooperative multi-tasking kernel for embedded 8051 in assembly.

Rockwell International - Downey, CA 1985 to 1989

Member of Technical Staff

- Developed docking and navigation algorithms for the Space Shuttle and the International Space Station. Performed simulations of space based robotic control systems and orbital operations.

NASA Lewis Research Center - Cleveland, OH 1983 to 1985

Engineering Co-Op

- Designed and implemented hardware for a computer controlled signal preprocessor to condition a data signal in a laser Doppler anemometer system for jet engine intra-rotor flow mapping.

Education

University of Southern California, Los Angeles, CA

Graduate Studies in Digital and Multivariable Control Systems, 1987

Cleveland State University, Cleveland, OH

Bachelor of Science in Electrical Engineering, Magna cum Laude, 1985