PROFESSIONAL EXPERIENCE

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1. **Generator Control Unit for Aerospace Industries**

   For different sizes of aircraft for different manufacturers (Boeing, Airbus & Embraer), primary and secondary power distribution system were needed different control system involving sensors, signal processing and power electronics. Due to confidential binding, detail cannot be provided.

   - 1-ph and 3-ph rectifiers
   - 1-ph and 3-ph variable voltage variable frequency inverters
   - Current, voltage, temperature, speed sensing circuits, closed loop control algorithm
   - A/D converters, microprocessor and FPGAs

2. **Wi-Fi based TV Remote as a Second Screen**

   Wi-Fi based TV Remote was not selling due to high cost to customer. Hired to review existing product design and offer solution to reduce cost. Reviewed and analysis existing design and components. Met with original development engineers and held discover meeting to understand methods for the design and component selection. Identified that PCB antenna was root of design problems.

   During discovery established 5 areas of design inefficiencies.

   - RF amp was oversized to drive PCB antennas
   - WLAN module was mounted via Board-to board increased height
   - Mechanical cost was high due to size increase board
   - Shielding was used for avoiding 24MHz interference on PCB
   - Due to custom connectors and fixed vendor LCD module cost was high

   Developed new architecture for product redesign from scratch:

   - Modified processor to FPGA based ARM7 controller.
   - Reduced power consumption by changing memories from 3.3V to mobile DDR 1.8V.
   - Eliminated EMI and reduced board size by replacing PCB antenna to chip antenna. Avoided interference of harmonics with 2.4GHz band by changing reference clock from 24MHz to 32MHz.
   - Implemented FPGA flexibility of signal swapping across LCD connector allowing use of different vendors and benefits of competitive pricing. Integrated Wi-Fi SoC directly on board which eliminated board-to-board connector, reduced height and RF amplifier power size.
   - Power reduction in uP, memories, and RF amplifier resulted in reduced cost and battery size.
   - Product was successfully re-engineered and went to productions.
   - Maintained a quality product and reducing production cost by 45%.

3. **Universal Programmable controller**

Customer needed a Universal Programmable Controller to eliminate need to swap out controls on chemical equipment that was used in multiple product runs.

- Design analog circuits using pSpice for universal inputs and outputs for 0-10VDC, 0-20mA, 4-20mA and digital logic signals.
- Selected ARM9 microprocessor with high speed 12-Bit A/D convertor.
- Used Matlab digital filter tool to design band pass filter.
- Designed switch mode power supply using Power over Ethernet.
- Switching logic for sensors was implemented by using CPLD Logic.

4. **VoIP Emergency Phone**

Create systems architecture to take an EMS analog phone and to VoIP phone. I was responsible for meeting with customer and gathering requirements.

- Design and Develop architecture based on ARM9, TI DSP
- Created schematic capture and PCB Design rules for PCB Layout Designer
- Used Matlab to design the digital filters, tone detector and echo cancellation algorithm for DSP
- Developed test plan and procedure for troubleshooting prototypes
- Verified and Validated test plans and test equipment
- Kept BOM cost in mind, and was able to bring project within the budget
- Product was completed and is currently in production.

5. **Re-architected & Redesigned Energy Saver**

Client had product with high failure rate in the field as well as end-user operation interruption during failure. Performed root cause failure analysis.

- Discovered that due to wide tolerances of switching relay timing, digital timing was not able to match dead-times between two relays.
- Found lack of fault feedback and control, when it fails customer operation experiences production activities interruption causing huge periodic losses.
- Re-architect the system from scratch to inverter
- Designed full-bridge rectifier for 12KW and inverter based on TMS320F2812 for sine wave generation and 600V IGBT (IRG4RC10S DPAK from International rectifier).
- Created a more stable system with faster feedback response.
- New design reduced cost 32%, efficiency increased by 8% and flawless product

6. **Golf Talking Hat**

The client had patented the idea in 2004 and started designing the product ended up with non-functioning prototype. Product exceeded BOM cost, weight and reliability of voice recognition due to signal integrity issues. Company had spent 2 years and $700K. Met with CEO at tradeshow and talked about product not being ready for launch.

- Created a proposal with new architecture, development time and BOM
- Developed and delivered the 1st version serving all the features except voice recognition

- Sourced and recommended VR algorithm vendor to support voice recognition
- The board was reduced by 33% and BOM were brought down 55%.
- Product is now in pre-production and field test of 5K units.

7. BLDC and PMAC Motor Control Design

Customer supplied specifications of common controller for 24VDC/4.8A BLDC and PMAC motors to control fluid injection pump control with non-linear torque-speed behavior.

- Created model and derived transfer function using Matlab/Simulink
- Performed circuit simulation and Design with pSpice
- Created schematic capture and PCB Layout
- Created code using RTOS embedded code generation in Matlab
- Selected components for BLDC and PMAC Motor Control Design
- Successfully delivered design that did BLDC and PMAC Motor Controller

8. AC Induction FOC modeling

John Deere wanted to standardize software development for AC induction filed oriented control for different motors for various applications. To help software engineers for easy simulation and real-time verification before release.

- Created standardized models in MATLAB/Simulink
- Implemented Clarke & Park transformation and adaptive observer
- Created PID and rotor position estimation algorithm
- Successfully delivered and was implemented by John Deere internally
- After characterizing motor parameters, FOC model is used to generate embedded code for system with just one command

9. Induction hearing loop

2KW amplifier for driving induction low impedance wire loop for hearing loop.

- Three Level Class-D amplifier for 1 ohm impedance load
- Designed sine wave PWM controller and power stages
- Includes harmonic analysis and low noise high power design
- Includes optimal thermal dissipation design
- Product was successfully re-engineered and went to productions

10. Blood Temperature Sensor

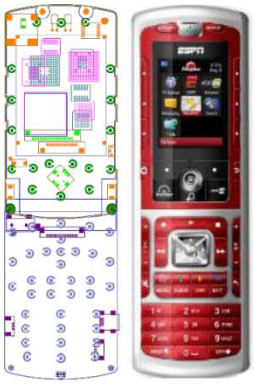
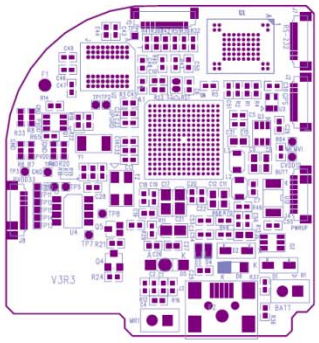
Client had theory of measuring blood temperature during surgery and wanted electronic controller to measure the blood temperature during surgery.

- Studied the principle of theory of measuring blood temperature
- Design analog circuit using high speed, high accurate OPAMs and simulated in pSpice
- Implemented user interface 8051 microcontroller used with A/D, D/A, I2C and RS-232
- Derived transfer function and coded into PC application for real-time comparison for calibration values

- Verified and delivered a manufacturability prototype
- Client sold the design to Johnson & Johnson Co.

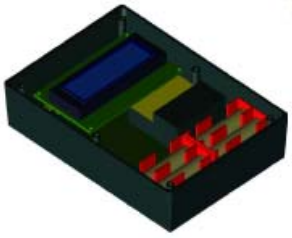
11. Others

- Speech recognition algorithm for embedded devices
- Gaming console machine for WMS
- 12-channel VHF/UHF RF tuner for documentary organization
- Data logger for RCA racing Co.
- Bluetooth based smart lock for industrial applications
- Emergency mass paging system (EMS) based on POGSAG protocol
- Proximity and motion sensor controllers
- Z-wave to ZigBee bridge module
- 1-ph 10A utility meter
- Metal Harness tester for Leeb sensor
- Buried metal object detector
- Digitally controllable SMPS power supplies for medical devices
- Many more …








Thank you