Justin Reina

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THESIS

Seeking full time employment for embedded electrical engineering or related activities.

WORK EXPERIENCE

Entrepreneurial Activities *Aug '20 – Aug '22*

Consideration for preventative IIOT maintenance solutions in select agriculture & industrial markets, with support for new IOT startup operations.

BrickRed Systems (*Firmware Engineer*) *Mar '20 to Aug '20*

Senior firmware engineer supporting Microsoft Research & Development, supporting solutions architecture and design for test & validation. Led selection & development for a new high-speed, Bluetooth 5 interface in test systems development featuring the Silicon Labs EFR32 architecture, developed in C using Simplicity Studio. Solution included BT5 interface for serial data streaming, a demo desktop BT5 application and a SPI interface for the customer to interface the incoming datastream.

Contract Work (*System Architect*) *Mar '19 to Mar '20*

Chief architect in new venture for biomedical healthcare electronics at Motusi. Lead of engineering operations, establishing requirements to generate system specification & hardware selection. Also participated in design work for test & validation apparatus of medical cooling systems with S5 Solutions, establishing a successful system architecture satisfying needs in a remote market, implementing for customer display. Both solutions featured dynamic & responsive, multi-component solutions requiring synchronization, shared resources and communications.

Ergsense (*Design Architect*) *Jun '18 to Mar '19*

System architect and design lead for new IIOT smart-pumping solution (optimyze), minimizing bearing fatigue and optimizing performance. Responsible for system definition, design specification, hardware architecture selection, proof-of-concept firmware, product documentation and test. Firmware development was completed to secure the prototype, for the STM32 F0 Cortex M0 processor in Atollic Studio.

Ergsense's multi-processor prototype supported RS-485, Wi-Fi & Bluetooth with separate, modularized interfaces. Through monitoring multiple sensory dimensions to pump operations this solution enabled new improvements to existing customer operations, improving survey monitoring & extending operating times.

This work helped materialize a new product concept for a client of Ergsense, securing the idea and beginning our prototype & production help. Participated in lead role for all phases of this transfer, generating the design and working with team from proof-of-concept through path to production.

Intel Labs (*Firmware Engineer, Research Scientist*) *Sep '10 to Sep '16*

Transfer of academic firmware publications (WISP) into Active RFID framework, securing a product opportunity leading to high-volume, cryptographic product placement in remote markets.

Firmware engineer on a battery-powered RFID tag in this work, for government vehicle tolling in Brazil. Device supports a 3-year battery life and 5 million units were deployed to the Brazilian government, for secure vehicle operations. Firmware was developed in Code Composer Studio, with custom plugin development as needed for code review and debugging support.

Served 2 years helping generate derivative RFID tag version of supporting a new Intel MCU architecture (D1000), helping the system architect identify performance requirements, the software development team with toolchain and apparatus, and establishing product placement for the new design building Intel's first product on the D1000 architecture .

Both tags featured full physical-layer and protocol implementations on-the-metal. Each tag was certified for ISO-18000:6C, Siniav and Artesp protocol compliance, where I served as the lead for external CM relations and representative for remote market certification. Additionally built components to the IDE tooling (Eclipse) for D1000 development, distributed with the first product release.

FIRMWARE EXPERIENCE

- Ergsense: Firmware for new IIOT preventative maintenance device
  - Architecture selection for new smart pumping solution
  - Featuring multiple processors (STM32, Particle) & interfaces (Bluetooth, WiFi & RS-485) in C
- Intel: Firmware for high-volume vehicle identification device
  - Bare-metal firmware generation for multiple protocols (RFID, SINIAV & ARTESP) using C & Assembly
  - Battery powered (3 yr.) & cryptographically secure (ISO & FIPS)
- Brickred Systems: Firmware for embedded Bluetooth serial adapter
  - Selection & generation for working prototype featuring Bluetooth 5 interface in C
  - Adapter provided a general purpose serial interface (SPI) to a Host PC using this Bluetooth interface

EMBEDDED DESIGN EXPERIENCE

- RISC & ARM Cortex-M experience (M0, M4)
- Free-RTOS experience for intelligent industrial monitoring (STM32, alt: µC/OS-II)
- Battery powered, bare metal communications development (MSP430, D1000)
- Deterministic, low power, high reliability firmware (MSP430)
- Communications with RFID, BLE, BT Mesh, RS-485 & SPI/I2C (EFR32 , TM4C, etc.)
- Peripheral control & interface experience (Sensor, radio & memory)

LANGUAGES

- C\C++, JAVA, LabVIEW & Assembly
- Practice – MATLAB, Python, Swift & HTML

R&D EXPERIENCE

- New processor design selection
  Help with generation & release of Intel Quark D1000
- Demonstrating idea to secure product roadmap
  Generation of prototype RFID unit, supporting protocol specification (SINIAV/ARTESP) and securing OEM relationship & work
- MVP Roadmap demonstration to secure client
  Ergsense prototype Xtag design description & proof-of-concept demo, transferred to client establishing product definition

NEW PRODUCT EXPERIENCE

- Experience in IP generation from ideation through MVP (Ergsense: optimyze)
- Experience in development and release for embedded products (Intel: Vehicle ID)
- Experience in design for manufacture

DISPLAY OF OWNERSHIP & DELIVERY OF RESULTS

- Experience in IP generation (Device Authentication & Security)
- Full-cycle prototype generation (Ideation->PoC->Prototype->MVP)
- Architect leadership & success for new ventures (Intel RFID, Ergsense)

CIRCUIT EXPERIENCE

- Circuit & PCB design (Altium, EAGLE, OrCAD)
- Fabrication & assembly (Intel, Ergsense)
- Multi board design (Ergsense)

FULL LIFECYCLE SUPPORT

- Full lifecycle experience for embedded products, from PoC through release and support
- Experience wearing multiple hats with ownership for success
- Product certification experience & support through release
- Experience in cross-discipline remote team activities

RAPID PROTOTYPING

- 3D print lead & operator (2 yrs. @ Intel - Stratasys 768/1200es)
- *Sw*: SolidWorks, Cura & ANSYS; *Hw*: CNC lathe & mill; *Print*: FDM & Resin; a few at home)

LAB EXPERIENCE

- *Conventional*
  Experience with Agilent/HP/R&S oscilloscopes, logic analyzers, function generators, power supplies & spectrum analyzers
- *Test & Measurement*
  Use of LabVIEW to establish & deliver successful debug, test & evaluation for product development work
- *Apparatus Development*
  Creation & performance of product qualification, certification & regression components at Intel for RFID tag
- *Procedure & Practice*
  Experience with regression validation for product generation, lead of certification for Intel product release

EDUCATION

University of Washington Seattle, WA

M.S. Electrical Engineering (*VLSI*) *Jan '10 – Aug '11*
(hired before completion) 100/117 cr

B.S. Electrical Engineering (*Embedded Design, Control Systems, Analog Design)* *Sep '06 – Dec '09*
B.S. Mechanical Engineering (*System Dynamics*)