Christian Stewart

Embedded Systems Engineer

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Authorized to work in the United States and European Union

Ten years experience in embedded software, power electronics, industrial automation in renewable energy / energy storage, and robotics.

Skills

- Software Architecture & Organization
- Low-level Software Design
- Debugging
- Test and Validation
- Mixed Signal Electronics Design
- Technical Communication
- Just-In-Time Learning
- Time Management
- Mindfulness

Professional Experience

NovaSource Power Services

Embedded Software Engineer (Full Time) *May 2021 - October 2022*

Primary Duties

- Design, test, and validate embedded software for a new robotic solar cleaning product intended for use in desert environments
- Maintain legacy codebase (or untangle the giant spaghetti monster that some might call a legacy codebase)
- Maintain web app and database for logging and viewing robot telemetry
- Mentor interns

Achievements

- Refactored 90% of legacy code to comply with safety standards and object-oriented design principles
- Applied knowledge of control theory and signal processing to develop a new robot control system that improved performance, decreased downtime, and lessened stress on the hardware
- Worked with a PCB designer to improve the robot's control PCB while navigating the global parts shortage
- Designed a hardware abstraction layer to replace the Arduino framework in an Arduino based system

Embedded Software Engineer (Contractor) *November 2020 - May 2021*

Primary Duties

- Fix bugs and implement improvements in existing embedded software codebase

Achievements

- Implemented and deployed a lightweight communication protocol (MQTT) for robot telemetry resulting in a 9x reduction in cellular data cost
- Fixed major bugs resulting in less robot downtime, and improved ease-of-use

Simpl Global Inc.

Embedded Systems Engineer *July 2018 - March 2020*

Primary Duties

- Provide guidance to the CEO on matters relating to software, firmware, and hardware
- Contribute to the embedded software and electronics design in the effort to realize a novel approach to energy storage
- Design drivers to communicate with embedded peripherals using I2C, SPI, UART, and GPIO
- Create relational database schema and RESTful API for cloud-base web services

Achievements

- Implemented and improved upon proprietary MPPT algorithm that maximized solar energy storage efficiency

JLM Energy Inc.

Product Design Engineer *August 2012 - June 2018*

Primary Duties

- Manage firmware development efforts for JLM’s portfolio of commercial and industrial energy storage solutions
- Walk customers and technical support staff through troubleshooting procedures
- Mentor interns and junior developers
- Communicate design requirements to installers and manufacturers

Achievements

- Designed and maintained embedded real-time framework for energy storage applications
- Shipped and installed 15 unique energy storage systems
- Contributed to the electronic design, PCB layout, and firmware development for:
  - IoT Energy Meter
  - Smart Solar Thermal Pump Controller
  - Arrayed Wind Turbine DC/DC Converter and Controller
  - Scalable LiFePO4 Battary Management System
  - 300W Solar Charge Controller
  - General purpose I/O and Power PCB providing communication (RS-485 / isoSPI), Relays, Analog Inputs, and 24VDC power output from 277VAC input that was used as the base for nearly all of JLM’s subsequent products
- Worked with backend web developers to design a standard JSON schema to work across product ecosystem

United States Navy

Fire Controlman Second Class *June 2001 - June 2007*

Primary Duties

- Operate and maintain the gunfire control system for the 5-inch gun on an Arleigh-Burke class destroyer, coordinate maintenance with the 5-inch gun maintenance crew, and coordinate gunnery operations with the ship's combat information center and bridge crews
- Conduct maintenance on all small arms and crew-served weapons in the ship's armory, maintain maintenance records, maintain records of weapons and ammunition issued to personnel, maintain records of personnel qualified to handle weapons and ammunition, and maintain inventory of weapons and ammunition.

Achievements

- Qualified Enlisted Surface Warfare Specialist
- Awarded two Navy and Marine Corps Achievement Medals for "professional performance in the superior execution of duties"

Education

B.S. in Electrical Engineering from University of Colorado Denver

Graduated May 2012 with honors

- Focus in Embedded Systems, Control Systems, and Digital Signal Processing
- Member of the Robotics Club

Personal Interests

- Hacking / Tinkering / Making
- Retro Gaming
- Being Outside Far From Civilization
- Baking / Cooking / Brewing

Technical Proficiencies

Languages

- C / C++
- Python
- Javascript / Node.js

Software Development Tools

- Compiler Toolchains (GNU / Clang)
- GNU Make
- Cmake
- Pylint
- Git
- Linux
- Azure
- AWS
- Vim
- VS Code
- JupyterLab

Electronics Design Tools

- KiCAD
- Eagle
- LTSpice

Test, Validation, and Debugging Tools

- Segger JLink
- Logic Analyzer
- Digital Multimeter
- Oscilloscope
- Power Supply
- Function Generator
- Spectrum Analyzer
- Soldering Equipment

Embedded Architectures

- ARM Cortex M*
- 8051
- AVR

Embedded Peripherals

- SPI
- I2C
- UART
- GPIO
- Timer/Counter
- EEPROM
- Flash
- SRAM
- Interrupts
- Clocks
- ADC
- DAC
- DMA
- Watchdog

Operating Systems, Frameworks, and Libraries

- FreeRTOS
- Arduino
- Standard C Library
- Standard Template Library
- Express
- Scipy
- Numpy
- CppUTest
- lwip
- mbedtls

Databases / Datastores

- PostgreSQL
- MongoDB
- Redis