

JAMES M NEWTON

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ROBOTICS ENGINEER - SUMMARY

Accomplished Robotics Firmware Engineer with extensive expertise in development, embedded systems, and advanced motion control, specializing in designing innovative solutions for complex robotic, IOT, and electronic systems. Excels at troubleshooting, debugging, and optimizing system performance. US Navy Gulf War Veteran. Mentor, educator. Well liked.

AREAS OF EXPERTISE

Robotics | Troubleshooting | Debugging | Web | Protocols | Electronics | Robotics Systems Design and Development | Embedded Systems Engineering | Firmware Development and Optimization | Communication | Documentation

TECHNICAL SKILLS

Languages: JavaScript | Typescript | C | C++ | Python | ASM PIC, ARM, AVR, MSP430, x86, web
Platforms: Embedded | Linux Xilinx, Ubuntu, Mint, Arch | Web Node.js, Electron, ISS, Apache, GCloud
Development: Git | Github | GitLab | VSCode | GCC | Make, CMake | Agile Methodologies
Protocols: I2C | SPI | UART | RS-485 | Dynamixel | HTTP | AJAX | REST API
Networks: CAN | IP | MQTT | RFID | LoRaWAN | Mesh | UDP | TCP
Libraries / Frameworks: CBLAS | ROS | FreeRTOS | ML.js | Tensorflow | React
Electronics: Encoders | Drivers | Servo | Stepper | Digital Logic | FPGA
Debugging: Oscilloscope | Logic Analyser | JTAG | Protocol Decoder | GDB | Perf | LED
Prototyping / Manufacturing: SMT solder, re-work | Pick-n-Place | PCB Altium, Eagle | CNC

EXPERIENCE

AMPLIBOTICS, INC. Las Vegas, NV (Remote) **2/2025 - present**
Contract - Robotics Firmware, UI

Leading a small team interfacing to Yaskawa HC30PL in C++, Doosan in Python and building an Electron-vite / React / Typescript app UI to automate setup and operation of palletizing robots.

HADDINGTON DYNAMICS, INC. Las Vegas, NV (Remote) **4/2017 - 10/2024**
Staff Firmware Engineer - Robotic Arms, 3D printed, Precise, Light industrial

Senior firmware engineer, lead, mentor for a team developing an ultra-low cost, precision, FPGA-based robotic arm. Contributed to the development and documentation of an advanced FPGA-based motion control and servo system, ensuring robust and precise robotic operations.

- Designed and implemented real time drivers via ARM Cortex-A on Xilinx Zynq-7000 while retaining high-level functions on Xillinux, avoiding the costs of an RTOS.
- Increased precision from several centimeters to 2 millimeters on a 1.7 meter arm by

- implementing a unique 6DOF DH Inverse Kinematics solver in C.
- Doubled the speed and reliability of movements, meeting operational goals, via Jerk Limited motion streaming with real time entries, que, and monitored in C.
- Co-designed and implemented a startup homing system utilizing existing encoders, eliminating the need for additional sensors or wiring through joints.
- Developed a configurable status return system to optimize data transfer, tailored to meet diverse customer use cases, including signal filtering improving customer satisfaction and reducing the need for future programmer time.
- Created a web-based ecosystem with node.js enabling seamless programming, configuration, and debugging of robotic arms through a browser, eliminating the need for local software installations.
- Added comprehensive test cases using Google Test (gtest) in C/C++ and pytest in Python to enhance system reliability and minimize bugs.

DASCOR, INC, Escondido, CA

1/2000 - 9/2021

Data Logging in Extreme Environments

Lead Firmware Developer

Developed new low power logging systems for difficult environments. Enabled multiple contract completions and retained existing customers until the death of the business owner.

- Extreme environments are difficult to access so data loggers must be ultra low power with long battery life and high reliability. Developed MSP430 firmware with instant wake and sleep to sip power then added ESP RF link for remote monitoring, data download, and bootloading.
- The propellant in solid fuel rockets can develop cracks during long term storage. This leads to pulses in acceleration and then explosions. We developed a PC104 high speed data logger using ultra fast C code to monitor sensors during test firings, which saved lives and ensured battlefield success.
- Client needed network monitoring of HVAC control. We replaced the processor with an ESP32 which also reduced cost by 10% while increasing capability.
- Updated legacy PIC based loggers extending product life by 7 years.
- Learned to operate pick and place, reflow, CNC, test machines in-house reducing cost.

MASSMIND, Escondido CA

1/1992 - Present

Chief Bottle washer (Part time)

Private consulting. Pioneered the launch of the 3D cement house printing industry in the USA in 2013 by developing a cost-effective high-power stepper driver solution for Total Kustom and then for the company that later became Icon Builds.

- Existing rotary encoders block axis passthrough or provide low resolution at high cost. Adapted an FPGA based analog design to a high speed micro to make an ultra low cost shaft encoder with more than 100K CPR. Instant positional feedback allows control methods which do not require extensive tuning.
- Consulting: Arduino / AVR, ESP 8266 / ESP32, PIC 12F, 16F, 18F, Raspberry Pi / Pico.

UCSD Extension, San Diego, CA

7/2018 - Present

Curriculum developer / Instructor (Part time)

Developed and taught top rated technology classes and full courses.

- Developed and instructed multiple courses using on-line resources to teach robotics.
- Developed and instructed "Introduction to Bioinformatics" classes.