Matt MacLeod

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SUMMARY

Ambitious Embedded Systems Engineer with 5 years' experience writing code and over 3+ years of professional experience contributing to all aspects of product development across a wide range of industries. Professionally, I've worked on many different projects with teams of varying sizes. Currently, I'm working as a Firmware Engineer at AMD where I have had the opportunity to contribute to the LPDDR5, DDR5 memory programs. As such, I am intimately familiar with contributing to a codebase in a team setting and comfortable with collaboration flows such as: pull requests, code reviews, automated pipelines, code formatters/linters and QA testing.

SKILLS

Languages & Protocols: C, C++, Python, CMake, Bash, **git, perforce**
Embedded Systems: Microprocessors: (**Armv8**-M**, Armv7E**-M**,** Avr), RTOS: (Zephyr, FreeRTOS), Interfaces: (**SPI, I2C, UART**, **CAN**)
Hardware: Design Software (Eagle, Altium, LTspice,Verdi,systemC), Debug Tools: (gdb, RTT)
Lab Equipment: Oscilloscope, **Logic analyzer**, Digital Multimeter, Signal Generator, Power Supplies

WORK EXPERIENCE

Senior Firmware Engineer   MAY 2023 – PRESENT (11 Mo)
AMD   Vancouver, BC, Canada
- Wrote RISC-V based firmware solutions (in C) for DDR5/LPDDR5 PHY.
- Implemented features (using system C) from JEDEC specifications into an architectural model emulating DDR5/LPDDR5 PHY to expedite pre-silicon firmware development.
- Developed tools (using C++ 20) for emulating intrinsic analog characteristics of PHY to DRAM boundary to enhance training firmware accuracy.

Embedded Firmware Engineer   JULY 2021 – APR (1Y, 9MO)
Rainhouse   Victoria, BC, Canada
- **Lead electronics team** in start-up (team of 4), to deliver all required hardware, embedded firmware, and full stack software for a wireless IoT, SMART CNC machine tool product line. Resulted in successful delivery of TRL-7 prototype, SDK, and the filing of 2 international patents.
- Wrote optimized, **multi-threaded embedded software** (**in C**) for 2 dual core **ARM SoCs**, to facilitate the real-time transmission and reception of 7 independent sensors over Bluetooth low energy at 1Mbps throughput.
- Experience with full board bring up of embedded ARM SoC including PCB design, bootloader configuration, debugging hardware peripherals and writing embedded software.
- Wrote the full stack IoT architecture encompassing gRPC streams to achieve 99.99% signal transmission over upper limit of Bluetooth low energy.
- Wrote **embedded Linux,** Zephyr **RTOS** based drivers (in **C**) for the nrf5340 ARM SoC to interface accelerometer ICs, ADC controller ICs, PCM microphones, thermocouples, and force sensors for high performance data collection.

Electrical Systems Design Engineer (Internship)   JAN 2020 – AUG 2020 (8 MO)
Motorola Solutions   Vancouver, BC, Canada
- Developed a software for hardware, automation framework (using C++/python) to characterize the IO performance of SSDs, HDDS and raid controllers over a temperature hysteresis profile. Final solution resulted in a **12x faster test procedure** and improved the storage device characterization **accuracy by 50%.**
- Spearheaded the board bring up, **hardware re-design** (using Altium) and **debug** of a PoE controller board for an NVR product family. Resulted in successful delivery of first-generation rugged NVR product line.

Electrical Engineer (Internship)   MAY 2019 – AUG 2019 (4 MO)
Seaspan ULC   Vancouver, BC, Canada
- **Collaborated across multi-disciplinary teams** and managed sub-contractors to deliver electrical single line diagrams for Canadian Coast Guard and Naval vessels.
- Sourced several major electrical instruments that became standard among a replenishment ship for the Canadian Navy.

Jr Autonomous Systems Engineer (Internship)   SEPT 2018 – DEC 2018 (4 MO)
InDro Robotics   Ganges, BC, Canada
- Designed, built and tested a working TRL-7 prototype of an after-market payload deployment mechanism that could be actuated through the DJI hand controller and mounts externally onto DJI's M210 drone. Resulted in the solution becoming a part of the company's product line.
- Programmed **embedded Linux flight controllers using C++** to integrate third party sensors and cameras with OEM **drones** for remote sensing operations.

Electrical Engineer (Internship)   JAN 2018 – APR 2018 (4 MO)
AML Oceanographic   Sidney, BC, Canada
- Tasked with using limited resources to improve the existing quality control process of PCBs before the next stage of manufacturing
- Automated the testing procedure of raw circuit boards using a combination of custom PCBs, test jigs and firmware validation scripts to yield a 5x faster quality control process.

PERSONAL PROJECTS

Nissan Leaf Battery Analytics Framework (RP2040, C++, python)
- Goal: Decode the CanBus messages to persist intrinsic battery pack sensors from a depleted Nissan leaf pack to a cloud storage system for predictive analytics in a remote, off grid storage system.
- Embedded Systems: See custom [can bus decoding library](#)

AI Home Security Guard (Raspberry Pi Zero W, C++):
- Goal: Create a device that utilizes facial and voice recognition methods to unlock door based on person's identity
- Hardware: Raspberry Pi Camera, USB Microphone, Bluetooth intercom System, Metal Gear Servo driven actuator to unlock door
- Embedded Systems: OpenCV Eigenfaces method for facial recognition, Voice to speech recognition algorithm used for user interface.

More Coming soon. For now, check out my [GitHub!](#)

PATENTS

- Sensor-based Smart Tooling for Machining Process Online Measurement and Monitoring ([Available](#))
- Real-Time DAS and SDK for Machine Parameter Online Measurement and Monitoring ([Available](#))

EDUCATION

Bachelor of Electrical Engineering (Digital and Embedded Systems Specialization)   SEPT 2016 – AUG 2021
University of Victoria   Victoria, BC, Canada