# Hayden Riddiford

Seattle, US | hayden.riddiford@gmail.com | (214) 971-5059 | www.haydenriddiford.com
github.com/haydenridd | linkedin.com/in/hayden-riddiford

## Summary

A lifelong tinkerer, and current firmware engineer. Passionate about building new languages and development tools for the embedded space.

## Education

**Georgia Institute of Technology**, BS in Electrical Engineering — Aug 2011 – May 2015

- Undergraduate Research - Prox-1 Student Satellite Project

## Experience

**Lead Firmware Engineer**, Terra Kaffe — July 2022 – present

Manager + individual contributor for firmware development of the TK-02 super-automatic espresso machine

- Managed a team of 3 contractors to complete both control and display firmwares for the TK-02 espresso machine while also being an individual contributor
- Wrote firmware utilizing FreeRTOS for Cortex M7 and Cortex M23 based MCUs
- Wrote and debugged low level drivers for various machine hardware including the display, motors, pumps, valves, and thermal controls
- Implemented LZMA de-compression on-chip to reduce firmware OTA image from ~25MB to ~500KB reducing update time from ~2 hours to ~5 minutes.
- Wrote an OTA validation and fallback routine from scratch to ensure no possibility of an update rendering a machine non-functional
- Visited contract manufacturer in China to write assembly line calibration and self-test routines for the machines to optimize production time
- Developed a PC test harness (RTT + python scripting) to drive on-chip testing in CI

**Senior Platform Systems Engineer**, Impinj — May 2020 – May 2022

Designed and performed continuous improvement on an RFID based Electronic Article Surveillance system

- Improved average detection rate to 90%+ in store pilot deployments through algorithm and RFID reader development
- Utilized EC2 computing instances and S3 storage on AWS to create an automated system for replaying and optimizing thousands of EAS detection events
- Created a series of company hosted Python packages for automating RFID reader and lab hardware control, datacapture, and analysis

**Test Engineer**, Texas Instruments — Aug 2015 – May 2020

Wrote test programs for production line testers that ensured integrated circuits met datasheet specifications

- Worked with IC design team to implement custom silicon and firmware based design-for-test solutions to optimize test coverage and test time
- Designed test board PCBs and software for 4 different battery gauge production test solutions across 4 different tester platforms
- Worked in four different roles over a period of two years as part of a new college graduate rotation program including an international rotation in Kuala Lumpur, Malaysia

## Skills

**Languages:** C, C++, Zig, Rust, Python

**Software/Devops:** Git, Docker, CMake, Meson, Github Actions, Bitbucket Pipelines, EagleCAD, Spotfire

**Embedded Tooling:** FreeRTOS, STM32Cube, Renesas e2Studio, TouchGFX, LVGL, SEGGER

## Projects

**Zig Programming Language Contributor** Jan 2024 – present

- Active user on the ziggit.dev forum: https://ziggit.dev/u/haydenridd/
- Member of the Zig Embedded Group writing Zig based HALs for microcontrollers

**RTT Port to Zig** Sept 2024

https://github.com/haydenridd/zig-rtt

- Static, compile time configuration of all up/down channels
- Ability to supply custom lock/unlock interface for thread safety

**TK-02 Doom Port** May 2024

Ported the "shareware" version of the original Doom game to the TK-02 machine for fun

- Custom memory allocator that shares internal/SDRAM memory to maximize available memory
- Control scheme using different touch screen areas as inputs with custom UI
- Ability to save/load games using the board's external flash IC

## Patents and Awards

**Patent Pending #18362939** 2024

- Method for automated grinder coarseness adjustment

**Manufacturing Innovation Award, Texas Instruments** 2018

- Given to inventions that save over $100,000 a year in manufacturing costs
- Used Python to analyze manufacturing data and predict which test boards were faulty