

Marcus T. Whitfield

Embedded Systems Engineer

📍 Austin, TX • 📞 (512) 555-0148 • ✉ marcus.whitfield@nexatech.dev • [in linkedin.com/in/marcuswhitfield](https://www.linkedin.com/in/marcuswhitfield) • github.com/mtwhitfield

Summary

Embedded systems engineer with 8 years of experience designing production firmware for ARM Cortex-M and AVR microcontrollers, real-time operating systems (FreeRTOS, Zephyr), and low-level serial communication stacks (I2C, SPI, UART, CAN). Track record of taking battery-powered and motor-control products from prototype through mass production at Nexa Devices and Synapse Robotics, with a focus on power budgets, MISRA-C compliance, and field-debuggable diagnostics.

Technical Skills

MCUs & Arch. ARM Cortex-M0/M3/M4/M7, STM32F4/H7/L4, AVR (ATmega328P, ATtiny85), ESP32 (Xtensa), MSP430, RISC-V (basic)
RTOS / OS FreeRTOS, Zephyr RTOS, ThreadX, bare-metal superloop & interrupt-driven design
Protocols I2C, SPI, UART/RS-485, CAN / CAN-FD, USB CDC, Bluetooth LE (GATT), Modbus RTU
Languages C (MISRA-C:2012), C++14/17, Python (test automation), ARM & AVR assembly
Toolchains GCC ARM Embedded, IAR Embedded Workbench, STM32CubeIDE, PlatformIO, Segger J-Link, Saleae Logic, oscilloscope

Professional Experience

Senior Embedded Systems Engineer

Mar 2022 – Present

Nexa Devices

Austin, TX

- Led firmware architecture for a battery-powered environmental sensor node (STM32L4, FreeRTOS), achieving 4.2-year battery life on two AA cells.
- Redesigned the low-power state machine, cutting idle current draw from 1.8mA to 340µA through sleep-mode tuning and peripheral gating.
- Built a CAN-FD diagnostic bus supporting 32 concurrent nodes for Nexa's industrial gateway line, cutting field debug time by 60%.
- Mentored three junior engineers on MISRA-C compliance; the resulting firmware passed an external functional-safety audit with zero critical findings.

Embedded Software Engineer

Jul 2019 – Feb 2022

Synapse Robotics

Austin, TX

- Developed motor-control firmware on STM32F407 (Cortex-M4) driving field-oriented control (FOC) at a 20kHz loop rate for robotic actuators.
- Implemented an SPI-based encoder interface with sub-100µs latency, enabling closed-loop control at 10,000 RPM.
- Wrote a bootloader supporting over-the-air firmware updates over BLE, deployed fleet-wide to 400+ robotic units without a truck roll.
- Authored a Ceedling/Unity unit-test harness, raising firmware test coverage from 22% to 71%.

Firmware Engineer I

Jun 2017 – Jun 2019

Vertex Instruments

Round Rock, TX

- Built a UART/Modbus RTU driver stack for handheld diagnostic instruments shipped to 12 countries.
- Designed AVR-based (ATmega328P) sensor calibration firmware with EEPROM wear-leveling for a 10-year field life target.
- Reduced per-unit BOM cost 18% by migrating timekeeping from an external RTC to the MCU's internal low-power timer.

Selected Projects

- **CANspy** – open-source STM32-based USB-to-CAN adapter with a Python GUI for live bus tracing; 800+ GitHub stars. github.com/mtwhitfield/canspy
- **Zephyr I2C Humidity Driver** – wrote and upstreamed a sensor driver merged into the mainline Zephyr RTOS driver tree.

Education & Certifications

B.S. in Electrical Engineering

2017

Meridian State University

GPA: 3.7/4.0

Relevant coursework: Digital Logic Design, Embedded Systems, Control Theory, Computer Architecture

Certifications: FreeRTOS Certified Developer (Percepio) • ARM Accredited Engineer – Cortex-M Architecture