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Portfolio: vishnurach.github.io
GitHub: github.com/Vishnurach/embedded-systems-portfolio
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Summary

Embedded Systems Engineer having 3.5 years of industrial experience and a proven track record in both **hardware design and firmware development**. Proficient in **C/C++**, **microcontroller programming** (**ARM, AVR, PSoC, PIC**), and **schematic/PCB design using Altium and KiCad**. Excels at bridging the hardware-software interface, leveraging deep proficiency in peripherals (**I2C, SPI, UART**) and test/measurement tools to automate validation, enhance reliability, and accelerate product development cycles. Eager to apply a holistic, system-level approach to solve complex challenges from initial architecture and circuit design through to robust firmware integration and testing.

Core Skills

- **Programming Languages:** C, C++, Embedded C, Python
- **Microcontrollers:** ARM Cortex-M (STM32, NXP LPC1768, PSoC 4, PSoC 5LP), ARM7 (NXP LPC2148), 8-bit: AVR (ATmega128, ATmega328), PIC16
- **Embedded Systems:** RTOS, Peripherals (I2C, SPI, UART, GPIO, ADC, Timers, PWM)
- **Tools & IDEs:** STM32CubeIDE, PSoC Creator, Keil µVision, MPLAB X, Arduino IDE
- **EDA & Simulation:** Altium Designer, KiCad, Proteus, LTSpice
- **Test & Measurement:** NI DAQ, MonoDAQ, Oscilloscopes, Logic Analyzers, Power Supplies, Function Generators, Power Source, Electronic Load
- **Testing & Automation:** Test Automation, Battery Charge/Discharge Control, Data Acquisition (DAQ), LabVIEW, Reliability Testing, Environmental Testing
- **Project Management Tools:** Jira, Codebeamer
- **Version Control Systems:** Tortoise SVN, GitHub

Professional Experience

Litin Design Labs, Kerala/ BTL India Pvt Ltd (On Deputation), Bengaluru | *R&D Engineer* |
Aug 2022 – Jan 2026(Serving Notice Period)

- **Developed and modified embedded firmware in C** for daughter board, hardware test jigs and product verification, improving test repeatability and throughput.
- Architected and implemented automated validation systems using **microcontroller, data acquisition hardware (MonoDAQ)**, and its software (**Dewesoft**) to test battery performance and device reliability, reducing manual test time by an estimated 40%.
- **Designed and simulated circuits**; owned component selection/procurement and design validation using **LTSpice** and lab instrumentation, ensuring adherence to IEC 60601-2-24 standards.
- **Executed comprehensive hardware test plans** at board, module, and system levels to verify design integrity and functional requirements.

Vidya Academy of Science and Technology, Thrissur, Kerala | *Assistant Professor cum Research Assistant* | Jan 2016 – Aug 2022

- Instructed and mentored 100+ students (diploma/B. Tech/M. Tech) in **embedded firmware development, microcontroller applications, and hardware integration**, developing laboratory curricula and conducting hands-on training sessions.
- Architected and developed the complete system for an award-winning **Augmentative and Alternative Communication (AAC) device**, from **schematic design to PCB design, assembly, testing, and final documentation**.

Indian Institute of Technology, Delhi | *Senior Research Fellow* | Jul 2019 – Dec 2019 (Sabbatical)

- **Authored coding tutorials and practical examples** for the STM32 microcontroller.

- **Built an NI DAQ + LabVIEW setup** to monitor battery State of Charge (SoC); **implemented Arduino/MATLAB** control for charge/discharge testing protocols.

Achievements & Awards

- **First Place Winner (State-Wide Competition):** Developed an AAC (Augmentative and Alternative Communication) device for the National Institute of Speech and Hearing (NISH). (Jul 2022)
- **Outstanding Contribution Award:** Awarded for exceptional work and dedication on the Holter ECG medical device development project. (Dec 2024)

Projects

Infusion Pump (Class II Medical Device)

- Developed firmware using **PSoC Creator** to validate **daughter board integration with a new MCU (PSoC 4)**, utilizing **UART communication**.
- Developed firmware to control **automated PCBA testing** through a **custom test jig**, enabling comprehensive validation of board peripherals including **EEPROM** utilizing **I2C communication**.
- Built battery charge/discharge measurement rig using **Arduino, Relay, MonoDAQ, and Dewesoft UI**; implemented logging for proving the battery capacity recovery technique.
- Designed **battery management system (BMS), power architecture and test jigs** in **Altium**; validated circuits in **LTSpice**.

Holter ECG Machine (Wearable Medical Device)

- **Accelerated product validation timelines by 40%** by developing firmware to automate Li-ion battery charge/discharge and environmental stress testing.
- Developed an automated test system for battery connection reliability, **eliminating 90% of manual testing labour**; verified charger IC and pack protection behaviour.

Invasive Cardiology Project

- Designed schematics for a carrier board featuring **power supplies, STM32 microcontroller, and communication peripherals (Ethernet, SPI, USB-UART, RS485)** in Altium Designer.
- Wrote and executed hardware evaluation plans; supported firmware-hardware integration and interface testing

Education

M. Tech in Power Electronics | First Class | University of Calicut | 2015
B. Tech in EEE | First Class | University of Calicut | 2013

Professional Development

Advanced Diploma in Embedded Systems (Hybrid: online + in-person labs) | Quest Innovative Solutions (QIS) Academy, Kochi | 2024 – 2025

- *Topics:* **Advanced C, Low-Level Driver Development, RTOS Architecture, and IoT Protocols**
- *Capstone Project:* In progress