

HARISH G

Embedded Systems & Firmware Engineer

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PROFESSIONAL SUMMARY

Embedded Firmware Engineer with production experience in bare-metal and interrupt-driven firmware development for 8/16/32-bit ARM microcontrollers (STM32, PIC18, Nuvoton). Proficient in C/C++ for constrained environments, device driver development, RTOS concepts, and serial communication protocols (UART, I2C, SPI, RS485, CAN). Delivered industrial-grade firmware for servo and static voltage stabilizer systems; collaborated with hardware teams on board bring-up, PCB debugging, and hardware validation. Reduced manual programming time by 30% through Python automation; supported a 40× production scale-up. Recognized with Best Outgoing Student and Academic Excellence awards. Eager to apply embedded expertise in IoT, industrial automation, and real-time control applications.

TECHNICAL SKILLS

Languages	Embedded C, C/C++, Python, Bare-Metal Programming, RTOS (FreeRTOS concepts)
Microcontrollers	STM32G0, STM32F4 (ARM Cortex-M), PIC18F46K22, PIC16, Nuvoton M051, Arduino, ESP32
Protocols	UART, I2C, SPI, RS485, CAN, ADC, EEPROM, RTC, USB (familiarity)
Firmware Skills	Device Driver Development, Interrupt-Driven Design, Fault Protection, Sensor Interfacing, Flash Memory Mapping, Low-Power Techniques, Real-Time Control
Debugging Tools	JTAG/SWD, MPLAB IDE, STM32CubeIDE, Serial Comm Tools, PROTEUS Simulation, Oscilloscope / Logic Analyzer (hardware debug)
Power Electronics	Servo Voltage Stabilizers, Static Voltage Stabilizers, IGBT Switching, Relay Logic, PCB Analysis
Other Tools	Python Automation, Linux, Git (version control), CI/CD awareness, Blender
Soft Skills	Cross-functional Collaboration, Leadership, Technical Documentation, Resilience

PROFESSIONAL EXPERIENCE

Junior Embedded Firmware Developer | Crisp System India Pvt. Ltd. — Coimbatore Jun 2024 – Dec 2024

- Designed and developed bare-metal firmware in Embedded C for STM32 and PIC18 microcontrollers targeting single-phase and three-phase servo voltage stabilizers across 3 commercial product variants.
- Developed device drivers for UART, SPI, I2C, and ADC peripherals, enabling real-time voltage, current, and temperature sensing with interrupt-driven architecture.
- Architected real-time fault logging covering overload detection, earth voltage faults, phase sequence errors, buzzer alerts, and relay cut-off for industrial and domestic operating modes.
- Built a scalable multi-board RS485 serial communication system for three-phase static stabilizers, supporting reliable data exchange across up to 3 interconnected control boards.
- Collaborated with hardware and PCB teams during board bring-up and system validation; diagnosed circuit-level faults using debug tools and hardware analysis, accelerating product deployment.
- Designed and validated 5 custom control boards through hardware testing, securing a production order of 200 units and achieving a 40× increase in output scale.
- Automated serial number programming for STM32 microcontrollers using Python with protected flash memory mapping and unique ID generation, reducing manual programming time by 30%.
- Implemented relay-based tap-switching voltage regulation with non-volatile EEPROM fault logging and real-time monitoring for 3-phase stabilizer systems.

- Created technical documentation covering firmware design, code architecture, hardware integration procedures, and test procedures for production deployments.

R&D Embedded Intern | Ozotec Automobile Pvt. Ltd. — Coimbatore

Sep 2024 – Nov 2024

- Contributed to electric vehicle cluster embedded firmware development across 3 prototype iterations; performed system design, electronic prototyping, and hardware troubleshooting.
- Evaluated 5 hardware development tools, streamlining prototyping workflows and reducing review cycles by an estimated 20%.

Project Intern | CIRPI Education Foundation — Chennai

Dec 2024

- Produced technical documentation for 2 embedded project modules, delivered on schedule; coordinated with 3-member team to meet all milestones.

KEY PROJECTS

1. Three-Phase Servo Stabilizer Controller | STM32 & PIC18 | Bare-Metal Firmware

- Wrote complete bare-metal C firmware for single and three-phase servo voltage stabilizers shipped in 3 product variants; implemented interrupt-driven servo motor regulation with real-time LCD voltage/current display.
- Integrated multi-mode fault protection (overload, earth voltage, phase sequence, buzzer, relay cut-off) for industrial and domestic environments.

2. Industrial Relay-Based Voltage Stabilizer | Nuvoton ARM MCU | Interrupt-Driven Firmware

- Built relay-based tap-switching firmware via transformer ratios with real-time analog sensing (voltage, current, temperature) and non-volatile EEPROM fault logging.

3. RS485 Multi-Board Serial Communication | STM32 | Static Stabilizer

- Established scalable multi-board serial communication with automatic unique board ID assignment, supporting three-phase static stabilizer deployments.

4. Automated Serial Number Programming System | STM32 + Python

- Developed production-line firmware tool with protected STM32 flash memory mapping, serial ID generation, and Python-automated programming, reducing manual effort by 70%.

5. AI-Powered Alzheimer's Patient Guider | IoT / Embedded

- Delivered an IoT embedded solution with sensor modules and real-time alert systems for patient navigation and safety monitoring.

6. Advanced Line-Following Robot | Arduino | Custom PID Control

- Implemented a custom PID-inspired control algorithm in C; competed in collegiate technical events achieving top rankings.

EDUCATION

Bachelor of Engineering – Electronics & Communication Engineering

Nov 2021 – May 2025

Tamilnadu College of Engineering, Coimbatore | CGPA: 8.1 / 10

CERTIFICATIONS

- Embedded System Design – NPTEL, IIT Madras (April 2024)
- Introduction to Programming in C – NPTEL, IIT Madras (April 2024)

ACHIEVEMENTS & AWARDS

- Best Outgoing Student of the Year – Randeep Memorial Award, Tamilnadu College of Engineering (May 2025)
- Academic Excellence Award – Tamilnadu College of Engineering (May 2025)
- District-Level Chess Championship – 2nd Place
- Technical Competition Certificate – Advanced Line-Following Robot, Collegiate Technical Event