Nguyễn Hoàng Minh Quốc

Embedded Firmware Intern

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CAREER OBJECTIVE

As a third-year Electronics and Telecommunications student at HCMUS, I am seeking an Embedded Firmware Internship position to gain hands-on experience in microcontroller-based system development. I aim to strengthen my skills in firmware design, peripheral driver programming (UART, SPI, I2C, GPIO), and embedded system optimization while contributing to real-world IoT/embedded projects.

EDUCATION

University of Science - VNUHCM (HCMUS)

2023 - 2027

Bachelor: Electronics and Telecommunications

- GPA: 3.73
- Co-author and presenter of the paper: "VQASEP: Applying AI Technologies to develop a Vietnamese Q&A System on an Embedded Platform," successfully accepted and presented at the prestigious 14th Scientific Conference (VNUHCM-US Conf 2024). The project involved building a standalone voice assistant using a Raspberry Pi and Google Gemini API to deliver an intuitive, hands-free Q&A experience in Vietnamese. (Git: https://github.com/Biu2005/PeeDee assistant).

EXPERIENCE

Robotics & Iot Lab (VNU-University of ScienceSience (HCMUS))

08/2023 - Present

STEM Tutor (Contract)

• Instructed STEM courses for high school and middle school students, covering Arduino/ESP32 programming, peripheral communication, and hardware integration on the weekends.

SKILLS

English	VSTEP B2 (Overall: 6.5/10)
Embedded Programming	C/C++, Embedded C, FreeRTOS
Microcontrollers, Mini pc & Architecture	ARM Cortex-M, STM32, ESP32, ESP8266, Raspberry Pi, Arduino
Interfaces & Peripherals	SPI, I2C, UART, ADC, Timers, GPIO, Interrupts,
Hardware & PCB Design	PCB Design: Altium, Proteus Prototyping: Proficient in soldering SMD (QFN, TQFP, 0603) and through-hole components
Tools & Environments	Git, Github, STM32CubeIDE, Keil C, VS Code, ESP-IDF,

MY PROJECTS

IoT Attendance System (RFID & Google Sheets)

08/2025 - Present

Role: Firmware Developer and Hardware Engineering

Description:

 Developed an ESP32-based IoT attendance device focusing on real-time task scheduling, peripheral interfacing, and reliable IoT connectivity with Google Sheets as the cloud client.

Responsibilities & Achievements:

- Designed and assembled a custom PCB (ESP32 + RC522 RFID + LCD 16x2 + power supply) using Altium.
- Integrated RC522 RFID reader via SPI protocol to read card data, and displayed attendance status on a 16x2 LCD through IPC interface.
- Implemented FreeRTOS tasks to manage RFID scanning, WiFi communication, HTTPS data transmission.
- Developed WiFi communication with retry and error handling for reliable cloud connectivity.
- Integrated HTTPS client with certificate validation to securely sync attendance records directly to Google Sheets.
- Optimized power consumption using deep sleep and wake-on-interrupt from RFID module.

Technologies & Skills: ESP32 (ESP-IDF, FreeRTOS), UART (debug logging), HTTPS (Google Sheets API), Altium PCB, Embedded C Git: https://github.com/Biu2005/attendance_SYS.

Calculator with Keypad and LCD

06/2025 - 19/08/2025

Role: Firmware Developer and Hardware Engineering

Description:

• Built a handheld calculator on STM32, applying FreeRTOS for task scheduling and peripheral interfacing to handle keypad inputs, perform calculations, and display results on an LCD.

Responsibilities & Achievements:

- Designed and assembled a custom PCB (STM32 + Keypad(created from buttons) + LCD) using Altium.
- Implemented keypad (created from buttons) input handling with debouncing to ensure reliable multi-step operations.

- Developed a custom driver for 16x2 character LCD using direct GPIO control (4-bit parallel interface), without relying on external I²C modules, to display real-time results.
- Applied FreeRTOS tasks to process (input polling, calculation, display update).
- Extended functionality to support **first- and second-degree equations** in addition to basic arithmetic.

Technologies & Skills: STM32, FreeRTOS, GPIO, LCD 16x2, Altium PCB, Embedded C

Git: https://github.com/Biu2005/Caculator

LiteHouse - Smart Home System (1 hardware + 1 firmware + 1 APP (MIT APP))

03/2025 - 05/2025

Role: Firmware Developer

Description:

• Built a small-scale smart home prototype using STM32, enabling control of devices (servo, relay) via a Bluetooth mobile application and an automated fire-safety feature with MQ2 gas sensor to trigger alarms, send alerts, and open doors for evacuation.

Responsibilities & Achievements:

- Developed firmware drivers on STM32, including **GPIO driver for LED control** and **ADC interrupt-based driver** for gas detection.
- Implemented UART communication between STM32 and HC-06 Bluetooth module for mobile app connectivity.
- Integrated automated door-opening feature triggered by MQ2 sensor via ADC interrupt handling.

Technologies & Skills: C/C++ Embedded, STM32 HAL/LL, UART, ADC, Interrupts, Bluetooth HC-06, Sensor Integration.

Git: https://github.com/Biu2005/LiteHouse

Video project: https://drive.google.com/drive/folders/1IyHeAX215S69uxc0pfSo29VWZflstxH-?usp=sharing

ACTIVITIES

Robotics & IoT Lab (HCMUS) & American Center

Technical Supporter

- (ROBOCUS Competition 2024, 2025): Provided live technical support and troubleshooting (C/C++, Arduino) for teams with line-following and remote-controlled vehicles.
- Served as a technical support member for a STEM outreach program, assisting with workshops and technology demonstrations at universities across the Mekong Delta.

Ngo Quyen High School

Technical Advisor

• Provided solutions and optimization strategies for remote-controlled vehicles (Arduino) communicating via Bluetooth (HC-05, UART) with an MIT App Inventor mobile app.

FRACE (2024)

Competitors

Finalist of the FRACE Competition 2025 about line following car

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