# Nguyễn Hoàng Minh Quốc

## **Embedded Firmware Intern**

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# **CAREER OBJECTIVE**

Seeking an internship in embedded firmware development with a focus on real-time task management, peripheral interfacing, and IoT system integration. My goal is to build reliable embedded firmware for microcontrollers, enabling efficient data acquisition, communication with external peripherals, and seamless integration with IoT platforms.

#### **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).

## SKILLS

Embedded Programming	C/C++, Embedded C, FreeRTOS
Network & Protocol	Wifi, BLE, HTTP/HTTPS, Websocket, MQTT
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)

22/08/2025 - 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 I<sup>2</sup>C 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: 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 I<sup>2</sup>C 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: STM32, FreeRTOS, GPIO, LCD 16x2, Altium PCB, Embedded C

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

## **TEAM PROJECTS**

LiteHouse - Smart Home System (STM32)

- Team size: 3 (1 Hardware + 1 Firmware + 1 APP (MIT APP))
- Role: Firmware Developer
- Programmed an STM32-based smart home system to control devices (servos, relays) via a Bluetooth mobile app.
- Implemented an automated fire-response safety feature that triggers alarms, sends mobile alerts, and opens doors upon gas detection (MQ2 sensor).
- Git: https://github.com/Biu2005/LiteHouse
- Video project: https://drive.google.com/drive/folders/11yHeAX215S69uxc0pfSo29VWZflstxH-?usp=sharing

Checkpoint Timing System (Application in the Robocus 2024 contest of the school)

- Team size: 2 (1 Firmware + 1 Web)
- Role: Firmware Developer
- Developed firmware for a race timing system using ESP32 to capture vehicle lap times at checkpoints.
- Utilized WebSockets to transmit real-time data to a web dashboard, ensuring low-latency delivery and accurate time synchronization for the competition.
- Git: https://github.com/Biu2005/Checkpoint-System

#### **ACTIVITIES**

Robotics & IoT Club (HCMUS)

08/2023 - 08/2025

STEM Educator: Led and instructed Arduino courses (basic & advanced) covering embedded programming, UART communication, and hardware integration for club members.

Technical Supporter (ROBOCUS Competition 2024, 2025): Provided live technical support and troubleshooting (C/C++, Arduino) for teams with line-following and remote-controlled vehicles.

Ngo Quyen High School

11/2024 - 01/2025

**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.

American Center

12/2024 - 01/2025

**Technical Supporter** 

 Served as a technical support member for a STEM outreach program, assisting with workshops and technology demonstrations at universities across the Mekong Delta.

# **CERTIFICATE**

English: VSTEP B2 (Overall: 6.5/10)

15/06/2025

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