

DONG THANH KHOA

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Professional Summary

Dynamic Embedded Software Engineer with strong expertise in C programming, RTOS-based development, and embedded communication protocols (UART, CAN, RS485, BLE, Wi-Fi). Experienced in firmware development on STM32/ESP32 platforms, PCB hardware design, and IoT system integration with cloud services (AWS, ThingsBoard). Adept at designing end-to-end embedded solutions for real-time monitoring, control, and data communication. Passionate about applying embedded system knowledge to drive innovation in automotive and healthcare applications.

Skills

- **Programming Languages:** C (strong), C++ (basic), Python (basic scripting)
- **Embedded Systems:** STM32, ESP32, AVR; FreeRTOS, ZephyrOS, Contiki OS
- **Communication Protocols:** UART, SPI, I2C, CAN, RS485, TCP/IP, BLE, Wi-Fi
- **IoT and Cloud Platforms:** ThingsBoard, AWS Cloud
- **Hardware and PCB Design:** KiCad, Altium Designer; Analog filter design, Power electronics (PFC, LLC)
- **Simulation and Tools:** NI Multisim, PSIM, Proteus
- **Frameworks and Libraries:** LVGL, OpenCV, Sphinx Documentation

Education

Ho Chi Minh City University of Technology

Bachelor of Electronics and Telecommunications Engineering

Major: Embedded Systems

GPA: 3.6/4.0

Certifications

TOEIC - Listening and Reading - 615

Experience

Cloud Burst Australia

Feb 2025 – Present

Embedded Software and Hardware Developer(Freelancer)

Remote freelance collaboration based on project milestones and deliverables.

- Developed embedded firmware and designed hardware for healthcare IoT systems including vital monitoring, fall detection, and asset tracking.
- Developed a server for real-time health monitoring, parsing physiological data (heart rate, breath rate, movement) from Aerosense devices and uploading to AWS Cloud.
- Designed and implemented full-stack management dashboard (Python Flask, HTML, CSS).
- Built a Bluetooth tracking server communicating with ESP32-based gateways, applying RSSI-based scoring for BLE tag positioning.

209B3 Lab

Jun 2024 – Sep 2024

Embedded Software Intern

- Developed Brightness Monitoring System using ESP32, MQTT, RS485.
- Conducted ADC performance and linearity testing on STM32 and AVR MCUs.
- Researched USB Mass Storage with FATFs on STM32 and ESP32-S3.
- Authored a 75-page STM32 tutorial focused on USB and file systems.

PIF Lab Innovation

Jun 2023 – Aug 2023

Embedded Hardware Intern

- Designed PCB for Weather Station using ESP32 and FreeRTOS.
- Developed a face detection system using OpenCV.

Projects

Design of a Health and Patient Location Monitoring System in Hospitals

Dec 2024 – Present

Designed and developed a healthcare IoT system integrating access control, BLE-based patient location tracking, and real-time vital monitoring via AWS Cloud.

- **Position:** Embedded Systems Developer — **Team Size:** 2
- **Technologies:** ESP32, BLE, AWS Cloud, MQTT
- **Key Contributions:**
 - Developed Access Control devices with fingerprint and facial recognition, supporting user enrollment and attendance tracking via server communication.

- Built Bluetooth Gateway devices on ESP32 to detect BLE tags, collect RSSI data, and forward information to a centralized server for location tracking.
- Implemented Bluetooth Configuration Server enabling wireless configuration (Wi-Fi credentials, MQTT settings) for ESP32 devices.
- Created Vital Monitoring Server to collect, process, and upload physiological data (heart rate, breathing rate, movement) to AWS Cloud for real-time health monitoring.

Smart Charger 360W with IoT and Display Monitoring

Aug 2024 – Present

Designed a high-efficiency AC-DC converter integrating PFC, LLC circuits, BMS control, and IoT monitoring.

- **Position:** Hardware Designer — **Team Size:** 5
- **Technologies:** Power Electronics, STM32, ESP32, PCB Design
- **Key Contributions:**
 - Designed and calculated PFC and LLC circuits for 360W AC-DC conversion.
 - Designed 4-layer PCB integrating BMS and IoT monitoring modules.
 - Programmed STM32 for overall system control and monitoring.
- **Achievement:**
 - Achieved 95% efficiency at 7.5A fast charging for 16-series Li-ion battery pack (ongoing project).

Smart Energy Meter

Sep 2024 – Dec 2024

Designed and developed a smart energy metering system with voltage, current, and phase measurement, integrated with IoT energy monitoring via ThingsBoard.

- **Position:** Hardware and Firmware Developer — **Team Size:** 2
- **Technologies:** STM32, ESP32, UART Communication, ThingsBoard, Analog Filter Design, Kalman Filter
- **Key Contributions:**
 - Designed schematics and developed AC voltage/current sensing circuits, applying 4th-order low-pass and high-pass filters.
 - Developed firmware architecture and synchronized UART data packets between STM32 and ESP32.
 - Implemented a basic cooperative scheduler on STM32 for task management.
 - Programmed STM32 to perform real-time measurements and transmit data to ESP32 for IoT monitoring.

Documentation on Applications of Zephyr OS

Jan 2024 – Apr 2024

Researched peripherals, kernel services, LVGL integration, and ModbusTCP communication on Zephyr OS.

- **Position:** Researcher — **Team Size:** 11
- **Technologies:** Zephyr OS, STM32F7 Series, Sphinx Documentation, LVGL
- **Key Contributions:**
 - Developed sample applications on STM32F746G-Discovery using Zephyr OS.
 - Researched and implemented ModbusTCP communication, kernel services, and LVGL-based GUI applications.
 - Authored user and developer documentation using Sphinx for internal and public release.

Smart LED Control

Feb 2024 – May 2024

Developed a smart LED control system integrating Wi-Fi connectivity, touch-based input, and automatic light-based control.

- **Position:** Team Leader — **Team Size:** 3
- **Technologies:** STM32, ESP32, Node-RED, UART Communication, FreeRTOS
- **Key Contributions:**
 - Designed and developed PCB for full system integration, ensuring isolation between 220VAC and DC circuits.
 - Implemented relay control via STM32, UART communication with ESP32, and TFT LCD status display.
 - Developed Wi-Fi configuration interface using ESP32 touchscreen input.
 - Integrated FreeRTOS for efficient multi-tasking and automated LED control based on ambient light intensity.

Brightness Meter

Dec 2023 – Feb 2024

Designed and developed a brightness measurement system using LDR sensors and STM32 MCU.

- **Position:** Firmware and Hardware Developer — **Team Size:** 3
- **Technologies:** STM32, ADC, LDR Sensor, Op-Amp Circuit, LCD Display
- **Key Contributions:**
 - Designed and calculated sensing circuits using LDR, including dual-supply Op-Amp and Howland Current Source configurations.
 - Developed and assembled custom PCB for the system.
 - Programmed STM32 to read ADC values, convert to brightness levels, and display results on LCD with dual-scale representation.
 - Developed state machine logic and modular component libraries for system firmware.

Activities

Pay It Forward Club - Students Research Lab

Jan 2023 – Present

- Familiar with ARM MCU peripherals (UART, I2C, SPI) and PCB design.
- Delivered UART communication lectures for 30+ students/semester.
- Conducted C programming workshops for high school students.