Parth Rajeshkumar Thakkar

Boulder, CO | +1 (303)-548-9344 | [Portfolio](#) | [Linkedin](#) | [Mail](#) | [Github](#)

EDUCATION

Master of Science, Embedded Systems Engineering & IoT   **August 2023 - May 2025**
University of Colorado, Boulder   GPA : 3.85/4
Coursework: Principle of Embedded systems, Embedded Systems Design, Internet of Things & Embedded Firmware(IoTF)
PCB, Real Time Embedded Systems

Bachelor's of Engineering, Electronics and Communication   **June 2019 - May 2023**
L.D. College of Engineering, Ahmedabad   GPA : 8.67/10

WORK EXPERIENCE

Embedded Developer, Intern - *Griden Power, Ahmedabad, India*   **September 2022 - August 2023**
- Responsible for designing the MQTT(Message Queue Telemetry Transport), OCPP 2.0(Open Charge Point Protocol) protocols and PCB for the Level 2 DC fast charger **100% from the ground.**
- Created, managed, and hosted a Logging portal within the AWS (Amazon Web Services) environment. Integrated freeRTOS with Charger alongside with ESP32.
- Developed drivers and tasks to integrate with other peripherals like touch LCD, Neoway GSM/GPS module, RFID.
- Integrated embedded components using C++ and achieved the charger system's live deployment within a four-month timeframe.

Firmware Developer, Intern - *Scanpoint Geomatics, Ahmedabad, India*   **October 2022 - July 2023**
- Elevated the capability of a custom UHF-RFID board by developing a driver that enabled it to effectively read and write RFIDs at an extended distance of **10 feet**, a significant improvement from the initial 5 feet range.
- Customized an UHF reader, ESP32, Touch screen(ST7796, SPI Compatible). Enhanced the driver by incorporating algorithms, hash maps that improved its overall performance by **10%**.
- Modeled and Manufactured a full-fledged product, including PCB and 3D printing of enclosure.

Hardware Developer - *Robocon LDCE, Ahmedabad, India*   **March 2019 - September 2019**
- Developed and deployed low-level firmware for ATmega328P, integrating I2C, UART, SPI, and PID/Motor Drivers, extending to STM32 and Raspberry Pi for a competitive robotics platform held at national level.
- Utilized MATLAB for simulation and optimization of navigational paths and PID control parameters, ensuring precise motor control in robotics competition.

SKILLS

Software : C, C++, Assembly, Python, Docker, AWS, OpenCV, Django Rest Framework, VHDL,
Hardware Architectures : ARM cortex M0/M4 Architecture, AVR Architecture, x86 Architecture, RISC
Boards : 6052, 8051, MSP430, KL25Z, LPC2148, STM32f0/f4, Raspberry pi4, ESP32c3, ATMega328p, Blue Gecko
Communication Protocols : USB, UART, I2C, SPI, Websockets, TCP/UDP, IoT, RF, BLE, RS232, PS2
Tools and IDE : uVision, Git, Eagle, KiCad, MATLAB, Postman, MCUXpresso, Microchip Studio, Stm32cubeIDE, Proteus, Logisim, Altium, Makefile, GDB, Command line and Shell scripting, Valgrind, Multithreading
OS : Linux(debian, arch), Windows, WindowsCE, freeRTOS
Skills : Logic Analyzer, Oscilloscope, Datasheet/Reference Manual, Function Generator, Digital Design, Debugging, OOPs

PROJECTS

Pong in 8051 using Assembly
- Utilizing **assembly** code, programmed a Pong game for the 8051 microcontroller, Integrated a **custom-designed PS2 keyboard hardware** controller for paddle control and a daisy chained LED matrix serving as the display.
- Developed a circuit with a bootloader circuit utilizing AT89C51RC2, Created device drivers for 32KB external NVSRAM, bit banged IO expander with I2C using AS31 assembler.
- Designed constant voltage-constant current, **BMS(Battery Management System)** to make it battery operated.

8-Bit CPU
- Engineered a CPU composed of basic **transistor-transistor-logic** and logic gates on breadboard, and is capable of executing basic programs such as Fibonacci series, addition, subtraction.
- As an embedded system, it is equipped with all necessary core blocks such as Program Counter, ALU, Control Unit, LCD for output register, two GPRs, Instruction Register, Soft Control unit made in EEPROMs(28C256), Clock, Instruction decoder, RAM(16 byte)Address Decoder made in Purely logic gates.

Drivers for STM32F4 and KL25Z
- Composed bare-metal drivers for STM32F411 and KL25Z microcontrollers, including DMA, DAC, ADC, PWM, UART, and watchdog for STM32F411.
- Developed FIFO, Circular Buffer, UART, PWM, and DAC drivers for KL25Z, using MCUXpresso. Enhanced system performance through assembly optimization, reducing execution times significantly. Implemented drivers for OLED display and SPI management, alongside an advanced MPU6050 driver for precise motion tracking.

Bare Metal RTOS in Stm32f070
- Systematized a **Bare Metal RTOS** For an ARM Cortex M0+ core (STM32F070). Included a number of features, such as a Scheduler, RTOS with Round Robin, Cooperative, and Periodic Scheduler methods. Semaphores and Mutex were also Implemented.