

LOKESH PANDITI

Embedded Systems & Firmware Developer

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Aspiring Embedded and Systems Programmer with strong interest in low-level software development, embedded systems, firmware engineering, and operating system internals. Skilled in C, C++, Rust, Python, and AArch64 Assembly, with hands-on experience in hardware-software interfacing, communication protocols, distributed embedded systems, and asynchronous firmware architectures. Passionate about building efficient, reliable, and predictable systems from first principles

PROJECTS

ESP32 UART Serial Shell

https://github.com/thirstymelon/esp32_uart_shell.git

C • ESP32 • ESP-IDF • PlatformIO

- Developed a modular UART-based command shell for ESP32 using ESP-IDF and FreeRTOS
- Implemented a custom command parser supporting argument validation, negative integer parsing, and dynamic command registration
- Designed a Linux-style interactive serial interface with command history, ANSI terminal formatting, and structured HELP generation
- Built reusable command handling architecture with clean separation between shell core, parser, and command modules
- Optimized UART input handling with buffered non-blocking reads and robust serial line processing
- Added extensible command framework enabling easy integration of future debugging and embedded utility commands
- Focused on embedded software architecture, maintainability, and low-level serial communication design principles

ESP32 Mesh Chat System

<https://github.com/thirstymelon/esp32Mesh.git>

C++ • PainlessMesh • ESPAsyncWebServer • AsyncTCP • U8g2lib

- Designed and developed a decentralized ESP32 mesh communication system enabling real-time messaging without internet or router dependency
- Implemented multi-hop packet routing with deduplication for reliable and loop-free message propagation across nodes
- Engineered a distributed OTA firmware update framework enabling firmware propagation across the mesh from a single source node
- Developed a custom chunk-based OTA transfer protocol with MD5 integrity verification, acknowledgments, and fault-tolerant retransmission handling
- Built a non-blocking asynchronous architecture supporting concurrent mesh networking, OTA processing, UI rendering, and web services
- Created a responsive web dashboard for real-time chat monitoring, node visualization, and diagnostics
- Integrated SSD1306 OLED display for live node status, peer metrics, and message previews
- Configured ESP32 nodes in simultaneous Wi-Fi AP + STA mode, allowing each node to operate as both client and relay/router

SKILLS

Programming Languages : C, C++, ARM64 Assembly, Rust, Python

Frameworks : ESP-IDF, Arduino

Protocols : UART, I2C, SPI, CAN

Tools & Platforms : Git, GitHub, PlatformIO, VSCode, ESP32, ESP8266

Core Concepts : RTOS, Interrupts, Clock, Timers, ADC, Debugging

EDUCATION

Bachelor of Technology in Computer Science, Parul University

2023 – 2027