Alejandro Ramirez

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Skills

- **Languages:** C, C++, Assembly, Python
- **Embedded Technologies**: UART, SPI, I2C, I2S, ADC, PWM, MQTT, FreeRTOS, ROS
- **Tools**: GDB, QEMU, Serial Debuggers

Experience

Embedded Software Developer, IEEE Region 5 Robotics Competition — Brownsville, Tx
Python|C++|PWM|ROS|Embedded Systems — Dec 2024 – April 2025

- Designed 5+ optimized algorithms improving robotics efficiency by 20%, enabling faster sensor response, smoother actuator control, and more reliable autonomous behavior.
- Engineered bare-metal motor control routines that synchronized PWM generation with sensor feedback, reducing latency by 30% while ensuring stable real-time response.
- Developed firmware bridging hardware interfaces with ROS software subsystems, enabling seamless cross-domain communication and improving real-time robotics performance by 15%.
- Validated hardware modules against subsystems, reducing errors by 40% and ensuring reliable performance.

Projects

Bare-metal RTOS Kernel Development, Embedded Systems Project — Dec 2025 - Present
C|Assembly|GDB Debugging|Microcontrollers|Git

- Implement a custom RTOS kernel from scratch, including task scheduler, tick timer setup, and context switching routines written in C and Assembly for deterministic execution.
- Introduce a system-level analysis task that monitors timing anomalies and delivers adaptive control signals to maintain deterministic real-time behavior.
- Validate kernel timing and memory usage behavior using breakpoints, trace buffers, and cycle-accurate profiling tools, ensuring predictable context switching and reliable task execution.

Raminox, Personal Project Team Lead — July 2025 – Present
C|C++|FreeRTOS|I2C|I2S|ADC|Git

- Lead a 4-person team in developing a custom embedded device with integrated wireless transceivers, enabling text like messaging and interactive applications in connectivity dead zones.
- Architect modular software architecture supporting real-time user interaction, multiplayer gaming, and resilient peer-to-peer data exchange using direct radio protocols.
- Interpret component schematics and reference manuals to design low-power system architecture and power regulation, reducing signal errors by 25% and extending battery life by 35%.

MicroUSC, Project Lead — Mar 2025 – July 2025
C|Assembly|FreeRTOS|UART|Git

- Directed a modular UART framework with fixed-size binary commands, reducing parsing cycles by 25% and lowering packet loss across subsystems.
- Optimized host CPU utilization by offloading packet parsing and validation to external processing units, reducing CPU load by 30% and boosting throughput by 30%.

Organizations

Institute of Electrical and Electronics Engineers, Member — Aug 2024 – Present

- Organized and contributed to collaborative engineering projects, fostering cross-disciplinary teamwork and embedded system problem solving.

Education

University of Texas Rio Grande Valley — Edinburg, Tx
BS in Computer Engineering — Anticipated Grad. Date: May 2027

- GPA: 3.68/4.0