Alejandro Ramirez

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Skills

- **Languages:** C, C++, Assembly, Python
- Embedded Technologies: UART, SPI, I2C, I2S, ADC, PWM, MQTT, FreeRTOS, ROS2
- **Tools**: GDB, QEMU, Serial Debuggers, Firmware Utilities

Experience

Embedded Software Developer, IEEE Region 5 Robotics Competition — Brownsville, Tx
Python | C++ | PWM — 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.
- Integrated ROS2 subsystems with a 7-person team, enabling seamless hardware-software communication and improving real-time robotics performance by 15%.
- Validated hardware modules against subsystems, reducing errors by 40% and ensuring reliable performance.

Projects

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

- 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%.

RetePulse Connect, Embedded Systems Project — July 2025 – Aug 2025
Python | C++ | MQTT | OTA | Linux

- Developed embedded firmware enabling full MQTT control of up to 10 devices, with continuous bidirectional messaging that monitored connectivity, state changes, and fault conditions.
- Built subsystem-safe routines for sensors, hardware control, and error detection, delivering deterministic performance with reliable feedback.
- Integrated over-the-air update workflows and automated state-reporting, reducing manual intervention by 40% and improving long-term maintainability.

MicroUSC, UART 4-byte Command System — Mar 2025 – July 2025
C | Assembly | FreeRTOS | UART

- Developed a modular UART framework with fixed-size binary commands, reducing parsing cycles by 25% and lowering packet loss across subsystems.
- Reduced host CPU load by 30% and boosted throughput by 20% by offloading 32-bit data packets to external processing.

Organizations

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

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

Education

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