

# Role Fit: Shure Senior Embedded Software Engineer

**Context:** This page maps the Shure job requirements to specific project evidence in this portfolio. Each section below corresponds to a key requirement, with links to relevant projects and explanations of how they demonstrate the skill.

**Professional Experience Note:** While this portfolio showcases academic and personal projects, my professional experience at Ford involved rigorous Ethernet/IP/TCP/UDP protocol conformance testing, packet analysis, and the implementation of deterministic CI test harnesses.

## Design, develop and test embedded software and associated components for audio products (C/C++)

- **Real-Time Audio Separation:** Teensy firmware, I2S/UART C/C++ code, Raspberry Pi processing and multithreaded Python demos demonstrating low-latency embedded audio capture and processing.
- **Analyzing Tennis Matches Based on Audio:** MATLAB-based audio signal processing and algorithm development (transient detection, spectral analysis) relevant to audio product R&D.
- **Stratum Synthesizer:** assembly-level audio engine and drivers showing deep knowledge of audio signal path and constraints.

## Hardware drivers, embedded software applications, audio and control networking (C/C++)

- **Stratum Synthesizer:** speaker and SD drivers, low-level peripheral control.
- **Zumo Shield Robot:** STM32 PWM, timers, UART and GPIO; illustrates driver usage and hardware control.

## Real-time, multitasking, and OS concepts (Embedded Linux / threads / synchronization)

- **Real-Time Audio Separation:** Embedded Linux user-space on Raspberry Pi + concurrency + synchronization.
- **Zumo Shield Robot:** microcontroller timing/interrupts and real-time control loop design.

## Networking & protocols (UART, I2S, possibility to work with Ethernet/TCP/UDP/Wi-Fi)

- **Professional:** Ethernet/IP/TCP/UDP (protocol conformance + packet analysis) - see resume for Ford experience.
- **Projects:** **Real-Time Audio Separation:** I2S audio capture and UART streaming; demonstrates embedded audio streaming concepts.

## Software architecture, design, and testing (reviews, unit/integration tests)

- **Toyota Auto-Validation:** demonstrates test automation and reporting.
- **Professional:** Experience with SonarQube rollout, deterministic builds, and harness-based validation.
- **Process:** I prioritize clear documentation, peer reviews, and testability (see reports included with each project).
- **Organization:** I estimate, organize, and document tasks as part of the standard engineering workflow.

## Hardware debugging and release processes

- **Zumo Shield Robot** and **Stratum Synthesizer** show hardware bring-up, telemetry, and iterative debugging workflows; **Toyota demo** shows validation and reporting practices.

## Version control and documentation

- Full repositories and README/USAGE/OVERVIEW docs are included with each project; this portfolio itself is version-controlled and deploy-ready.
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