Vishal **Coelho**

Staff Firmware Engineer

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Summary

Staff Firmware Engineer with 15 years of experience designing and delivering embedded software for audio, wireless, and industrial control systems. Expert in low-power Arm Cortex-M platforms, RTOS and bare-metal systems, and DSP optimization. Proven ability to lead cross-functional teams, influence product specifications, and deliver production-quality firmware deployed in millions of devices worldwide. Recognized for driving innovation, reducing time-to-market, and shaping next-generation system architectures.

Core Competencies

Embedded Development: Bare-metal, RTOS, DSP, low-power optimization
Protocols: SoundWire (SDCA), WBMS, SPI, I^2C, PMBus, UART
System Design: Firmware architecture, power management, functional safety, CI/CD
Languages: C, Python, C++, Arm & C28x assembly, MATLAB
Tools: VSCode, Keil, Code Composer Studio, Debug/JTAG, Git/Gerrit, Atlassian, JFrog

Professional Experience

Cirrus Logic

Staff Firmware Engineer — *2022 - Present*

- Developed production-quality firmware for PC audio codecs deployed in laptops from Dell, HP, and Lenovo (millions of units shipped).
- Spearheaded end-to-end software component development, including requirements, architecture, validation, and CI/CD integration.
- Implemented **Smart Microphone Processing Unit (SMPU)** to offload wakeword detection from host system DSPs, delivering double-digit power savings by enabling host sleep mode.
- Designed and delivered the industry's first **Sidecar interface** to aggregate multiple amplifiers behind a single codec, reducing system complexity and enabling innovative laptop audio designs.

Texas Instruments

R&D Software Engineer (Connectivity) · Member, Group of Technical Staff — *2017 - 2022*

- Led firmware development of the lower MAC for TI's proprietary **Wireless Battery Management System (WBMS)** protocol, adopted by multiple Tier-1 EV OEMs.
- Designed power management module that achieved **32% lower current consumption** than OEM targets, significantly improving battery pack lifespan.
- Co-authored multiple **technical disclosures** and influenced WBMS system specification with efficient synchronization algorithms and power-optimized radio usage.
- Collaborated across marketing, systems, and analog teams to ensure compliance with **automotive functional safety standards (ISO 26262)**.
- Developed proprietary RF performance test examples (PER, RSSI, throughput) that cut validation time by **10x** across multiple modulation schemes.

Texas Instruments

Applications Engineer (C2000) — *2010 - 2017*

- Owned software development for Math & DSP accelerator IP, including MATLAB prototyping, optimized C28x assembly, CI/CD pipelines, and technical documentation.
- Delivered foundational libraries used across all **C2000 real-time control solutions**, enabling industrial and automotive motor control, PLC, and digital power systems.
- Developed firmware for the **first UL 1699B-certified DC Arc Detection system** for solar PV, achieving <100 ms arc detection response.
- Authored **whitepapers, user guides, and application notes** that became key references for engineers worldwide.

Patents & Disclosures

- Multiple invention disclosures filed at Texas Instruments related to wireless network formation, resynchronization, and preservation of data integrity in wireless systems (details available upon request).

Additional Information

- Active involvement with Scouts, Pack #9.