MUHAMMAD SHAFQAT ASHRAF

Embedded & DSP Engineer || ARM Cortex-M || Signal Processing || C/C++ || MATLAB

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SUMMARY

Electrical Engineer with hands-on experience in embedded systems and a growing specialization in Digital Signal Processing (DSP) and communication systems. Skilled in real-time firmware development, signal acquisition, and embedded communication protocols, with exposure to modulation techniques, signal processing workflows, and hardware-software integration.

Experienced in ARM Cortex-M platforms, IoT communication (BLE, NB-IoT), and system-level debugging. Strong interest in SATCOM systems, SDR platforms, and DSP algorithm development, with practical experience bridging embedded systems and real-time data processing.

WORK EXPERIENCE

Embedded Firmware Engineer — **OCT 2025 - Present**

Techanzy Limited - Lahore, Pakistan

- Developed real-time embedded firmware in C/C++ for ARM Cortex-M platforms (nRF52 DK, nRF9160).
- Designed and implemented Zephyr RTOS-based applications including task scheduling, interrupt handling, and inter-task communication.
- Developed low-level peripheral drivers (UART, SPI, I2C, GPIO, ADC).
- Implemented secure UART-based authentication protocol between ESP32 and nRF platform to ensure data privacy and device validation.
- Integrated BLE and NB-IoT communication stacks for IoT connectivity.
- Performed board bring-up, firmware debugging, and hardware validation using J-Link debugger and lab instrumentation.
- Optimized firmware for power efficiency in IoT applications.
- Maintained version control using Git.

AI Systems Deployment Engineer (Embedded + Edge AI) — **Hackathon**

Techanzy Limited

- Deployed AI voice agents using ElevenLabs API integrated with Raspberry Pi 4.
- Designed physical AI interaction system combining embedded hardware with cloud-based voice AI.
- Implemented secure communication between edge device and AI processing module.
- Managed full system deployment including configuration, testing, and client demonstration.
- Ensured stable real-time voice response performance.

Process Engineer — **July 2025 - OCT 2025**

Xiaomi Mi Technology - Lahore, Pakistan

- Supported embedded hardware testing, PCB validation, and electronic system troubleshooting.
- Assisted in firmware bring-up activities and peripheral-level validation.
- Prepared technical documentation, feasibility notes, and system improvement reports.
- Coordinated with cross-functional teams for smooth technical operations.

Electrical Engineer (Manufacturing Excellence) — **Aug 2024 - July 2025**

Challenge Apparels Limited - Lahore, Pakistan

- Coordinated cross-functional engineering teams to optimize manufacturing processes, technical workflows, and system efficiency.
- Performed system-level analysis and troubleshooting to identify bottlenecks and support continuous process optimization.
- Developed and maintained technical, process, and compliance documentation aligned with operational and quality standards.

CORE COMPETENCIES

- Digital Signal Processing (DSP Fundamentals)
- Communication Systems (Modulation/Demodulation, Signal Analysis)
- Embedded Systems & Real-Time Firmware
- Signal Acquisition & Processing (Time/Frequency Domain)
- Software Defined Radio (SDR – Conceptual Understanding)
- Wireless Communication: BLE, NB-IoT
- MATLAB / Python (Signal Processing – Learning/Applied)
- ARM Cortex-M Development
- Hardware-Software Integration

Technical SKILLS

Programming:

- C, C++, Embedded C, Python, Assembly

DSP & Communication::

- Signal Processing Fundamentals, FFT (conceptual/practical), Filtering Basics, Modulation Techniques (PSK, FSK – theoretical), Data Acquisition

Embedded Platforms:

- ARM Cortex-M, nRF52 DK, nRF9160, ESP32, Raspberry Pi 4

RTOS & Firmware:

- Zephyr RTOS
- Interrupt Service Routines (ISR)
- Inter-task Communication
- Memory & Power Optimization

Communication Protocols:

- UART, SPI, I2C, BLE, NB-IoT

Tools:

- MATLAB, LAB VIEW (Basic to Intermediate)
- Segger Embedded Studio
- J-Link Debugger
- Oscilloscope
- Logic Analyzer
- Git

Soft SKILLS

- Problem Solving
- Analytical Thinking
- Team Collaboration
- Effective Communication
- Adaptability to Emerging Technologies
- Attention to Detail
- Leadership in Technical Projects

EDUCATION

Bachelor of Electrical Engineering — 2020 - 2024
University of Engineering and Technology Lahore

Intermediate (Pre-Engineering) — 2018 - 2019
Punjab Daanish Boys School DG Khan

LANGUAGES

- Urdu
- English
- Chinese (Beginner Level)