Md Shofiqul Islam

Embedded Linux | IIO Kernel Driver Author | ARM SoC | Zephyr RTOS | Medical Device Software

Espoo, Finland | Finnish Permanent Residence Permit | Open to Europe and Ireland

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Professional Summary

Embedded Linux engineer with **5+ years of professional experience** building production-quality ARM firmware, HAL-level device drivers, and real-time software for mission-critical SoC platforms, combined with active upstream Linux kernel contributions across 8 subsystems. Author of the upstream Linux kernel IIO driver for the Maxim/ADI MAX86150 ECG and PPG biosensor (under active review by Jonathan Cameron, IIO maintainer) and the first upstream driver for the TI ADS1299 8-channel 24-bit EEG/EMG ADC. Zephyr RTOS driver merged into mainline. Python test automation and CI/CD background from regulated embedded projects. Biomedical Engineering background providing direct understanding of medical device signal chains and safety-critical software quality requirements. Eligible to work across the EU without visa sponsorship.

Technical Skills

- **Embedded C/C++:** HAL and register-level device driver development for ARM Cortex-M/A; bare-metal and RTOS firmware; memory-mapped I/O, ISRs, DMA control; Linux kernel coding standards
- **Linux Kernel:** IIO, net-next, ASoC, XFS, SCSI, DRM/Accel, power supply, SoC subsystems; regmap, kfifo, DMA-safe buffer design; interrupt-driven triggered buffers; Device Tree bindings; 15 accepted upstream patches
- **RTOS & Real-Time:** Zephyr RTOS; interrupt-driven data pipelines; race condition analysis; spinlocks, mutexes, semaphores; deterministic execution under hard real-time SLAs
- **Sensor & Converter Interfaces:** I2C, SPI, UART at register level; 24-bit precision ADC interface (MAX86150 ECG/PPG, ADS1299 EEG/EMG, MAX30101/MAX30102 pulse oximetry); FIFO management; DMA-safe burst reads
- **Platform & Build:** Yocto/Bitbake cross-compilation for ARM; Linux kernel build and configuration; Docker; cross-toolchain management
- **Debug:** GDB/KGDB, JTAG/SWD, ftrace, perf, tracepoints; static analysis (sparse, smatch, checkpatch); root-cause analysis of kernel panics, NULL dereferences, and interrupt races
- **Test & CI/CD:** Python and Robot Framework test automation; GitHub Actions; unit and integration test plan design; automated regression detection
- **Languages:** C (expert); C++17/20; Python (senior, automation); Bash
- **Medical Device:** IEC 62304 Class B software lifecycle; biosignal acquisition pipelines; ROS 2 integration for medical robotics; DSP for biomedical signals
- **Tools:** Git, GDB, JTAG, Docker, GitHub Actions, Gerrit, Jira, Agile/Scrum

Work Experience

SoC Software Engineer *Mar 2023 – Present*

Nokia, Espoo, Finland

- Linux kernel LTS upgrades and BSP maintenance for Nokia legacy 5G SoC platforms; Yocto/OpenEmbedded layer management and CI/CD regression pipeline ownership.
- Embedded C and C++ development for Nokia 5G L1 radio platform: real-time signal processing, hardware integration, and driver-level implementation.
- Embedded C development for Nokia **5G and 6G ASIP platforms** using **Synopsys development tools**: driver implementation and hardware integration for application-specific instruction-set processors.
- Designed and implemented a **C library for 5G and 6G channel estimation algorithms** used in interference cancellation development — full ownership from requirements through integration.
- **Technical authority** for interface specifications between SoC hardware, firmware, and software subsystems; led formal design reviews and change control across global engineering teams.

Software Development Engineer (RF/L1) *Mar 2022 – Mar 2023*
Nokia, Oulu, Finland

- Embedded C++ development for Nokia 5G L1 radio signal processing platform.
- **Wind River Linux and VxWorks** middleware adaptation and integration for hard real-time 5G L1 processing on ARM SoC platforms.
- Yocto/OpenEmbedded meta layer development and maintenance for L1 radio platform targets; hardware-software integration and verification.
- Real-time embedded software development under hard real-time scheduling requirements; performance regression analysis with perf and ftrace.

Software Test and Automation Engineer *Sep 2021 – Feb 2022*
Etteplan, Tampere, Finland

- Python and Robot Framework automated test suites for regulated embedded customer projects; requirements traceability; CI pipeline integration.

Master's Thesis Worker *Jul 2018 – Dec 2018*
Sooma Medical, Helsinki, Finland

- DSP-based electrical field modelling pipeline for clinical brain stimulation planning in a regulated medical device environment.

Open Source Contributions

Linux Kernel IIO — MAX86150 ECG and PPG Biosensor Driver lore.kernel.org/linux-iio

- Production-quality IIO driver for the Maxim/ADI MAX86150 integrated ECG and PPG biosensor: I2C/regmap, 32-entry FIFO, DMA-safe 24-bit burst reads, interrupt-driven triggered buffer, power management, Device Tree bindings. Diagnosed and fixed two kernel panic scenarios: NULL dereference race on `active_scan_mask` and stale interrupt status race causing spurious FIFO reads. Submitted v7; under active review by IIO maintainer Jonathan Cameron.

Linux Kernel IIO — ADS1299 8-Channel 24-bit EEG/EMG ADC Driver lore.kernel.org/linux-iio

- First upstream Linux kernel driver for the TI ADS1299 precision 8-channel 24-bit biopotential ADC: SPI/regmap, continuous data conversion, DMA-safe burst reads, interrupt-driven sampling, Device Tree bindings. Submitted v2 July 2026.

Zephyr RTOS — MAX30101/MAX30102 Pulse Oximeter Driver PR #108697 – merged

- Complete sensor driver merged into Zephyr RTOS mainline: I2C, interrupt-driven triggered sampling, Devicetree bindings, Kconfig, CI. Reviewed by Intel and Nordic Semiconductor maintainers.

Linux Kernel — Multi-subsystem Patches lore.kernel.org

- 15 patches across IIO, net-next, ASoC, XFS, SCSI, DRM/Accel, power supply, and SoC subsystems; reviewed and accepted by maintainers at Intel, Microsoft, Red Hat, and Linaro.

Education

Master of Health Sciences (M.H.Sc.) in Biomedical Engineering *2016 – 2021*
University of Oulu, Finland
Specialisation: Biomechanics and Imaging. DSP, medical device hardware-software interfacing, safety-critical system design. Thesis: DSP electrical field modelling pipeline for clinical brain stimulation at a Finnish medical device company.

Master of Science (M.Sc.) in Computer Science and Engineering *Jan 2014 – Dec 2015*
Islamic University, Bangladesh

Bachelor of Science (B.Sc.) in Electrical and Electronics Engineering *Oct 2008 – Feb 2013*
International Islamic University Chittagong (IIUC), Bangladesh

Certifications

Linux for Engineers – The Linux Foundation | Introduction to RISC-V (LFD110) – The Linux Foundation | Generative AI and Large Language Models – Coursera