

Michał Jurek

EMBEDDED SOFTWARE ENGINEER

Łódź, Poland | +48 662 803 973 | michal.jurek220@gmail.com | linkedin.com/in/jurekmichal | github.com/michalji

PROFESSIONAL SUMMARY

Embedded Software Engineer with 4+ years of experience in safety-critical automotive ADAS software (ISO 26262, ASIL D, AUTOSAR) and ultra-low-latency 5G Layer 1 baseband development on custom ASIC platforms. Proficient in C, C++, Assembly and Python across the full embedded development cycle — requirements, software architecture, driver development, board bring-up, and HIL/SIL verification. Strong hands-on hardware background: PCB design, oscilloscope and logic-analyzer debugging, and component-level electronics repair. Recognised internally in 2023 for exemplary performance and rapid professional growth.

PROFESSIONAL EXPERIENCE

R&D Embedded Software Engineer | Ericsson, Łódź Nov 2025 – Present

- Develop 5G NR Layer 1 (physical layer) baseband software in C and Assembly for radio units, focused on ultra-low-latency signal processing in the data path close to the antenna.
- Implemented physical-layer signal processing features — beamforming, gain control, and ripple compensation — for time-critical pipelines on a proprietary ASIC platform.
- Delivered a synchronization feature for hardware accelerators that reduced buffer sizes and ensured seamless data handover between processing stages, increasing system throughput.
- Designed a configurable delay mechanism for 5G channels, enabling end-to-end lab testing with short radio-to-baseband cabling.
- Migrated legacy hardware functionality to a new ASIC generation and wrote custom Assembly routines for internal accelerator architectures.
- Maintain and improve Layer 1 software through bug fixes and stability enhancements; supported onboarding and knowledge sharing within a newly established engineering unit.
- Verify features across simulation and hardware environments (traffic and signalling configuration, timing and data-integrity analysis); contribute to code reviews and technical documentation.

R&D Embedded Software Engineer | ZF Automotive Systems Poland, Łódź Jun 2022 – Nov 2025

- Developed, debugged and tested safety-critical embedded software for ADAS ECUs across multiple vehicle platforms, compliant with ISO 26262 (ASIL D) and MISRA C; provided technical leadership through rigorous code reviews.
- Configured AUTOSAR (Vector MICROSAR) OS and base software for real-time safety co-processors: task scheduling, partitioning, and peripheral configuration.
- Integrated and configured vehicle communication stacks — CAN, LIN, Automotive Ethernet, and DoIP — ensuring reliable operation across vehicle networks.
- Led cross-functional software/hardware bring-up of a new ECU prototype platform: resolved integration bottlenecks, validated electrical integrity, and reduced bring-up time.
- Architected a safety-certified power-management platform component, subsequently reused across multiple customer projects.
- Developed low-level Assembly startup code and resolved complex defects in startup and diagnostics stacks on Aurix TriCore (Lauterbach TRACE32).
- Implemented a custom LIN transceiver driver for an automotive Linux platform, enabling communication with an ultrasonic sensor controller.
- Designed and maintained HIL and SIL test benches; executed unit, integration and system testing with full V-model traceability; authored requirements and software architecture documentation.
- Verified software robustness through static and dynamic analysis, ensuring standards compliance and memory safety in safety-critical environments.

Service Technician | PentaPro Service, Łódź Jun 2021 – Jun 2022

- Programmed and configured Siemens PLCs (STEP 7) and Simatic HMI panels for production-line control, diagnostics and manual operation.
- Diagnosed and repaired industrial control cabinets, motor drives/VFDs and pneumatic systems from electrical and pneumatic schematics, ensuring production continuity.
- Maintained industrial fieldbus communication (Profibus, Profinet, Modbus) and supported factory expansion under LOTO and machine-safety standards.

SELECTED PERSONAL PROJECTS

- **USB Media Controller (STM32F4, FreeRTOS, TinyUSB)** — designed and built a composite USB device (CDC + HID consumer control) on STM32F4 with FreeRTOS and TinyUSB: rotary encoder and hardware-debounced button inputs via GPIO interrupts, DMA-based UART, and a Windows companion app in C++/WinRT.
- **RF Test-Instrument Reverse Engineering & Repair** — reverse engineered legacy calibration software for an Agilent E4425B signal generator in Ghidra, reimplemented the calibration procedures (binary search + Newton-Raphson) as open-source Python/PyVISA scripts, and performed component-level repair of the instrument's sampler board.
- **DIY Gantry CNC Mill** — designed and built a 3-axis machine for precision aluminium machining: Mesa 7i96S FPGA motion controller, LinuxCNC with real-time kernel tuning (CPU isolation, IRQ affinity), VFD spindle integration, and CAM programming in Fusion 360.
- **Smart LED Controller** — developed a custom ESP32-based controller with own PCB design (schematic capture, layout, bring-up) and dual power-supply architecture; firmware for analog and digital LED strips with MQTT integration into Home Assistant.

ACHIEVEMENTS

- 2nd place, company-wide internal hackathon — led a team that built a graph-based codebase indexing tool giving LLMs semantic code awareness (LSP, MCP, vector embeddings, graph algorithms).
- ZF internal recognition award (2023), granted for exemplary performance and rapid professional growth.

TECHNICAL SKILLS

Languages: C (MISRA C), C++, Python, Assembly (TriCore, custom ASIC ISAs), Bash
Automotive & Safety: ISO 26262 (ASIL D), AUTOSAR / Vector MICROSAR, OSEK, MISRA C, V-model, functional safety
Telecom / DSP: 5G NR Layer 1, 3GPP, O-RAN, beamforming, gain control, hardware accelerators, low-latency signal processing
RTOS & OS: Bare-metal firmware, FreeRTOS, AUTOSAR OS / OSEK, QNX, Embedded Linux
Hardware: Infineon Aurix TriCore, STM32, ESP32, TI TDA4 / Sitara, NVIDIA Orin, FPGA basics (VHDL)
Peripherals & Drivers: Low-level device drivers, DMA, GPIO / interrupt handling, timers / PWM, memory-mapped I/O
Protocols: CAN, LIN, Automotive Ethernet, DoIP, USB (CDC/HID), UART, SPI, I2C, MQTT, Profinet, Profibus, Modbus
Debugging & Tools: Lauterbach TRACE32, JTAG/SWD, GDB, Vector toolchain (CANoe, CANalyzer, CANape, DaVinci, vFlash, CANDela Studio), Tasking, oscilloscope, logic analyzer, Git / GitLab / Gerrit, CMake, Make, Bazel, DOORS, PTC Integrity
Testing & Quality: Hardware-in-the-Loop (HIL), Software-in-the-Loop (SIL), unit and integration testing, static and dynamic code analysis
Practices: Software architecture design, requirements engineering, code reviews, technical documentation, cross-functional collaboration
Electronics: PCB design and schematic capture (KiCad), board bring-up, component-level repair

EDUCATION

Bachelor's degree, Computer Science	University of Łódź	2021 - 2025
Electronics and Telecommunications (coursework)	Technical University of Łódź	2019 - 2021

LANGUAGES

Polish — native | English — professional working proficiency (B2/C1) | German — basic (A2)