



Ertuğrul Topçu

Embedded Systems Engineer

LOCATION

Turkey

EDUCATION

- **B.Sc. in Electronics and Communication Engineering**

Kocaeli University • 2019 – 2024

- **High School Diploma – Information Technologies & Electronics**

Abdurrahman Nermin Bilimli Industrial Vocational High School • 2012 – 2016

LINKS

GitHub

LinkedIn

Website

ABOUT

Product-focused Embedded Systems Engineer working across low-level firmware, custom electronics, embedded Linux, connectivity, backend infrastructure, and mechanical product development.

Experienced in register-level MCU development, custom HAL and driver design, RTOS-based architectures, USB HID, secure boot and DFU, sensor calibration, and hardware bring-up.

Developing the ERTotech Refleks Hall-effect arcade controller platform with a strong focus on measurable latency, signal integrity, power consumption, reliability, manufacturability, and field updates.

Built a Linux kernel transport and reverse-engineered the end-to-end protocol stack of a Goodix GXFP5130 fingerprint sensor operating behind an embedded controller, from EC mailbox communication to encrypted image capture.

EU citizen based in Turkey and open to product-focused embedded software opportunities in Germany, including hybrid, remote, and on-site roles.

EXPERIENCE

Founder (Pre-incorporation)

ERTotech

2024 – Present

Building ERTotech as an independent embedded product venture prior to formal incorporation. Leading end-to-end development of the Refleks Hall-effect arcade controller, including product architecture, custom electronics, low-level firmware, USB integration, secure boot and DFU, desktop software, enclosure design, prototyping, supplier coordination, and production planning.

Embedded Systems Engineer

RMIRA Teknoloji A.Ş.

01/2024 – 02/2024

Worked as a full-time embedded systems engineer, independently designing hardware and developing firmware for vehicle tracking systems, including CAN-based devices, MQTT communication, and RTOS-oriented system design.

Embedded Systems Intern

PARS AR-GE A.Ş.

03/2024 – 05/2024

Developed a vehicle tracking system prototype using ESP8266 and u-blox GNSS modules, handling GNSS data acquisition, cloud transmission, offline storage, and on-device debugging with display and EEPROM.

PROJECTS

Hall-Effect Arcade Controller Platform

Designed the ERTotech Refleks competitive-grade arcade controller from concept to production prototype, including Hall-effect sensing, custom PCB revisions, STM32 firmware, 1 kHz USB HID, DInput/XInput support, calibration, a desktop control panel, secure DFU, secure boot, enclosure CAD, and manufacturing decisions.

Goodix GXFP5130 Linux Driver & Protocol Reverse Engineering

Developed a Linux platform driver and /dev/gxftp userspace transport for a Goodix fingerprint sensor behind a Nuvoton embedded controller. Reverse-engineered the EC mailbox protocol, packet framing, checksums, timing, GPIO handshakes, device configuration, calibration, TLS 1.2 PSK communication, fingerprint events, and encrypted image capture, with libfprint integration as the target.

Secure IoT Infrastructure (Raspberry Pi & VPS)

Built a secure IoT communication infrastructure using Raspberry Pi and VPS, integrating VPN, MQTT, HTTPS, and mutual TLS for reliable device-to-server data exchange.

SKILLS

Firmware & Low-Level Systems

C / C++

Bare-metal MCU development

Interrupts, Timers, DMA

Embedded Linux Systems

Embedded Linux bring-up

Yocto / Buildroot

Cross-compilation toolchains

USB HID and custom descriptors

State machines and real-time logic

FreeRTOS

Secure boot, DFU, and firmware update design

Custom HAL and peripheral driver development

Remote debugging and deployment

Systemd services and process management

Linux-based device integration

MCU Platforms & Architectures

STM32 (C0, C1, WB, H7, MP1)

MSP430

ESP32 / ESP8266 (ESP-IDF, AT)

ARM Cortex-M

Hardware & PCB Design

Schematic and PCB design (Altium, KiCad)

Board bring-up and hardware debugging

Oscilloscope and logic analyzer usage

Signal integrity and hardware debounce

Basic EMC / EMI considerations

Power design fundamentals (LDO, buck, PoE)

Communication & Protocols

UART / SPI / I2C

USB

CAN

BLE

GNSS / NMEA

MQTT

HTTP / HTTPS

mTLS

IoT & Infrastructure

Secure device-to-server communication

Raspberry Pi based systems

VPS and VPN integration

Device provisioning and telemetry

Local and remote update mechanisms

Tools & Development Workflow

Git-based workflows

CLI-based tooling

Custom HAL and BSP development

Reproducible build environments

Linux-first development

CMake, Ninja, GCC ARM, OpenOCD, J-Link, and ST-LINK

CERTIFICATES

Version Control Systems: Git and GitHub

BTK Akademi • 2023

Mastering Microcontroller and Embedded Driver Development

Udemy (FastBit Embedded Brain Academy) • 2023

Learn to Design Your Own Boards

Udemy • 2023

LANGUAGE

Turkish(Native)

English(Intermediate to Upper-Intermediate (B1–B2))