Provided projects are my hobby projects, but I have also designed professional PCBs as part of my work, for example:

- Modifications to improve the ESD/EMC immunity of a 6-layer PCB used in one of the most advanced mass-produced devices in the ES-SYSTEM portfolio.
- Complete PCB designs created from scratch for automotive-class, medical, emergency-lighting, EV charging, and wireless embedded devices.

As part of my professional work, I create electronic devices from A to Z; however, PCB design itself is the area to which I have devoted the most time and attention.

I designed two automotive-class PCBs completely from scratch — starting from assumptions and requirements, through component selection, block diagrams and schematics, up to the PCB layout itself.

The first version was a 2-layer PCB designed with 10/10 mil design rules, followed by a second, significantly denser 2-layer version using 6/6 mil trace/space rules, while keeping the same functionality and schematic concept — ELTE GPS automotive I/O controller.

I have also designed and modified many 2-, 4-, and 6-layer PCBs for emergency-lighting systems.

I have worked on PCBs for medical devices as well.

Overall, this gives me practical professional experience with dozens of PCB designs, revisions, and production improvements across automotive, medical, emergency-lighting, EV charging, wireless embedded systems, and industrial electronics.

PROFESSIONAL PCB EXPERIENCE:

- 2 PCB versions for ELTE GPS, designed completely from scratch — automotive-class STM32-based I/O board with CAN, RS232, UART, analog and digital I/Os, signal conditioning, protection circuits, SMPS, drivers, latches, and input fuses.
- 5 PCB versions of the Vertex Wireless controller for ES-SYSTEM.
- 2 PCB versions of the wired Vertex controller, a product that has been present on the market for years — modifications, ESD/EMC immunity improvements, and other design corrections.
- Approximately 10 2-layer PCBs for emergency-lighting luminaire electronics — improvements, modifications, and corrections.
- Approximately 10–15 4- and 6-layer PCBs for emergency-lighting electronics — design improvements, modifications, EMC/ESD-related corrections, and production updates.
- 3 revisions of a 4-layer PCB for an EV vehicle charger / WallBox.
- Approximately 10 revisions of a battery-powered medical measurement device with wireless communication — 2-layer PCB.

MORE INTERESTING HOBBY PCB PROJECTS:

- 2-layer PCB for the Display Portal device, approximately 200 components — version with 7 independent WS2812 channels (v1).
- 2-layer PCB for the Display Portal device, approximately 200 components — significantly redesigned version with 4 WS2812 channels (v2).
- 4-layer PCB for an STM32H743-based drone controller, designed within one weekend as part of a concept for a drone-detection system intended for border monitoring.
-

ONE OF THE MORE INTERESTING PROFESSIONAL PCB PROJECTS I WORKED ON:

6-layer PCB of a mass-produced emergency-lighting controller for ES-SYSTEM.

I worked on modifications and improvements of the ESD/EMC immunity of one of the most advanced emergency-lighting controllers in the ES-SYSTEM product portfolio.

The modifications were introduced directly into a PCB that was already actively used in devices being manufactured and sold to customers.

My modifications increased the device immunity level against fast transient / burst-type interference by 347%, confirmed during laboratory testing in which I personally participated at the National Institute of Telecommunications in Warsaw.

After successful verification, the PCB revision containing my modifications was introduced directly into mass production.

This work involved not only modifying the PCB itself, but also identifying and localizing the EMC problem, analyzing possible coupling paths, introducing hardware improvements, and verifying their effectiveness through repeated laboratory testing.

ADDITIONAL HARDWARE AND PCB-RELATED EXPERIENCE:

Apart from PCB design itself, I also had the opportunity to participate in the manufacturing of devices based on complex professional PCBs.

At Dantom Production Solutions in the UK, I worked on the assembly of telecommunications equipment, including 4G LTE transmitter/base-station electronics. This gave me an opportunity to closely inspect this class of hardware while performing professional THT assembly and soldering.

At HSW S.A., I worked with military-grade electronics while assembling and manufacturing electronic systems used in military equipment, including AHS Krab self-propelled howitzers. This allowed me to become familiar with differences between ordinary commercial electronics and military-grade construction, including PCB durability, mechanical robustness, assembly methods, reliability, and resistance to harsh operating conditions.

At Carkom, I had the opportunity to inspect, modify, and repair PCBs from dozens of different types of automotive LED lighting systems. This gave me practical insight into automotive electronics designed for high thermal stress, vibration, EMC requirements, heat dissipation, and difficult environmental conditions.

I also worked with electronics intended for power-generation facilities, including equipment used at a large gas-steam power plant, as well as with CNC machines and industrial control systems.

Combined with my PCB design experience, these projects gave me practical knowledge of how electronics are designed and manufactured for automotive, medical, industrial, telecommunications, emergency-lighting, and military applications.

More about my work and hobby projects can be found on

https://wojtron.pages.dev