Łukasz Przeniosło
Curriculum vitae

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WORK EXPERIENCE

● JULY 2017 – PRESENT

Przenioslo Electronics & Software, Szczecin
Hardware & Software Engineer (Owner)

Hardware and software design according to the client's needs and/ or specifications. See Appendix sections for more clients and projects references.

● MAY 2020 – DECEMBER 2021

Icotera Sp. z o.o., Szczecin
Hardware Subject Matter Expert

Hardware development processes management and verification.

● JUNE 2013 – JULY 2017

Mechatronic Engineering Sp. z o.o., Szczecin
Hardware & software engineer

Development and maintenance of hardware for the produced SMT machinery, writing firmware for the created hardware, writing testing PC applications, building prototypes.

● JULY 2012 – JUNE 2013

Mechatronic Engineering Sp. z o.o., Szczecin
Hardware & manufacture engineer

SMT machinery hardware assembly, faulty parts service, existing designs debugging.

EDUCATION

2014–16 **Electrical engineering**
MA DIPLOMA
West Pomeranian University of Technology, Szczecin

2010–14 **Electronics engineering**
BA DIPLOMA
West Pomeranian University of Technology, Szczecin

COURSES & LICENSES

2022 **Sages MISRA C**
Safe code based on MISRA C course

2020 **The Technology Academy**
RF & Microwave course

2018 **C++ Institute CLA & CLP**
Advanced C11 programming course

2017 **Unmanned Aerial Vehicle Operator**
Visual Line of sight (VLOS) license

Document last update date and time: 2023/12/16, 23:55. Up-to-date CV always under github.com/bremenpl/cv/blob/master/tex/cv.pdf

HONORS AND SCHOLARSHIPS

2017 **Szczecin's city president best thesis award**
Received for MA thesis: Universal smart electric motors controller for industry applications

2015 **Polish Minister of science and higher education scholarship**
Received in 2015 for academic achievements

SKILLS

HW PCB design & production, soldering, rapid prototyping, Altium Designer, Orcad/ Allegro, AVR, PIC, ARM, PowerPC, STM32, FPGA, C2000, MEMS, RF/analog, power electronics, low power, BMS, SBC

SW Assembly, C, Modern C++, MISRA C, Qt, QML, Matlab, Plecs, Spice, GIT, VHDL, DSP, FreeRTOS, motor control, Buildroot/ Yocto (Poky), Linux drivers, IoT, OPCUA, Unit testing

MISC Documentation (LaTeX, Doxygen, Office), HW/SW product management (design, pricing, production, BOM optimization)

COMMUNICATION

POLISH   Native language

ENGLISH   Full professional proficiency

GERMAN   Elementary proficiency

SOCIAL NETWORKING

LINKEDIN   linkedin.com/in/przenioslo

GITHUB   github.com/bremenpl

GITHUB   github.com/przenioslo

APPENDIX A: EXTENDED COMPETENCE LIST (HARDWARE)

- Digital circuits development based on discrete components or advanced IC's
  - MCU based designs, using IC's such as ARM Cortex M0/M3/M4/M7, PIC, AVR or C2000 families,
  - CPU based designs, using IC's such as NXP i.MX 6 and i.MX 7 series application processors or TI AM335x Sitara application processors,
  - FPGA based designs, using IC's such as Xilinx Spartan family or Lattice Mach family,
  - experience in high speed designs for SBCs (Single Board Computers) consisting of memories IC's such as: NOR/ NAND Flash, DDR3 RAM, SD cards and eMMC chips, Sata drives,
  - familiar with high speed designs utilized for:
    * reducing cross-talk and distortions,
    * reducing ground bounce,
    * reducing radiation (EMI),
    * differential pairs design and routing,
  - familiar with signaling/equalization and signal integrity provision techniques
  - knowledge about serial interfaces, such as: UART/ USART, I2C, I2S, SPI, QSPI, CAN, LIN, Ethernet, Ethercat.

- Analog circuits development based on discrete components and dedicated IC's
  - experience in audio analog front-end designs,
  - experience in building low voltage measurement circuits,
  - utilizing high resolution ADC's and DAC's,
  - good knowledge about analog circuits shielding and separation (i.e. ground start connections, guard rings, via shielding and stitching),
  - experience in RF analog front-end design. Utilized techniques:
    * output to antenna matching impedance circuits (Wavelength and Microstrip),
    * PCB antenna length tuning,
    * knowledge about network analyzer usage,
  - built devices in the following technologies/ frequencies (and wrote firmware for them):
    * Wifi, 2.4 Ghz (ESP8266 and ESP32),
    * Zigbee, 2.4 Ghz and 868 Mhz (Digi Xbee Digimesh),
    * Bluetooth, 2.4 Ghz (Nordic NRF chips),
    * 2G/ 3G, 820 - 2200 Mhz (u-Blox SARA U201),
  - good knowledge about the principles of operation of the basic discrete components such as BJT's, Mosfets, OP Amp's, Flip-flops, Multiplexers/ Demultiplexers etc.

- Power electronics circuits development based on discrete components and dedicated IC's
  - motor control drivers (from ground-up) for the following motor types: Stepper motors, DC motors, VCM (Voice coil) motors, BLDC and PMSM,
  - experience in creating hardware for industry grade robots utilized in SMT production, such as: Pick and Place machines, Stencil printers, conveyors and reflow ovens,
  - DC-DC converters (Buck and Boost converters),
  - built and programmed high voltage/ current (Lithium and Lead acid based) Battery Management Systems (BMS) and Uninterruptible power supplies (UPS) for power backup applications (civil, maritime and medical),
  - experience in building various battery chemistry devices and chargers (i.e.: Li-ion, Li-pol, LiFePo4 (LFP), Nimh, lead acid),
  - experience in building low power, energy harvesting, battery powered IoT devices.

- CAD/ CAM/ Simulation technologies, tools knowledge and usage experience:
  - long time Altium Designer user,
  - experience in schematics design and simulation,
  - experience in mixed signals design's PCB creation consisting of up to 12 layers stackups,
  - experience in creating multi PCB designs
  - experience in using SPICE and other simulation tools, such as: LTSpice, SIMetrix, Simulink, Plecs,
  - experience in WiFi technology based (incl. AX) hardware development and testing.

APPENDIX B: EXTENDED COMPETENCE LIST (SOFTWARE)

- Hardware description languages:
  - proficient in VHDL code design,
  - less experienced in Verilog code design.

- Assembly
  - experienced in AVR Assembler space efficient code development for memory constrained devices,
  - generic knowledge of ARM and x86 assemblers for debugging purposes.

- C
  - long time experience in C89, C99 and C11 standars usage,
  - bare metal applications (no operating system),
  - real time operating systems applications, such as FreeRTOS,
  - embedded Linux based applications (ARM and PowerPC),
  - high efficiency x86 multiplatform applications,
  - Linux Kernel drivers development (character and network),
  - knowledge in the memory management field (MMU, DMA, dynamic memory allocation, memory structure architectures),
  - experience in multiprocess and multithread applications (good knowledge of multithreading principles),
  - experience in using generic and self written DSP libraries for applications such as: PID control, Fuzzy Logic control, audio signals processing, measurement data processing).
  - experience in using MISRA C and various Linter applications.
  - long time experience in designing firmware for various power management devices (BMS, UPS, motor control, switched converters).
  - long time experience in various Bootloader programs design.

- C++
  - long time experience in C++11, C++14 and C++17 standards,
  - build efficient applications for multiple operating systems: Windows, Linux, Mac OS, iOS, Android,
  - utilizing modern C++ concepts, such as Smart Pointers, Futures, Lambdas, Templates, Move semantics,
  - familiar with design patterns and principles such as SOLID or RAII,
  - familiar with Unit Testing principles,
  - experience in multithreaded application in low and high level domain,
  - long time experience in using Qt with QML and/ or Felgo frameworks. Utilized Qt technology for building truly multiplatform (desktop and mobile) applications,
  - experience in creating event driven applications,
  - built both backend (headless) and front end (GUI) applications,
  - knowledge about maintaining good balance between code readability/ quality and high performance,
  - knowledge of data structures and algorithms,
  - experience in both low level (TCP/IP, UDP) and high level (HTTP, FTP, SFTP, OPCUA, MQTT etc.) networking protocols and applications.

- Tools and Operating Systems
  - proficient in Unix/Linux, Windows and MacOs environments,
  - Linux build systems maintenance and design using Buildroot and Yocto (Poky) tools,
  - familiar with make, qmake and cmake building tools,
  - worked with multiple compilers: MSVC, GCC and LLVM,
  - working efficiently with GIT version control (and SVN if forced to),
  - familiar with Valgrind dynamic analysis tool,
  - familiar with GDB debugging tool both locally and remotely,
  - familiar with Gtest, Ceedling and Catch2 unit testing frameworks,
  - familiar with Jira and Confluence management and documentations tools.

APPENDIX C: EXTENDED COMPETENCE LIST (MISCELLANEOUS)

- Proficient in documentation preparation using
    - LaTeX,
    - Doxygen,
    - MS Office/ Libre Office
    - Confluence
- experience in hardware, software and mixed type of products leading in small teams. Long time interdisciplinary experience provides good diversity for various projects,
- can act as a standalone developer or a team player in a project,
- good at multitasking, can handle multiple sub-tasks simultaneously,
- experienced with developer to client relations handling,
- experienced with client to ODM relations handling,
- good at Power Point presentations (both preparing and giving them),
- experienced with working in multicultural environments.
- experienced with leading engineering teams in various embedded projects.
- experienced in 3D design (Rhino) and general 3D printing (mostly for support products, such as electronics devices prototype cases).
- long time Beaglebone and Raspberry Pi based systems designer (HW and FW/ SW).

Appendix D: Work references (clients/ employers)

This section lists some of the companies (clients or employers) I have worked for in the past. It provides only the basic information that is not covered by the NDA's/ contracts, such as company name, manager/ supervisor name + position at the time and contact info. The list is not sorted in any specific way- it is (time wise) randomly ordered.

- **Icotera Sp. z o.o.**
  Kim Esben Jorgensen (CTO), Danny van der Poel (CCO)
  contacts: Linkedin, Linkedin

- **Mechatronic Engineering Sp. z o.o.**
  Zygmunt Mijakowski (R&D director)
  contact: Linkedin

- **MacGregor Germany GmbH & Co. KG**
  Joerg Hering (Chief of Hardware & Software dept)
  contact: email

- **idoc A/S**
  Peer Mork (CEO), Morten Ford (Head of Projects & International Defense)
  contacts: Linkedin, Linkedin

- **West Pomeranian University of Technology**
  Krzysztof Penkala (PhD, EEng, Senior Lecturer)
  contact: Linkedin

- **Global Power Source Pte. Ltd.**
  Vinit Dipak Gandhi (Head of Business Development)
  contact: Linkedin

- **LINA Medical Polska Sp. z o.o.**
  Kamil Lata (Project manager
  contact: Linkedin

- **Apptimia Sp. z o.o.**
  Robert Rak (CCO)
  contact: Linkedin

- **Mpower Sp. z o.o.**
  Michał Bonisławski (CCO)
  contact: Linkedin

The section presents some of the projects I have participated in commercially. In some of them I participated partially, as an engineer in a bigger team. In others, I participated fully, providing a complete product from ground-up. The order in which the projects are listed is random and has no correlation with the order of listed companies in the prior section.

- **Battery management system (BMS) based on lead acid and lithium chemistry cells**
  FULL PRODUCT BRINGUP
  Designed the complete product from ground-up, including: client requirements evaluation, hardware components proposals, hardware schematics and PCB design, hardware simulations, firmware development, BOM optimization, prototype and mass production management and scheduling. The end product was intended for high power battery management installations in critical infrastructures, such as hospitals or server farms. The designed BMS allowed for accurate telemetry of the battery electrical and physical parameters. Self developed algorithm allowed for accurate battery internal impedance (IR) calculations.

- **FPGA based SBC controller module**
  HARDWARE DESCRIPTION AND KERNEL DRIVERS DEVELOPMENT
  Designed a board controller for a client provided, existing single board computer. The work involved complete VHDL code design for the controller FPGA (managing different hardware parts in real time), as well as writing the Linux kernel driver for the main on-board SoC communicating with the given controller.

- **Integrated impedance scanner for biomeasurement applications**
  FULL PRODUCT BRINGUP
  Designed the hardware, firmware and software for a medical device prototype used to measure electrical parameters, allowing to perform accurate bioimpedance calculations.

- **IoT self-sustainable, smart weather stations**
  HARDWARE AND FIRMWARE DEVELOPMENT
  Designed the hardware and firmware for networked weather stations used for crops harvesting process optimization. The design involved low power design in both hardware and firmware layers. Multiple stations were placed on a single crops field to periodically measure atmospheric parameters, which would then be fed to the centralized server via GSM technology. Server backend and web frontend were developed by other team members.

- **Power line communication (PLC) emergency lights system**
  HARDWARE AND FIRMWARE DEVELOPMENT
  Designed the firmware, software and parts of the hardware for an industrial scale system used for emergency lights power cycling management. The communication with smart light modules was done over PLC, which allowed for feasible integration within legacy electrical grids in old buildings.

- **Semi-automatic stencil printer**
  HARDWARE AND FIRMWARE DEVELOPMENT
  Designed the hardware, firmware and PC control software for a semi-automatic Stencil Printer (device used for solder paste distribution over PCBs during production). The design involved real time I/O handling and motor control.

- **Semi-automatic stencil printer**
  HARDWARE AND FIRMWARE DEVELOPMENT
  Designed the hardware, firmware and PC control software for a semi-automatic Stencil Printer (device used for solder paste distribution over PCBs during production). The design involved real time I/O handling and motor control.

- **Seamanship improvement voyage suite**
  SOFTWARE DEVELOPMENT
  Created the backend and frontend for a seamanship improvement software to be used in the maritime market. The application used in different modes, could be utilized by the captains on the ship's bridge, as well as by the operators in fleet operation centers. The aim of the project was to reduce potential nautical incidents during cruising.

- **High efficiency wireless + wired gateway**
  PROJECT MANAGEMENT AND HARDWARE DESIGN CONSULTING
  Overseen the hardware product development, i.e. validated and proposed electronic design and thermal solutions, created hardware simulation scenarios, optimized bill of materials (BOMs), conducted hardware tests, designed prototypes.

- **Automatic SMD components feeder**
  FIRMWARE AND SOFTWARE DEVELOPMENT
  Designed the firmware for various automatic feeder devices used with SMT Pick & Place machines. Created the PC suite software used for manufacturing and testing purposes. Created and assembled prototypes.

- **Smart UPS**
  HARDWARE AND FIRMWARE DEVELOPMENT
  Designed the hardware and firmware for a multi-functional UPS device intended for the maritime market. It allowed for the configuration of most of the electrical, operational parameters (over multiple USB endpoints/ protocols). It consisted of multiple electrical protections (implemented in hardware in firmware) and allowed for smart charging and discharging of the cells to optimize energy utilization.

- **Soldering paste dispenser head**
  HARDWARE AND FIRMWARE DEVELOPMENT
  Designed the hardware and firmware for a multi-functional/ multi-modal soldering paste dispenser head mounted in a Pick & Place machine. It allowed for efficient soldering paste distribution over different subtracts (mostly PCBs), utilizing different dispensing methods (i.e., solder paste squeezing or "spitting"). It kept the mounted solder paste within a controlled temperature to avoid drying.

- **Electrosurgery knife**
  FIRMWARE DEVELOPMENT
  Designed the firmware for an electrosurgery device within a team of developers. The device was intended for a medical market and allowed for cutting and coagulating living tissues. Lead the firmware architectural design for the product. Conducted code reviews. Designed unit tests.

- **Multimotor controller**
  FULL PRODUCT BRINGUP
  Designed a complete device (hardware, firmware and PC tuning software) for dual (various) motor control in real time. The product supported two different motor types (DC, BLDC, PMSM, Stepper or VCM) driving simultaneously. The devices was used as part of different industrial machines that had to utilize motor controlled linear or rotary movement. It consisted of numerous DPS algorithms implemented for smooth control operation.

- **Beaglenode**
  FULL PRODUCT BRINGUP
  Authoring an open source/ open hardware project based on BeagleBone, which is under continuous development. It's aim is to allow for seamless lights and shutters control implementation in 110/ 230 V AC "star"shaped electrical home installations. The first hardware prototype was designed in Altium Designer. On the software side the product is being developed using the following technologies: Yocto, Qt, C++, MQTT.

- **Production line conveyor**
  HARDWARE AND FIRMWARE DEVELOPMENT
  Designed the hardware and firmware for a multi-segment conveyor utilized in automotive parts production industry. The product allowed for transporting the required parts between different automatic assembly stages on the production line. It consisted of functionalities such as parts scanning and "traffic"mitigation.