Embedded Software & Hardware electronics design Engineer

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Personal:

Family Name:	**Akimov**
Given Name:	**Volodymyr**
Birth date:	**11 Apr 1967**
Citizenship:	**Ukrainian**
Total experience:	**25+ years**

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Facebook	https://www.facebook.com/profile.php?id=100000189843327
GitHub	https://github.com/sevstels
Latest CV	https://gradient-sg.com/cv

About work experience

25+ years experience in design of hardware and software products and worked in several countries including Russa, Ukraine, Singapore, South Korea. I hold several US patents: US8319650B2, US8129995B2 in the field of car power battery engineering. Worked in private and government enterprises.

My solutions are now used in industry, in cars of Hyundai Motors company. Full product lifecycle experience. Systems planning, analysis, optimization, design. Automotive electronics, RF communication, digital signals processing. High power car DC/DC supply and battery BMS design.

Large experience in development of Windows/Linux user application, embedded firmware using C/C++ and low-level languages (assemblers). High-Speed digital, analog & digital mixed signal board design. RF RxTx modules design. Schematic design, PCB layout, assembling, debugging. Large experience in Linux drivers, uClinux, RTOS`s for embedded devices. Porting, debugging kernel and user space drivers.

Was create Digital Signal Processing algorithms for radar equipment. Written CAN, Bluetooth BLE communication library, develop embedded software for radio communication, radio navigation vehicle system, night vision system. Project`s architecture analysis and definition, design, implementation and improvement.

Educational background

Sevastopol National Technical University
- https://en.sevsu.ru

Department: Theoretical Radio engineering
Degree: Radio electronics engineer
Diploma: **"Master of Science" (MS)** 14.06.1991 - 15.06.1996 5 years

Additional specializations education:

Technical college:	Degree: Ship's electric technician	Diploma	1984 - 1985	1 year
Technical school:	Degree: Electronic hardware assembler	Diploma	1982 - 1984	2 years
Technical school:	Degree: TV electronic technician	Diploma	1982 - 1983	1 year
Common school:	Standard education for all citizens	Diploma	1974 - 1984	10 years

Employment history

22.08.2024 - 10.01.2025
Company: **National University of Singapore**: Materials Science and Engineering
- https://cde.nus.edu.sg/mse/

Position: Research Associate
Responsibilities: Software, firmware, electronics PCB, prototype development.

Project: AI-assisted wearable undergarment stethoscope for early detection of heart failure.

Development of electronic circuit, micro PCB boards for prototype. Porting embedded RTOS operating system for the new Bluetooth LE MCU. Development embedded BLE firmware. Development real-time OpenGL ES Java/C++ Xamarin Android/IOS user app for digital signal processing and data visualization.

01.11.2023 - 31.05.2024
Company: **Singapore Institute of Technology**, Singapore
- https://www.singaporetech.edu.sg/

Position: Research Fellow
Responsibilities: Project development. Concept, software, hardware, prototype development.

Project for Singapore Post: “Smart Parcel Box”.

Full elaboration of the project according to the customer's wishes. Calculation and modeling of nodes. Development of optical sensors array for parcel detection with AI algorithm. Simulation of electronic nodes of the system. Development of secured communication protocols for system control.
Development of electronic circuit and PCB boards for prototypes. Development of encrypted bootloader. Porting of the RTOS operating system for the new ARM processor. Development embedded firmware. Development of Bluetooth transmitter’s firmware. Development secured user Android app (NDK + Java).
The project prototype was successfully completed.

10.11.2018 - 30.12.2023
Company: **A-Star, IMRE, NanoBio Lab**, Singapore
- https://www.jyyinglab.net/research-leadership/prof-yings-lab

Position: Research Officer
Responsibilities: New medical device design

My recent projects in A-Star NanoBio Lab in Singapore were focused on the development of the precision miniature PCR machines for rapid diagnosis of dangerous diseases and infections such as COVID.

Our work helped Singapore in the COVID fight, especially in the early days of the pandemic, and was covered in the national media. The media write about our work:

https://www.straitstimes.com/singapore/health/singapore-scientists-on-the-front-lines-of-fight-against-covid-19

NanoBio Lab projects:

Miniature infection analyzer
Detection of dangerous infections within 5... 15 minutes.
Ideal for personal use, small clinics, individual doctors.
https://en.gradient-sg.com/mPCR/

Module for multi channel PCR real-time analyzers:

This module can be easily connected in large clusters via the CAN interface.
https://gradient-sg.com/cv/nbl/pic/pcr-analyzer.png

96-Channel Isothermal Amplificator, real-time infections detector
Portable version with battery power. For mass and fast sample testing.
Embedded expert system for recognizing viral infections based on AI network.
Device https://gradient-sg.com/cv/nbl/pic/cepat1.jpg
PC App https://gradient-sg.com/cv/nbl/pic/cepat.png

ART high accuracy Bio Scanner
Accurate detection of infection levels in the 24 bit contrast range.
The resolution is higher than the human eye or any camera.
Built-in data processor and analyzer.
Connection to a computer or cell phone.
Fast scanning, 10 seconds per test
Device https://gradient-sg.com/cv/nbl/pic/scn1.jpeg
Device https://gradient-sg.com/cv/nbl/pic/scn2.jpeg
PC Win app https://gradient-sg.com/cv/nbl/pic/scn-app.png
Scan result https://gradient-sg.com/cv/nbl/pic/scn-res.png

Precision soldering oven for optical electronics:
https://en.gradient-sg.com/t962/

Software for remote Infrared sensors:
https://en.gradient-sg.com/mlx/

15.01.2018 - 15.07.2018
Company: **ImageVision Pte Ltd**, Singapore
- https://emagevisionpl.com

Position: Software product engineer
Responsibilities: New tools and product design

Developing machine vision image processing algorithms for automatic defects recognition system.
The solution is used in the automated computer vision equipment.
To verify the manufacturing quality of human heart valve implants.
Design 25Mp camera lens controller, control protocols and PC applications.

Used technology and tools: MSVS MFC, OpenCV, CUDA, HALCON,
Basler pylon lib, Optotune, IAR for ARM, Altium designer for electronics PCB.

Please examples.
Sharp Image assembler for computer vision
- https://en.gradient-sg.com/istack

Android OpenGL, 3D video player (Java Xamarin, C++, NDK, Shaders GLSL)
- https://en.gradient-sg.com/s3d/android.php

Windows DirectX, 3D image player: (C++, CUDA C, Shaders HLSL)
- https://en.gradient-sg.com/s3d/player.php

Windows OpenGL, fast, FFMPEG 3D video player (C++, Android Media Framework, Shaders GLSL)
- https://en.gradient-sg.com/s3d/vplayer.php

20.02.2011 - 31.12.2017
Company: **Centre for Quantum Technologies**, National University of Singapore
▸ http://www.quantumlah.org
Position: Electronics engineer.
Responsibilities: Physics experiments technical support.

Developing custom electronics equipment for quantum physics research.
Design device main concept, select electronic components, select devices structure, develop electronic schematic, hardware PCB layout. Provide PCB assembly, firmware & user software development.
Experimental devices testing and debugging, then do bugs fix for best operation.

Used technology and tools:

DirectX 9..11, OpenGL, Android OpenSL
NVIDIA CUDA, OpenCV, Android NDK, SDK

Bluetooth classic, Bluetooth Low Energy, CAN
RF microwave, Optics sensors, Lasers control systems, Mixed (D/A) PCB layout

Remote analog sensors: optical, magnetic, photonics, ion traps.
Fast process stabilization systems (PID reg), analog & mixed & digital.
High-power management systems design.

Windows drivers, Linux drivers, RTOS drivers
MFC, wxWidget`s, uGUI, GUI/Console applications design

Use tools: Quartus, VDSP++, Autodesk Inventor, AutoCAD, Ansys HFSS, IAR, P-CAD, Altium designer, AVR, BlackFin DSP BF533, BF561, ARM Cortex M0/M3

NUS CQT portfolio:
- https://en.gradient-sg.com/lpes/ Laser pulse energy regulator
- https://en.gradient-sg.com/lsync/ Laser's frequency synchronizer
- https://en.gradient-sg.com/usbcan/ USB CAN adapter and API
- https://en.gradient-sg.com/gsensor/ Three Axis Gravity Sensor Array
- https://github.com/sevstels/Ubertooth-Win/ Bluetooth protocols debugging tool
- https://en.gradient-sg.com/prog/ SPI Flash programmer
- https://en.gradient-sg.com/servo/ Remote Servo array with CAN control
- https://en.gradient-sg.com/rfgen/ Microwave generator 6... 12GHz wit remote CAN control
- https://en.gradient-sg.com/rfmul/ Microwave analog switch 0... 12GHz wit remote CAN control
- https://en.gradient-sg.com/pidslow/ PID Regulator wit remote CAN control
- https://en.gradient-sg.com/iontrap/ Ion Trap controller

01.12.2010 - 18.02.2011
Company: **Pineone Communications Co., Ltd**, Suwon, South Korea
▸ http://www.pineone.com
Position: Senior Research Engineer.
Responsibilities: Software & Hardware engineer.

Developing embedded hardware and system software for new Samsung products.
Developing mobile handset application software.

Used technology and tools:

Porting the Linux kernel for Android OS on developer boards ▸ Odroid, ▸ Odroid-7
Drivers & kernel adaptation for the Samsung SoC ARM Cortex-A8 ▸ S5PC100

Drivers & kernel adaptation for the Samsung SoC ARM Cortex-A8 ▸ S5PC110
Androd SDK/NDK, Keil ARM, Eclipse

22.11.2007 - 25.11.2010
Company: **TECS Ltd, Hyundai motors automotive R&D center**, Cheonan, South Korea
▸ http://www.tecstar.co.kr/en/rnd/rnd01.php
Position: Researcher
Responsibilities: Software and Hardware design engineer

Developing an vehicle Night-Vision camera system with "Black Box" device.
Making system architecture, algorithms, hardware, software. Porting embedded OS: RTOS, Linux.
Write OS kernel drivers for different peripheral devices and interfaces.
Write application for data and image processing for Analog Device ADSP-BF561 2 core DSP processor.

Porting U-Boot (kernel loader) for custom board.
Porting uClinux kernel for custom board.
Porting user space applications for uClinux specifics.

Develoop user-space applications, write Linux kernel drivers:
HDMI FB (frame buffer) video stream driver
HDMI audio ALSA input/output driver
Video4Linux ITU-R BT.656 capture driver

Porting scmRTOS for DSP BlackFin BF561
Porting MPEG-4 realtime video compression lib, make speed optimization for DSP mcu
Porting MP3 realtime audio play/record lib
Porting UFFS NAND file system library

Porting QT4 embedded GUI lib (Low lewel drawing functions)
Write and speed optimization IIR Digital filters (BlackFin asm)
Frameworks: uClinux, scmRTOS, OpenCV, IVT Lib, AlgLib, LTI Lib, Qt4 Embedded

Please see the **portfolio**.
Here, completed vehicle "Black Box" system, integrated with GPS navigation system.
▸ https://gradient-sg.com/cv/tecs/

Period: 10.11.2005 - 10.11.2007
Company: **LG Chem Research Park**, Daejeon, South Korea
▸ http://www.lgchem.com/
Position: Research engineer
Responsibilities: Hardware and Software design

Worked as hardware & software designer. Developed automotive hardware and firmware, debugged prototype and tested electronic systems, used in the new hybrid Hyundai motors vehicles.
Development electric vehicle smart BMS system:
▸ https://www.lgensol.com/en/business-automotive-battery

Precession current leakage sensor for Li-Ion polymer battery fire protection.
C/C++ embedded programming with use "Keil" and "Tasking" compilers for Infineon XC167 processor.

My LG patents: US20110199223 ▸ https://www.google.com/patents/US20110199223
US20110128009 ▸ https://www.google.com/patents/US20110128009

My LG projects:
▸ https://gradient-sg.com/cv/lg/

Period: 19.06.2000 - 12.08.2005
Company: **Meander** Ltd, Sevastopol, Ukraine
Position: Radio freq electronics engineer
Responsibilities: RF hardware and firmware design

Network (WEB) television, cable TV communication nodes.

Design devices for network TV (web TV), TV signal handlers. RF hardware design, RF TV transmitters and linear modulators. Equipment for receiving information from satellites series "NOAA" (HRPT decoder) and PC software for controlled ground station.

RF Tx power transmitter design, for example:
- https://gradient-sg.com/cv/meander/pwr-amp2.jpg 300-500 mHz 200 Watt output unit
- https://gradient-sg.com/cv/meander/pwr-amp1.jpg 300-500 mHz preamplifier unit

Programming: Visual C++ multi-treading, GUI application development. Embedded C programming and assembler language. Development cable TV encoder 'Crypton' with CCS IDE for DSP TI TMS320C54.

Summary of Relevant Skills

RF electronics:
Good RF knowledge, limits: 0 - 12 GHz. Transmitters and radio receivers design. Design prototype, verification, debug: VCO, PLL, RF - power amplifiers, mixers, small signal amplifiers, band filters, transmission lines. Design experience and understanding of fundamentals of circuits effects such as temperature driftage, parasitic noise, signal distortion, linearization, etc. Using special software for RF design and simulation high frequency PCB boards.

Analog electronics:
Design of small signal amplifiers, RF power amplifiers.
Design pulsed power source, different realizations passive and active analog filters.

Optic electronics:
Calculation and modeling of optical sensors hardware. Optical object presence detectors.
Optical sensors for biologic and physical research: https://en.gradient-sg.com/lsensor/
For example multi system 3D cinema equipment: https://en.gradient-sg.com/s3d/emitter.php

Digital Signal Processing:
Objects recognition, detection and navigation equipment.
For example the portable defense system, drone sensor: https://en.gradient-sg.com/dsensor/

Digital electronics:
Microcontrollers, DSP, DDR, SDRAM, SRAM, ADC, DAC, CPLD, FPGA, video analog input interface, digital video encoders. High-speed circuits, making, verification, debug, support: UART, COM, LPT, RS232, SPI, I2C, LVDS, USB2, CAN. Experience with debug tools such as logic analyzers, in-circuit emulators and software debuggers.

Programming languages

Language	Total years of usage	Date of last usage
C/C++	25	2025
Java	18	2025
HTML, CSS, PHP	25	2025
Assembler Infineon XC167CI	2	2007
Assembler DSP TI TMS320VC5402	2	2006
Assembler DSP AD ADSP-BF561	4	2017

Assembler 8051 core	10	2017
Assembler AVR	6	2015
Assembler ARM Cortex M0, M4, A8, ARM7	4	2024
JavaScript	25	2025
Verilog for CycloneIII,Max7/3000	3	2020
Shader Language HLSL (DirectX)	2	2024
Shader Language GLSL (OpenGL)	2	2025
Android Xamarin	8	2025
Android NDK	10	2025

Tools and Software

List of tools used for projects

Microsoft Visual Studio, Android Studio, Eclipse. Matlab Simulink, Microwave Office, OSLO optics. Micro-Cap, Ansys HFSS. P-CAD, OrCAD, Specctra, Altium Designer, Keil, Tasking, IAR, Quartus, VDSP++. Version control system: GitHub.

Debuging Tools

Visual Studio Debugger, Wireshark, GNU software development tool chain. Linux GDB, J-LINK, J-TRACE, ST-Link, BF ICE-1000, BF ICE-2000, XDS510USB, TI CC-DEBUGGER.