

Sergey Bashkirov

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Summary

Firmware/Embedded Software Engineer with 12+ years of professional experience in firmware and software in areas related to RTOS, bare metal, Linux, hardware interfaces, drivers, USB, networking; worked closely on actuators control, signal acquisition and processing, user interface design, robotics; machine learning; electrical engineering, have ability to read and design electronic schematics; good background in math and physics; have recent experience in optics (filters, polarizers, shutters), laser devices, electro-mechanics control.

Areas of expertise

Firmware design: Embedded systems, signals acquisition, sensors, real-time programming in RTOS (real time operating systems) and bare metal firmware, embedded Linux
Crossplatform programming: GUI, hardware communication, C, C++, familiar with Java and C#. **Scripting and automation:** Scripting languages, embedded scripting, bare metal firmware scripting
Embedded: Digital communication protocols such as SPI, I2C, TWI, USART, familiarity with FPGA design **Electrical engineering:** PCB design, digital and analog circuits, signal filtering
Math: Computer vision, machine learning, statistics, data, image processing, Kalman / Extended Kalman filter

Most recent professional achievements

- Reduced development time and eased prototyping by implementing hardware embedded real time scripting language and scriptable GUI builder.
Designed firmware, GUI and schematics for scalable USB powered control module for Raman scattering laser radiation acquisition device.
- Created full control solution for pneumatic mechanism of variable complexity by designing expandable stackable PCB set consisting of identical PCBs, designed GUI for embedded Linux, communication library based on XMPP protocol, made real time firmware for ~10 interconnected by common bus microcontrollers.
- Achieved high precision with equipment made of the lowest cost components by applying machine learning techniques to calibration process.
- Reduced hardware design time by making expandable PCB solutions consisting of identical PCBs with identical firmware.
- Reorganized production and supplies purchase processes by performing statistical predictive contracts analysis. Made WEB server based business control software for warehouse keeping, product assembling, purchasing and contracts tracking.

Most recent work experience

Aist-NT Inc.

Novato, CA

Software Engineer, April 2007 - present

Designed firmware for all hardware solutions, created embedded real-time scripting language, designed AFM software, integrated a number of 3rd party devices

Transmag

Santa Rosa, CA

Contract, USB interface design, August 2013 - December 2013

Designed USB based BLDC motor controller's interface. Designed firmware, user interface, suggested proper USB schematics.

IPM RAS

Moscow, Russia

Contract, remote position, pneumatic mechanism control module, April 2012 - February 2015

Created firmware, software and schematics for pneumatic robot control modules, developed scriptable SDK, programmed movement algorithms.

Education

Moscow Institute of Physics and Technology

Moscow, Russia

Master of Science in Applied Mathematics and Physics, February 2004

Moscow Institute for Problems in Mechanics

Moscow, Russia

Courses in robotics, control theory and stability, June 2004

Laboratory of Robotics and mechatronics.

Detailed technical proficiencies

Platforms: Embedded systems, Linux OS, Windows OS, ChibiOs, FreeRTOS, familiarity with Buildroot, Raspbian, OpenWRT, Android
Programming: C, C++, Java, microcontroller assembly language, Debug skills
Devices: Atmel AVR, STM32 ARM Cortex-M, NXP ARM ARM7TDMI, AD Shark DSP, Altera FPGA design in Verilog and debugging with testbench, familiarity with Microchip PIC
Interfaces: USB, Ethernet, TCP/IP, UDP, I2C, TWI, SMBus, SPI, UART, PWM, DAC, ADC, JTAG debugging
Scripting: Lua, Ruby, Python, R, MATLAB/Octave, SQL, Shell scripting, Pawn, java script, ajax, html, bootstrap, ruby-on-rails
Applications: data acquisition, signal processing, FIR/IIR filtering, Kalman filtering, automation, drivers design

Frameworks: Qt, Boost, OpenCV, VTK, CMake, Qt Unit Test Framework

Software, tools: Git, Subversion, Eclipse, VisualDSP, VisualStudio, GitHub, SourceForge, Understanding firmware development lifecycle, familiarity with TFS, IAR, Keil, MPLab

Electrical: PCB design, electrical engineering and debugging, soldering skill, knowledge of Oscilloscopes, multimeters digital meters, logic analyzers, frequency analyzers, signal generators, Board level bring up experience

KiCAD, Eagle, NGSpice, familiarity with Altium, OrCAD, LTSpice