David Karibe

Curriculum Vitae

"People who are really serious about software should make their own hardware" -Alan Kay

Education

2005–2009 **Bachelor of Science**, *Physics (Electronics)*, The University of Nairobi, *Second Class Honours, Upper Division*.
Specialized in Applied Microprocessor Technologies and Instrumentation

Experience

2010–Current **Senior Technologist**, University of Nairobi, Physics Department.
In charge of innovation and research laboratories in the electronics and laser applications thematic sections. Developing content, reviewing and teaching practical units in embedded systems, workshop skills and computer programming.

Responsibilities:

- Designing embedded systems hardware and developing firmware for ARM Cortex-M targets for application in various innovation projects.
- Design and review of embedded systems and workshop skills practical laboratory courses for the department of Physics.
- Teaching and evaluating students in embedded systems, workshop skills and computer programming courses
- Offering technical support to researchers at the department in instrumentation and interfacing problems
- Facilitating and training in the University of Nairobi Solar Academy short course which happens at least twice every year.
- Facilitating and training in the University of Nairobi Electronics Academy short course for corporate at the Physics Department
- Repair, maintenance and development of new research set-ups
- Procurement of new equipment (computers, embedded development Kits and assorted electronics components, microscopic imaging systems)

Consulting

2018–current **Hardware/Firmware Engineer**, *Justus Technologies*.
Design and implementation of solar power monitoring IoT system using NXP K64F ARM cortex M4 controllers.

Responsibilities:
- Overall product design
- Design of the embedded systems hardware including modeling and spice simulation.
- Prototyping and testing of the hardware circuitry using digital meters and oscilloscopes
- Firmware development in C and low-level debugging.
- Agile development process management with version control using git and trello scrum boards
- Assisting with procurement of required components for the project
- 3D printing of mock up designs for packaging

2017–current **Co-founder and Lead Firmware Engineer**, *Sign-IO*.
Implementation of Bluetooth Low Energy(BLE) hardware and firmware in C using NXP KW41Z chips and Android application BLE integration.

Responsibilities:
- Capturing circuit Schematics and designing PCB layouts for BLE embedded systems
- Developing firmware for BLE embedded systems using KITs
- Building prototypes, testing and debugging firmware in the prototypes
- Agile development process management with version control using git and trello scrum boards
- Managing version control repositories for the development team
- Recruiting and training junior firmware developers

Vocational

2008 **August Holiday Internship**, University of Nairobi, Physics Department, Industrial Electronics Unit.
Developed an embedded system for farming automation with sensors and actuators.

Detailed achievements:
- Learned and exercised problem solving techniques; brainstorming, problem definition and problem disintegration.
- Circuits design, PCB prototyping and hardware debugging
- Applied Micro-controller programming in C
- Project Documentation

Computer skills

Novice PERL

Intermediate ASSEMBLY, Java, Android platform, HTML/CSS/JavaScript, Linux admin (Kernel and Userspace system configuration), shell scripting, Git (Version Control and collaboration)

Advanced C/C++ programming, Electronics Systems Modeling and Simulation in systemC, Algorithms design in Matlab/Octave, KiCAD Schematic and PCB Layout Design, ELectronics Spice Modeling and Simulation in ngspice, Documents formating in LaTeX, Openscad 3D modeling, Python Programming, GNU/Linux user: building software from source, configuration, hardware interfacing

Embedded Development Skills

Software

Toolchains	ARM GNU toolchain: General set-up and configuration, building and debugging firmware. Build automation tools: Writing Makefiles to automate firmware build process
Debug Severs	OpenOCD, USBDM, Jlink and PE-micro: experience of use for debugging ARM targets including Freescale KL Series and ST Microelectronics' microcontrollers
IDEs	Eclipse (CDT and JDT) ,NXP Kinetis Design Studio, NXP MCUExpresso with Kinetis SDK, Mbed online platform, Android Studio: Used them for teaching and projects
Simulation	SystemC, ngspice and Matlab: Used in latest teaching and research work in post-graduate studies
Wireless	Nordic NRF24L01+ ISM wireless platform, NxP KW41Z Bluetooth Low Energy Platform paired with an android application
Interfacing	Research equipment interface to Linux OS including serial ports,usb spectrometers and cameras for Matlab platform data acquisition
KiCAD EDA	Designing Schematics, Spice simulation, PCB layout routing and exporting PCB artwork in SVG and Gerber files

Hardware

Prototyping	PCB prototyping using toner transfer method (double sided boards with rivetted vias) and professional services OSH Park and Itead
Testing	PCB signal troubleshooting using digital meters, oscilloscopes and logic analyzers
Debugging	Serial Wire Debug(SWD with ARM CMSIS-DAP) using NXP freedom boards and Tower KITs
Wireless	signal tracing using RF spectrum analyzer (SPECTRAN HF-6060 V4) for antenae testing

Workshop Skills

3D Modelling	OpenSCAD; precision 3D modelling for 3D printing and visualization models for electronics components to be used in PCB layout 3D inspection
3D Printing	Using Ultimaker2 printer with Cura slicing tool: For product prototyping; plastic housing for embedded systems boards, optic bench alignment custom and replacement components, new setups for holographic imaging, drone parts for a remote sensing project, gears and other components for remote controlled car project

Technical Training

Photovoltaic Systems

Photovoltaics Trainer	PV systems sizing and installation, 2 days at the Physics Department, University of Nairobi

Tailor-made Training in Photovoltaics
: PV labs, Grid-tie systems, Roof installation, Special flexible materials with applications on portable devices, 2 weeks at Delf University, Netherlands

Food and Energy trainer
: SUNfarming GmbH organized Food and Energy mixed PV systems and green house farming - Systems Design and Implementation - 2 weeks training programme at the North West University of Potchefstroom, South Africa

Languages

English
: **Fluent (Speaking, reading and writing)**

Swahili
: **Fluent (Speaking, reading and writing)**

Kikuyu
: **Native language**

Hobbies

- DIY and Electronics
- Travelling and Photography
- Blogging
- CAD and 3D printing

Referees

Prof. K. Kaduki
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