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Summary

Creative geek with roots in electronics engineering, an entrepreneurial mindset and a passion for building and integrating systems on chips.

My experience is built up in a relatively broad spectrum of engineering know-how; covering computer architecture, embedded software programming and automotive systems.

As an electronics digital design engineer, I design system architectures, code RTL, do static timing analysis, tailor designs to vendor-specific FPGAs

and integrate subsystems into an SoC. I'm familiar with several technologies and buses including: PCIe, Ethernet, WiFi, AXI, HDMI, Multi-Gigabit Transceivers (MGT) and many Microblaze-centered systems. Additionally, I code low-level C drivers, build testing environments and benchmarks tools.

Since 2011, I play leadership and management roles; I follow 'Agile Project Management' with a coach mindset. People management skills enabled me to lead multi-site projects successfully.

Experience

Valeo

PRINCIPAL ENGINEER, SW MANAGER

Valeo is a tier-1 multinational automotive supplier, with annual sales exceeding €15B and 75,000 employees. Valeo's largest software R&D center is located in Egypt.

HIL Testbench Development for Automotive SW Validation

July '13 – today

Design, develop and Implement state-of-the-art test benches for automotive hardware-in-loop (HIL) SW validation.

- Lead and grow a team from 5 to 15 engineers
- Manage multiple projects, resource planning and billability, purchasing, training and enhancing customer satisfaction
- Successfully deliver a HIL test bench to 20+ projects at more than 3 production sites
- Implement HD video streams, high-performance ultrasonic sensors simulation, Ethernet, Flexray and CAN bus communication using FPGA IPs in VHDL/Verilog
- Implement test boards; PCB design and testing activities
- Develop and maintain an RT kernel with firmware and drivers
- Develop and maintain Java-based Test-Automation Environment
- Enable Automotive SW Validation for automatic self-parking cars, Laser Radars, Video surround views and many advanced driver assistance systems

SilMinds

CO-FOUNDER AND SR. DIGITAL DESIGN ENGINEER

A six year entrepreneurial journey with other enthusiastic innovative engineers who started the company from the ground up.

Consultant at Silicon Vision

Nov '12 – Jan '13

Implement a verilog digital communication bit-chain, and a test system. Silicon Vision provides design services for analog/mixed signal of wireless/optics communication chips.

- Implement the digital communication bit chain; FEC, CRC, SERDES and interleaver blocks. This chain integrates to an analog RF chip
- Develop a Microblaze-based SoC to build a configurable dynamic testing environment for their next generation chip

DFP Stream Coprocessor

Oct '10 – Oct '12

Design and build a completely new stream processor architecture to efficiently utilize SilMinds Decimal Floating-Point (DFP) IP library.

- Manage and lead a team of 5 engineers
- Build an architecture with a configurable number of DFP units

- Ensure a powerful instruction-level parallelism capabilities
- Build a run-time configurable Network-on-chip for dynamic routing
- Support semaphores for thread synchronization with the host PC
- Productize the coprocessor: Integration within a Xilinx PCIe (X8 Gen-2) card, managing DMA streams, low-level PC drivers with adding GCC backend support
- Benchmark the coprocessor; showed 10X speed-up on a 50MHz build over a 3 GHz CPU
- Publish technical papers and apply for patents (USPTO)

Decimal Floating-Point IPs

Nov '07 – Sep '10

Design and implement of decimal floating-point (DFP) arithmetic cores comforting the IEEE 754-2008 standard. This is the core technology for SilMinds.

- Work closely to our CTO, Hossam Fahmy, and an IEEE floating-point standard committee member with a Stanford Ph.D. Basing our design on IEEE draft versions gave us a market lead at that time
- System level design, VHDL implementation, data path optimization, static timing analysis, FPGA tailoring and writing automation scripts for EDA tools
- Implement Basic (\pm , \times , $/$ and $\sqrt{}$) and Elementary functions (Log , Ln , X^Y ... etc.) in VHDL to complete a robust arithmetic library of IP cores for monetary applications
- Technical Presenter in a 10-day business trip: On August '08, SilMinds Sponsored [Hot Chips 20](#) Conference at Stanford University
- Publish several papers and apply for patents, listed below

Consultant at [Varkon Semiconductors](#)

Nov '08 – Feb '09

Build an on-chip testing environment for their DVB-C IP core.

- Build an FPGA microblaze-based SoC with PC controls
- Directly integrate with a mutiport DDR-II memory controller to serve high-throughput requirements

Matlab FPGA Accelerator

May '07 – Sep '07

Develop a HW accelerator for Matlab. A business failure at the beginning of the start-up experience.

- Override Matlab's underlying math engine, [ATLAS BLAS](#), to accelerate common arithmetic functions.
- Design and build an FPGA-based accelerators for parallel matrix operations

SysDSoft (Acquired by [Intel](#))

TESTING LAB ENGINEER

IEEE 802.11 (Wifi) Controller Testing

Aug '06 – April '07

Test and report Wifi controller using Hardware-in-loop technique. SysDsoft provides design services for PHY and MAC wireless communication layers.

- Contribute to the testing team of a Wifi project for [NewLogic](#) (Acquired by [Wipro](#)).
- Bug reporting, verification and evaluation of advanced IEEE 802.11 features; Station roaming, link rate adaptation, U-APSD, WMM and low power stations

Education

[Faculty of Engineering](#), Cairo University, Egypt

COMPUTER NETWORKS DEPARTMENT

Graduate Classes

2007 – 2011

I passed several graduate classes including: Advanced Computer Networks, Computer Architecture, Computer Arithmetic, Advanced Math and Technical Writing.

[Faculty of Engineering](#), Cairo University, Egypt ELECTRONICS AND COMMUNICATIONS DEPARTMENT

Bachelor of Science degree

2001 – 2006

Graduated with grade *Good*. As a student, I co-founded 'Tafra Scientific Magazine', issued by Cairo University, and was its Chief Editor. My graduation project is "MPEG-2 Decoder using HW/SW Co-design". Supervised by Prof. Serag Habib, the project was graded *Excellent*. On the IEEE's annual event, Egyptian Engineering Day, the project was awarded as *EED's Best Project*.

Skills

Digital Electronics

- VHDL / Verilog
- MGC Questa
- Xilinx XPS/EDK and Vivado flows
- Multicore Microblaze
- AXI4-based SoC Integration
- Interfacing DSP, LVDS and MGT
- RAW Video Signalling

Natural Languages

- Arabic: Mother tongue
- English: Fluently written and well spoken. I had my primary and preparatory education at [Misr Language Schools](#).

Programming

- Embedded C
- IEEE 754-2008
- Matlab
- C++
- C#
- Java / eclipse
- TCL and Bash

Others

- Agile Project Mgt
- CVS/SVN/GIT
- Makefiles
- IEEE 802.11

Automotive Systems

- BroadR-Reach Ethernet
- Flexray, CAN and LIN
- Vector Tools: Canoe, ..
- ISO 26262
- MISRA-C
- Rational DOORS
- Computer Networks
- Video Compression
- Linux Power User
- \LaTeX

Publications

by date: “A decimal fully parallel and pipelined floating point multiplier,” in *Forty-Second Asilomar Conference on Signals, Systems, and Computers*, Asilomar, California, USA, Oct. 2008.

“Energy and Delay Improvement via Decimal Floating Point Units,” *arith*, pp.221-224, 2009 19th IEEE Symposium on Computer Arithmetic, 2009

“A Decimal Floating-point Fused-Multiply-Add Unit,” *Circuits and Systems (MWSCAS)*, 53rd IEEE International Midwest Symposium on, 2010

“Algorithm and architecture for on-line decimal powering computation,” *Forty-Fourth Asilomar Conference on Signals, Systems, and Computers*, 2010

“Decimal Floating Point for future processors,” *Microelectronics (ICM), International Conference on*, 2010

“Massively Parallelized DNA Motif Search on FPGA,” *Book Chapter from “Bioinformatics - Trends and Methodologies”*, Mahmood A. Mahdavi, ISBN 978-953-307-282-1, InTech, 2011

Patents

by date: “Decimal Floating-Point Processor”, *App.* - Filed Dec '12

“DPD/BCD To BID Converters”, *App.* - Filed Oct '12

“Decimal Elementary Functions Computation”, *Grant* - Issued Jul '14

“Parallel Redundant Decimal Fused-Multiply-Add Circuit”, *Grant* - Issued Aug '14

“Rounding Unit for Decimal Floating-Point Division”, *Grant* - Issued Jun '14

“Decimal Floating-Point Square-Root Unit Using Newton-Raphson iterations”, *Grant* - Issued Aug '14

“Decimal Floating-Point Fused-Multiply-Add Unit”, *Grant* - Issued Apr '14

Training Courses

by date: “Project Management Program”, Feb '09, RS Management Consulting House

“Agile Project Management”, Mar 2010, The International Consortium for Agile [Certificate 

“Business Writing”, Oct '13, Top Business Group for HR

“Train the Trainer”, Nov '13, Brilliance Business School [Certificate 

“Advanced Time Management”, Feb '14, Brilliance Business School [Certificate 

“Flexray, automotive network bus”, Mar '14, Valeo, internal

“Linux Kernel Driver Programming with Embedded Devices”, Jul '17, Udemy [Certificate]