Doğukan Doğrubudak

FPGA Engineer

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Education

2019-2024
Hacettepe University
B.Sc. in Electrical and Electronics Engineering
Graduated on June 10 2024
Featured Courses: Advanced Digital Design,**Digital Signal Processing**, Integrated Circuit

2018-2019
Hacettepe University
School of Foreign Languages
English, B2

Skills

Digital Design-FPGA
- **VHDL**
- **Nexys A7 100T, DE1-SoC**
- **Vivado, Quartus**

Embedded Design
- C
- STM32 Nucleo
- Cube IDE

Analog Design
- Proteus, Altium Designer, LTspice, EasyEDA

Programming Languages
- **Python,** C, Assembly

Soft Skills
- MS Office
- Problem identification, understanding and solving
- Analytical thinking

Language

- Turkish-Native
- English-Intermediate(B2)

Summary

As a graduate of Electrical and Electronics Engineering, I have experience in **VHDL, C, and Python,** with strong skills in digital design and FPGA development. Currently, alongside FPGA, I am improving myself in analog circuit design and embedded software. With good analytical thinking and a strong eagerness to learn, I am seeking an FPGA engineering position where I can utilize and further develop my skills.

Professional Experience

JUNE 2025-Present
Freelance Hardware Engineer – Volunteer (In Office)
- Reverse engineering of a **Chinese battery charger** was completed with a detailed schematic.
- Contributed to the development of the **embedded software** for a **jet engine control board** designed by the company, based on the **STM32 Nucleo F103C8T** microcontroller.

JULY 2023-AUGUST 2023
ASTOR A.Ş. Internship-Switching Products-In Office and factory
- Gained hands-on experience in reading and analyzing panel-level electrical projects.
- **A broad perspective and hands-on understanding of system design and analysis — from the transistor/chip level to panel-level industrial applications — were gained through this experience.**

Self-Learning Experience

JUNE 2024-Present
- Achieved strong **proficiency in FPGA digital design.** Some VHDL codes written are available on GitHub.
- Gained experience with communication protocols such as **UART, I2C, SPI, and Ethernet.**
- A project is currently being developed in which audio data captured from the **ADMP421 digital MEMS microphone** is analyzed using an **FFT IP core**, and the results are visualized via **VGA output**.
- Worked on various modules including O7076, DHT11, MPU6050, HCSR04, HC05 Bluetooth, L293D PWM, NRF24, NodeMCU, and Ethernet using both **FPGA and microcontrollers.**
- Acquired basic experience in using Vivado IP Catalog and MicroBlaze.
- **Developed analog electronics skills** through projects like **joystick controllers** and **battery chargers.**

Certifications

- Dijital Donanım Tasarımcısı Olma Kursu, April 2025, Udemy

Projects

Project details are provided on the following page
- FEBRUARY 2025 -Joystick Controller
- JUNE 2024 - Term Project – Temperature Controller(FPGA)
- JUNE 2024 - Graduation Project – Emupent(Microprocessor Emulator)
- FEBRUARY 2024 - Term Project - ALU Design at Transistor (CMOS) Level

Projects Details

Joystick Control Circuit **February 2025**

- Partial **reverse engineering** of a **joystick control board** was performed.
- A circuit design supporting up to 12 digital and 8 analog inputs was developed, recognized by the computer as joystick controls via the **HID protocol.**

Skills utilized: C, MikroC, Proteus, Circuit Design

Term Project - ML Based Temperature Controller (FPGA) **June 2024**

- An open-loop predictive control system and interface were developed to regulate ambient temperature based on temperature, humidity, and occupancy.
- Temperature and humidity data from the DHT11 sensor, along with occupancy count, were transmitted to a computer interface via UART.
- Multiple linear regression was used to calculate the target temperature, which was sent back to the FPGA board via UART to control motor speed using PWM.
- The interface also enabled manual control of motor speed, ambient lighting, and an alarm system.

Skills utilized: FPGA, VHDL, Quartus, Communication protocols (UART, Single-Wire), Python, Multiple Linear Regression, Interface Design

Graduation Project – Emupent **June 2024**

- An x86-based Pentium microprocessor architecture emulator was designed, featuring 32-bit general-purpose registers, a flag control unit, interrupt management, and an instruction decoder.
- A user-friendly graphical interface was developed using Python to parse and execute approximately 40 Assembly instructions and handle console-based input/output operations.
- Emulator accuracy was validated through tests aligned with laboratory experiments from the Microprocessor Design and Architecture course.

Skills utilized: Python, Interface Design, Assembly, Teamwork, Problem Solving

Term Project – 8x8 Multiplier **January 2024**

- This project involved a transistor-level CMOS layout design for an 8x8 multiplier.
- As a result, an 8x8 multiplier capable of multiplying two 8-bit binary numbers was integrated into an ALU.

Skills utilized: CMOS Layout Design, Electric (Circuit Design)