

Ministrey of Science and Higher Education
of the Russian Federation
Penza State University
Faculty of Computer Engineering

Course Work

For the course "Computer and peripheral devices"

On the topic "Development of a hardware emulator for particular instruction set
conversion"

Completed by

Mohamed Fikri

Accepted by

 *and. 09/10/26.*

Penza 2025

PENZA STATE UNIVERSITY
Faculty of Computer Engineering
Department of Computer Engineering

"APPROVED"



Acting Head of the CT Department

Ph.D. N.S. Karamysheva

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ASSIGNMENT

for coursework on the course

Computers and Peripherals

Student Mohamed Fikri Group 23VVIIm1

Project topic Development of a hardware emulator for particular instruction set conversion

Initial data (technical requirements) for the project

Develop a hardware emulator that converts Intel 8086 code to PIC16F887 for the instructions concerning Increment, NOP, SUB (ADDLW, ADDWF) by means of an FPGA toolkit.

Requirements:

1. Hardware definition means: VHDL and/or schematic tools

2. Target bare metal FPGA: Xilinx Spartan-3

3. Simulator: ISE Simulator

4. Input device: serial port

5. UCF constraints

6. Board: any board containing a Spartan-3 or newer FPGA

7. Development environment: Xilinx ISE 9.1i

8. Verification of the results: MPLAB (PIC16F887) and DOSBox (Intel 8086)

Scope of work for the course

1. Computational part

Calculation algorithm of the conversion of the PIC16F887 addition instructions to Intel 8086 code. Hardware development of the converter in VHDL.

2. Graphical part

Graphical schemes of the algorithm;
principle electronic schemes of the device.

3. Experimental part

Simulation of the converter; screenshots of the simulation process

Project execution schedule by sections

1. Analysis of the PIC16F887 and Intel 8086 instruction formats

2. Development of the conversion algorithm

3. Development of the VHDL modules

4. UCF constraints

5. Simulation in ISE Simulator

6. Verification in MPLAB and DOSBox

7. Explanatory note

Assignment issue date: " ____ " ____

Project defence date: " ____ " ____

Supervisor  _____

Assignment received _____ " ____ " ____ 2026

Student  _____ Mohamed Fikri