

Penza State University
Department of Computer Engineering

EXPLANATORY NOTE

for the course "Computers and Peripherals"
on the topic "Development of a Hardware Emulator
for Particular Instruction Set Conversion"

Completed by: student of
group 23BBMa1 Saad
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Accepted by:
A.O. Semenov

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 Saad HMAIDI Group 23VVial

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 PIC16F887 code to Intel 8086 code for the instructions concerning logical AND (ANDLW, ANDWF) 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 logical AND 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 Saad Hmaid