



Khalifa University of Science, Technology and Research

Electronic Engineering Department

Microprocessor Systems Laboratory ELCE333

Experiment No. 3

Pre-Lab Report

HCS12 Input and Output Ports

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Aim:

To introduce the students to the read and write data from the input and output ports and how delays can be implemented using loops.

Objectives:

- 1- Understand the microcontroller IO ports.
- 2- Configure the ports as inputs or output.
- 3- Read and write data from input and output ports.
- 4- To examine the DIP switches of PTH for I/O programming on Dragon12+ Board.
- 5- To do I/O bit programming in HCS12 Assembly language.
- 6- To create binary counter on Dragon12+ Board.
- 7- Download, run, and test code on a Dragon12+ Board.

Pre-Lab Questions:

1) List six of the Dragon12-Plus board features.

- 1- Powerful 16 bit CPU
- 2- 256 Kbytes of flash memory
- 3- 12 Kbytes of RAM
- 4- 4 K bytes of EEPROM
- 5- SCI ports
- 6- SPI ports

2) Open the mc9s12dg256.inc under your includes directory and list the port address of the Ports B,J,P and H

VportB: equ \$00000001

Vportj: equ \$0000FFCE

Vporth: equ \$0000FFCC

Vportp: equ \$0000FF8E

3) Consider the code given below, how many cycles (single step execution) will it take to execute this program? How long will this take on the Dragon Plus Trainer board?

total no. of cycles:

ldab #100 - 1 * 1 = 1

ldx #10000 - 2 * 100 = 200

dex - 1 * 10000 * 100 = 1000000

bne loop2 - 3 * 10000 * 100 = 3000000

dec b - 1 * 100 = 100

bne loop1 - 3 * 100 = 300

Total number of cycles: $1 + 200 + 1000000 + 3000000 + 100 + 300 = 4000601$ cycles.

Frequency = 50MHz as found in labscript0

Execution time on board = $4000601 \text{ cycles} / 50\text{MHz} = 0.08001 \text{ secs}$