Princess Sumaya University for Technology
Computer Engineering Department
22440: Microprocessor Lab

Experiment 5: Programmable Peripheral Interface 8255

Introduction

The 8255 is a general purpose programmable I/O integrated circuit (IC) used to interface peripheral devices to the microprocessor system bus. Figure 1 shows the pin configuration of the 8255.

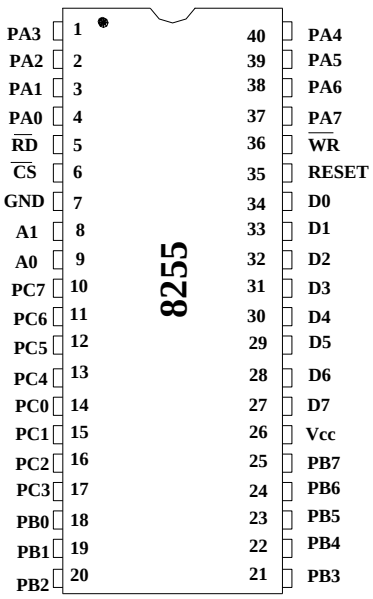

Figure 1: 8255 Pin Configuration

This IC has 24 I/O pins which may be individually programmed in two 12-pin groups and used in three major modes of operation.

In Mode 0, each group of 12 I/O pins may be programmed in sets of 4 to be input or output.

In Mode 1, each group may be programmed to have 8 lines of inputs or outputs. Of the remaining 4 pins, 3 pins are used for handshaking and interrupt control signals.

Mode 2 is a bi-directional bus mode which uses 8 lines for a bi-directional bus, and 5 lines (one line is borrowed from the other group) for handshaking.

Operation Mode Selection

The mode of operation is specified by the control word as follows:

Control Word Format

D7	D6	D5	D4	D3	D2	D1	D0
1	**MSA1**	**MSA0**	**PA**	**PCu**	**MSB**	**PB**	**PCl**

D7: 1 = Mode Set Flag Active

MSA1-0: Mode selection for group A

00 = Mode 0

01 = Mode 1

1X = Mode 2

PA:	Port A I/O selection	1 = input	0 = output
PCu:	Upper Port C I/O selection	1 = input	0 = output
MSB:	Mode selection for group B	1 = Mode 1	0 = Mode 0
PB:	Port B I/O selection	1 = input	0 = output
PCl:	lower Port C I/O selection	1 = input	0 = output

Seven-Segment Display

Figure 2 shows a schematic for a typical common anode seven segment display. Giving a logic low (0) for any of the shown pins will light the corresponding LED. Giving it logic high (10) will keep it off. Your 7-segment display pins should be connected to an output port on the 8255. For example, connecting pins **a** through **h** to PORTC (with hgfedcba being PC7 PC6 PC5 PC4 PC3 PC2 PC1 PC0), giving PORTC a value of A4 in hex shows number 2.

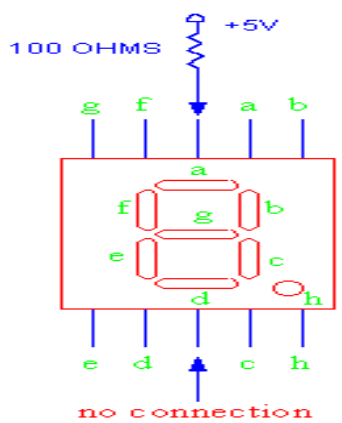

Figure 2: 7-Segment Display

Lab Assignment

1) Construct the following circuit.
2) Write assembly program to output number 0 on the 7 segment display. Write the proper sequence of instructions to output simulating the function of writing to PortA through controlling A1, A0 and IOW.