

## Lab 4 LCD Display

### I. Objectives

- To learn to interface 8051 with LCD display.
- To implement a look up table (LUT)

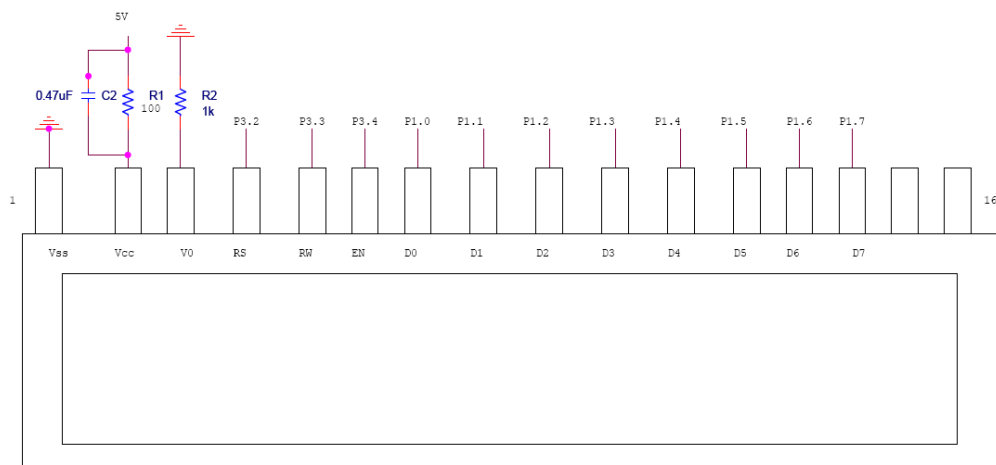
### II. Materials

- Keil uVision3 development environment.
- 8051 hardware development kit (MDE-8051)
- Jumper kit
- OPTREX DMC-20481 LCD display
- Resistors

### III. Procedures

#### Part 1 (Week 1)

1. Connect trainer board with DMC-20481 as shown in the following figure. (**IMPORTANT:** Be careful with the power supply and connections. Wrong connection might damage the LCD display or the trainer board.)



2. Based on the sample program 12-2 (p. 355), write a program to display “ELEG3923” in the middle of the first line, and your first name in the middle of the second line. (**IMPORTANT:** the 8051 port pins used for RS, RW, and E are different from the textbook, so you need to make modifications in the program accordingly). Character location can be found in Table 12-3 (p. 357). The specific requirements are given as follows

- (1) Use BIT directive to define the pins P3.2, P3.3, P3.4 as RW, RW,

and E respectively

- (2) The strings: "ELEG3923" and your name must be stored in a ROM location, and access those contents with a loop and DPTR register.
  - (3) Use a switch to control the display. If the switch is ON, display only your name; if the switch is OFF, display only "ELEG3923". (Hint: you can clear the screen by writing "#01H" to the command register of the LCD display).
3. Display "Go Razorbacks!" in the middle of the LCD screen. Continuously scroll the string from left to right.

#### Part 2 (Week 2)

1. Connect switches 5, 6, 7 to P2.0, P2.1, P2.2 respectively
2. Constantly monitoring the combination of the three switches. Display the corresponding decimal value ('0' ~ '7') in the first character of the first line in the display. Specific requirements are as follows
  - (1) Use LUT to store the ASCII code of the decimal values
  - (2) After reading the value from the switch, compare it with the value read in the previous round. If they are the same, do nothing; if they are different, update the display. (use the instruction CJNE)