Lab Manual for Embedded System Design

Lab No. 3

Arduino Interfacing with LCD

Objectives

In this lab students are introduced to the LCD and its interfacing with Arduino Uno.

LAB # 3
LCD interfacing with Arduino

Introduction

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A *16x2* LCD display is very basic module and is very commonly used in various devices and circuits. A *16x2* LCD means it can display 16 characters per line and there are 2 such lines. It is shown in Fig. 3.1.

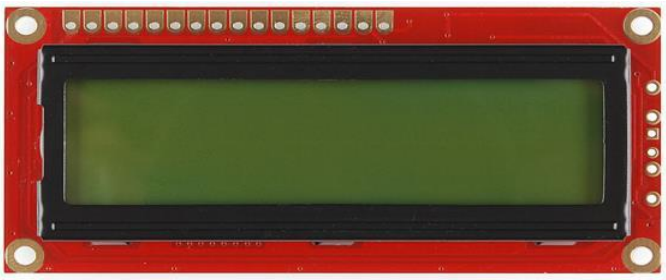
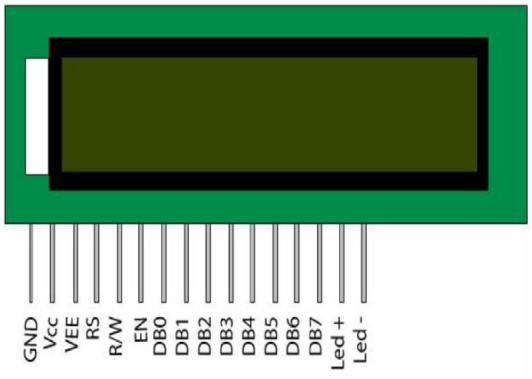


Fig. 3.1: *16x2* Liquid Crystal Display (LCD)

In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. The pin configuration is of LCD is shown in Fig. 3.2.



Pin No	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	Vcc
3	Contrast adjustment; through a variable resistor	V_{EE}
4	Selects command register when low; and data register when high	Register Select
5	Low to write to the register; High to read from the register	Read/write
6	Sends data to data pins when a high to low pulse is given	Enable
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Backlight V_{CC} (5V)	Led+
16	Backlight Ground (0V)	Led-

Fig. 3.2: LCD Pin Configuration.

Time Boxing

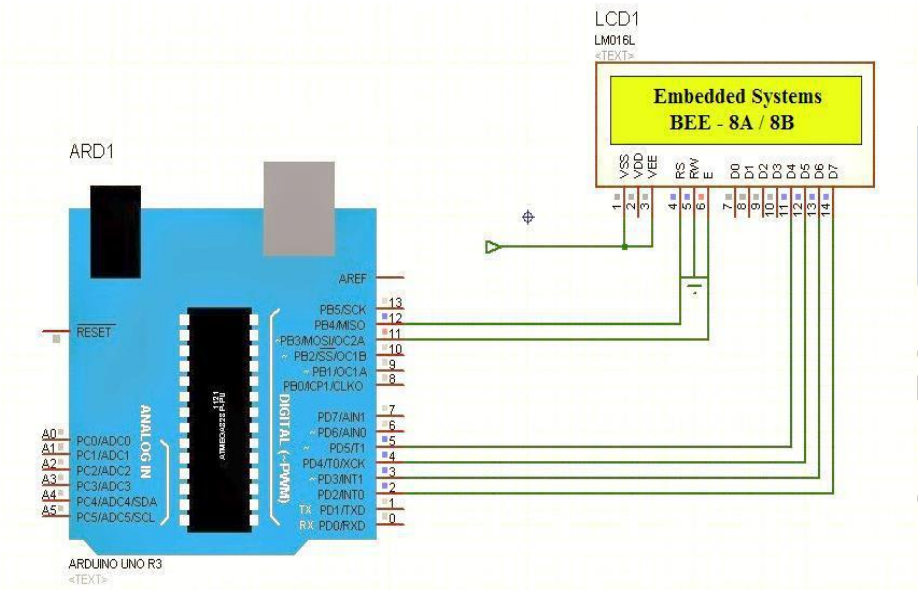
Activity Name	Activity Time	Total Time
Login Systems + Setting up Proteus & Arduino Environment	3 mints + 5 mints	8 mints
Walk through Theory & Tasks	60 mints	60 mints
Implement Tasks	80 mints	80 mints
Evaluation Time	30 mints	30 mints
	Total Duration	178 mints

Objectives

In this lab students are introduced wit LCD & its interfacing with Arduino Uno.

Lab Tasks/Practical Work

1. **Write a sketch to interface Arduino with *16x2* Liquid Crystal Display (LCD). Write the name of your course "Embedded Systems" in the 1st Line and your Section "BEE - 8A/8B" in the 2nd Line of LCD. This Text should blink with a delay of 0.5 seconds.**



Code:

```
#include <LiquidCrystal.h> LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

void setup()
{
        lcd.begin(16, 2);                    // Setting Up the LCD No. of Rows & Columns
}

void loop()
{
    lcd.setCursor(0, 0);
        lcd.print("Embedded Systems");
        lcd.setCursor(0, 1);
        lcd.print("BEE - 8A/8B");
        delay(500);
        lcd.clear();
        delay(5000);

        }
```

2. **Write a sketch to interface Arduino with *16x2* Liquid Crystal Display (LCD). First line of LCD should display your name, second line of LCD should display your registration number, and text in both line should keep moving from left to right.**