EXPERIMENT NO 11

LCD AND KEYPAD INTERFACING

INTRODUCTION:

Keypad Interfacing with 8051 microcontroller. AT89S51 is an electronic device falling under the category of a microcomputer. It is basically an 8-bit CMOS device capable of performing high at low-power and comes with flash programmable and erasable read only memory of 4K byte size.16x2 LCD means that there are two rows in which 16 characters can be displayed per line, and each character takes 5X7 matrix space on LCD. In this we are going to connect 16X2 LCD module to the 8051 microcontroller 89C52.

OBJECTIVE:

To know what is the Keypad, and how to interface it to the Microcontroller.

To know what is the Liquid Crystal Display (LCD), and how to interface it to the Microcontroller.

To know how to use Keypad and LCD to build any application.

PROCEDURE:

1. The 12 keys are arranged in 3 columns and 4 rows. Each column and row is connected by a separated wire as shown in the figure.

2. Pushing a key merely connects the corresponding row to the corresponding column

3. We connect the columns to 3 output pin of the PIC and the rows to other 4 input pins.

4. For each of the columns we output logic '1' holding other columns to logic '0' and scan the values of the rows, if one of the rows is logic '1', this means thatthe key located at the intersection of the current column and the current row ispressed. If no row is one, the logic '1' should be moved to the next columnand the rows then rescanned.

5. The PIC should keep repeating this process every time it's required to detect a key press.

6. This method of keeping searching is called piling Method, also we may usethe interrupt method for key press detection.

7. There are many types of keypads like Phone Keypad (the shown above),Calculator Keypad, and also keyboard is a form of keypad.

8. Almost all these keypads follow the same way in key press detection.

9. So, for interfacing any keypad to the microcontroller we need number of bins equal to the number of rows and columns of that keypad.

10. As shown above the rows must be specified as inputs, and columns must be specified as outputs.

LCD

LCDs (liquid crystal display) are widely used devices that come in differentforms that differ in size and shapes and many other features. However almost allLCDs conform to a standard interface specification. In our lab we will considerLM016L LCD with size 2\*16 (32 characters) that has a simple interface as shown in the figure.

D0-D7 is the data bus and is used to pass commands and characters to theLCD. Data can be transferred to and from the display either as a single 8-bit byte or two 4-bit nibbles. In the later case only the upper four data lines (D4-D7) are used. This 4-bit mode is beneficial when using a microcontroller with few input/output pins available.

VSS = Ground (0V)

VDD= VCC (4.5 V – 5V)

VEE= Used to alter the control contrast of the display. Ideally, it should be connected to variable power supply.

RS (Register Select): when this line is low, data bytes transferred to the display are treated as commands. By setting it to high data is treated as characters.

E: Starts the transfer of data to or from the LCD on falling edge

R/W: This line is used to choose whether to write to or to read from the LCD.

Since we will write to the LCD, and not read we will connect R/W to the ground

ISSUES:

NO issue found regarding this lab.

CONCLUSION:

In this lab we learn what is the Keypad, and how to interface it to the Microcontroller also we learn what is the Liquid Crystal Display (LCD), and how to interface it to the Microcontroller and how to use Keypad and LCD to build any application.