

UNIT - III

I/O and Memory Interface

Topics to be Covered:

- LCD
- Keyboard
- External Memory RAM, ROM Interface
- ADC, DAC Interface to 8051

Serial Communication and Bus Interface:

- Serial Communication Standards
- Serial Data Transfer Scheme
- On board Communication Interfaces - I²C Bus.
- SPI Bus
- UART; External Communication Interfaces
 - RS232
- USB.

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. These modules are preferred over seven segments and other multi-segment LEDs because

- ① LCD's are economical
- ② easily programmable
- ③ No limitation of displaying special & even custom characters, animations and so on.

A 16X2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix.

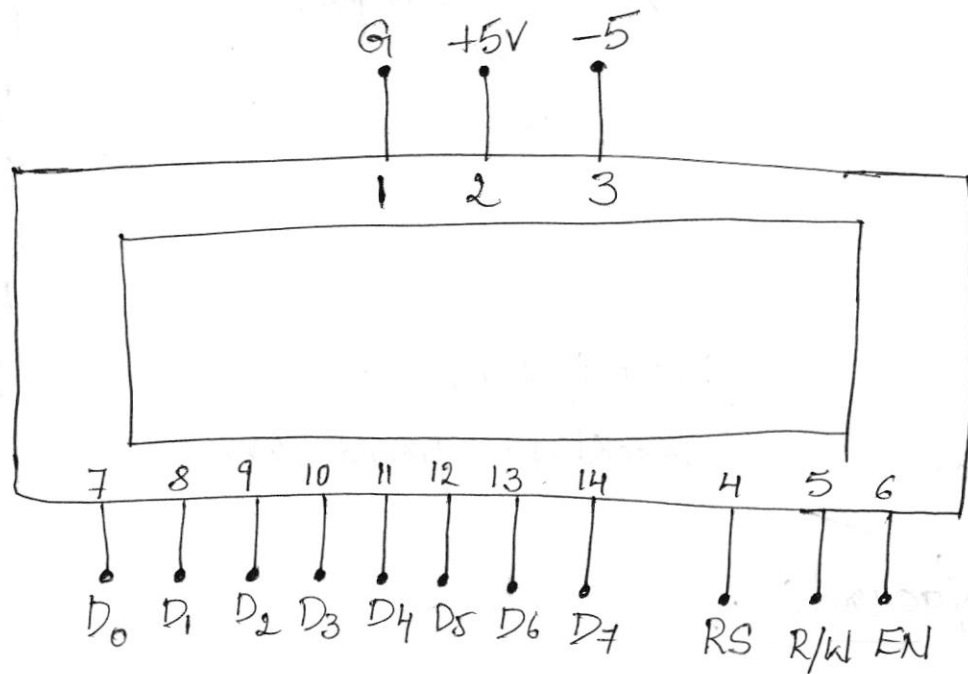
This LCD has two registers namely Command and Data.

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. Data is the ASCII value of the character to be displayed on the LCD.



Pin No.	Function	Name
1.	Ground (0V)	Ground
2.	Supply Voltage 5V (4.7V-5.3V)	V _{CC}
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

DB0

8

DB1

9

DB2

10

8-bit data pins

DB3

11

DB4

12

DB5

13

DB6

14

DB7

15

Backlight Vcc (5V)

LED+

16

Backlight ground (0V)

LED-

Keyboards :-

The predominant interface between humans and computers is the keyboard.

Keyboards range in complexity from the "Up-down" buttons used for elevators to the personal computer QWERTY layout, with the addition of function keys and numeric keypads.