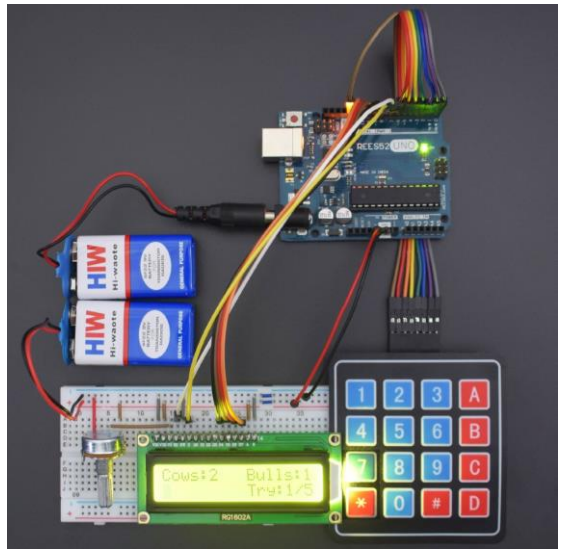
16×2 LCD DISPLAY



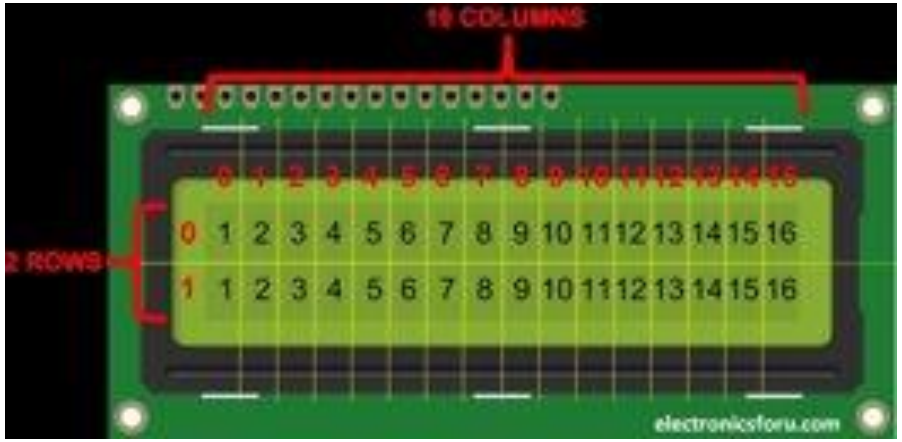
- An **LCD** is an electronic display module which uses **liquid crystal** to produce a visible image. The **16×2 LCD** display is a very basic module commonly used in DIYs and circuits. The **16×2** translates o a display **16** characters per line in **2** such lines.

- The liquid crystal libraray allows us to control LCD Display.

- The LCDs have a parallel interface, meaning that the microcontroller has to manipulate several interface pins at once to control the display.

FEATURES OF **16×2 LCD** DISPLAY

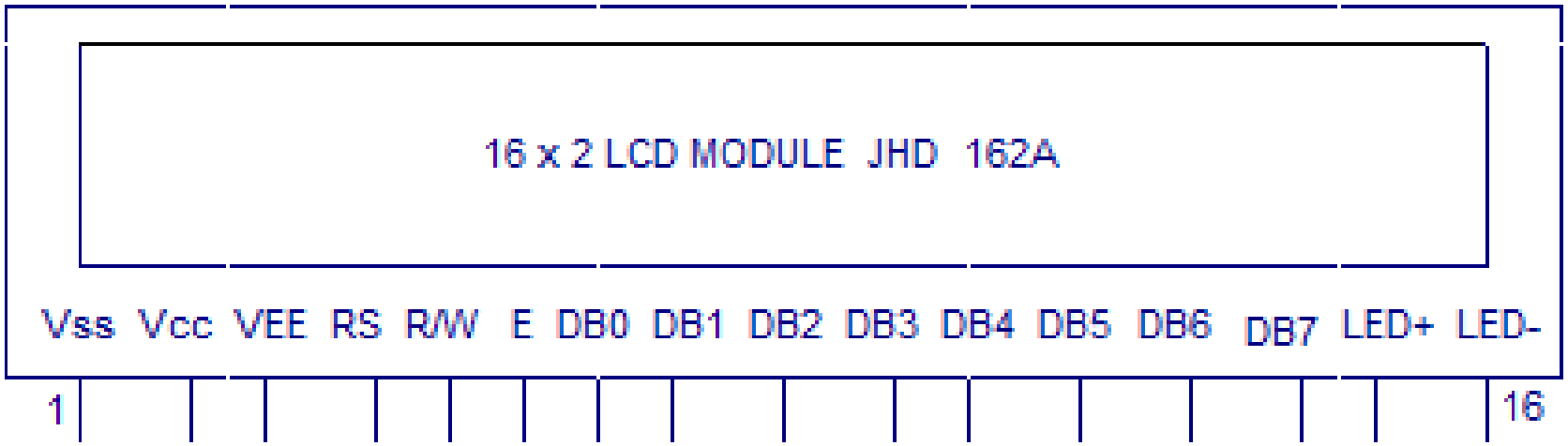
- Operating voltage 5V .
- Backlight colour : Green.
- Horizontal characters 16.
- No. Of lines 2.



APPLICATION

- As a display device.
- Displays data on backlit screen

PINOUT DIAGRAM



Pin1(Vss):Ground pin of the LCD module.

Pin2(Vcc): Power to LCD module (+5V supply is given to this pin)

Pin3(VEE):Contrast adjustment; the best way is to use a variable resistor such as a potentiometer. The output of the potentiometer is connected to this pin. Rotate the potentiometer knob forward and backwards to adjust the LCD contrast.

PIN4(RS):Selects command register when low, and data register when high.

Pin5(R/W): Read/Write modes. This pin is used for selecting between read and write modes. Logic HIGH at this pin activates read mode and logic LOW at this pin activates write mode.

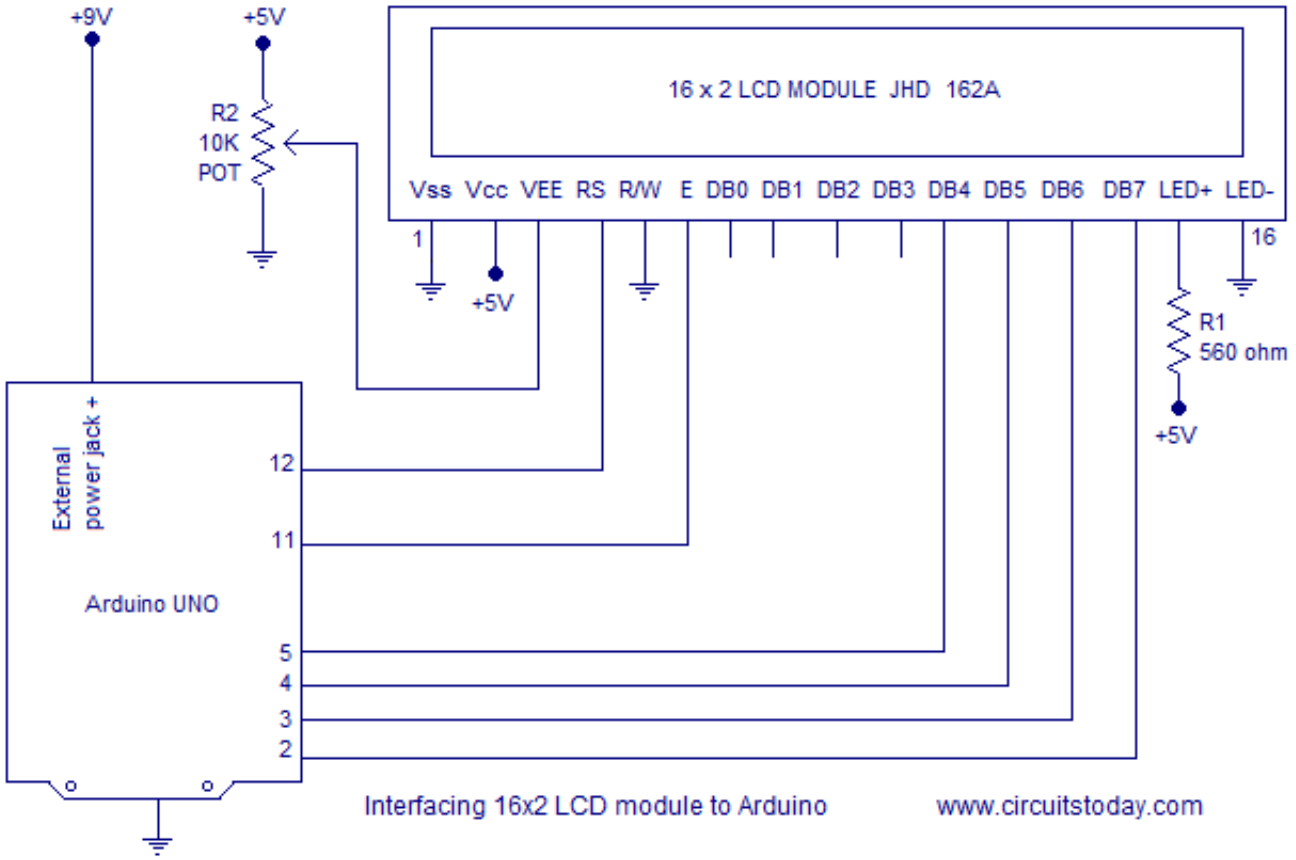
Pin6(E): This pin is meant for enabling the LCD module. A HIGH to LOW signal at this pin will enable the module.

Pin7(DB0) to Pin14(DB7): These are data pins. The commands and data are fed to the LCD module though these pins.

PIN15(LED+): Backlight VCC (5V).

PIN16(LED-): Backlight Ground (0V)

CONNECTION WITH ARDUINO



RS pin of the LCD module is connected to digital pin 12 of the arduino. R/W pin of the LCD is grounded.

Enable pin of the LCD module is connected to digital pin 11 of the arduino.

The **LCD module and arduino are interfaced in the 4-bit mode**. This means only four of the digital input lines(DB4 to DB7) of the LCD are used. This method is very simple, requires less connections and you can almost utilize the full potential of the LCD module.

Digital lines DB4, DB5, DB6 and DB7 are interfaced to digital pins 5, 4, 3 and 2 of the Arduino.

The 10K potentiometer is used for adjusting the contrast of the display. 560 ohm resistor R1 limits the current through the back light LED.

The arduino can be powered through the external power jack provided on the board. +5V required in some other parts of the circuit can be tapped from the 5V source on the arduino board.

The arduino can be also powered from the PC through the USB port.

PROGRAM- ARDUINO CODE FOR PRINTING 16x2 LCD MODULE AND HELLO WORLD

```
#include<LiquidCrystal.h>

LiquidCrystal lcd(12, 11, 5, 4, 3, 2);  // sets the interfacing pins

void setup()
{
 lcd.begin(16, 2);  // initializes the 16x2 LCD
}

void loop()
{
  lcd.setCursor(0,0);           //sets the cursor at row 0 column 0
  lcd.print("16x2 LCD MODULE"); // prints 16x2 LCD MODULE
  lcd.setCursor(2,1);           //sets the cursor at row 1 column 2
  lcd.print("HELLO WORLD");     // prints HELLO WORLD
}
```