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Interfacing 16x2 LCD with Raspberry PI

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Introduction:

Raspberry Pi is a credit card sized computer that plugs into a computer monitor or TV, and uses standard keyboard and mouse. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games. Here we are going to interface 16x2 LCD display with Raspberry Pi.

Hardware Required:

1. Raspberry Pi board.
2. Jumper wires.
3. 16x2 LCD splay.
4. Breadboard.

16x2 LCD display:

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. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), 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.

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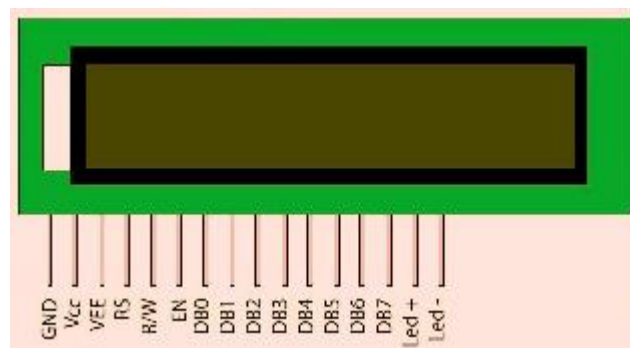
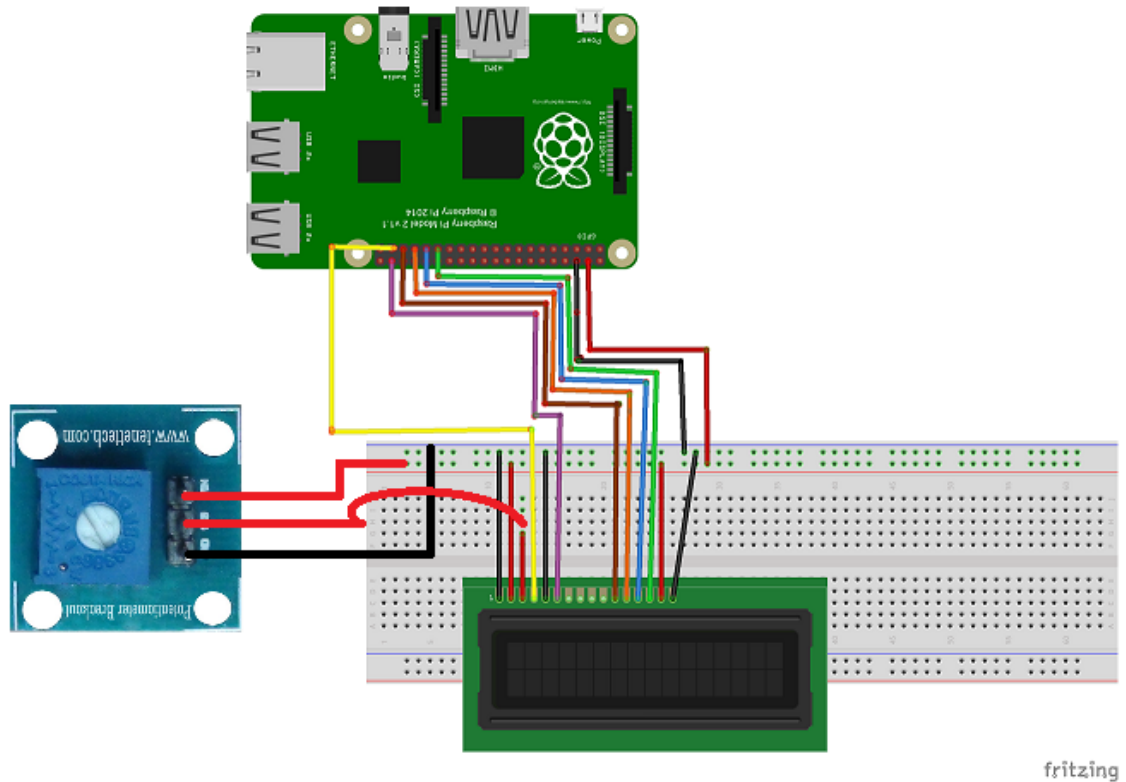**Circuit diagram:**

Figure 2

Coding:

```
import

import RPi.GPIO as GPIO

import time

LCD_RS = 37

LCD_E  = 38

LCD_D4 = 35

LCD_D5 = 33

LCD_D6 = 31

LCD_D7 = 29

LCD_WIDTH = 16

LCD_CHR = True

LCD_CMD = False

LCD_LINE_1 = 0x80

LCD_LINE_2 = 0xC0

E_PULSE = 0.0005

E_DELAY = 0.0005

def main():

GPIO.setwarnings(False)

GPIO.setmode(GPIO.BOARD)

GPIO.setup(LCD_E, GPIO.OUT)

GPIO.setup(LCD_RS, GPIO.OUT)

GPIO.setup(LCD_D4, GPIO.OUT)

GPIO.setup(LCD_D5, GPIO.OUT)

GPIO.setup(LCD_D6, GPIO.OUT)
```

```python
GPIO.setup(LCD_D7, GPIO.OUT)

lcd_init()

while True:

    lcd_string("Tenet tech",LCD_LINE_1)

    lcd_string("Bangalore",LCD_LINE_2)

    time.sleep(3)

    lcd_string("Tenet varsity",LCD_LINE_1)

    lcd_string("Tenet blogspot,LCD_LINE_2)

    time.sleep(3)

    lcd_string("Tenet R&D",LCD_LINE_1)

    lcd_string("Palani",LCD_LINE_2)

    time.sleep(3)

def lcd_init():

    lcd_byte(0x33,LCD_CMD)

    lcd_byte(0x32,LCD_CMD)

    lcd_byte(0x06,LCD_CMD)

    lcd_byte(0x0C,LCD_CMD)

    lcd_byte(0x28,LCD_CMD)

    lcd_byte(0x01,LCD_CMD)

    time.sleep(E_DELAY)

def lcd_byte(bits, mode):

    GPIO.output(LCD_RS, mode)

    GPIO.output(LCD_D4, False)

    GPIO.output(LCD_D5, False)

    GPIO.output(LCD_D6, False)
```

```python
GPIO.output(LCD_D7, False)

if bits&0x10==0x10:

GPIO.output(LCD_D4, True)

if bits&0x20==0x20:

GPIO.output(LCD_D5, True)

if bits&0x40==0x40:

GPIO.output(LCD_D6, True)

if bits&0x80==0x80:

GPIO.output(LCD_D7, True)

lcd_toggle_enable()

GPIO.output(LCD_D4, False)

GPIO.output(LCD_D5, False)

GPIO.output(LCD_D6, False)

GPIO.output(LCD_D7, False)

if bits&0x01==0x01:

GPIO.output(LCD_D4, True)

if bits&0x02==0x02:

GPIO.output(LCD_D5, True)

if bits&0x04==0x04:

GPIO.output(LCD_D6, True)

if bits&0x08==0x08:

GPIO.output(LCD_D7, True)

lcd_toggle_enable()

def lcd_toggle_enable():

time.sleep(E_DELAY)
```

```python
GPIO.output(LCD_E, True)

time.sleep(E_PULSE)

GPIO.output(LCD_E, False)

time.sleep(E_DELAY)

def lcd_string(message,line):

message = message.ljust(LCD_WIDTH," ")

lcd_byte(line, LCD_CMD)

for i in range(LCD_WIDTH):

lcd_byte(ord(message[i]),LCD_CHR)

if __name__ == '__main__':

try:

main()

except KeyboardInterrupt:

pass

finally:

lcd_byte(0x01, LCD_CMD)

lcd_string("Goodbye!",LCD_LINE_1)

GPIO.cleanup()
```
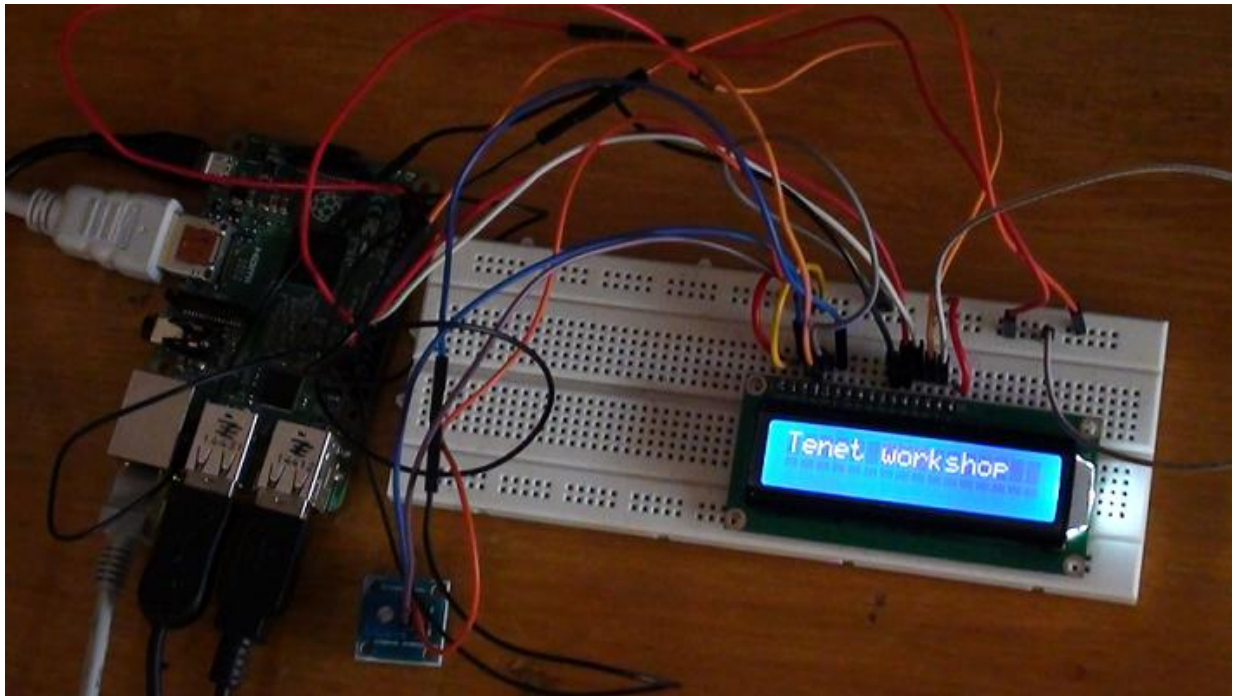
OUTPUT:

For product link:

1. http://tenettech.com/product/7021/raspberry-pi-2-model-b-basic-kit-tt-sp-19022015

2. http://www.tenettech.com/product/2442/16-x-2-character-lcd-display-with-backlight-jhd162a-green

3. http://www.tenettech.com/product/866/breadboard-small-self-adhesive

For more information please visit: **www.tenettech.com**

For technical query please send an e-mail: **info@tenettech.com**