How to Build and Code, using an Arduino R3 Uno , an "i2c 16x2, Serial Interface Adapter Module, LCD Display".

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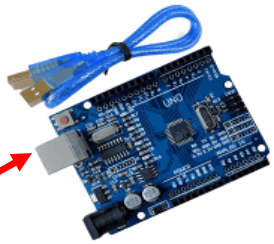
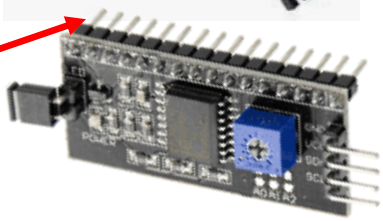
For SCORPIO TECHNOLOGY

Design Brief – You will Build and adjust the Example Code for an "i2c 16x2, Serial interface Adapter Module (PCF8574), LCD Display" with only 4 wires (positive, negative & 2 wires) using an Arduino Uno R3 Microcontroller.



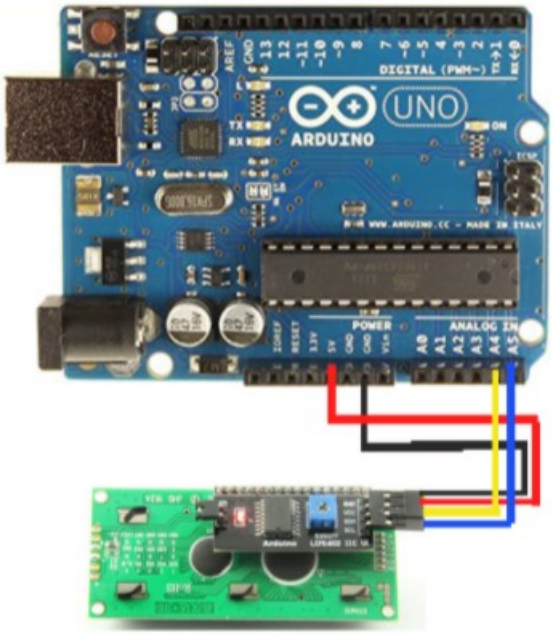
Parts Required

-An Arduino Uno & Lead.
- An Arduino 16x2 LCD Display.
- An Arduino i2c 16x2 Serial interface Adapter Module.
- A 16 long Male Header Pin (usually attached to the Module)
- 4 Dupont Male to Female connecting leads.



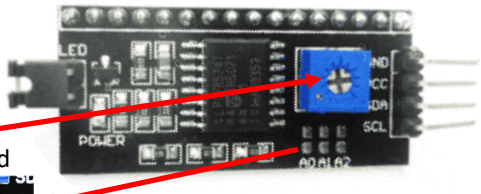
☐ **The i2c Serial Interface Adapter Module, usually has the 16 Pin Male Header attached to it. If not solder and then solder the complete module to the 16x2 LCD as above.**

☐ **Using 4 Male to Female Dupont connector wires, attach as below.**



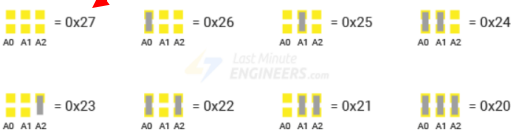
Black-GND to GND on Uno
Red– VCC to 5V on Uno
Yellow– SDA to A4 on Uno
Blue– SCL to A5 on Uno

☐ **The popular i2c 16x2 LCD serial Interface Adaptor Module has a PCF 8574 chip that has an i2c address code of 0x27. Codes can vary from 0x27 to 0x20.(see yellow diagrams below) If your Module won't work and has a different address, go to the internet, i2c LCD Calculator, to find your i2c address or see below.**
Our Module has no jumped or soldered connections across A0,A1,A2 on the Adaptor Module so we will use 0x27 in our sketch for our PCF 8574 i2c LCD Module.



enlarged

No jumped or soldered connections



☐ **Once you upload the sample sketch below, to display your text you need to adjust the contrast adjuster trimpot.**

☐ **Upload Pat's sample sketch below to the Arduino IDE, setting the Baud Rate to 9600.**


```
//LCD 16x2 i2c Module (PCF 8574)- 4 wires only.

//Modified by Pat McMahon 27/3/2022 with explanations and 2 lines of messages.
//Connect from the 16x2 i2c LCD Module to the Arduino Uno.
//GND from the 16x2 to GND on Uno
//Vcc from the 16x2to 5V on Uno
//SDA from the 16x2to A4 on Uno
//SCL from the 16x2to A5 on Uno
//Backlight seems to be on whether the small jumper switch is on or off.
//Adjust the trimpot on the 16x2 to get the desired display.
//The Sketch below makes the display lines on the LCD alternate from top to bottom etc.

#include <Wire.h>               // These Libraries are required.
#include <LiquidCrystal_I2C.h>     // These Libraries are required.

LiquidCrystal_I2C lcd(0x27, 16, 2); // ox27 is the code for the particular 16x2 module, 16 and 2 is for the 16 across,2 down.
int timer=1500;                 //Sets the interval in milliseconds between the line delays. Alter to fasten or slow the change.

void setup()
                    // This setup does the following once.
{

 lcd.init();               // This initializes the LCD.
 lcd.backlight();          // This turns on the backlight of the LCD.
 lcd.clear();             //This wipes the screen.
 lcd.setCursor(0,0);        //Sets the screen to start on the top left, top line of screen.

}

void loop()                  //This loops the code when the Uno is powered up.
{
 lcd.setCursor(0,0);           //Starts the character on top left, top line of screen.
 lcd.print("    SCORPIO    ");   //Prints the first line of the message.
 delay (timer);               //Delays the change to the next line which is 1500 milliseconds.
 lcd.clear();                //Wipes the first line message.
 lcd.setCursor(0,1);           //Starts the character on bottom left, bottom line of screen.
 lcd.print("   TECHNOLOGY   ");   //Prints the second line of the message.
 delay (timer);               //Delays the change to the next line which is 1500 milliseconds.
 lcd.clear();                //Wipes the second line message.

}
```

☐ **CONGRATULATIONS on building and coding your own i2c LCD 4 wire (Positive, Negative & 2 wires) Display.**

☐ **Extension Work— The above sample sketch only alternates 2 lines of messages. Copy the Blue section and paste multiple times the lines, changing the Text but ensuring it is 16 characters wide between " " exclamation marks.**

Note – I have found that <u>all UPPER CASE</u> letters display better than some lower case letters.