Serial Print using an LCD Display

http://arduino.cc/en/Tutorial/LiquidCrystalSerial

The Liquid Crystal Library allows you to control LCD displays that are compatible with the Hitachi HD44780 driver. There are many of them out there, and you can usually tell them by the 16-pin interface.
This example sketch accepts serial input from a host computer and displays it on the LCD. To use it, upload the sketch, then open the Serial Monitor and type some characters and click Send. The text will appear on your LCD.

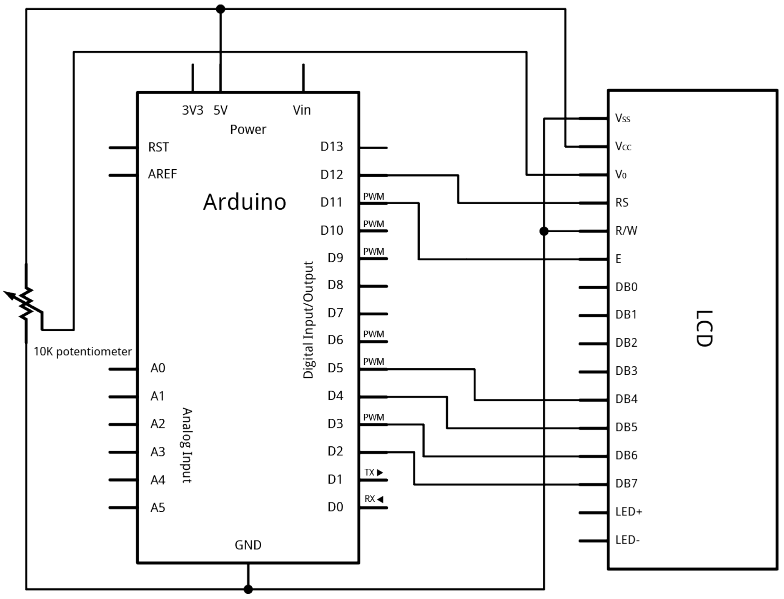
HARDWARE REQUIRED

Arduino Board
LCD Screen (compatible with Hitachi HD44780 driver)
pin headers to solder to the LCD display pins
10k Potentiometer
breadboard
hook-up wire

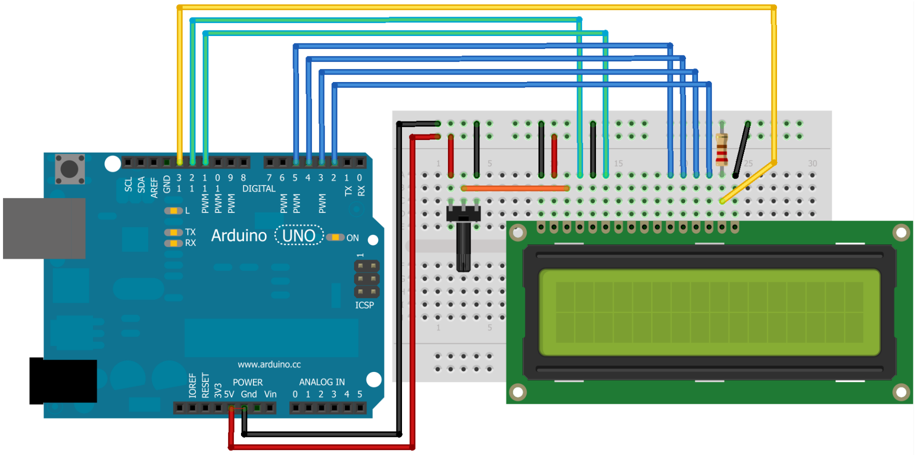
CIRCUIT

The LCDs have a parallel interface, meaning that the microcontroller has to manipulate several interface pins at once to control the display. The interface consists of the following pins:
A register select (RS) pin that controls where in the LCD's memory you're writing data to. You can select either the data register, which holds what goes on the screen, or an instruction register, which is where the LCD's controller looks for instructions on what to do next.
A Read/Write (R/W) pin that selects reading mode or writing mode
An Enable pin that enables writing to the registers
8 data pins (D0 -D7). The states of these pins (high or low) are the bits that you're writing to a register when you write, or the values you're reading when you read.
There's also a display constrast pin (Vo), power supply pins (+5V and Gnd) and LED Backlight (Bklt+ and BKlt-) pins that you can use to power the LCD, control the display contrast, and turn on and off the LED backlight, respectively.
The process of controlling the display involves putting the data that form the image of what you want to display into the data registers, then putting instructions in the instruction register. The LiquidCrystal Library simplifies this for you so you don't need to know the low-level instructions.
The Hitachi-compatible LCDs can be controlled in two modes: 4-bit or 8-bit. The 4-bit mode requires seven I/O pins from the Arduino, while the 8-bit mode requires 11 pins. For displaying text on the screen, you can do most everything in 4-bit mode, so example shows how to control a 2x16 LCD in 4-bit mode.

SCHEMATIC



IMAGE



Made with Fritzing.org

CODE

```
/*
  LiquidCrystal Library - Serial Input

 Demonstrates the use a 16x2 LCD display.  The
LiquidCrystal
 library works with all LCD displays that are
compatible with the
 Hitachi HD44780 driver. There are many of
them out there, and you
 can usually tell them by the 16-pin interface.

 This sketch displays text sent over the serial
port
 (e.g. from the Serial Monitor) on an attached
LCD.

 The circuit:
 * LCD RS pin to digital pin 12
 * LCD Enable pin to digital pin 11
 * LCD D4 pin to digital pin 5
 * LCD D5 pin to digital pin 4
 * LCD D6 pin to digital pin 3
 * LCD D7 pin to digital pin 2
 * LCD R/W pin to ground
 * 10K resistor:
 * ends to +5V and ground
 * wiper to LCD VO pin (pin 3)

 Library originally added 18 Apr 2008
 by David A. Mellis
 library modified 5 Jul 2009
 by Limor Fried (http://www.ladyada.net)
 example added 9 Jul 2009
 by Tom Igoe
 modified 22 Nov 2010
 by Tom Igoe

 This example code is in the public domain.

 http://arduino.cc/en/Tutorial/
LiquidCrystalSerial
 */
```

```
// include the library code:
#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

void setup(){
    // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  // initialize the serial communications:
  Serial.begin(9600);
}

void loop()
{
  // when characters arrive over the serial port...
  if (Serial.available()) {
    // wait a bit for the entire message to arrive
    delay(100);
    // clear the screen
    lcd.clear();
    // read all the available characters
    while (Serial.available() > 0) {
      // display each character to the LCD
      lcd.write(Serial.read());
    }
  }
}
```