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***Arduino Workshop* by John Boxall.**

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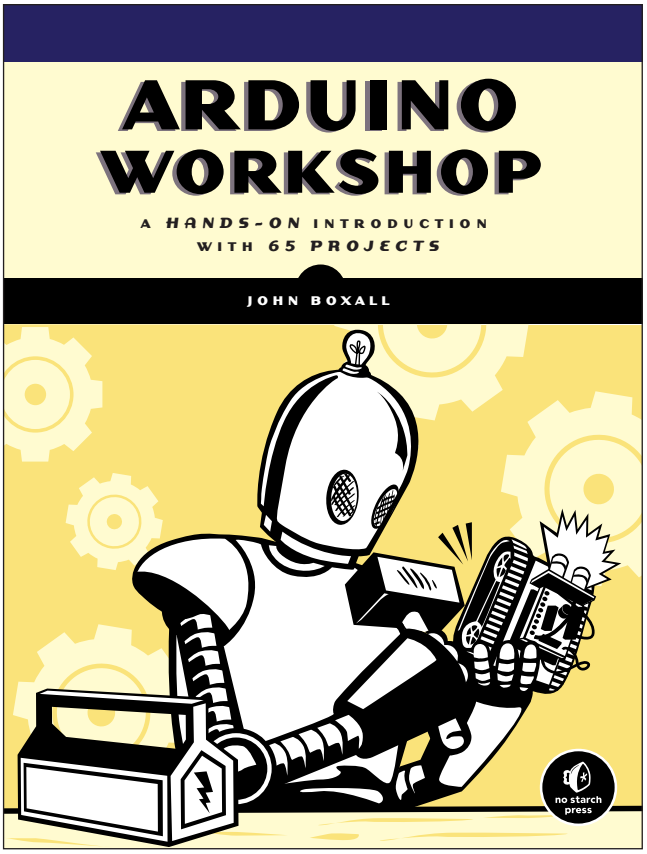

Project #44: Creating a Simple GPS Receiver

Now let's create a simple GPS receiver. But first, because you'll usually use your GPS outdoors—and to make things a little easier—we'll add an LCD module to display the data, similar to the one shown in Figure 13-6.

Figure 13-6: The Freetronics LCD & Keypad shield

NOTE *Our examples are based on using the Freetronics LCD & Keypad shield. For more information on this shield, see* http://www.freetronics.com/collections/display/products/lcd-keypad-shield/. *If you choose to use a different display module, be sure to substitute the correct values into the* `LiquidCrystal` *function in your sketches.*

To display the current position coordinates received by the GPS on the LCD, we'll create a very basic portable GPS that could be powered by a 9 V battery and connector.

The Hardware

The required hardware is minimal:

- Arduino and USB cable
- LCD module or Freetronics LCD shield (mentioned earlier)
- One 9 V battery to DC socket cable
- One SparkFun GPS shield kit

The Sketch

Enter and upload the following sketch:

```
// Project 44 - Creating a Simple GPS Receiver
❶ #include <TinyGPS.h>
#include <LiquidCrystal.h>
LiquidCrystal lcd( 8, 9, 4, 5, 6, 7 );

// Create an instance of the TinyGPS object
TinyGPS gps;

❷ void getgps(TinyGPS &gps);

void setup()
{
  Serial.begin(4800);
  lcd.begin(16, 2);
}

void getgps(TinyGPS &gps)
```


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```
// The getgps function will display the required data on the LCD
{
  float latitude, longitude;
  //decode and display position data
❸ gps.f_get_position(&latitude, &longitude);
  lcd.setCursor(0,0);
  lcd.print("Lat:");
  lcd.print(latitude,5);
  lcd.print("  ");
  lcd.setCursor(0,1);
  lcd.print("Long:");
  lcd.print(longitude,5);
  lcd.print("  ");
  delay(3000); // wait for 3 seconds
  lcd.clear();
}

void loop()
{
  byte a;
  if ( Serial.available() > 0 ) // if there is data coming into the serial line
  {
    a = Serial.read();          // get the byte of data
    if(gps.encode(a))           // if there is valid GPS data...
    {
❹     getgps(gps);              // grab the data and display it on the LCD
    }
  }
}
```

From ❶ to ❷, the sketch introduces the required libraries for the LCD and GPS. In `void loop` at ❹, we send the characters received from the GPS receiver to the function `getgps()` at ❸, which uses `gps.f_get_position()` to insert the position values in the byte variables `&latitude` and `&longitude` (which we display on the LCD).

Displaying the Position on the LCD

After the sketch has been uploaded and the GPS starts receiving data, your current position in decimal latitude and longitude should be displayed on your LCD, as shown in Figure 13-7.

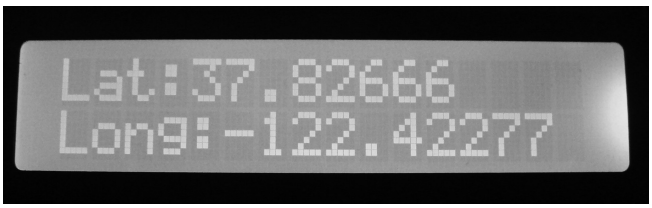

Figure 13-7: Latitude and longitude display from Project 44

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But where on Earth is this? We can determine exactly where it is by using Google Maps (*http://maps.google.com/*). On the website, enter the latitude and longitude, separated by a comma and a space, into the search field, and Google Maps will return the location. For example, using the coordinates returned in Figure 13-7 produces a map like the one shown in Figure 13-8.

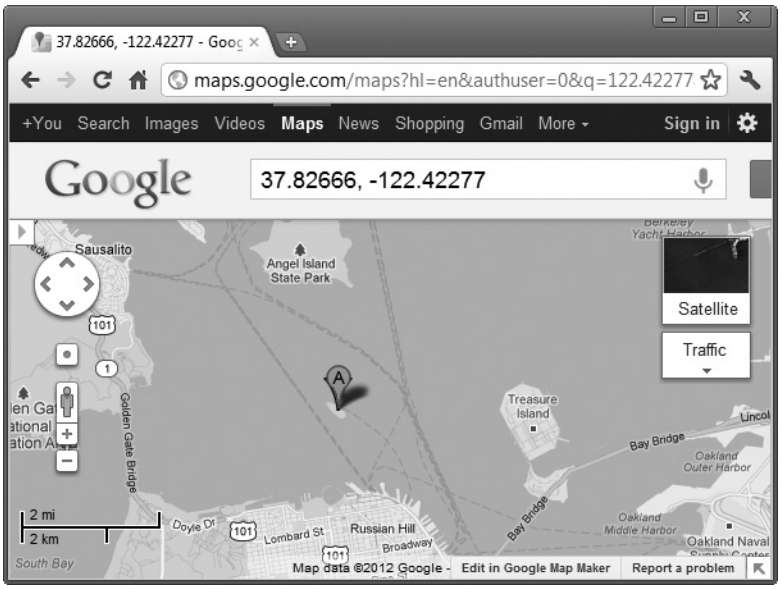

Figure 13-8: Location of position displayed in Figure 13-7