**GPS and MicroSD Integration Instructions**

**Sensor Info**

## GPS Module

The sensor is a [NEO-6M](https://www.amazon.ca/gp/product/B073MFYL8B/ref=ppx_yo_dt_b_asin_title_o04_s00?ie=UTF8&psc=1) from u-blox. It can track up to 22 satellites on 50 channels and achieves the industry’s highest level of sensitivity. The module is able provide various data such as latitude, longitude, altitude, speed, heading, number of satellite connection, etc, for more detail refer the document on this [link](https://randomnerdtutorials.com/guide-to-neo-6m-gps-module-with-arduino/). The breakout board comes with a voltage regulator but require soldering of the output pins.

## MicroSD Module

The sensor is a [Micro SD Mini TF Card Adapter Reader Module](https://www.amazon.ca/gp/product/B07QQBBL6S/ref=ppx_yo_dt_b_asin_title_o04_s00?ie=UTF8&psc=1) from KeeYees. The breakout board comes with a voltage regulator so both the GPS and this module can be connected with the same VCC pin. The maximum capacity of the module is 16Gb, not sure why this is the case but I think this is sufficient for this project.

**Sensor Communications**

The GPS sensor uses TX and RX pins to interface with the Arduino through the digital pins. Through these pins, the sensor will constantly send the data to the main controller (Arduino in this case) at a rate of 5Hz. It will require to up to 30 second to secure the connection with the satellite (LED will blink every second to indicating connection is secured).

Unlike the GPS module, there are no LED indicators to indicate if the data is being logged or not. An addition MicroSD card, formatted to the FAT version, is require to log the data.

**Instructions**

These boards do need to be wired externally since it cannot be mounted directly to the Arduino. The mapping for the GPS module is per Table 1 and for the MicroSD module is per Table 2 :

Table 1 GPS module mapping

| **GPS module** | **UNO** | **MEGA** |
| --- | --- | --- |
| TX | 2 | 18, 16, or 14 |
| RX | 3 | 19, 17 or 15 |
| GND | GND | |
| VCC | 5V | |

Table 2 MicroSD module mapping

|  |  |  |
| --- | --- | --- |
| GPS module | UNO | MEGA |
| CS | 4 | 53 |
| SCK | 13 | 52 |
| MOSI | 11 | 51 |
| MISO | 12 | 50 |
| VCC | 5V | 5V |
| GND | GND | GND |

The Arduino Uno or Mega will need a power source so make sure to connect VIN and GND to the positive and negative of a 9 volt (or other external battery).

**Mounting**

I recommend mounting the antenna close to the windows or on the roof to get a good connection with the satellite and mounting the MircoSD board with the main controller to have easy access to the SD Card.

There are five (5) mounting holes on the GPS board and four (4) mounting holes in the MircoSD board that can be used.

Note, the antenna cable is quite short but a longer cable can be use to mount the antenna to a desirable location

**Code**

The code is already configured to communicate to the UNO using pin 2 and 3 as TX and RX and pin 4, 11, 12 and 13 as CS, MOSI, MOSO and SCK. The data is currently stored directly to the microSD card as a CSV file. The data is than imported to the google earth to display over a map.