

# Electric Longboard Sensor Module Build Tutorial

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## Code

### Raspberry PI

#### Parts List

Raspberry PI with a micro SD Card  
5v power supply  
Ethernet Cable  
Micro SD card Reader

#### Raspian

To run any programs on the raspberry PI, we will need to give it an operating system. We will be using Raspian.

Raspian is a Linux OS distribution based on Debian Linux but updated specifically for raspberry pi.

Download "Raspian Lite" from the official Raspberry Pi website.

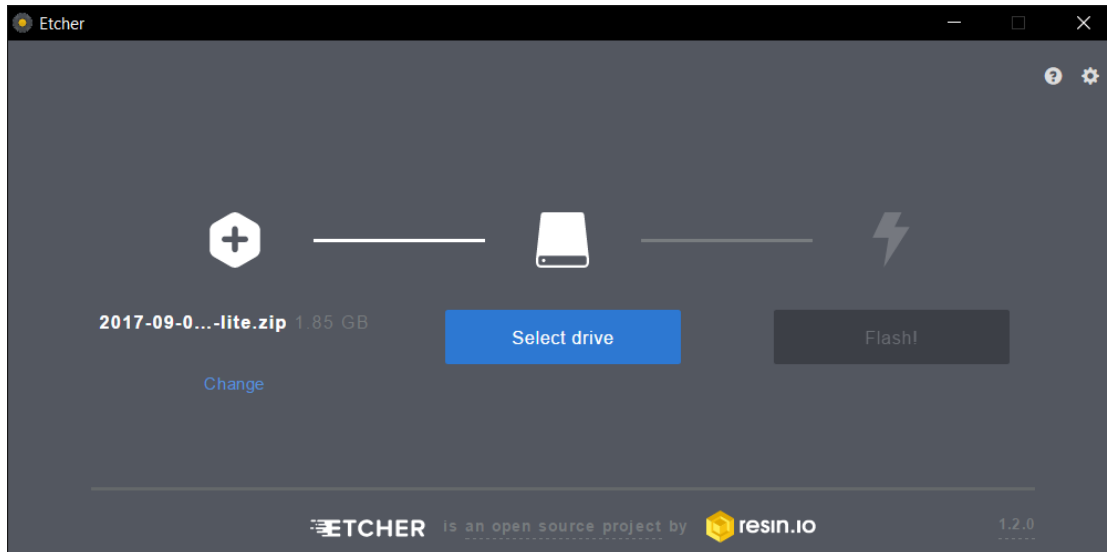
<https://www.raspberrypi.org/downloads/raspbian/>

We will then need to burn the ISO image onto the sd card. To do this we will use a flash software.

Download "Etcher" from the official etcher website.

<https://etcher.io/>

Select the downloaded Debian Image, the SD card and hit Flash!

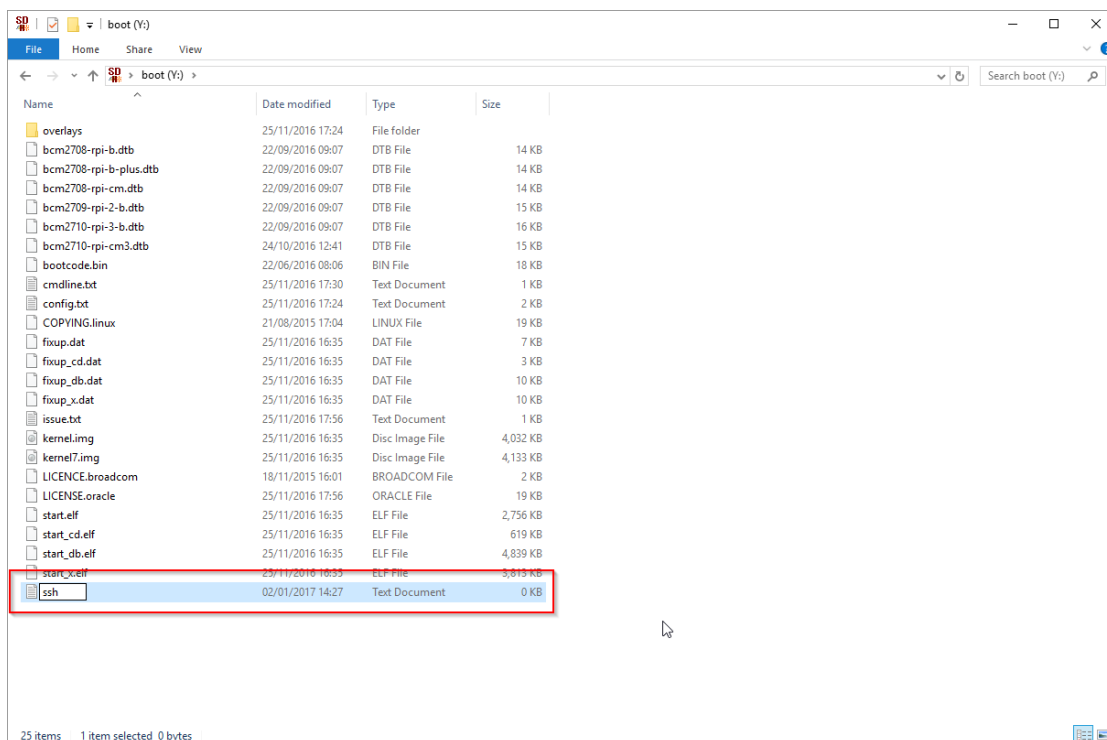


For a more thorough set of instructions check out the official Raspi flashing tutorial.  
<https://www.raspberrypi.org/documentation/installation/installing-images/>

## SSH

SSH or “secure shuttle” is a program use to access a computer remotely. We will need this in order to be able to control the raspberry PI from a laptop, with no extra hardware such as a keyboard or monitor. SSH is installed by default on any UNIX system. Thus we just need to enable it.

The simplest way is to create a blank “ssh” document in the boot file on the newly flashed SD card.



To then access the Pi, connect it to your laptop over ethernet.

If you are using a windows computer type the command “arp -a” into cmd in order to search your local LAN network for IPs.

You should be able to identify the IP of the RasPi.

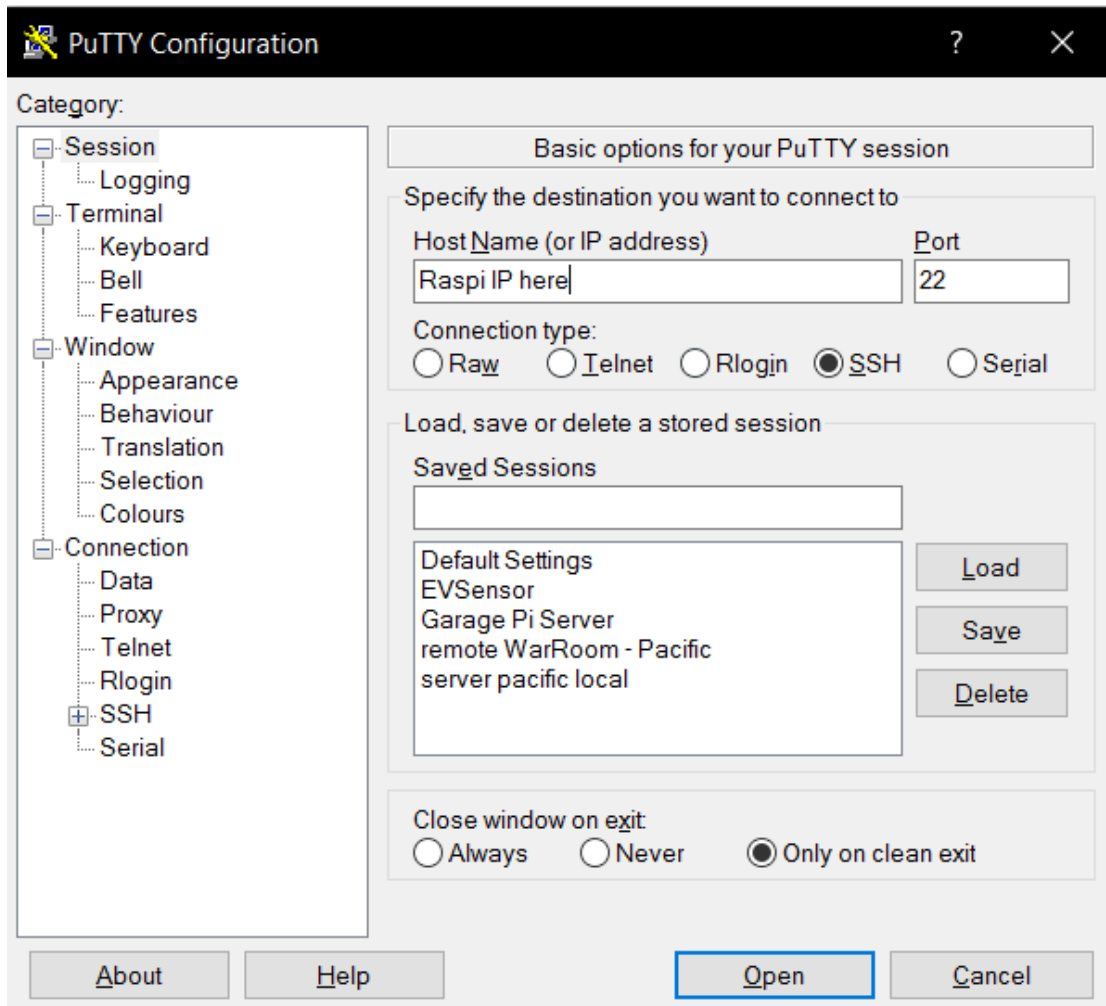
```
C:\>arp -a

Interface: 192.168.1.6 --- 0x12
Internet Address      Physical Address      Type
192.168.1.1           9c-3d-cf-c5-e2-c8     dynamic
192.168.1.255         ff-ff-ff-ff-ff-ff     static
224.0.0.22            01-00-5e-00-00-16     static
224.0.0.251           01-00-5e-00-00-fb     static
224.0.0.252           01-00-5e-00-00-fc     static
239.255.255.250       01-00-5e-7f-ff-fa     static
255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

If you do not already have Putty installed do so now.

<http://www.putty.org/>

Putty is a program used by windows to communicate over a few different protocols. It allows us to establish a ssh tunnel.



Open PuTTY and input the IP of the pi where it says “Raspi IP here”. The default SSH port is “22”. Hit “Open”

This should establish a connection to the RasPi and it will ask for login credentials.

The default login credentials are:

Username: Pi

Password: Raspberry

Congrats, you should now be in full control of the RasPi remotely.

## Python

In the RasPi terminal type “sudo apt-get install python2” and hit enter.

After a short installation process you should be able to type “python” in the terminal and receive the following:

```
pi@raspberrypi ~ $ python
Python 2.7.3 (default, Mar 18 2014, 05:13:23)
[GCC 4.6.3] on linux2
Type "help", "copyright", "credits" or "license" for more information.
```

This means that python has been installed.

## Git

Git is a program used to pull files from repositories such as GitHub, we will use this program to download all of the necessary code to power the project.

In the RasPi terminal type “sudo apt-get install git” and hit enter.

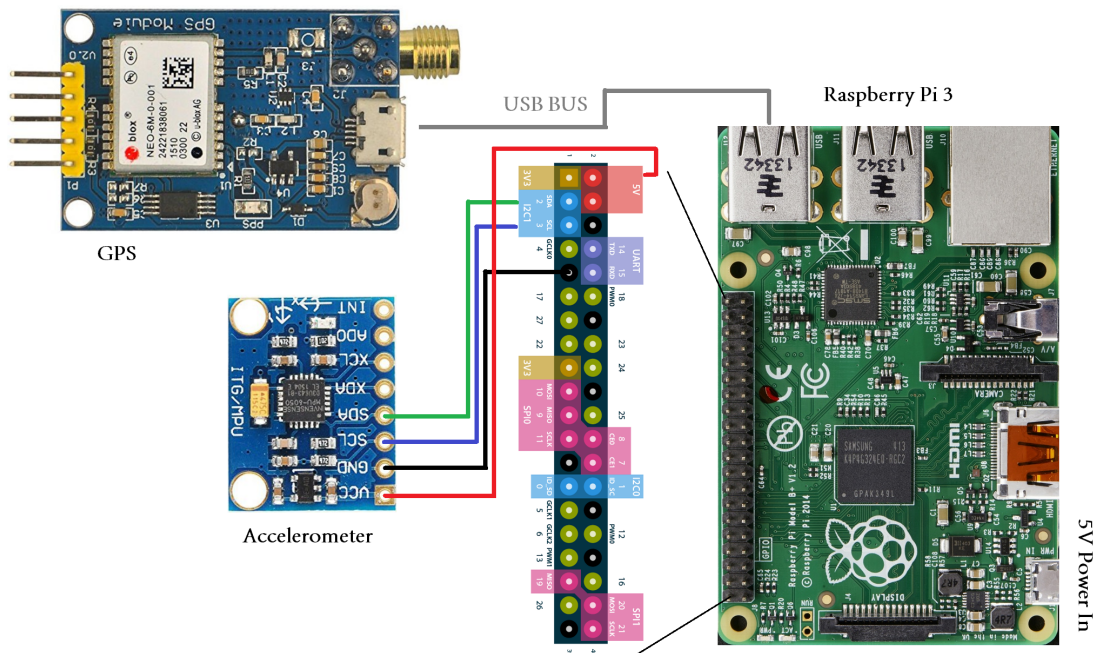
# Electrical

## Parts List

- Raspberry Pi
- 3D printer filament
- 4 x 1/4” length plastic fastener screws
- 4 x 1” length plastic fastener screws

## Schematic

The following connections need to be made. Th



## Power Supply

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## Mechanical

### Parts List

PLA or ABS Printer  
3D printer filament  
8 x 1/4" length plastic fastener screws  
4 x 1" length plastic fastener screws  
Double sided tape.

### Instructions

The Enclosure is designed to be 3D printed with either ABS or PLA.

The STL files for the enclosure are provided (Enclosure Full Top.STL, Enclosure Full Bot.STL).

Once printed, use the 1/4" length screws to mount the GPS, Accelerometer, and Raspberry Pi.

The GPS antenna can be left inside, and taped to the top part of the enclosure using double sided sticky tape or it can be wired to the outside.

Place a line of sticky tape at the far side of the bottom of the enclosure and attached the battery bank.

Using the 1" length screws fasten the enclosure together.

The final product should look like the following picture.

