

## GPS module:

- A GPS module uses a receiver chip, antenna, and CPU to receive signals from satellites and calculate a location
- The module uses a process called trilateration to calculate its position by measuring the distance to satellites using radio signals.
  1. Trilateration: Trilateration is a mathematical technique that uses distance measurements to determine the location of a point of interest
  2. Trilateration uses the distance from at least three known points to calculate the position of a target. The distance is calculated using the rate and time, where  $\text{distance} = \text{rate} \times \text{time}$ .

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- GPS Module we are using is neo 6M

## Raspberry Pi B+ J8 Header

Pin#	NAME		NAME	Pin#
01	3.3v DC Power		DC Power 5v	02
03	GPIO02 (SDA1 , I2C)		DC Power 5v	04
05	GPIO03 (SCL1 , I2C)		Ground	06
07	GPIO04 (GPIO_GCLK)		(TXD0) GPIO14	08
09	Ground		(RXD0) GPIO15	10
11	GPIO17 (GPIO_GEN0)		BITCLOCK GEN1 GPIO18	12
13	GPIO27 (GPIO_GEN2)		Ground	14
15	GPIO22 (GPIO_GEN3)		(GPIO_GEN4) GPIO23	16
17	3.3v DC Power		(GPIO_GEN5) GPIO24	18
19	GPIO10 (SPI_MOSI)		Ground	20
21	GPIO09 (SPI_MISO)		(GPIO_GEN6) GPIO25	22
23	GPIO11 (SPI_CLK)		(SPI_CE0_N) GPIO08	24
25	Ground		(SPI_CE1_N) GPIO07	26
27	ID_SD (I2C ID EEPROM)		(I2C ID EEPROM) ID_SC	28
29	GPIO05		Ground	30
31	GPIO06		GPIO12	32
33	GPIO13		Ground	34
35	GPIO19	LRCLOCK	GPIO16	36
37	GPIO26		DATA IN	38
39	Ground		DATA OUT	40

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<http://www.element14.com>

### CONNECTION OF GPS MODULE TO RPI:

Neo-6M RPI

VCC to Pin 1, which is 3.3v

TX to Pin 10, which is RX (GPIO15)

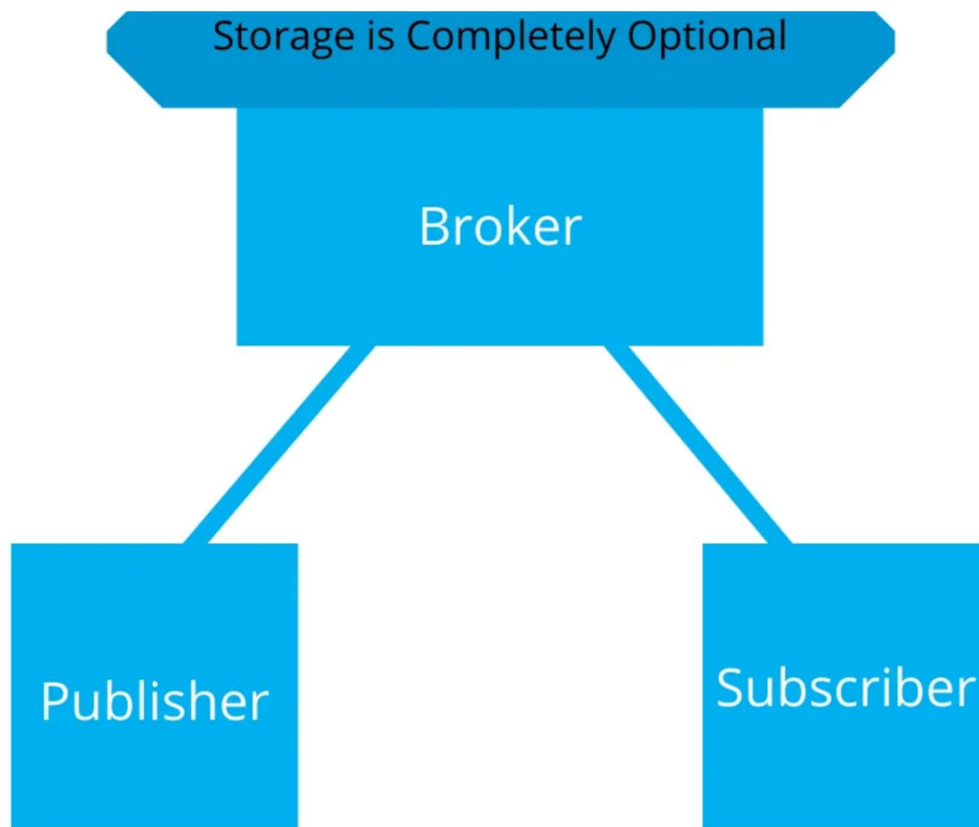
RX to Pin 8, Which is TX (GPIO14)

Gnd to Pin 6, which is Gnd

<https://youtu.be/OWP3D-51vIc?si=fLvYhDImqZgljufz>

<https://youtu.be/N8fH0nc9v9Q?si=BzO-nrT-kkRCt1ke>

## MQTT PROTOCOL



### Hardware Specifications

- [Raspberry Pi 4 Model B / Raspberry Pi 3 Model B+](#)
- Micro SD Card (min 8 GB)
- 5V adapter (with a recommended current rating of 2.5A or more)

## Installing Mosquitto MQTT Broker on Raspberry Pi:

To set up an MQTT broker on Raspberry Pi, follow these steps:

- Open a new terminal window and install Mosquitto dependencies.

```
sudo apt install mosquitto mosquitto-clients'
```

- To check if the mosquito is running

```
sudo systemctl status mosquito
```

```
pi@raspberrypi:~$ sudo systemctl status mosquitto
● mosquitto.service - Mosquitto MQTT v3.1/v3.1.1 Broker
   Loaded: loaded (/lib/systemd/system/mosquitto.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2023-07-10 16:25:32 BST; 1min 9s ago
     Docs: man:mosquitto.conf(5)
           man:mosquitto(8)
  Main PID: 1333 (mosquitto)
    Tasks: 1 (limit: 2063)
   CGroup: /system.slice/mosquitto.service
           └─1333 /usr/sbin/mosquitto -c /etc/mosquitto/mosquitto.conf

Jul 10 16:25:32 raspberrypi systemd[1]: Starting Mosquitto MQTT v3.1/v3.1.1 Broker...
Jul 10 16:25:32 raspberrypi systemd[1]: Started Mosquitto MQTT v3.1/v3.1.1 Broker.
```

<https://youtu.be/pPKrVwBNc?si=LK1Jlbwyl2doScml>