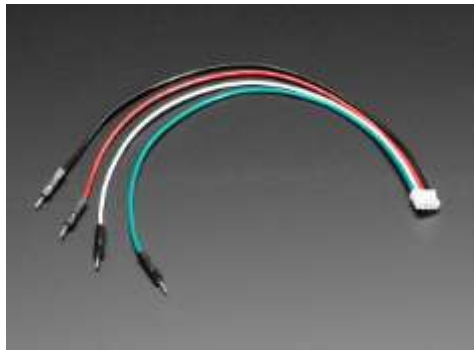


STEMMA Soil Sensor - I2C Capacitive Moisture Sensor on BBG Guide

Materials required:

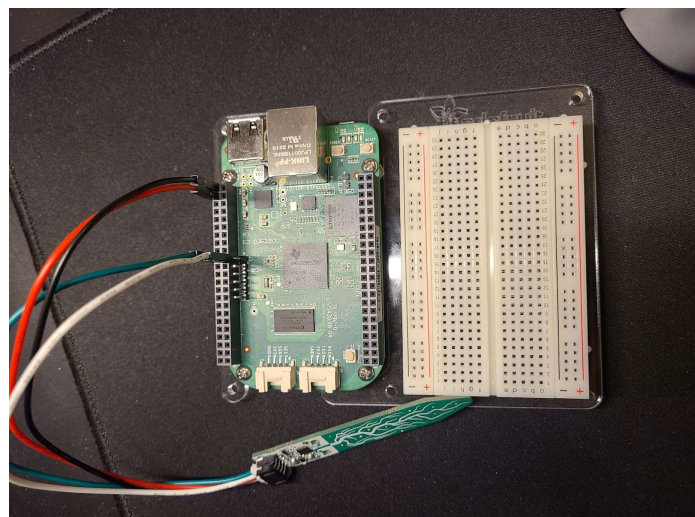
- Adafruit I2C capacitive moisture sensor
- 4-pin to Male/Female Header cable (both male and female connectors should be provided with the sensor)



Procedure:

1. Connect the header cable to the port on the sensor board
2. Connect the pins to the appropriate pin headers on the BBG
 - a. Red wire (Vin)=> VDD_3V3 (P9_03)
 - b. Black wire (GND)=> DGND (P9_01)
 - c. Green wire (I2C SCL) => I2C2_SCL (P9_19)
 - d. White Wire (I2C SDA) => I2C2_SDA (P9_20)

| P9 | | | |
|----------|----|----|------------|
| DGND | 1 | 2 | DGND |
| VDD_3V3 | 3 | 4 | VDD_3V3 |
| VDD_5V | 5 | 6 | VDD_5V |
| SYS_5V | 7 | 8 | SYS_5V |
| FWR_BTN | 9 | 10 | SYS_RESETN |
| GPIO_30 | 11 | 12 | GPIO_60 |
| GPIO_31 | 13 | 14 | GPIO_50 |
| GPIO_48 | 15 | 16 | GPIO_51 |
| GPIO_5 | 17 | 18 | GPIO_4 |
| I2C2_SDA | 19 | 20 | I2C2_SCL |
| GPIO_3 | 21 | 22 | GPIO_2 |
| GPIO_49 | 23 | 24 | GPIO_15 |
| GPIO_117 | 25 | 26 | GPIO_14 |
| GPIO_115 | 27 | 28 | GPIO_113 |
| GPIO_111 | 29 | 30 | GPIO_112 |
| GPIO_110 | 31 | 32 | VDD_ADC |
| AIN4 | 33 | 34 | GND_ADC |
| AIN6 | 35 | 36 | AIN5 |
| AIN2 | 37 | 38 | AIN3 |
| AIN0 | 39 | 40 | AIN1 |
| GPIO_20 | 41 | 42 | GPIO_7 |
| DGND | 43 | 44 | DGND |
| DGND | 45 | 46 | DGND |



3. Download and install the necessary libraries:

- a. **Note: The code used to interface with the sensor will be in python; run these commands to install python3 (ensure your board is connected to internet first)**

```
(bbg): ~$ sudo apt-get update
```

```
(bbg): ~$ sudo apt-get upgrade
```

```
(bbg): ~$ sudo apt-get install python3-pip
```

```
(bbg): ~$ sudo pip3 install --upgrade setuptools
```

- b. Installing Adafruit_seesaw, Adafruit_Blinka, Adafruit_CircuitPython_seesaw (more detailed instructions in the following

<https://learn.adafruit.com/adafruit-stemma-soil-sensor-i2c-capacitive-moisture-sensor/python-circuitpython-test>)

```
(bbg): ~$ git clone https://github.com/adafruit/Adafruit\_seesaw
```

```
(bbg): ~$ sudo pip3 install Adafruit_seesaw
```

```
(bbg): ~$ git clone https://github.com/adafruit/Adafruit\_CircuitPython\_seesaw
```

```
(bbg): ~$ sudo pip3 install Adafruit_CircuitPython_seesaw
```

```
(bbg): ~$ git clone https://github.com/adafruit/Adafruit\_Blinka
```

```
(bbg): ~$ sudo pip3 install Adafruit_Blinka
```

4. After successful installation, test the sensor with the following code

- a. Create a .py file with the following, and run the code with “sudo python3 <name_of_file>.py” (**Note: The moisture sensor has address 0x36 on the I2C bus and the I2C bus should be automatically initialized through the provided code**) :

```
# SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
# SPDX-License-Identifier: MIT
import time
import board
from adafruit_seesaw.seesaw import Seesaw
i2c_bus = board.I2C() # uses board.SCL and board.SDA
# i2c_bus = board.STEMMA_I2C() # For using the built-in STEMMA QT connector
# on a microcontroller

ss = Seesaw(i2c_bus, addr=0x36)

while True:
    # read moisture level through capacitive touch pad
    touch = ss.moisture_read()
    # read temperature from the temperature sensor
    temp = ss.get_temp()

    print("temp: " + str(temp) + " moisture: " + str(touch))
    time.sleep(1)
```

d. The terminal on the BBG should output the following:

```
debian@BeagleBone:/mnt/remote/soil_test$ sudo python3 soil_sensor.py
temp: 19.196323437780002  moisture: 342
temp: 18.87500404854  moisture: 340
temp: 19.196323437780002  moisture: 340
temp: 19.622562198300002  moisture: 340
temp: 18.97992341982  moisture: 340
temp: 19.30124280906  moisture: 340
temp: 19.30124280906  moisture: 340
```

e. Try touching the sensor and see the change in the moisture reading, the values should range from 340 (very dry) - 1015 (wet)

```
debian@BeagleBone:/mnt/remote/soil_test$ sudo python3 soil_sensor.py
temp: 19.196323437780002  moisture: 340
temp: 19.40616218034  moisture: 343
temp: 19.511081551620002  moisture: 431
temp: 19.0914040665  moisture: 1016
temp: 19.196323437780002  moisture: 1015
temp: 19.0914040665  moisture: 1016
temp: 18.97992341982  moisture: 348
```

Troubleshooting:

1. If the device is not found, double check the address of the device on the I2C bus and check if you are using the appropriate BBG pin headers.
2. When trying to run the sample code provided above and there are errors of missing libraries/functions, ensure that the libraries have been installed properly. The following link <https://learn.adafruit.com/adafruit-stemma-soil-sensor-i2c-capacitive-moisture-sensor/downloads> contains more detailed explanations on how to set up libraries and the links to the github repositories containing the library contents.