

# Instructions:



## PLANT MONITOR – PICO AND PICO W



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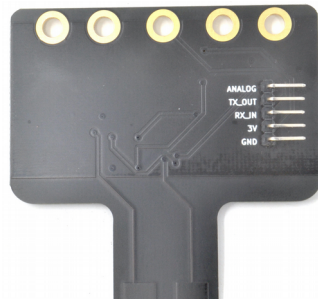
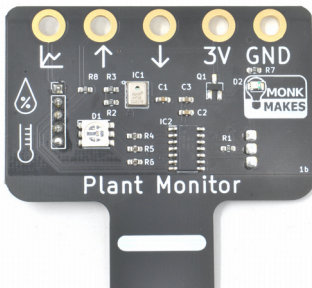
## WARNING

Only the prong of the Plant Monitor below the white line should be allowed to get wet. If the top of the board gets wet, disconnect it from everything, dry it using a paper towel and then leave it the thoroughly dry out before trying to use it again.

# INTRODUCTION

The MonkMakes Plant Monitor measures soil moisture, temperature and relative humidity. This board is compatible with the BBC micro:bit, Raspberry Pi and most microcontroller boards.

- Superior capacitive sensor (no electrical contact with soil)
- Alligator / crocodile clip rings (for use with BBC micro:bit and Adafruit Clue etc.)
- Ready soldered header pins for Arduino and other microcontroller boards.
- Easy to use UART serial interface
- Additional analog output for moisture only
- Built-in RGB LED (switchable)



## USING THE PLANT MONITOR

The plant monitor should be placed as shown below.



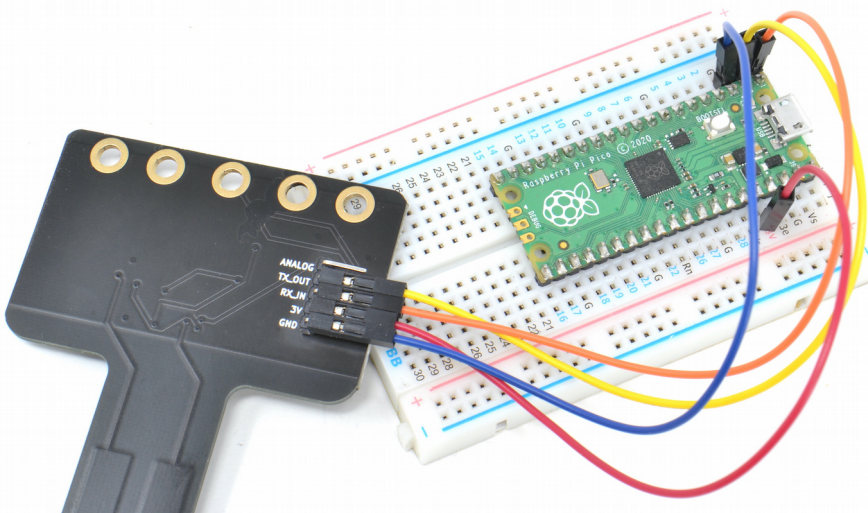
The front side of the prong should be as close to the edge of the pot as possible. The sensing all takes place from the far side of the prong.

The electronics should be facing out of the pot and the prong of the Plant Monitor pushed into the dirt as far as the white line (but no deeper).

It's a good idea to attach the wires you are going to use to connect to the Plant Monitor before positioning it in the plant pot.

Once powered up, the plant monitor will immediately start displaying the level of wetness using the builtin LED. Red means dry, green means wet. Before you put the Plant Monitor in the pot, try gripping the prong in your hand and the moisture of your body should be enough to alter the LED's color.

Connect the Plant Monitor to your Raspberry Pi Pico using solderless breadboard and female to male jumper wires as shown below, or if you prefer female to female jumper wires, directly from board to board..



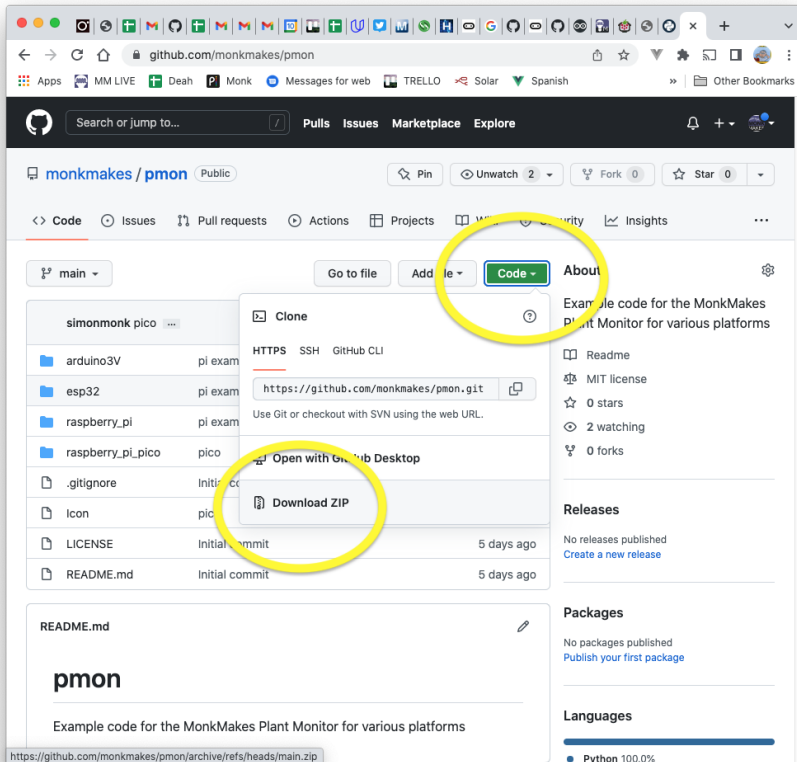
The connections are as follows:

- GND to GND
- 3V on the Pico to 3V on the Plant Monitor
- TX on the Pico to RX\_IN on the Plant Monitor
- RX on the Pico to TX\_OUT on the Plant Monitor

Using the MonkMakes Breadboard for Pico ([https://www.monkmakes.com/pico\\_bb](https://www.monkmakes.com/pico_bb)) will make it very much easier to identify which pin of the Pico is which.

To get you started, you will find a MicroPython library and test program in the examples for this board on its github page here: <https://github.com/monkmakes/pmon>

If you are unfamiliar with git, the easiest way to download it is to go to the github page above and then use the download ZIP feature (see below).



This download contains the example files for the Plant Monitor for lots of platforms, not just the Pico. So having downloaded the ZIP archive and extracted it, you will find it contains a folder called `raspberry_pi_pico`. Inside this folder you will find four files, that you should open using Thonny (<https://thonny.org/>).

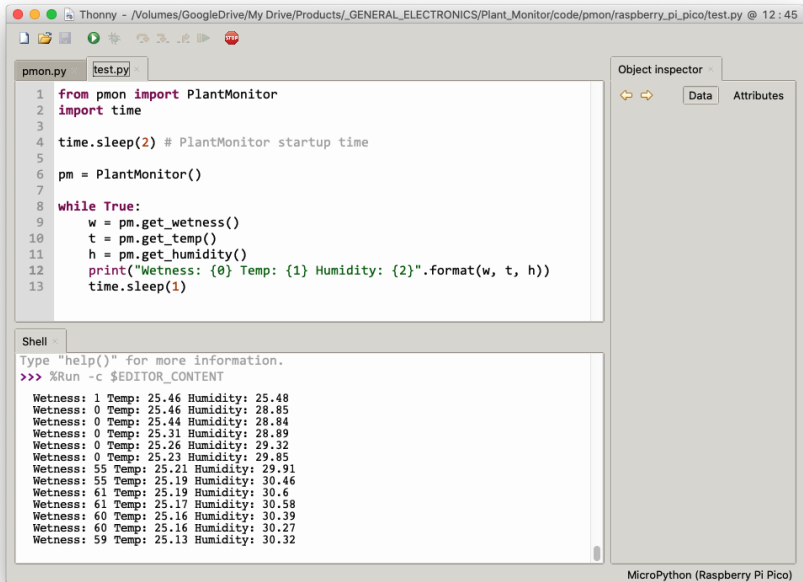
- `pmon.py` – a MicroPython library for the Plant Monitor
- `microdot.py` – the microdot light-weight web server
- `mm_wlan.py` – A Wireless LAN library
- `test.py` – a test program using the `pmon` library

The middle two of these files are only needed if you want to run the Pico W web server example.

Before you can run `test.py` copy the files `pmon.py`, `microdot.py` and `mm_wlan.py` onto your Pico, by using the SaveAs menu option in Thonny and then selecting

Raspberry Pi Pico for the destination. When you run test.py you should see the wetness, temperature and humidity being printed out.

Use the program test.py as a template for your own programs for the Pico.



```
1 from pmon import PlantMonitor
2 import time
3
4 time.sleep(2) # PlantMonitor startup time
5
6 pm = PlantMonitor()
7
8 while True:
9     w = pm.get_wetness()
10    t = pm.get_temp()
11    h = pm.get_humidity()
12    print("Wetness: {0} Temp: {1} Humidity: {2}".format(w, t, h))
13    time.sleep(1)
```

```
Type "help()" for more information.
>>> %Run -c $EDITOR_CONTENT

Wetness: 1 Temp: 25.46 Humidity: 25.48
Wetness: 0 Temp: 25.46 Humidity: 28.85
Wetness: 0 Temp: 25.44 Humidity: 28.84
Wetness: 0 Temp: 25.31 Humidity: 28.89
Wetness: 0 Temp: 25.26 Humidity: 29.32
Wetness: 0 Temp: 25.23 Humidity: 29.85
Wetness: 55 Temp: 25.21 Humidity: 29.91
Wetness: 55 Temp: 25.19 Humidity: 30.46
Wetness: 61 Temp: 25.19 Humidity: 30.6
Wetness: 61 Temp: 25.17 Humidity: 30.58
Wetness: 60 Temp: 25.16 Humidity: 30.39
Wetness: 60 Temp: 25.16 Humidity: 30.27
Wetness: 59 Temp: 25.13 Humidity: 30.32
```

If you have a Pico W, then you can take advantage of its wireless capabilities and try out the example pico\_w\_server.py.

# Pico W Plant Monitor

**Water: 93**

**Temp (C): 31.43**

**Humidity: 26.94**

Before running `pico_w_server.py`, find the following lines, and put your network name and password into the code.

```
ssid = 'network name'  
password = 'password'
```

When you run the program, you should see something like:

```
Connecting to Network...  
Connected IP Address = 192.168.1.132  
Setting up webserver...
```

Now open a browser window on a computer on the same network as the Pico W and navigate to the IP address shown when the program first ran (in this case, 192.168.1.132).

The readings will refresh every second.



## TROUBLESHOOTING

**Problem:** When I first connect power to the PlantMonitor, the LED cycles through colors. Is this normal?

**Solution:** Yes, this is the Plant Monitor doing a self-test as it starts up.

**Problem:** The LED on the Plant Monitor does not light at all.

**Solution:** Check the power connections to the Plant Monitor. Alligator leads and jumper wires can become faulty. Try changing the leads.

**Problem:** I am connecting using the serial interface, and I get wetness readings, but the humidity and temperature readings are wrong and not changing.

**Solution:** You may have inadvertently powered your Plant Monitor from 5V rather than 3V. This may have destroyed the temperature and humidity sensor.

## SUPPORT

You can find the Product's information page here: <https://monkmakes.com/pmon> including a datasheet for the product.

If you need further support, please email [support@monkmakes.com](mailto:support@monkmakes.com).

# MONKMAKES

As well as this kit, MonkMakes makes all sorts of kits and gadgets to help with your electronics projects. Find out more, as well as where to buy here:

<https://monkmakes.com> you can also follow MonkMakes on Twitter @monkmakes.

