BIMMERBOY CODING

PlantMate

Version 1.0

Introduction

PlantMate is an Arduino based automatic plant watering system that can maintain up to 4 plants. This system includes the PlantMate circuit board with a 6V power adapter, 4 water pumps (hoses not included) and 4 moisture sensors.

This system will maintain your plants' moisture levels and keep track of when they were last watered. The only thing you need to do is ensure there is water in the tank.

Even though we think this system works in a most excellent way, please use your own judgement when dealing with the health of your plants. Unforeseen circumstances can occur and it would be in your best interest to monitor your plants and the operation of this system.

We have an Android app that you can use to verify your water pump operation, monitor your current moisture levels as well as how long it has been since the system last watered each plant. There is no IOS app.

Quick Start Guide

Parts List

Ensure you have the following:

- PlantMate circuit board
- 4 Water pumps and wiring
- 4 Moisture Sensors and wiring
- Hose for the water pumps (not included)
- Water tank (not included)

Setup

- Install the PlantMate controller in the center location within your plants so that all sensors and their wiring are able to easily reach their respective plant. Keep the unit and its power supply off the floor in case there are water spills as neither of these components are water proof.
- Position each moisture sensor into the soil or grow media somewhere between the base of your plant and the edge of their pot. Note the labeling on the wiring as this will match with the related water pump for each plant.
- Run a section of water hose (cut to fit) from each water pump (labelled) to each plant and be sure that it is positioned off the grow media surface to prevent soil from being backwashed back into the water tank when the water stops flowing. Use paper clips, sticks, etc. to position the water outlet to your desired location in the pot. Be careful to ensure that the moisture

sensors do not get wet where the electronics are exposed. Feel free to wrap electrical tape around the electrical components and wiring connector if this is an issue.

- **Important**: Be sure that your water pumps and water level in the water tank is lower than the height of your plants to prevent starting a siphoning effect when you run your pumps.
- We recommend you use the Android app to test each pump to ensure there is no unintentional siphoning when the pumps run.
- Add water to your tank so that the pumps are completely submerged.
- Plug the 6V power adapter into a wall outlet.

The system will now water any plants that need watering according to their moisture sensors and will maintain their ideal moisture states. For a more detailed explanation on how this system works, see **Operational Details**.

Optionally you can use our Android app to ensure that each water pump is operational and what each plants moisture levels are. See **Using the Android App** for details on this process.

Operational Details

The system will maintain your plant moisture based on three moisture zones, Dry, Moist, and Wet.

When initially powered up, each plant state will be 'unknown'. The system will wait for approximately 5 minutes before it will actually start any watering on your plants. This gives you time to ensure you have the moisture sensors positioned where you want them and they are reading more or less what you expect the moisture level to be.

Once the system starts the watering process for the first time, the system will water any plant that is not in the Wet zone until they are in the Wet zone. During this watering cycle the plant will be in a 'Watering' state.

Once a plant is in the Wet zone, their state is considered to be 'Watered'. Note: Any plant that is already in the Wet zone when we start up will be considered to be 'Watered'.

When watering a Dry plant, the pump will run for 5 seconds. When watering a plant that is in the 'Moist' zone, (but not in the 'Wet' zone) the pump will run for 2 seconds. Once the plant is in the 'Wet' zone, it will not be watered until it falls into the 'Dry' zone.

The system checks the plants every 5 minutes to determine if it needs to water any of the plants.

Once a plant is watered (in the Wet zone) it will only be watered again when the moisture levels fall into the Dry zone. This is effective because most plant root systems

need to breathe between watering cycles to avoid ‘drowning’ the plant. This is good for the root system and the plant and this system was designed to follow this watering methodology.

Once your plants’ water pump has watered your plant, it will track how long it has been since it last watered the plant. This can be monitored using the Android app.

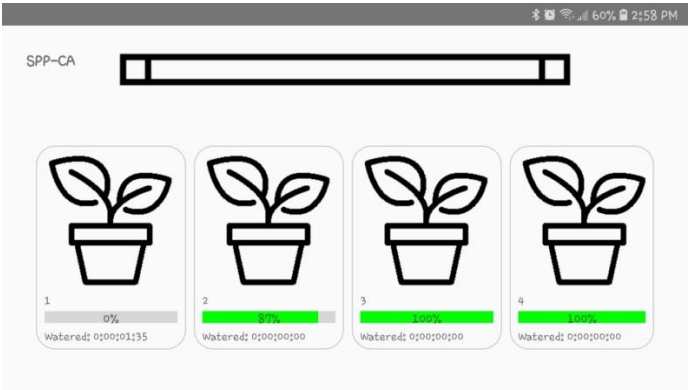
Using the Android App

The Android App uses Bluetooth technology to communicate with the PlantMate hardware. This allows the application to view the moisture levels of each plant as well as when the plant was last watered. These are considered status updates and they occur every second when there is a Bluetooth connection listening to the PlantMate hardware.

Setup

1. Install the Android app https://play.google.com/store/apps/details?id=com.bimmerboycoding.plantmate :
2. Locate your PlantMate device with your phones' Bluetooth application.
3. Once you locate your device, pair the device with your phone using **1234** as the PIN when prompted.

Once paired, open the PlantMate Android application. The application will know which paired Bluetooth devices are PlantMate hardware automatically.



In the top left corner you will see your Bluetooth paired device name. In this case it is SPP-CA.

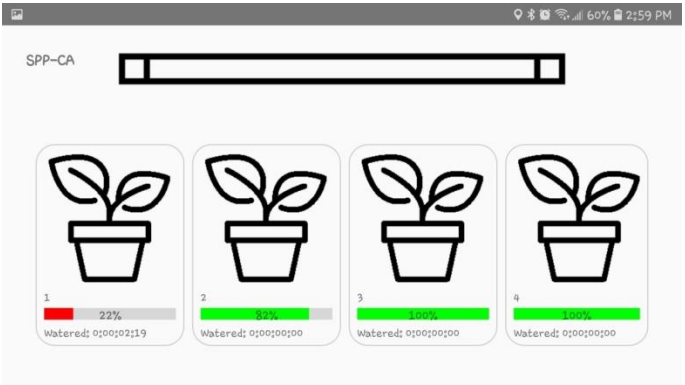
To the right of that is a light bar icon. You can ignore that as it is not currently used.

Below the light bar are the 4 plants that the system can manage.

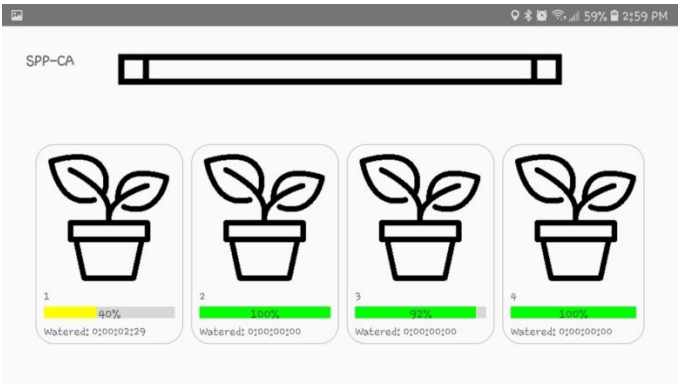
The leftmost plant is showing a sensor that is completely dry.

Below the 0% for plant #1 is when the system last watered the plant (1 minute and 35 seconds ago).

As the moisture changes, so will the display as seen in the next few photos:



Here we see that the moisture is coming up for plant #1, it is now 22% but still in the Dry zone as indicated by a red status bar.



The display changes to yellow for the Moist zone, we see we are at 40% now and that was watered 2 minutes and 29 seconds ago.

Note the green plants are displaying all zeros for the watered value. This means the system has not watered these plants yet.

Also note: The system is designed to have 4 moisture sensors hooked up at all times. When there is no sensor hooked up for a plant, the display will fluctuate around the 100% mark. This prevents the water pump for that plant from needlessly running when there is no plant to water.

Manually running a pump

With the Android App, press on a plant icon and hold it for a short moment and you will be presented with a context menu.

When you click the “Run this plants pump for 2 seconds” text, the pump will run for that plant. This allows you to ensure you have the correct pump on the correct moisture sensor. It also allows you to run the pump while you position the water hose outlet to where you want the water to be applied.