Assembly and Operation Manual

November 2019

SwitchDoc Labs

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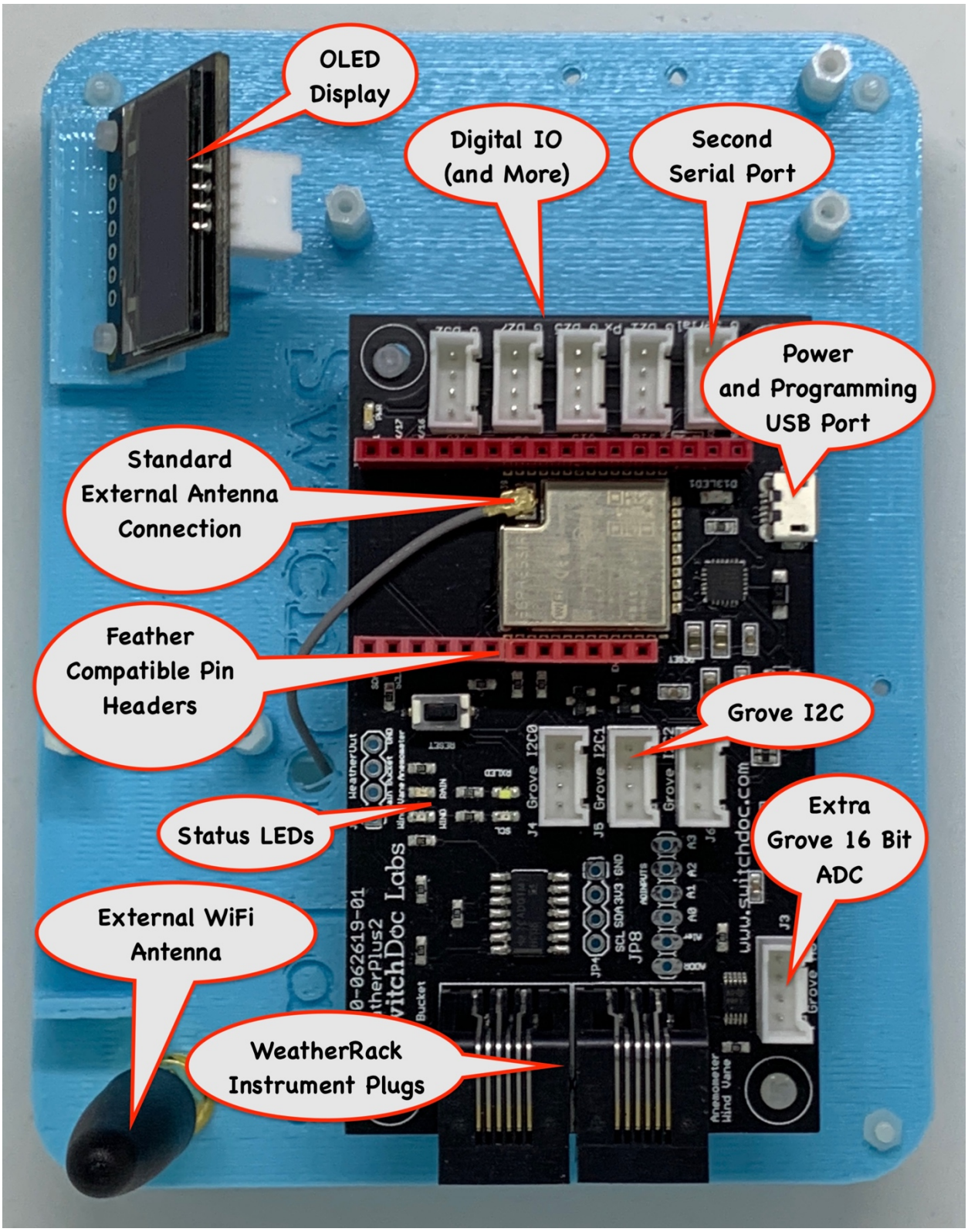
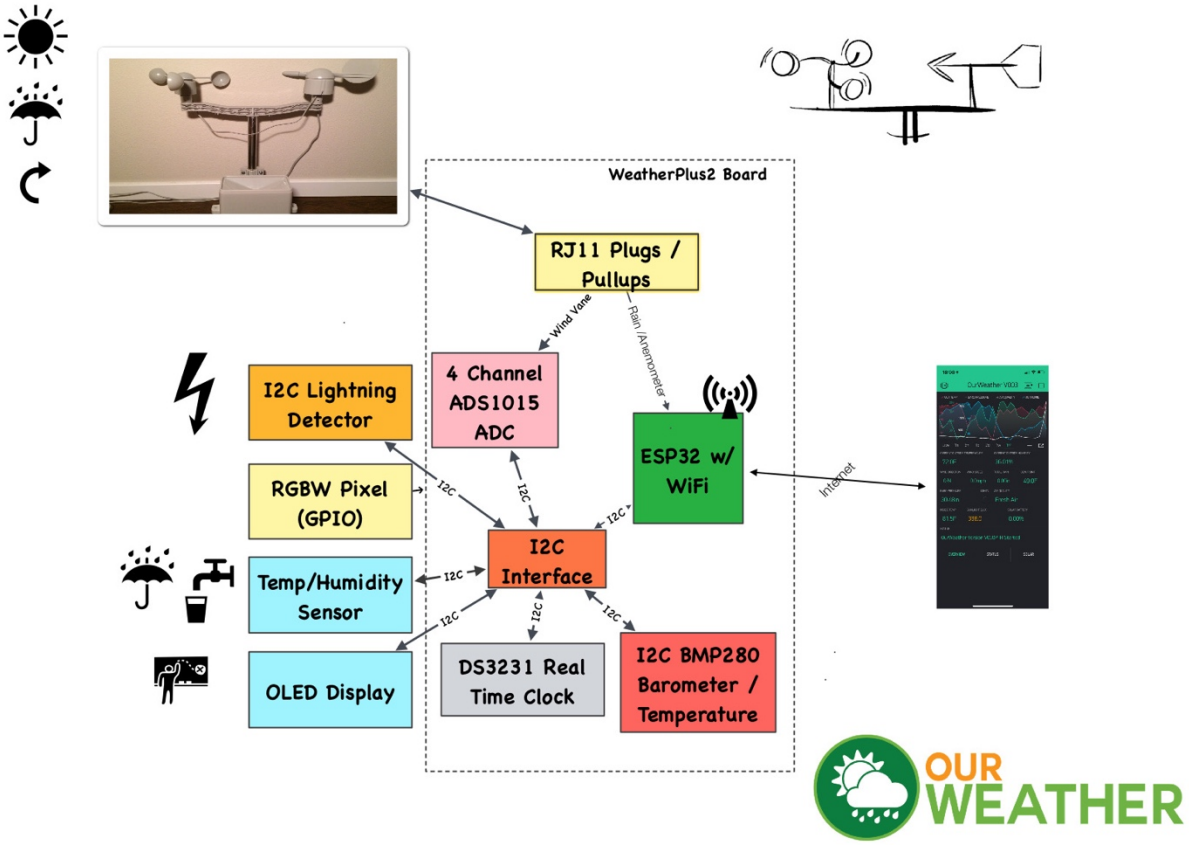
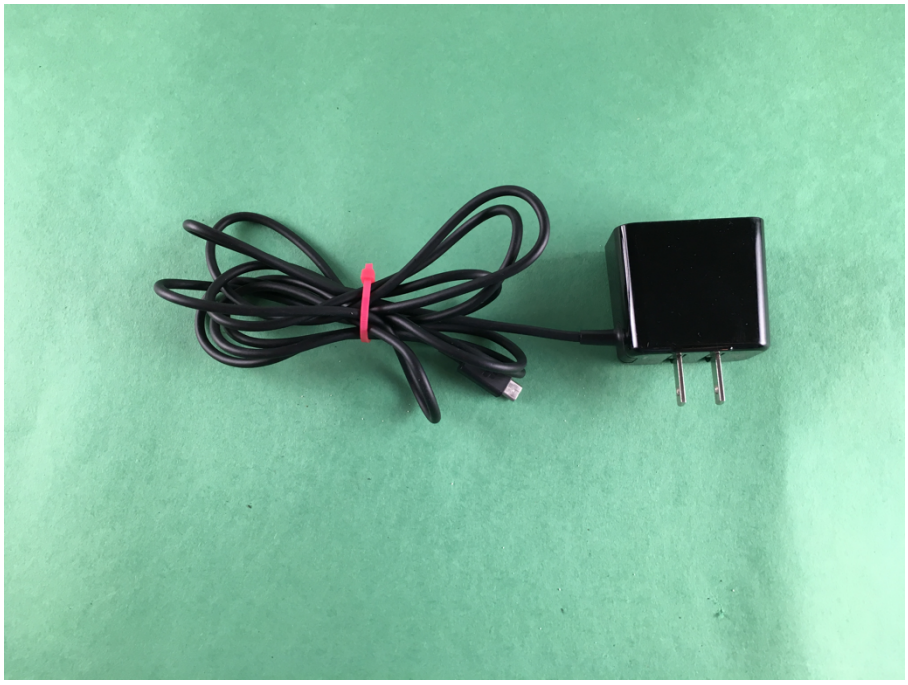

OLED Display
Digital IO (and More)
Second Serial Port
Power and Programming USB Port
Standard External Antenna Connection
Feather Compatible Pin Headers
Grove I2C
Status LEDs
Extra Grove 16 Bit ADC
External WiFi Antenna
WeatherRack Instrument Plugs


WeatherPlus2 Board
RJ11 Plugs / Pullups
Wind Vane
Rain / Anemometer
I2C Lightning Detector
4 Channel ADS1015 ADC
ESP32 w/ WiFi
Internet
RGBW Pixel (GPIO)
I2C Interface
Temp/Humidity Sensor
OLED Display
DS3231 Real Time Clock
I2C BMP280 Barometer / Temperature
I2C
OUR WEATHER

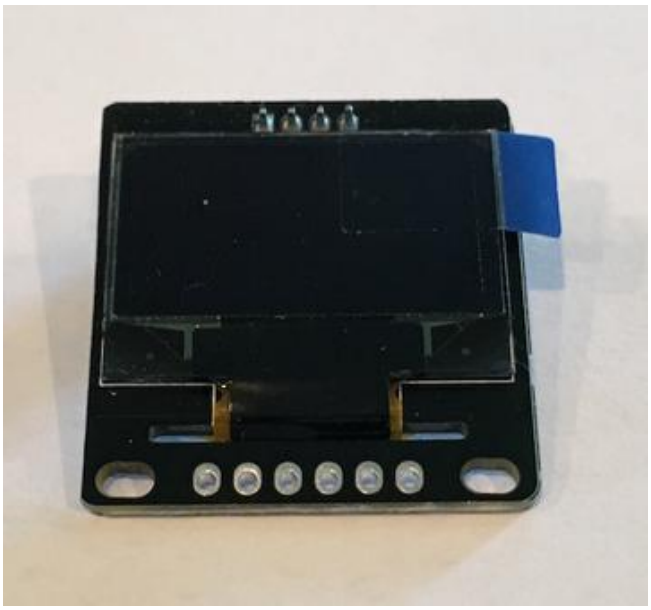
What is in the OurWeather Box?

Following is a list of all the parts included in OurWeather.

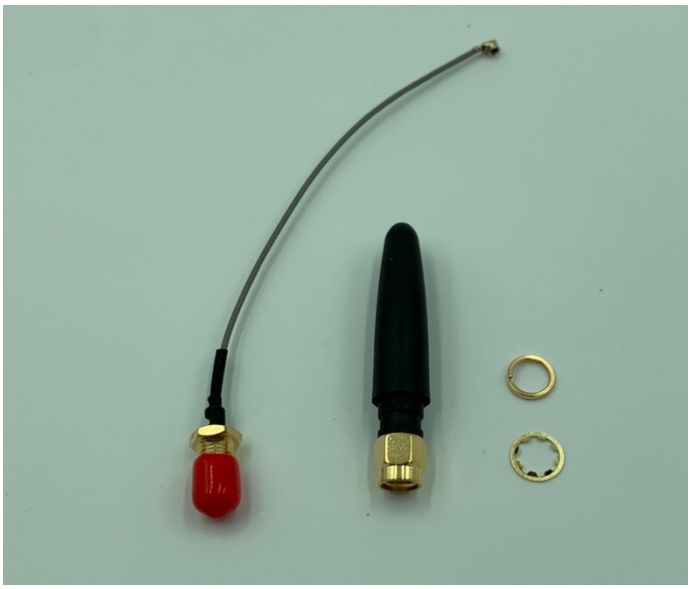
A - Micro Power



USB 5V Supply



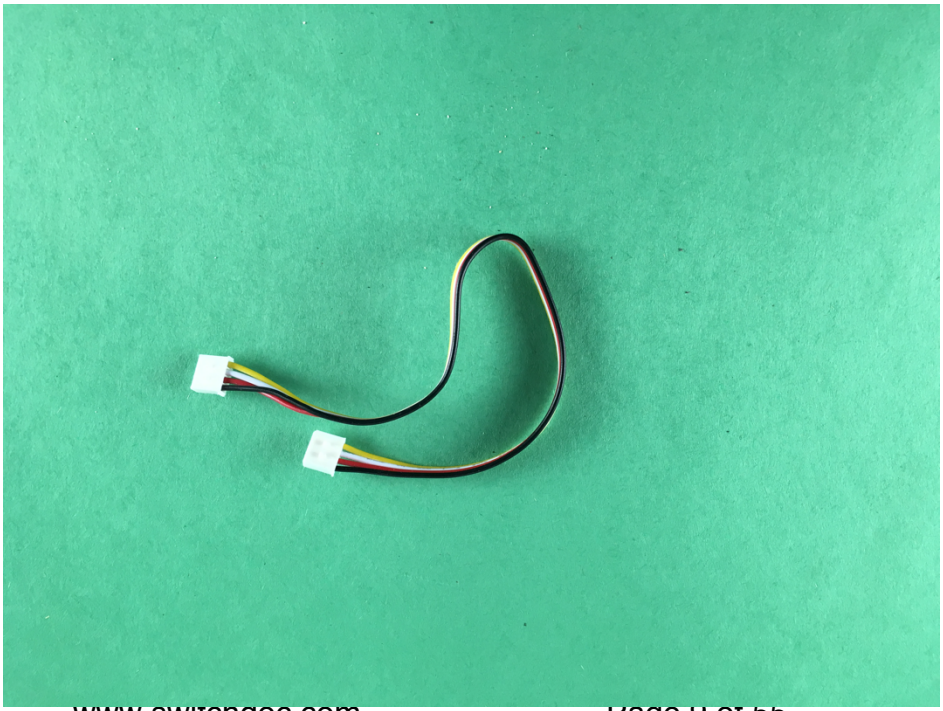
B - Grove OLED Display



C – WiFi Antenna

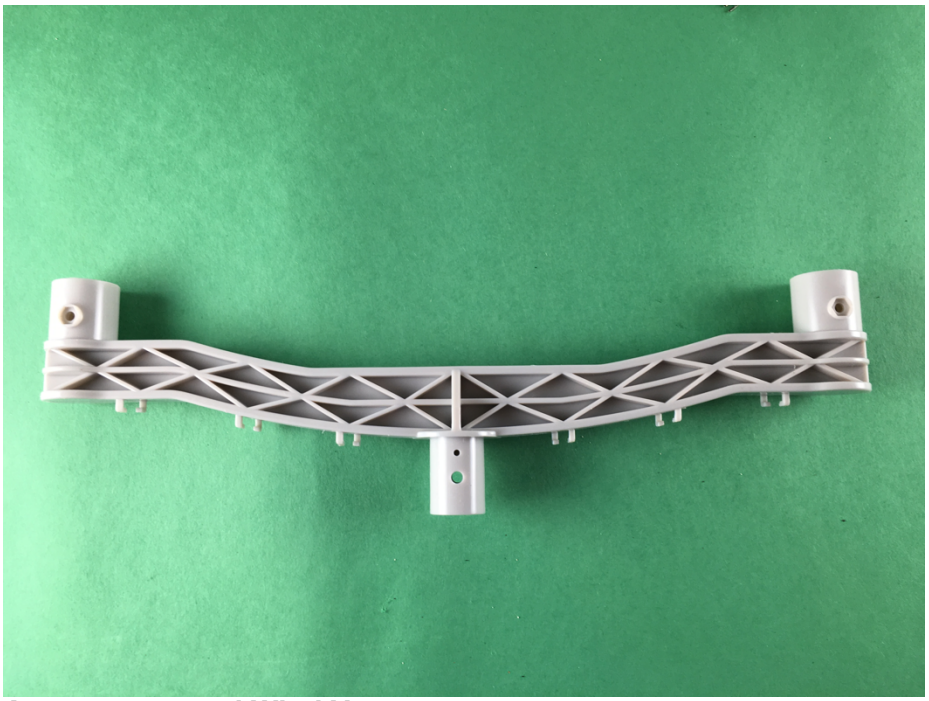
D -Grove Outdoor Temperature and Humidity Sensor SHT30

E – M2 Box of Nylon standoffs, screws and bolts



F - Grove Cable (One included)

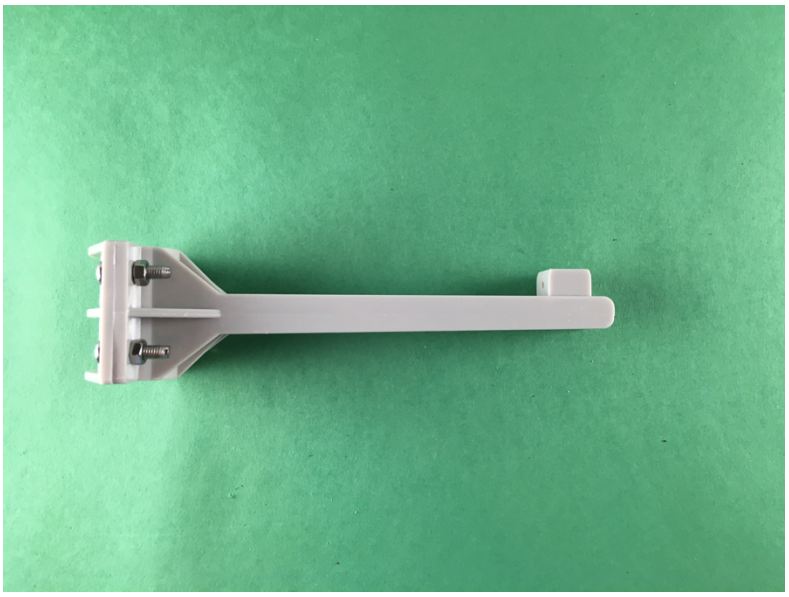
G - Wind Direction Wind Vane



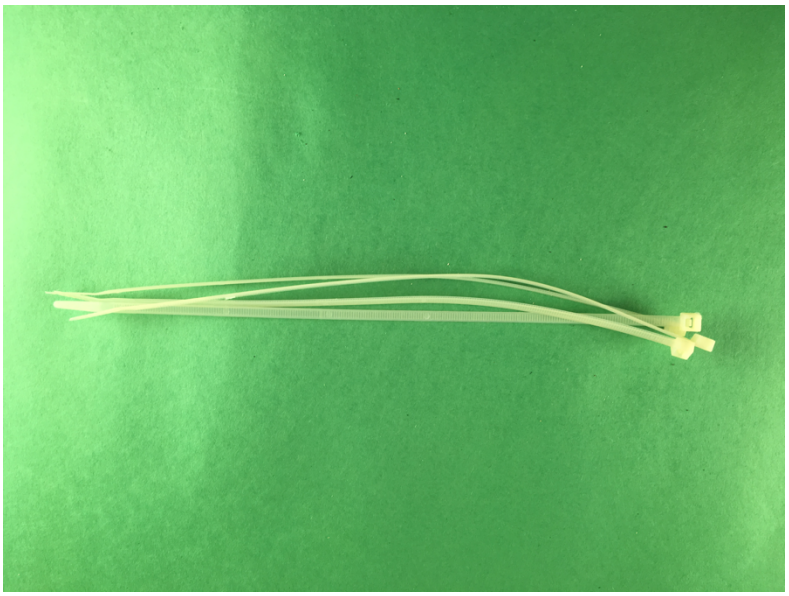
H - Bracket for Anemometer and Wind Vane

I - Rain Bucket

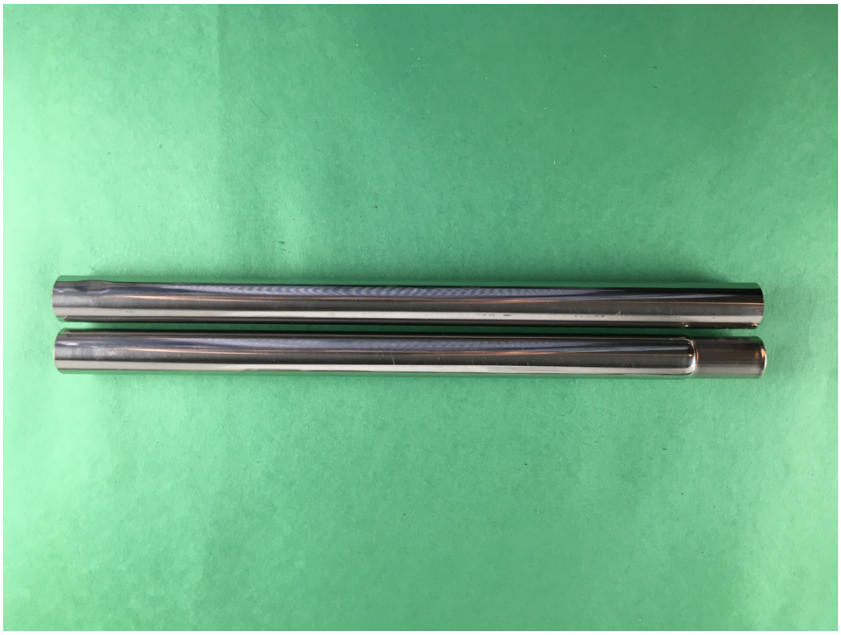
J - Wind Speed Anemometer



K - Rain Gauge Mounting Assembly



L - Wire Ties



M - Metal Mounting Tubes

M - Metal Mounting Mast for Weather Instruments

N – No Part

O - Mounting Brackets for Metal Mast

P - Screws for Mounting Weather Instruments to Brackets. Contains two small self tapping screws and three screws with bolts

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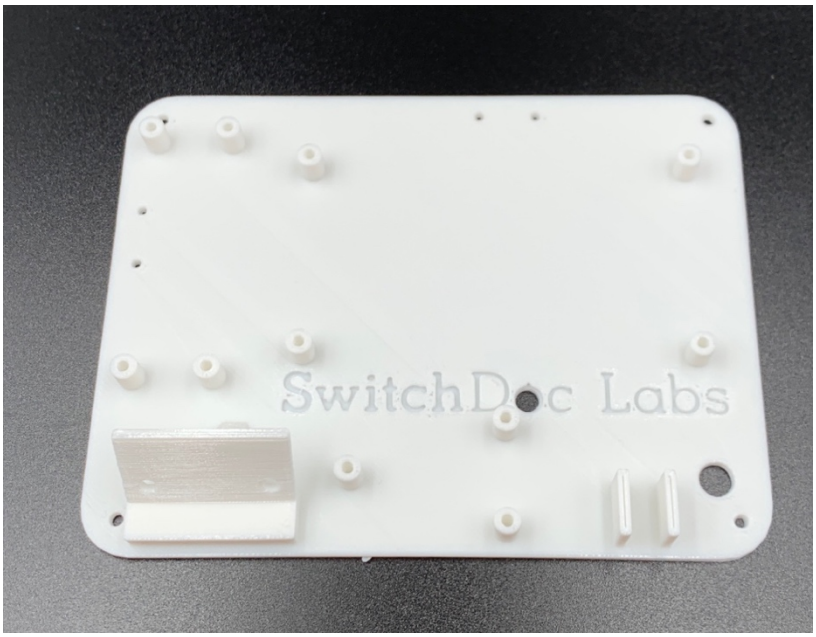
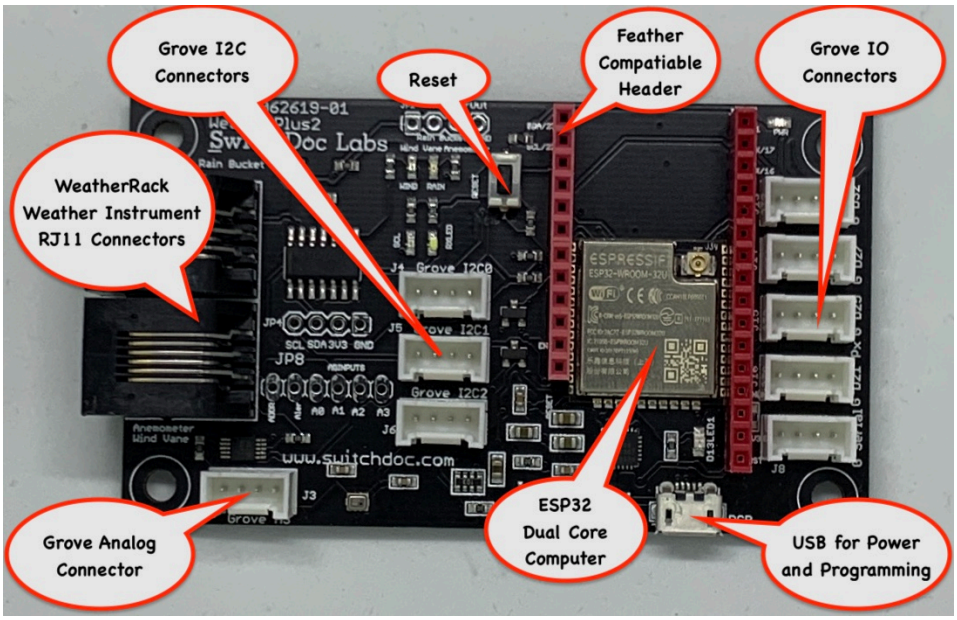


Q – OurWeather Base Stand

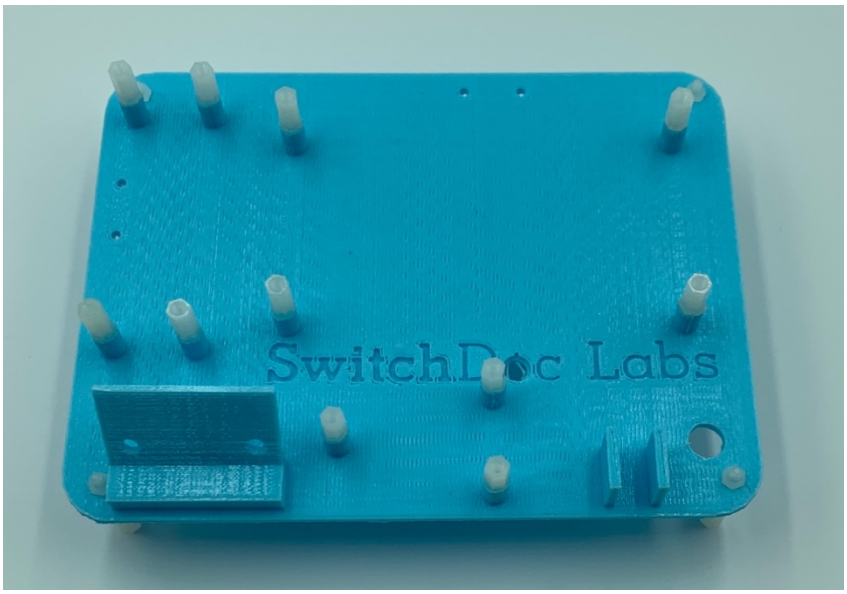


R – WeatherPlus2 Computer Board

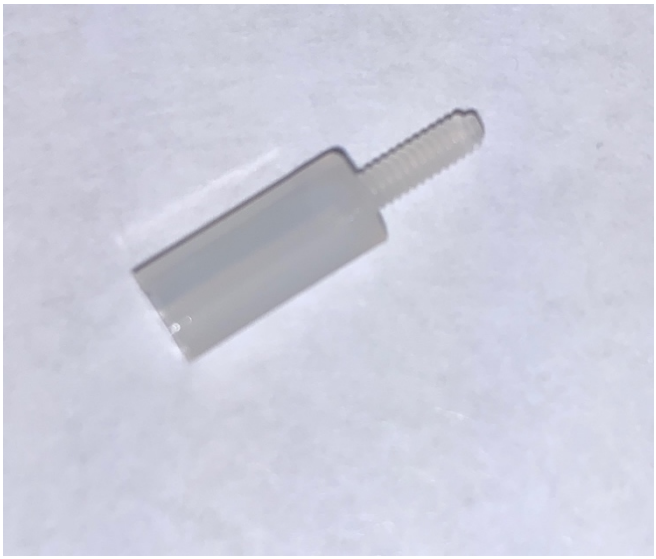
Step By Step Assembly

Building the Computer Module.

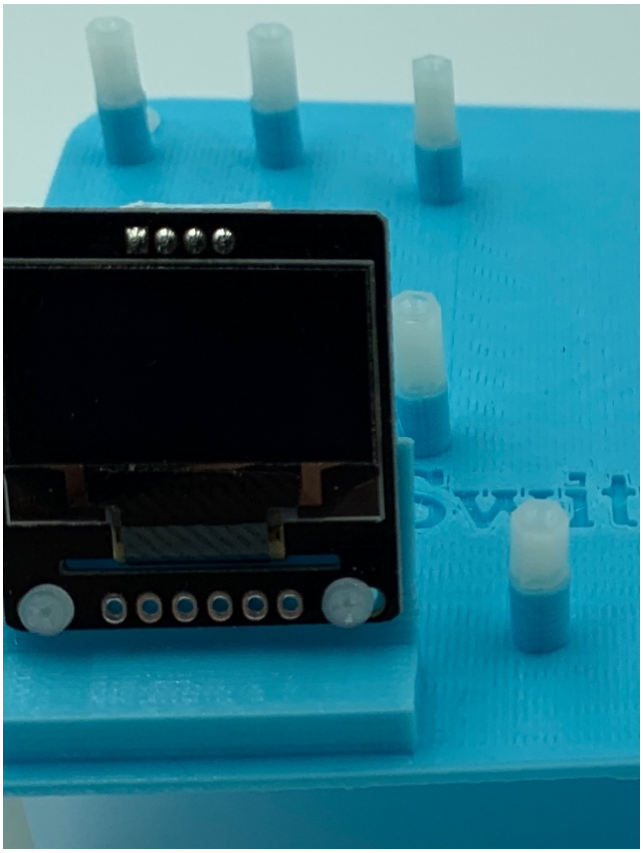
Step 1 – Take the OurWeather Base 3D Print (Q) and put four standoffs and bolts from the Nylon Spacers (E) into each of the four corners of the Base Print.



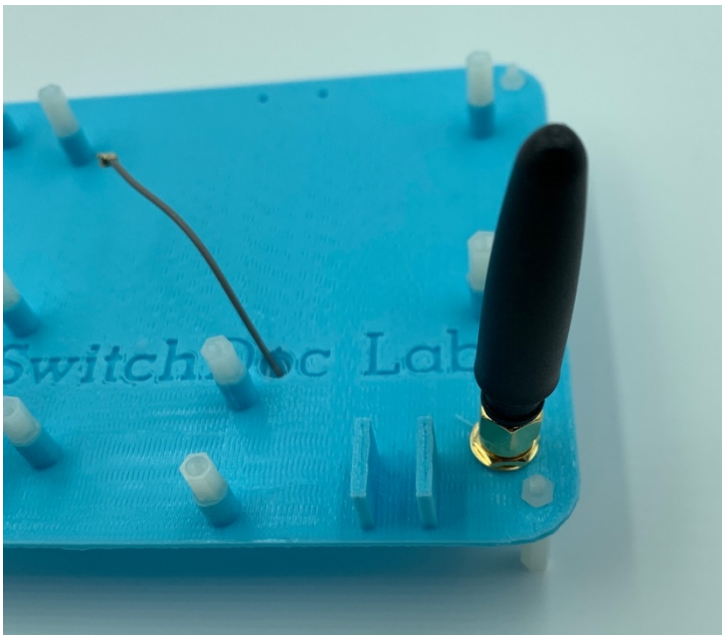
Step 2 – Using Super Glue, place a standoff (E) in each of the remain pylon holes on the OurWeather Base 3D Print (Q). Let dry.



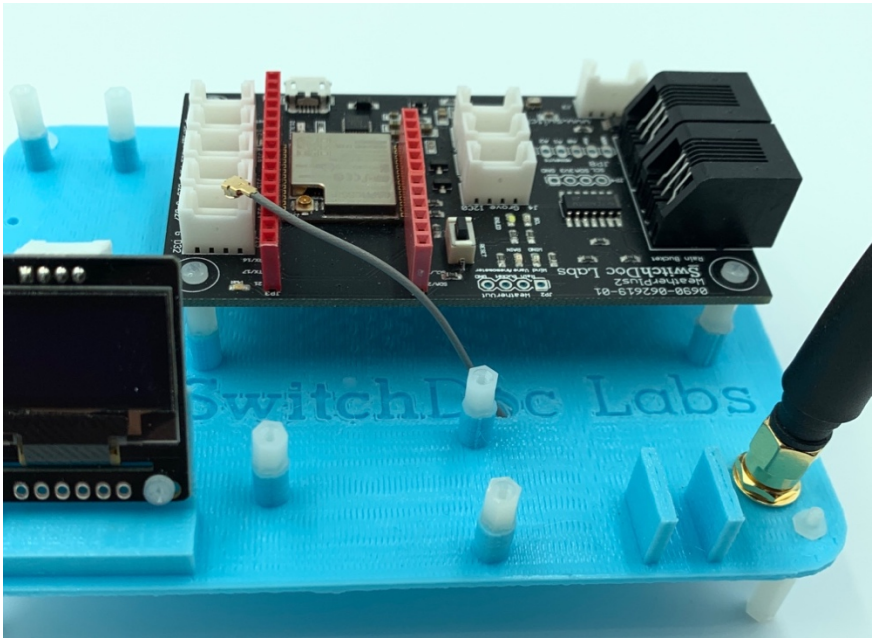
Step 3 -Attach the Grove OLED Display (B) on to the slot on the left of the OurWeather Base Plat (Q) using two small screws and nuts (E). Feel free to glue the board on if you can't get the screws and nuts on the board.



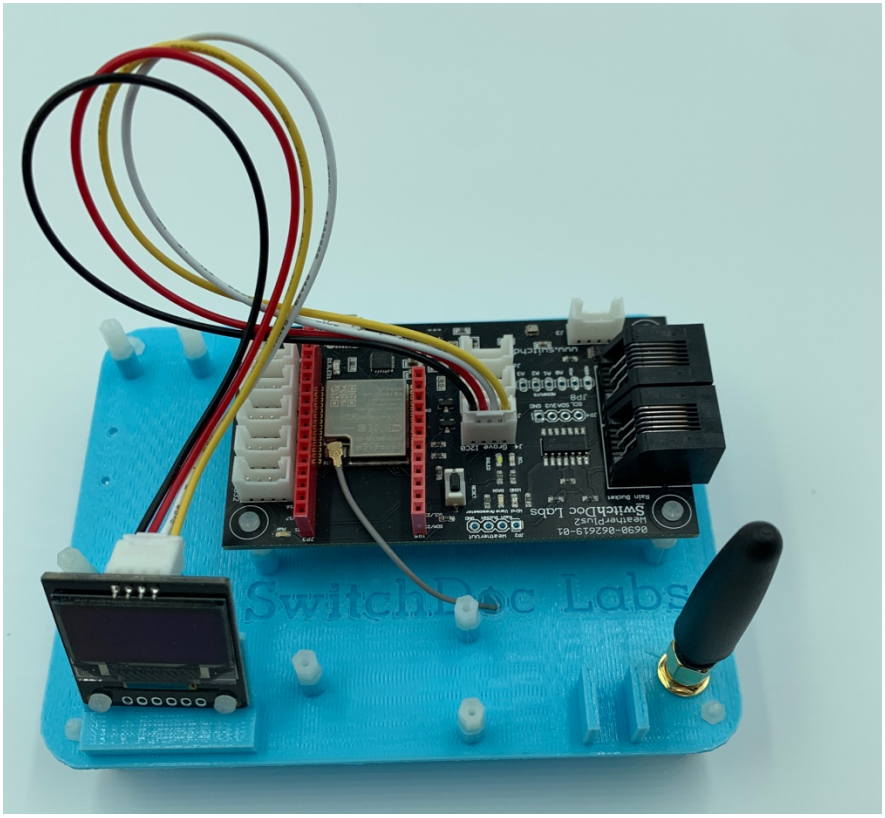
Step 4 – Attach the WiFi Antenna (C) to the OurWeather Base (Q) from the bottom (removing the Red cap if present) and attach it to the Base using the brass nut and screw. Route the wire up through the "O" in the SwitchDoc Labs Logo on the OurWeather Base (Q). Screw on the black antenna on the connector from the top of the OurWeather Base as shown below.



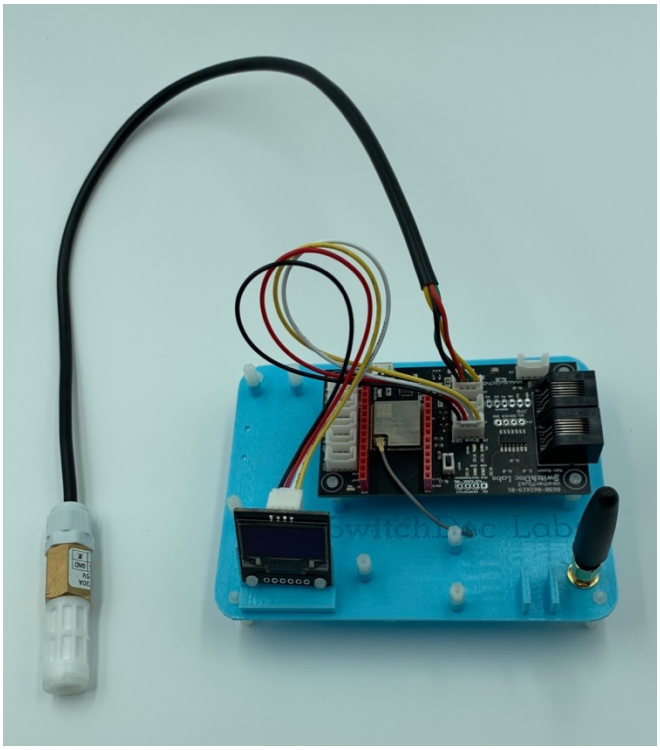
Step 5 – Attach the WeatherPlus2 Board (R) to the OurWeather Base unit (Q) using four screws from the M2 Nylon box (E). Take the small gold part of the WiFi Antenna Wire (C) and push it gently down on the



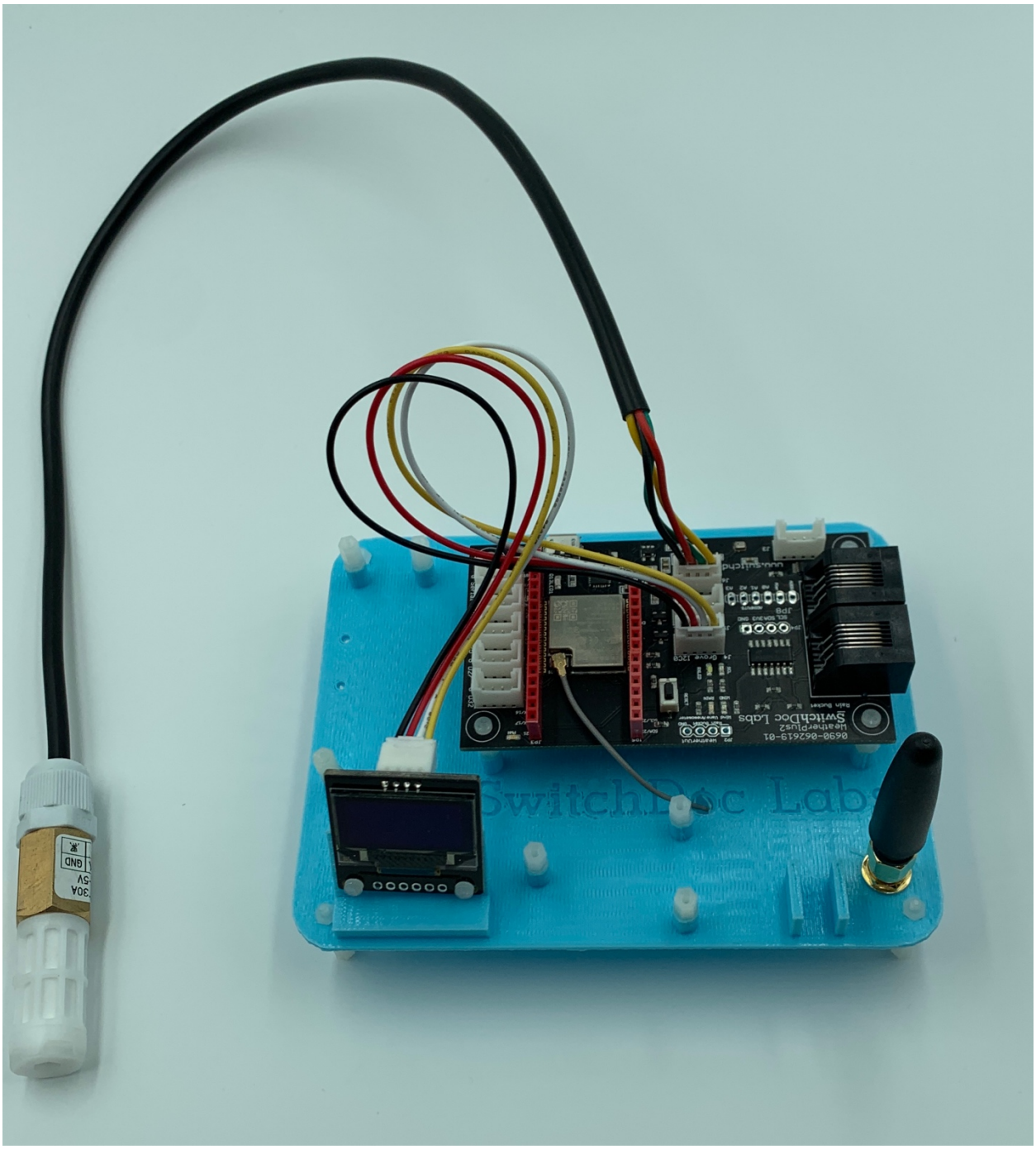
Step 6 - Plug a Grove Cable (F) in the OLED Display (B) and then into the I2C Grove Connector on the WeatherPlus2 Board(R) (any I2C socket will work, use the front one on the WeatherPlus2 Board)



Step 7 - Plug in the Grove connector from the SHT30 Outdoor Temp/Humidity Sensor (D) into the I2C Grove Connector Slot on the WeatherPlus2 (Q) Any I2C Grove socket will work, use the one on the back of the WeatherPlus2 Board(Q).

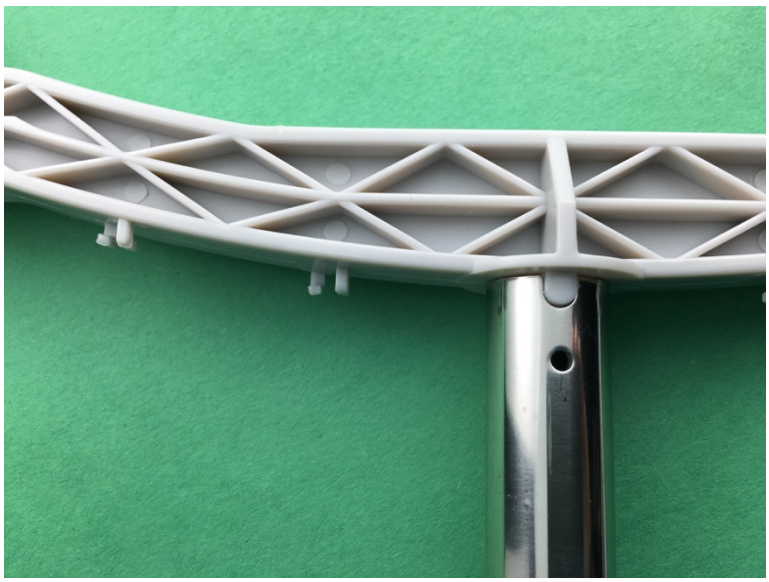


Step 8 - This completes the assembly of the OurWeather Base Computer Module. Check your work over at this point.



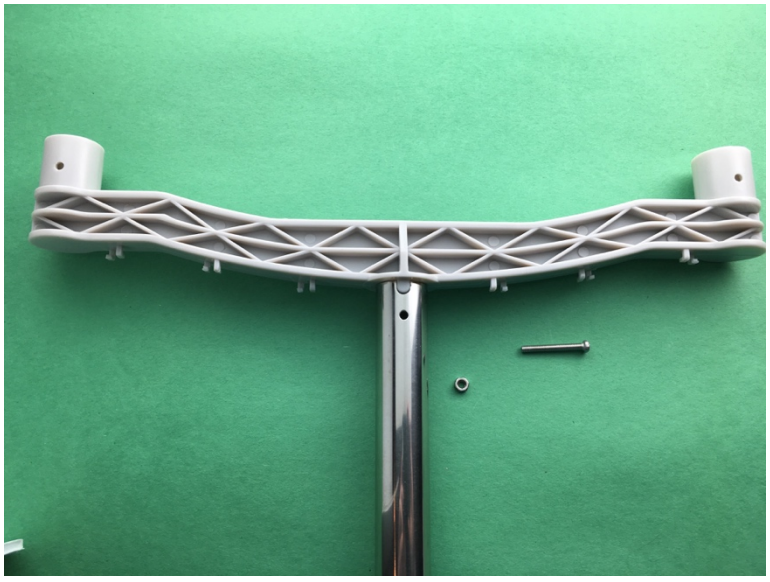
Step 9 - Pick up the Metal Mounting Mast (M) with the mounting holes drilled in the top of the mast.

Step 10 - Place the Bracket for the Wind Vane and Anemometer (H) into the Mounting Mast (M) from Step 9. Note the Mounting tab in the bracket and Key in the Mounting Mast and make sure



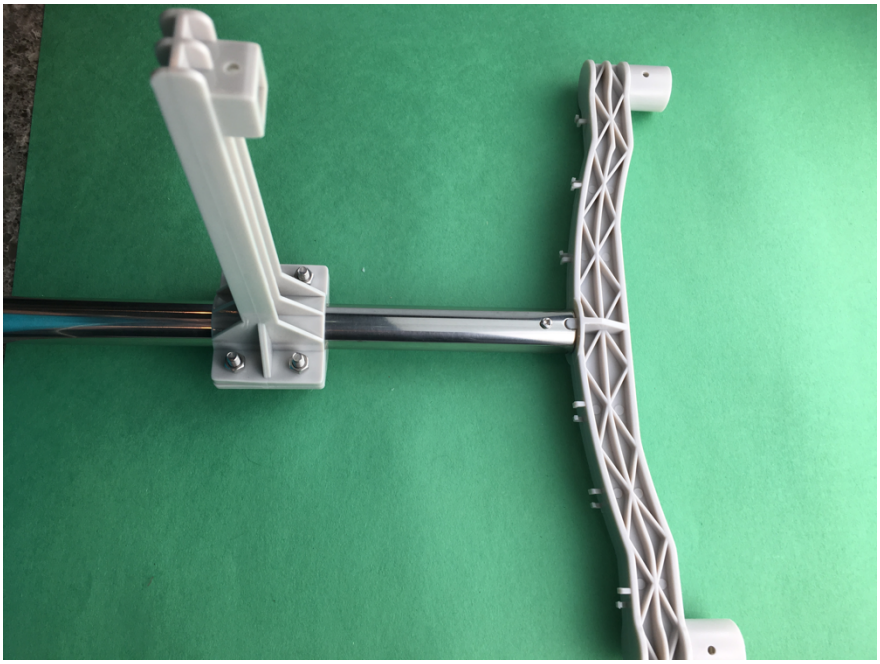
they are aligned.

Step 11 - Take a screw and bolt (P), remove the bolt, slide the screw through the hole in the



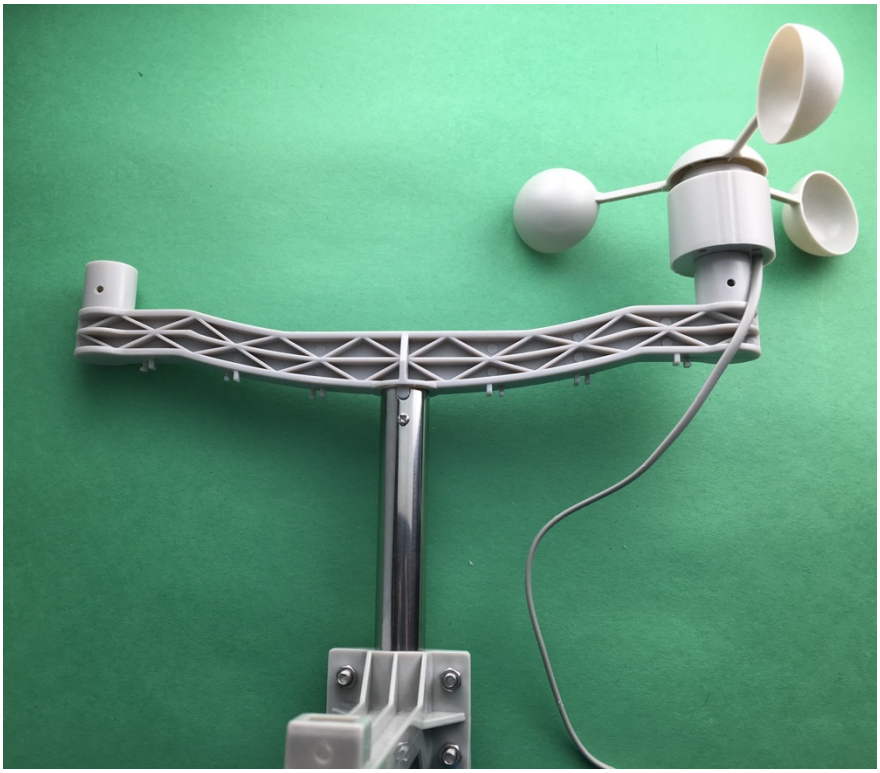
Mounting Mast (M) from step and tighten the bolt to the Mast.

Step 12 - Take the Rain Gauge Mounting Assembly (K) and slide it on the Mounting Mast (M) to about 5 inches from the top of the Mast as shown. Tighten the bolts to secure the Rain Gauge Mounting Assembly to the the Mounting Mast. Note that the Square Bracket points towards the



top of the Mast.

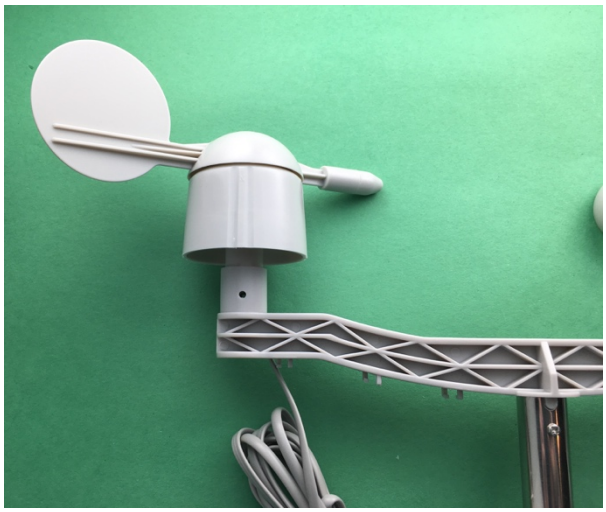
Step 13 - Take the Anemometer (J) and place it at the left end Wind Vane and Anemometer



Bracket (H). Note the alignment tab on the Anemometer.

Step 14 - Take a screw and bolt (P), slide it into the Wind Vane and Anemometer Bracket (H) under the Anemometer (J) and tighten in place to secure the Anemometer (J).

Step 15 - Take the Wind Vane (G) and place it on the other end of the Wind Vane and

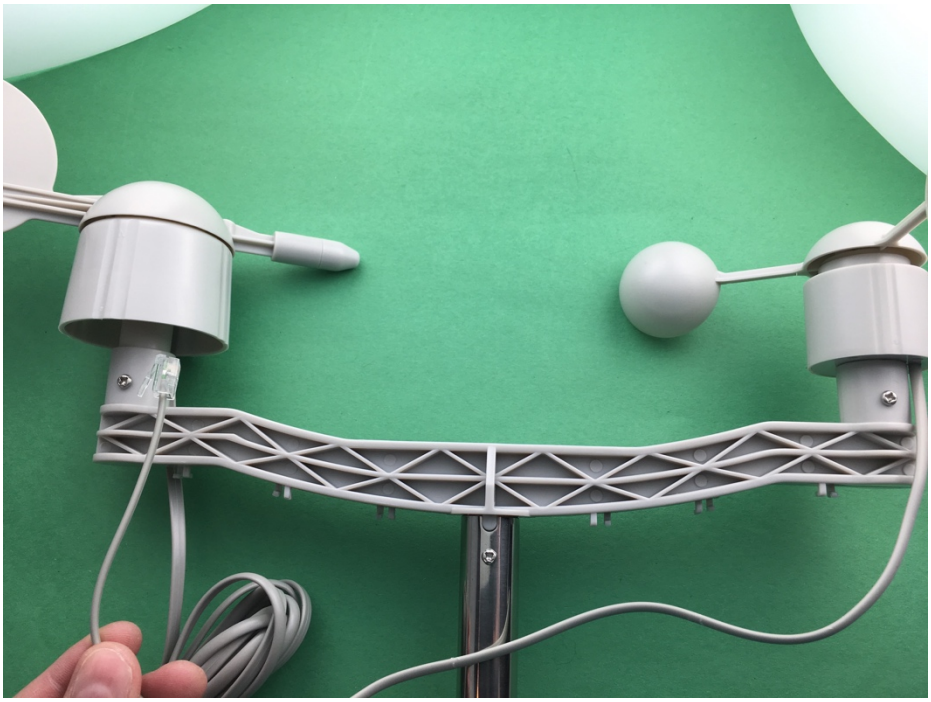


Anemometer Bracket (H). Note the alignment tab on the Wind Vane.

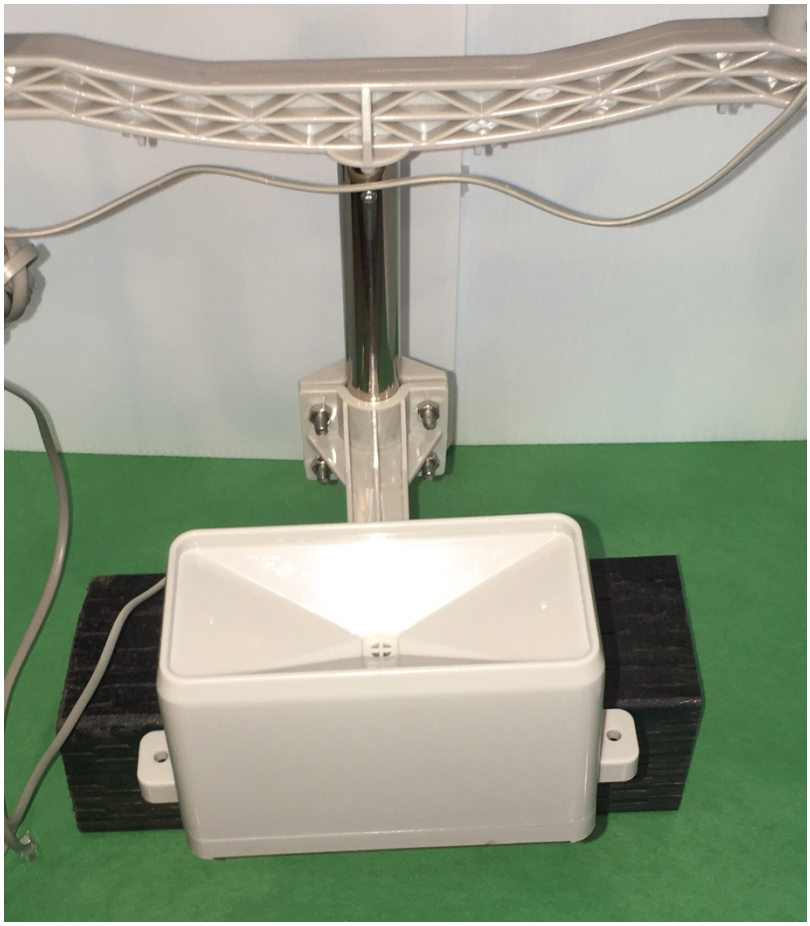
Step 16 - Take a screw and bolt (P), slide it into the Wind Vane and Anemometer Bracket (H)

under the Wind Vane (G) and tighten in place to secure the Wind Vane.

Step 17 - Take the RJ45 plug on the cable from the Anemometer (J) and snap it into the bottom of the Wind Vane (G). The plug will only fit one way and it will snap into place.

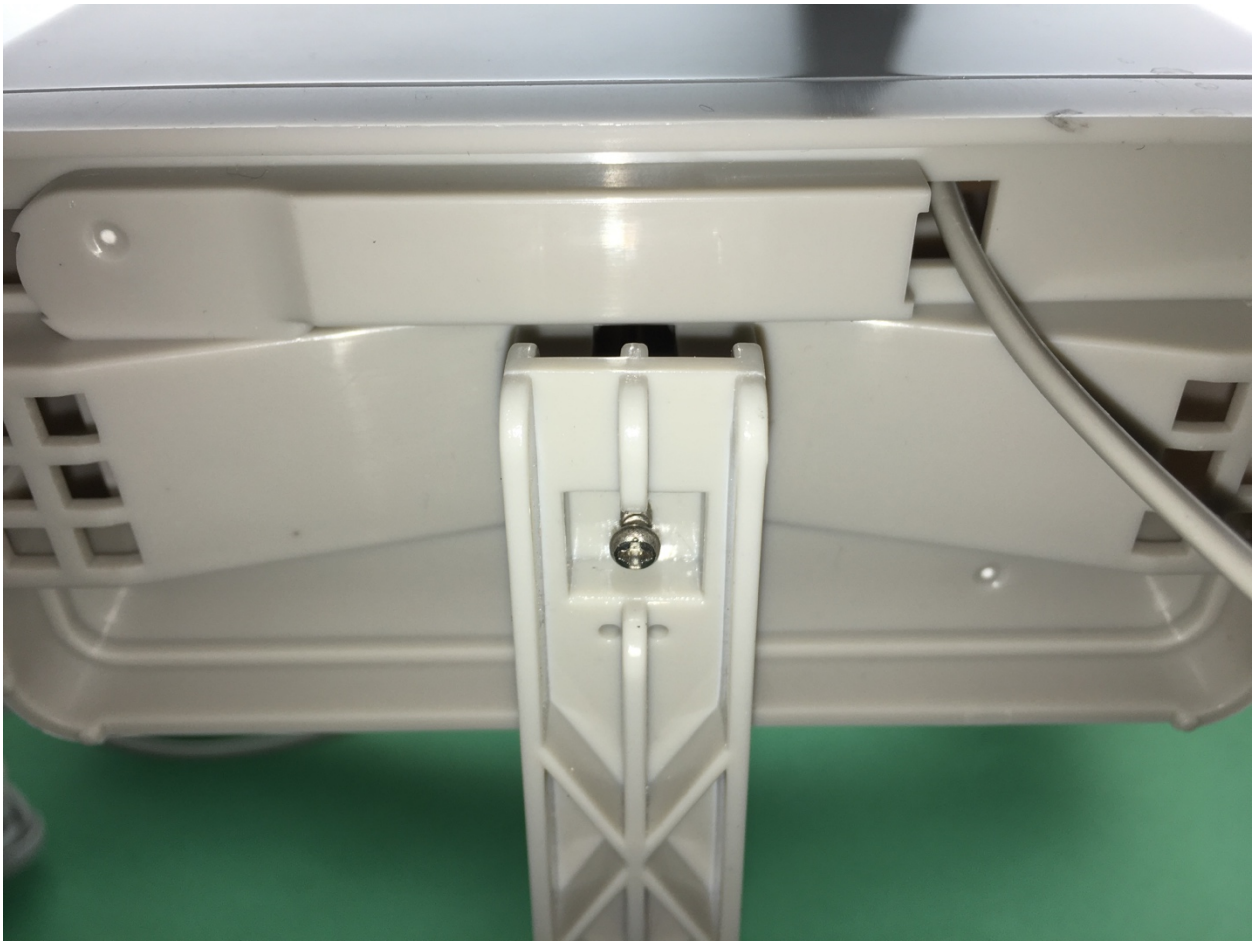


Step 18 - Take the Rain Gauge (I) and place it on the Rain Gauge Mounting Assembly (K)



perpendicular to the Rain Gauge Mounting Assembly (K) as shown.

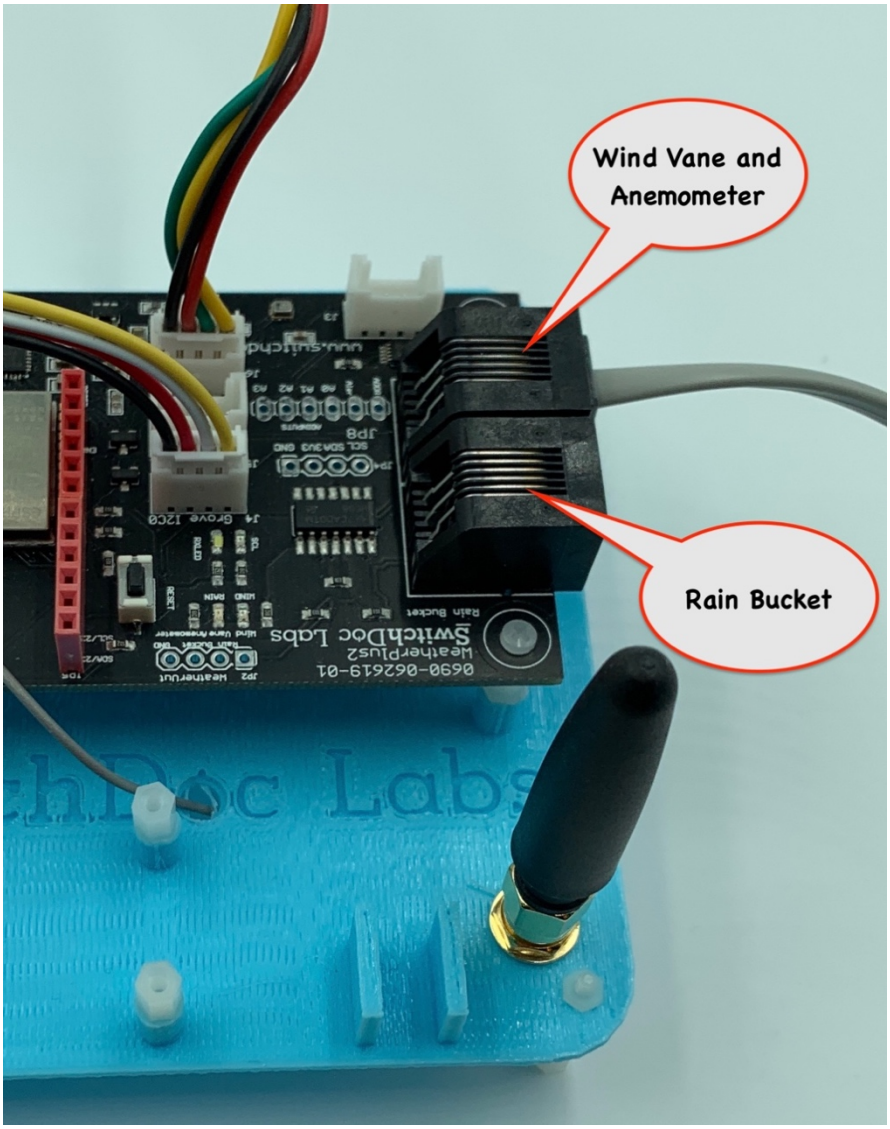
Step 19 - Take a self tapping screw and screw it in the bottom of the Rain Bucket Mounting Assembly to secure the Rain Bucket.



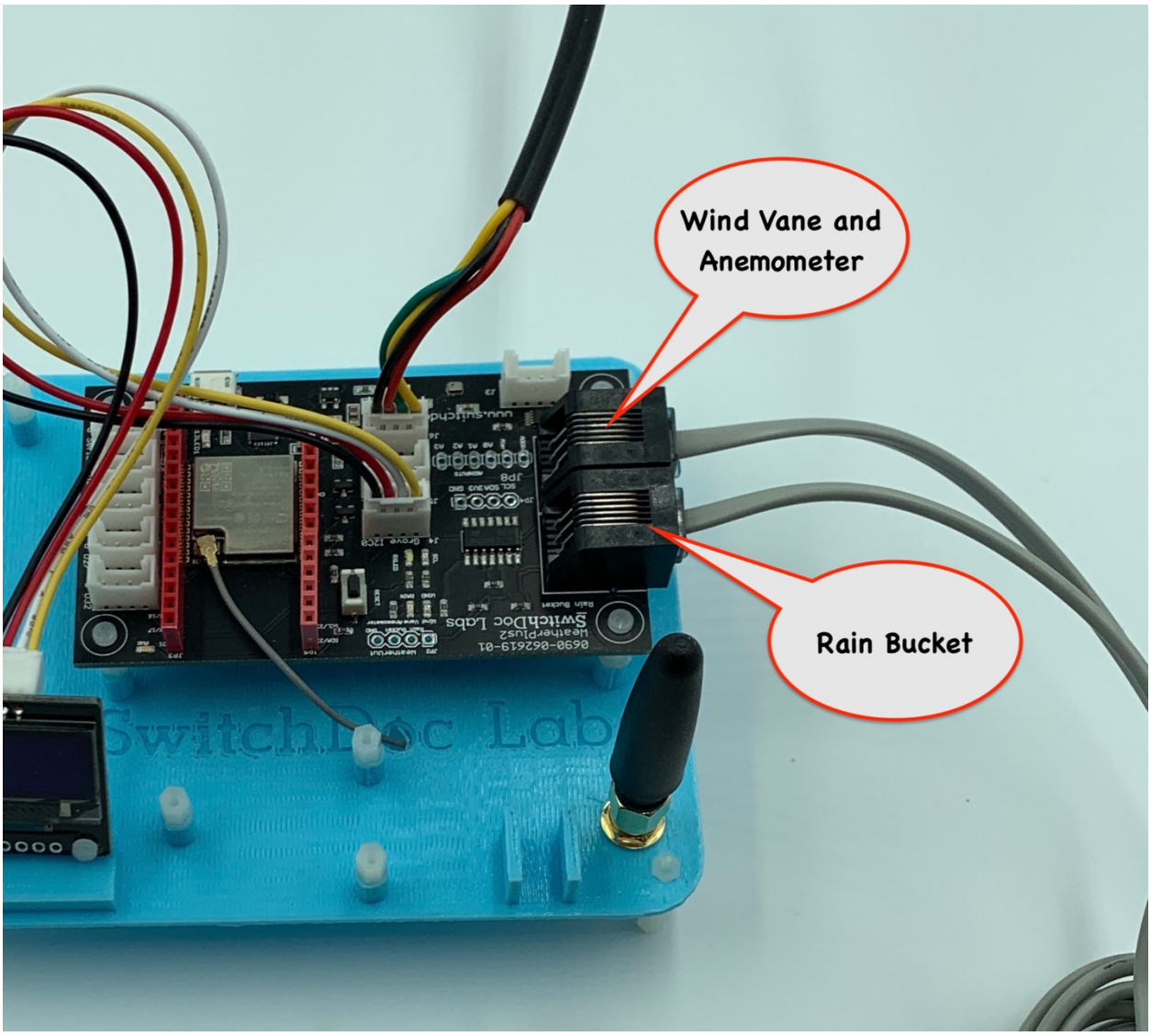
Step 20 - Push the second Mounting Mast (M) into the first Mounting Mast (M).

Step 21 - Stand the Mounting Mast up and secure it with books, wood or bricks to keep it secure for testing.

Step 22 - Plug the RJ54 Cable coming from the Wind Vane Assembly (G) into the Plug receptacle labeled Rain Bucket on the WeatherPlus2 board (R). Note that there are two RJ54 Plug receptacles on the WeatherPlus3 board (R). One is labeled Rain Bucket and the other is labeled Anemometer/Wind Vane. If you plug them in the wrong position, nothing will be damaged, but the Weather sensors will not work until you plug them in correctly. This is the number one mistake people make! Check your work!



Step 23 - Plug the RJ54 Cable coming from the Rain Bucket (I) into the RJ54 Plug receptacle on the WeatherPlus board (R). One is labeled Rain Bucket and the other is labeled Anemometer/Wind Vane. If you plug them in the wrong postition, nothing will be damaged, but the Weather sensors will not work until you plug them in correctly.



This completes the WeatherRack assembly.

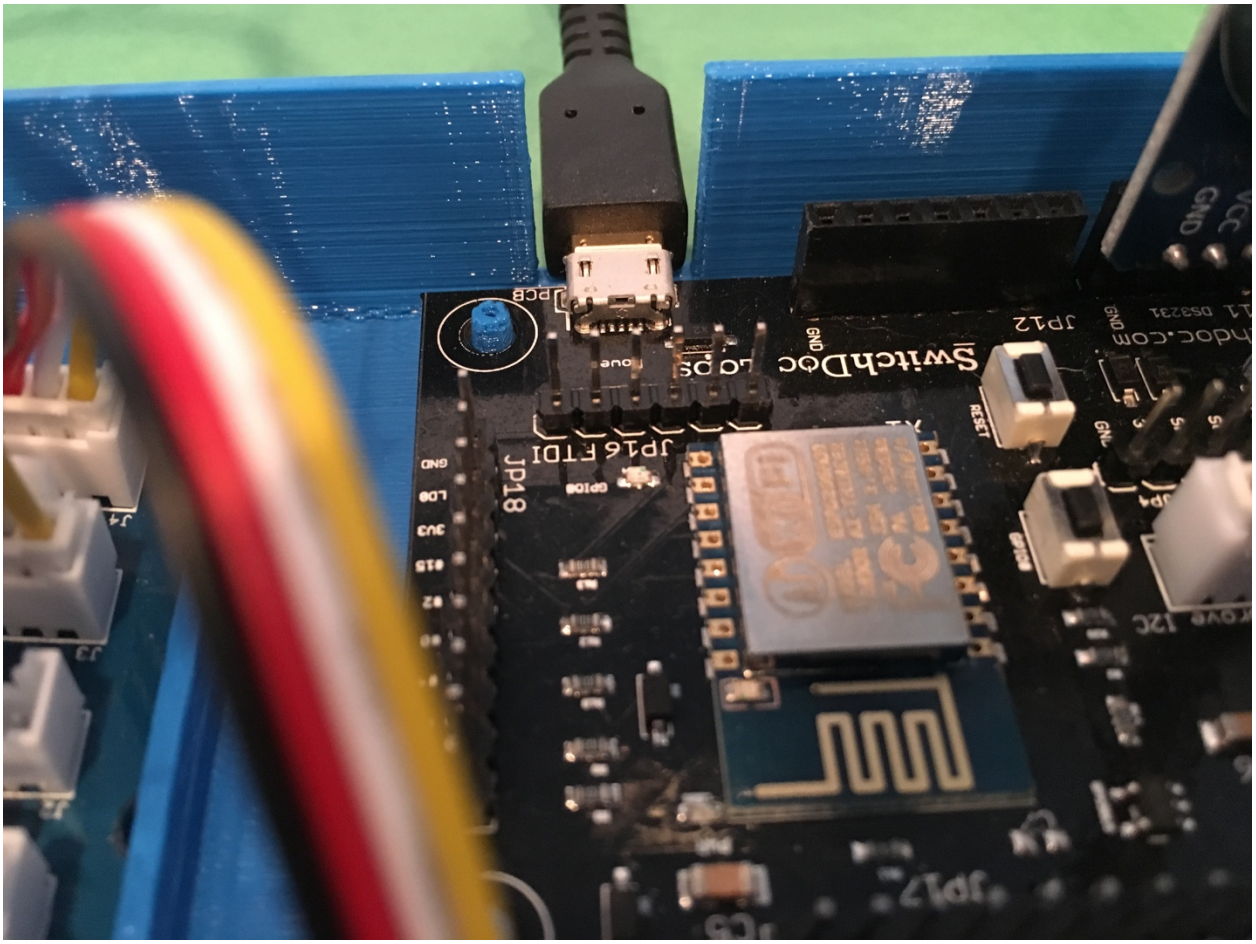
Note that you have clamps and wire ties left over in the assembly process for the WeatherRack. You can use these to install the WeatherRack assembly outdoors and use the wire ties to secure the cables from the WeatherRack to the Computer Assembly.

You will also have a power pack left over.

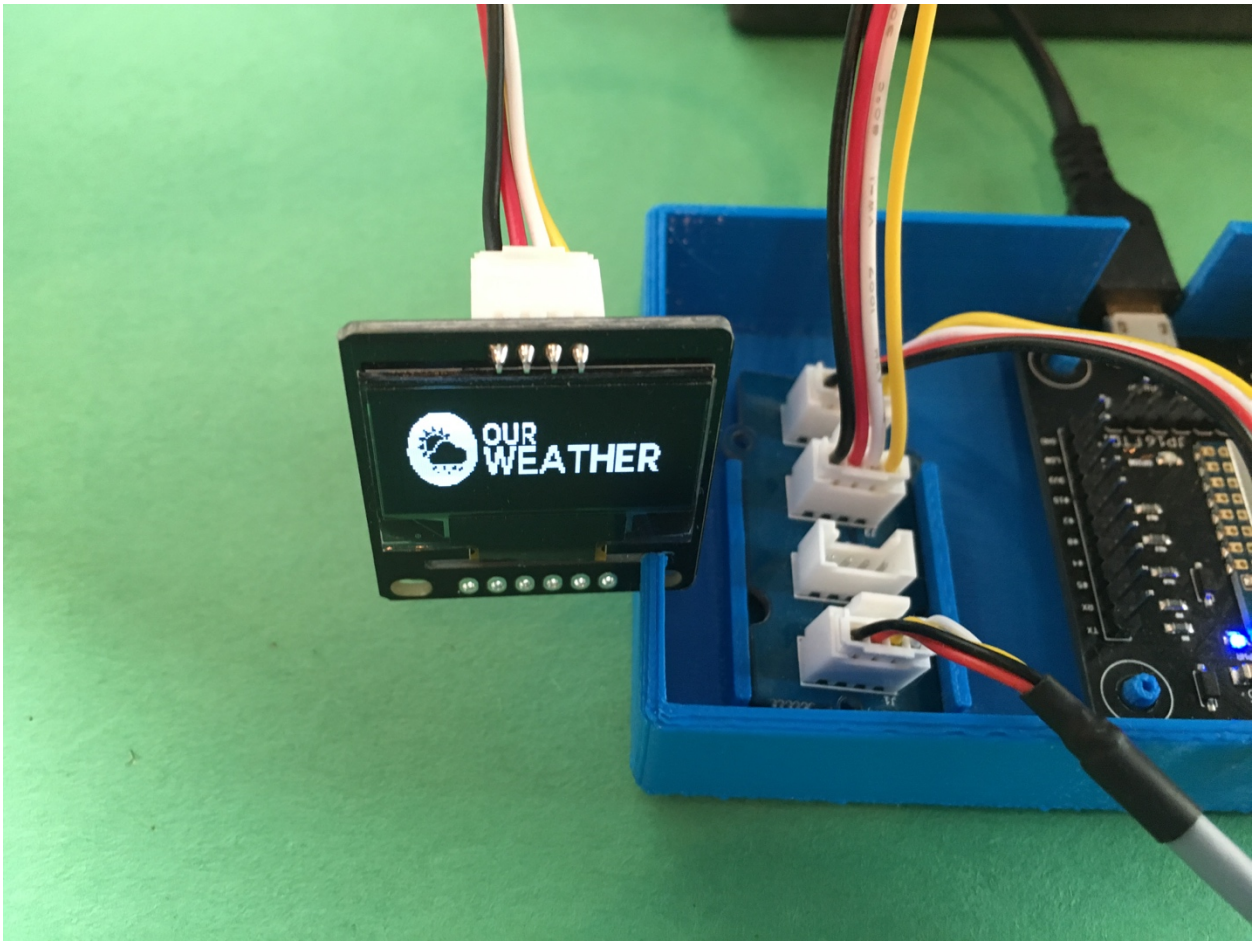
Next we will power up OurWeather, test our sensors and then hook it up to your local area network.

Testing the OurWeather Weather Station

Step 1 - Plug in the micro USB Cable (A) into the micro USB Plug on the WeatherPlus Board (R).



Step 2 - Plug in the Wall unit of the 5V Power Supply (A) into a 110V AC outlet. You will then see the OurWeather Logo on the OLED Display (B). If you don;t see the Logo then see the Troubleshooting section at the end of this manual.



Step 3 - Wait 10 minutes and then you will see the OurWeather OLED Display (B) start to cycle through current weather conditions.

Step 4 - Turn the Wind Vane (G), wait until the display rotates to the Wind Direction and see if it has changed.

Step 5 - Spin the Anemometer (J) and you will see the wind speed and wind gust change.

Step 6 - Breath on the Outdoor Temperature and Humidity Gauge and you will see the outdoor temperature and humidity change on the display.

Step 7 - Tilt the Rain Gauge and hear it click. Do this 10 times. Then the rain total on the display will change.

This completes testing. If something doesn't work, check the troubleshooting guide at the end of this manual.

Power Up OurWeather

Step 1 - Get the name (often called an SSID) and password for your local WiFi network and write them here:

WiFi Access Point Name: _____

WiFi Access Point Password: _____

Step 2 - Plug the power supply into the micro USB power plug on the WeatherPlus board

Note: If you don't want to connect up to a WiFi, just wait 5 minutes and OurWeather will start displaying your local weather information.

Step 3: Continue with the next chapter, Setting up your OurWeather WiFi Connection

Setting up your OurWeather WiFi Connection

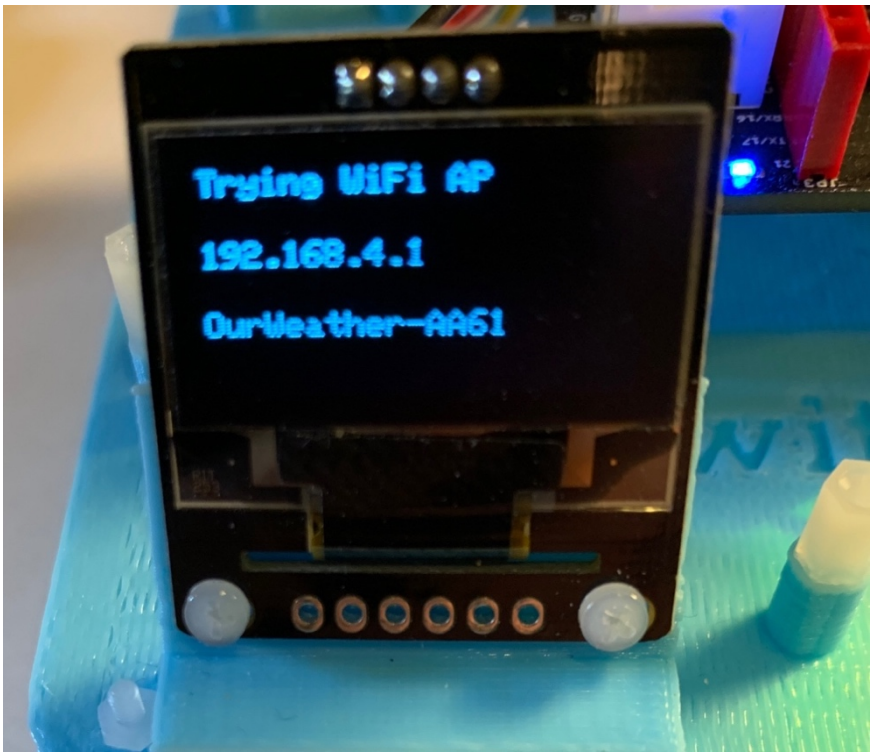
In the previous chapter, you found your local WiFi access point name and password. We will start using all this information now to set up OurWeather on your local WiFi connection.

Step 1: Unplug the OurWeather power supply. Note: Hitting reset or unplugging your OurWeather system will disconnect your from the OurWeather WiFi. You will need to do step 5.

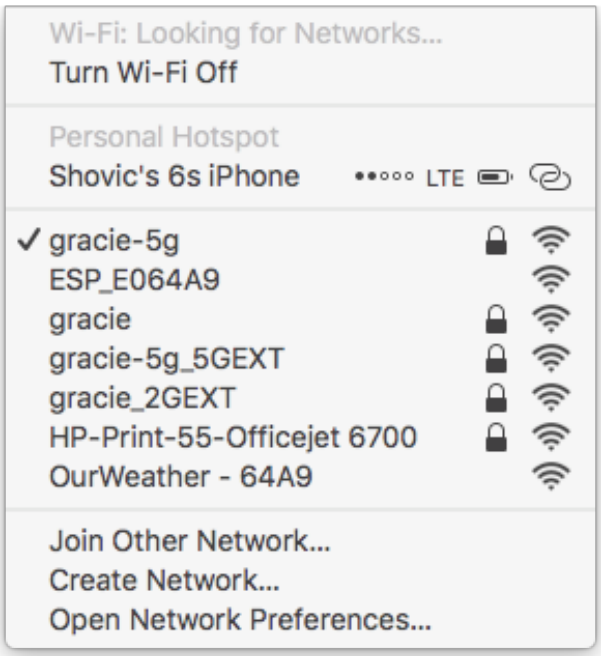
Step 2: Wait 10 seconds

Step 3: Plug the OurWeather power supply back into the outlet

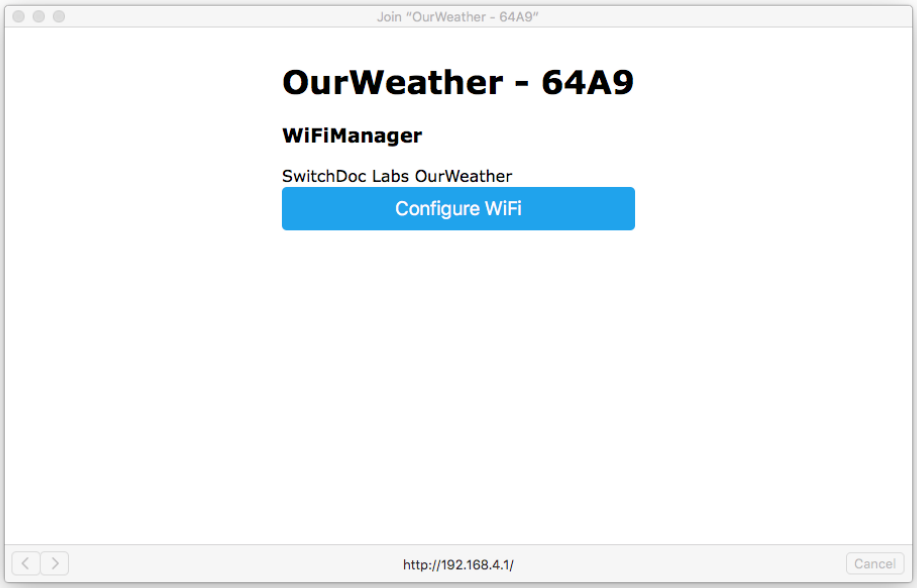
Step 4: You will see a very similar screen to the below:



Step 5: Connect your computer or laptop WiFi to the Wireless Access Point name (OurWeather -AA61 in our example above). Example on a Mac below.



Step 6: Open a web browser (Safari, Chrome preferred - will work with most Internet Explorer



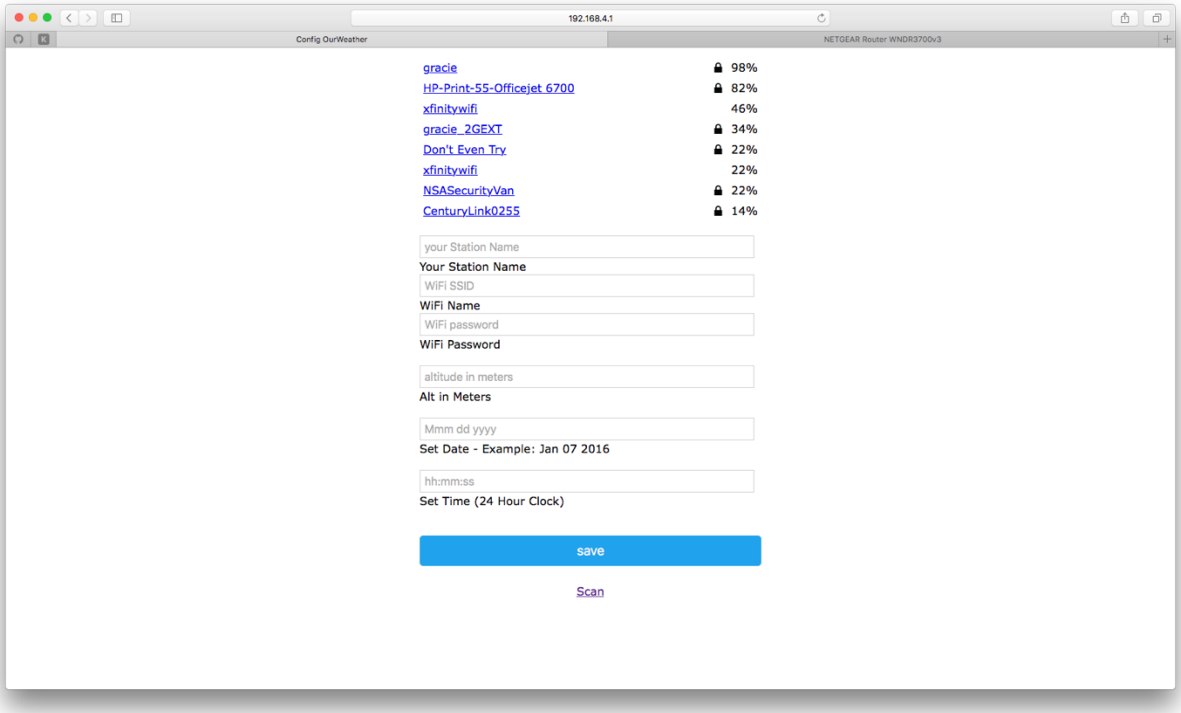
versions) and type in "http://192.168.4.1" and shortly you will see a screen as below. Note that you only have 5 minutes to complete the next steps. Otherwise OurWeather will start displaying the weather data. If you wish to restart, either repeat Steps 1-3 or push the reset button on the Weather Plus board.

Step 7: Click on the Configure WiFi Button on the screen that comes up. It may take a bit before your computer connects. If it doesn't, repeat Step 5 and 6. Rebooting the OurWeather computer (by power cycle or using the Reset button) may be required, depending on your network).

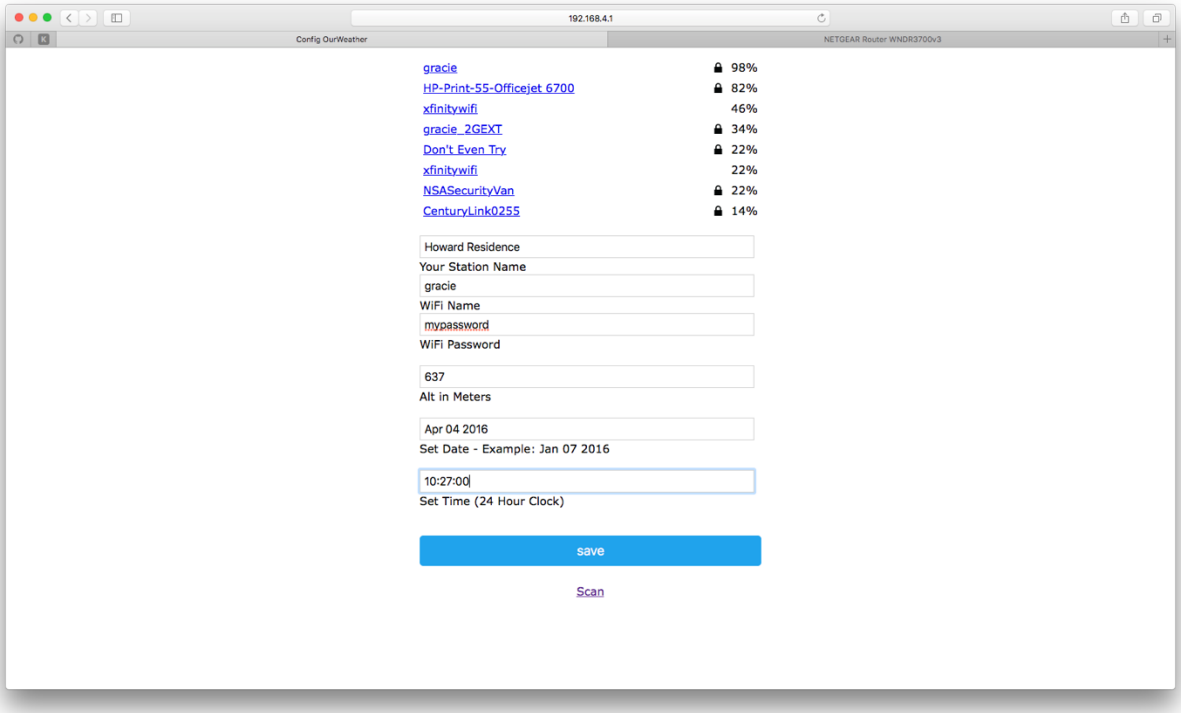
Step 8: Fill out the displayed form to set up OurWeather WiFi connection.

Each of these fields is described below:

- Your Station Name - The name of your OurWeather Station (ex. Howard Residence)
- WiFi Name - The name (SSID) of your local WiFi connection
- WiFi Password - The password for your local WiFi connection
- Alt in Meters - Your station altitude in meters (for setting barometric pressure) Defaults to 643
- Set Date - Set date of clock in OurWeather. Optional – OurWeather will get the current date on bootup when you are connected to the WiFi.
- Set Time - Set time of clock (in 24 hour time). Optional – OurWeather will get the current date on bootup when you are connected to the WiFi.

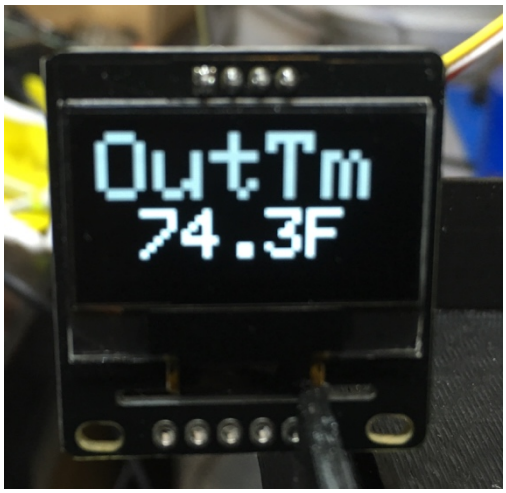


Example filled out page follows.



Step 9: Hit Save. OurWeather will try to connect. If it doesn't connect (for example if you typed a bad password or WiFi name - watch the screen) then it will reset it self back to Step 4 and you can try again.

Step 10: You are now connected to your local WiFi. OurWeather will start displaying weather



information.

Looking at the OurWeather Webpage

Step 1: You must connect OurWeather to a local WiFi network as in the previous chapter to see the OurWeather Webpage

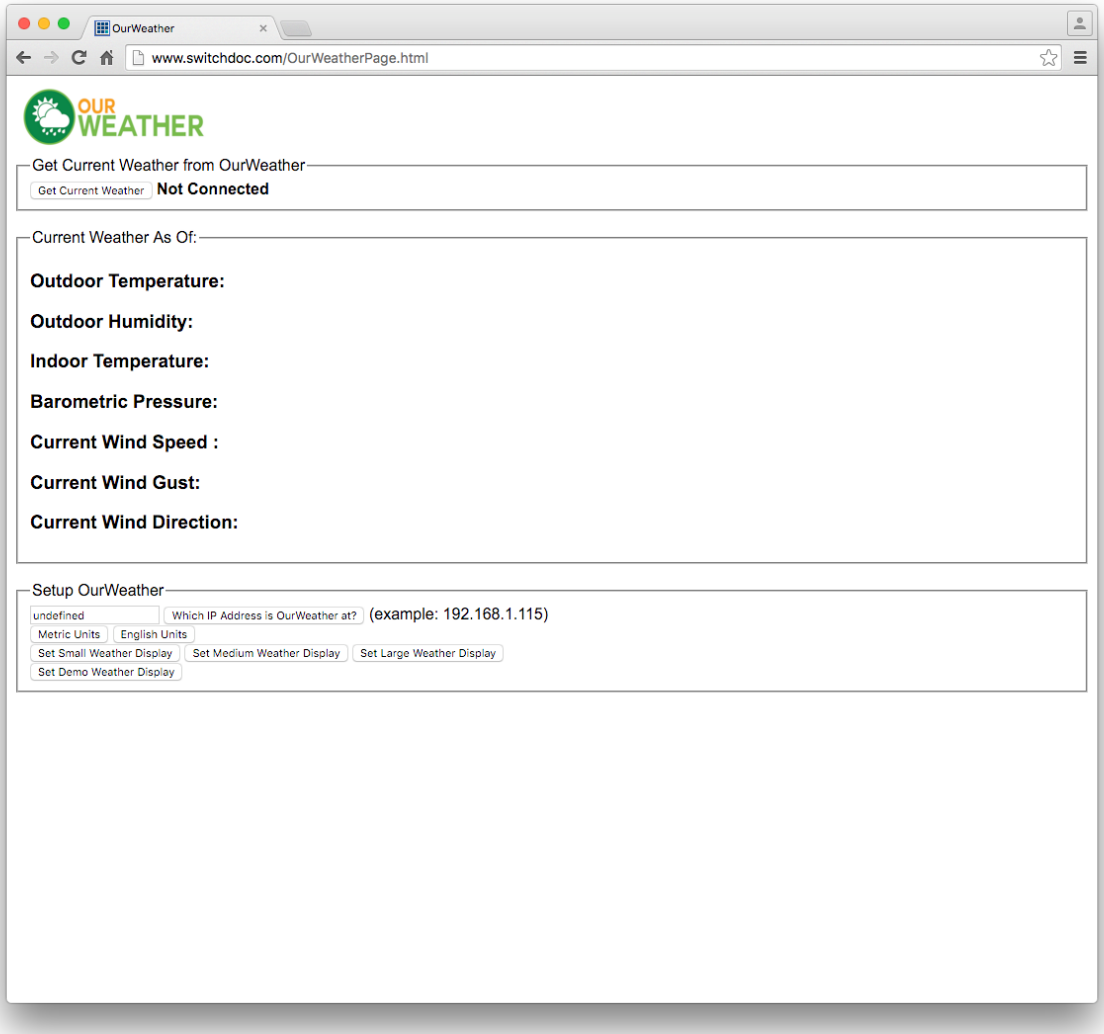
Step 2: Find the OurWeather local IP number. To do this, either turn OurWeather on and off using the power supply or hit the RESET button on Our Weather.

Step 3: As Our Weather powers up, you will see a window similar to the following:

192.168.1.140 is the local IP number showing in the above picture. Your IP number will be different.

Step 4: Open a browser window and type in the following URL:

http://www.switchdoc.com/OurWeatherPage.html

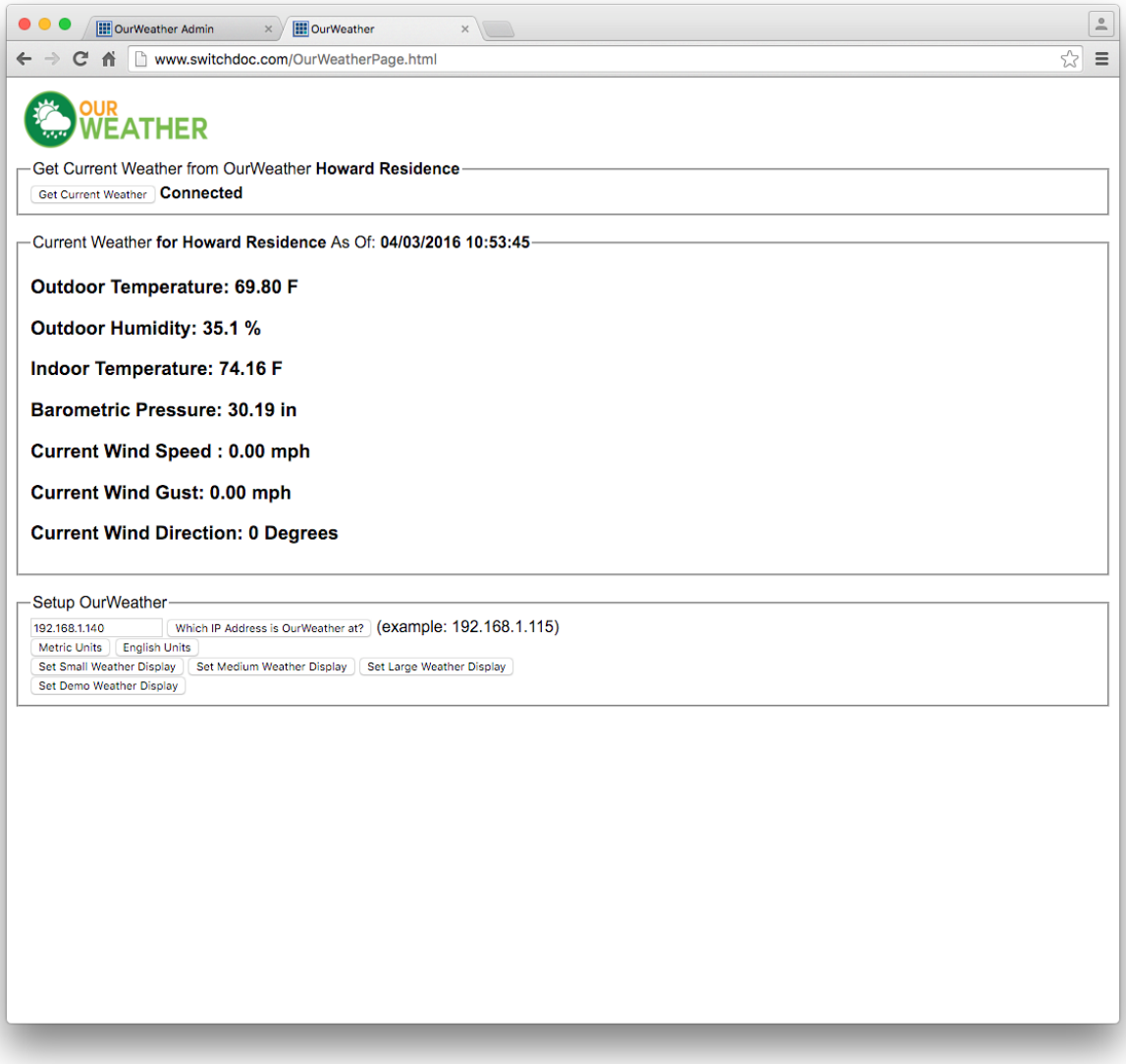


This will bring up the following page.

Step 5: Look under “Setup OurWeather” and enter your IP number gathered in Step 3 and put in the provided box next to the “Which IP Address is OurWeather at?” button

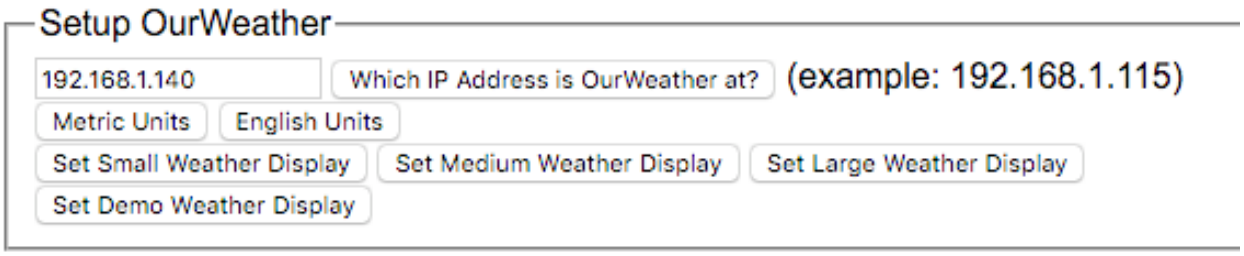
Step 6: Click on the button “Which IP Address is OurWeather at?” Next to the IP number you just entered.

Step 7: Click the button at the top of the page saying “Get Current Weather”



Step 8: You are now able to read OurWeather on your computer!

Note: This procedure needs to be repeated on each computer (or mobile device) that you wish to read OurWeather from. The OurWeather Page station is only available on the local network. An advanced procedure is required to be able to see this page and information on the general Internet outside of the local WiFi. See the application note “Seeing OurWeather on the Internet For Advanced Users” for information.



Description of the other “Setup OurWeather” buttons:

- Metric Units - Change all units to Metric on this page
- English Units - Change all units to English on this page
- Set Small Weather Display - Change the OurWeather Display to Small type
- Set Medium Weather Display - Change the OurWeather Display to Medium type size
- Set Large Weather Display - Change the OurWeather Display to Large type size
- Set Demo Weather Display - Change the OurWeather Display to demo mode. Demo mode cycles through the easily changeable weather sensors quickly (Temperature / Humidity / Wind speed / Wind Direction) quickly if you are having students hand manipulate the sensors. This is also the mode that OurWeather will come up in if you don’t connect it to a local WiFi after 5 minutes.

Advanced Usage - OurWeather Administration Page

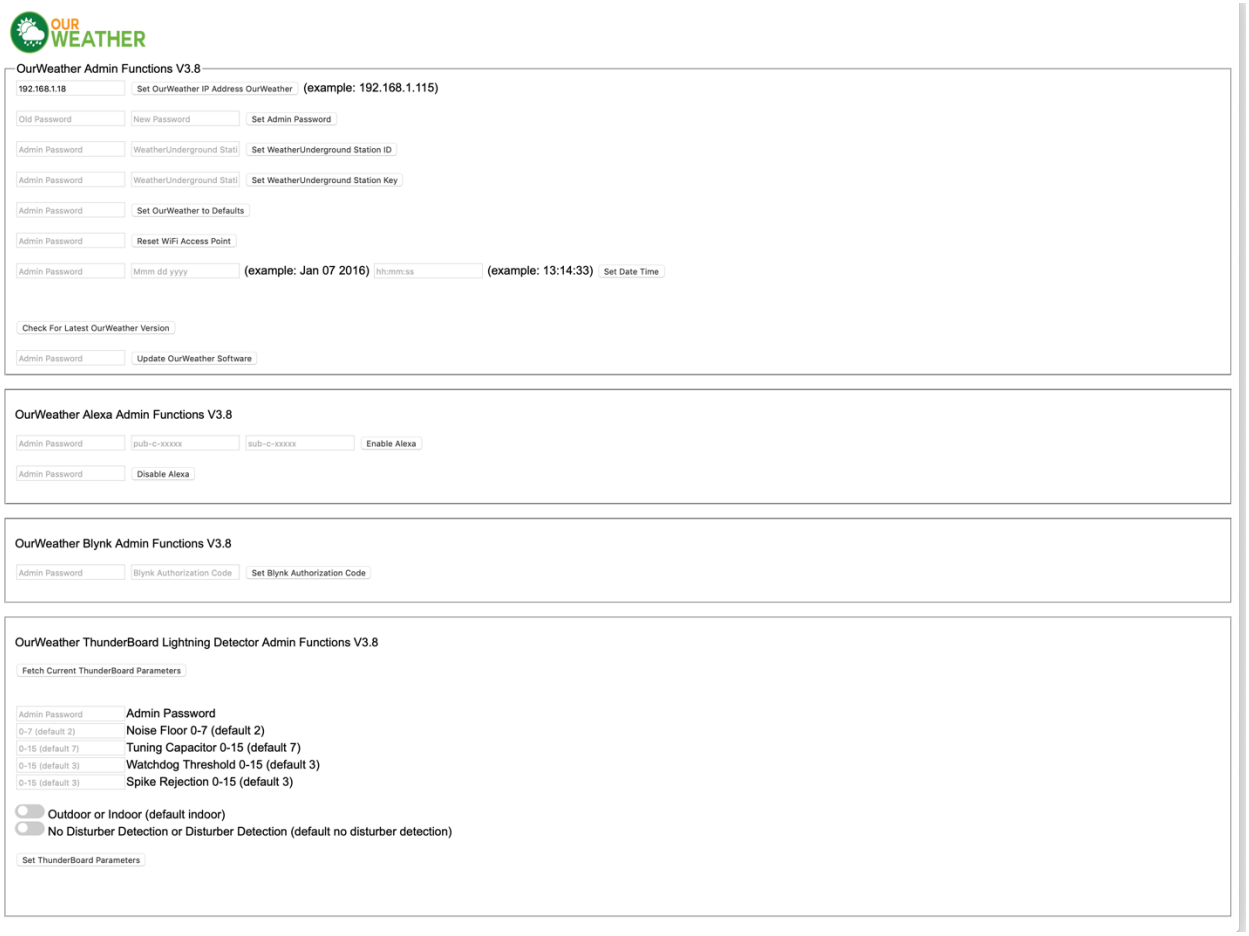
For OurWeather Administrators:

Note: IT IS RECOMMENDED THAT YOU SET AN ADMINISTRATION PASSWORD IMMEDIATELY TO PROTECT YOUR OURWEATHER STATION FROM BEING CHANGED BY UNAUTHORIZED PEOPLE.

Step 1: Open a browser and type in the following URL:

http://www.switchdoc.com/OurWeatherAdmin.html

This will open a page as follows. Note that the IP number will be filled in if you completed the procedure above for the OurWeatherPage. If not, enter the IP number of your OurWeather Station and click the “Which IP Address is OurWeather at?”



Step 2: Change your Admin password. The default password for OurWeather is “admin”

Now you have set a new password (38555533 in our example page above), you can use all the other functions.

Button Descriptions

Any of these buttons (with the exception of “Check For Latest OurWeather Version”) requires the use of the Admin password that you set in Step 2 above.

- SetOurWeatherTo Defaults - Reserved for future versions - This does nothing in software Version 014 and below. You can reset OurWeather entirely (including Admin password) by rebooting pushing the GPIO0 button when you seethe OurWeather Logo and holding it until you see the following page.

- Reset WiFi Access Point - Resets the WiFi SSID and Password to “XXX” and “XXX”. OurWeather can then be reset to a different local WiFi. This does not reset the Admin password.

- SetDateTime - To reset the OurWeather Clock, enter the date and time in the format shown (remember the time is in 24 hour format) and click the button

Updating the OurWeather Software

The final buttons on the OurWeatherAdmin page are for doing an update of the onboard OurWeather Software.

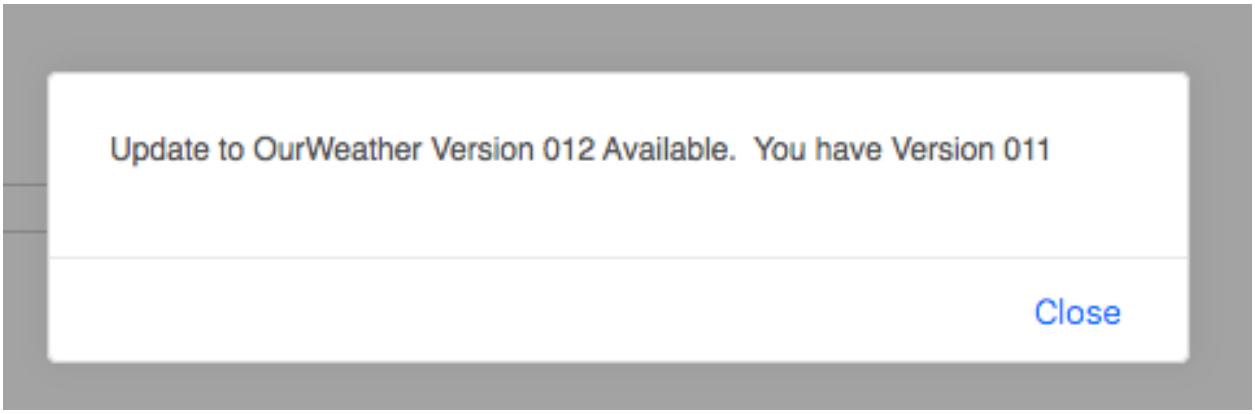
- Check For Latest OurWeather Version - clicking this button checks the SwitchDoc Labs OurWeather Server to check the latest version available for update.

Update OurWeatherSoftware - Fill out the Admin password and click the button to Update the OurWeather Software. Follow the directions on the screen below.

Note: Depending on your Internet connection, you may have to repeat the Update several times.

During boot you can see the software version number that OurWeather is running as seen below:

You can compare this version number to the available update version shown by clicking on the

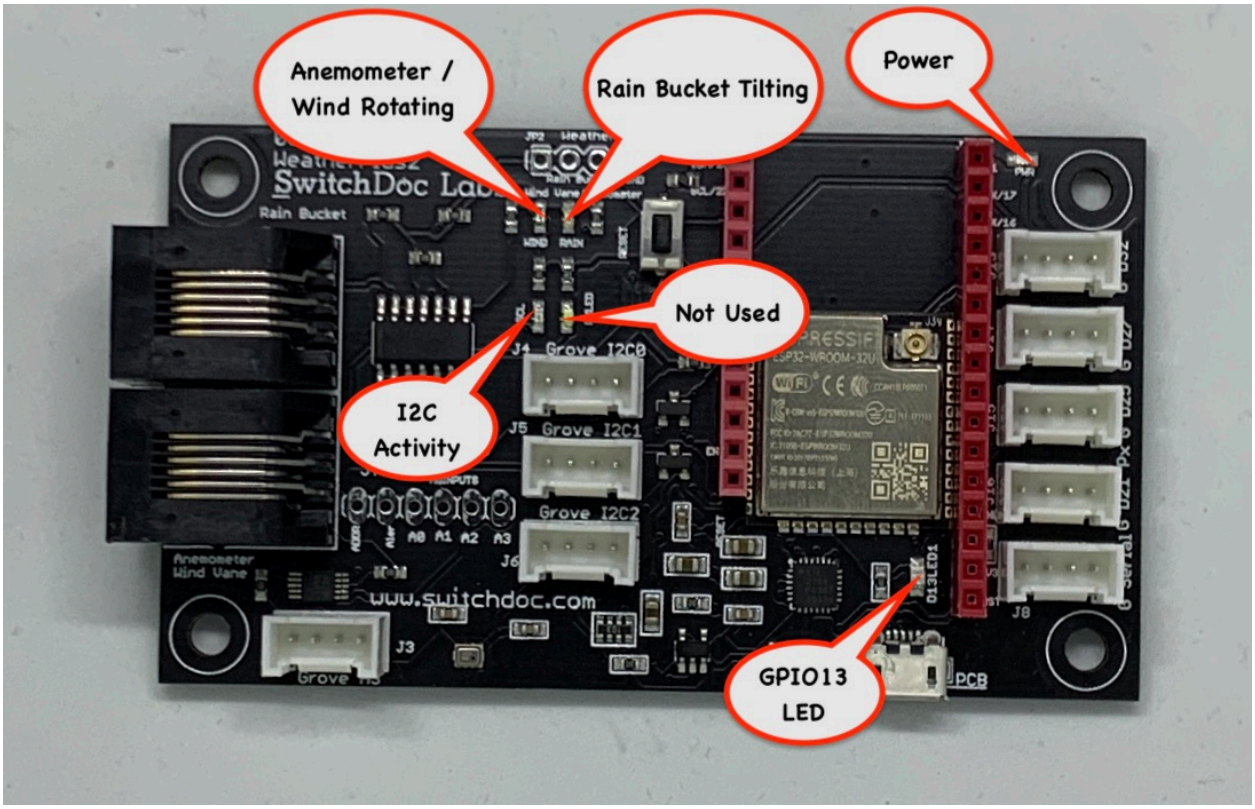


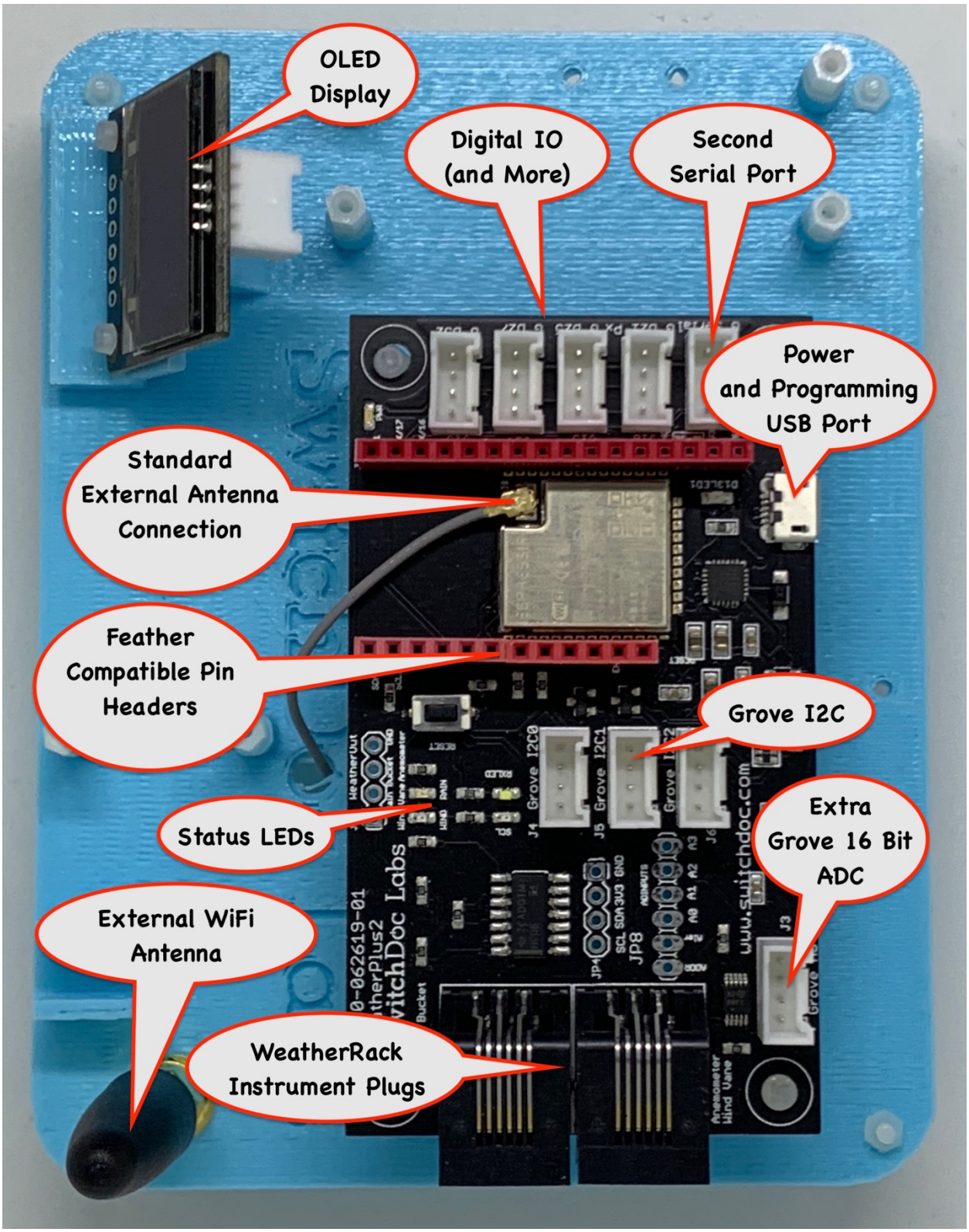
“Check For Latest OurWeather Version” button.

Buttons and Lights on the OurWeather Board

The OurWeather Weather Kit is built upon the SwitchDoc Labs WeatherPlus2 board. There is one button on the WeatherPlus2 board.

Reset - Push this button to reboot the OurWeather Kit




OLED Display
Digital IO (and More)
Second Serial Port
Power and Programming USB Port
Standard External Antenna Connection
Feather Compatible Pin Headers
Grove I2C
Status LEDs
Extra Grove 16 Bit ADC
External WiFi Antenna
WeatherRack Instrument Plugs

Troubleshooting Guide

Q: My wind direction and speed is not working. I am getting a lot of rain

A: You have the RJ45 plugs on OurWeather Reversed

Q: I can't get my WiFi to connect on OurWeather

A: Make sure your WiFi password has no special characters or quote marks. OurWeather does not like those.

Q: My Inside temperature value is too high.

A: The inside temperature is taken at the Barometer and will read high because of board self heating. Look at getting the OurWeather Expansion kit that has a separate Inside Temperature and Humidity Sensor, the HDC1080.