



Assembly and Operation Manual

April 2016

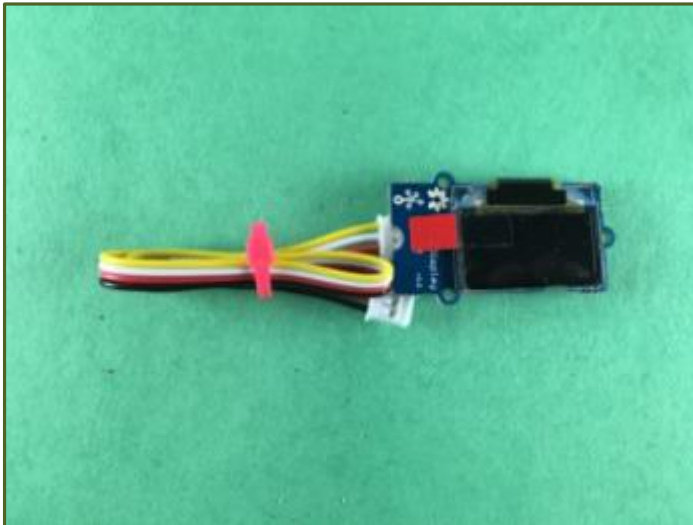
SwitchDoc Labs

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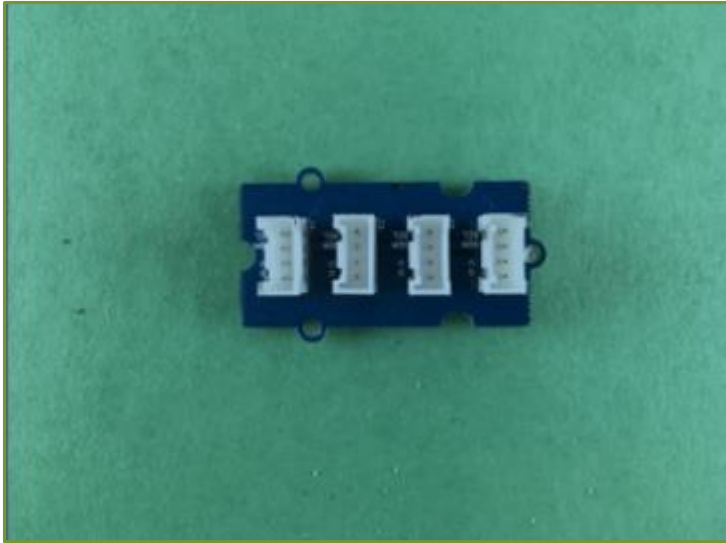
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A - Micro USB 5V Power Supply



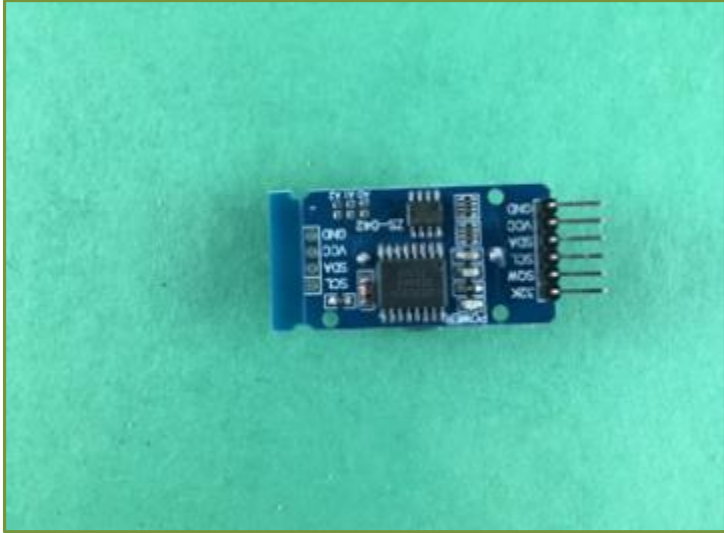
B - Grove OLED Display



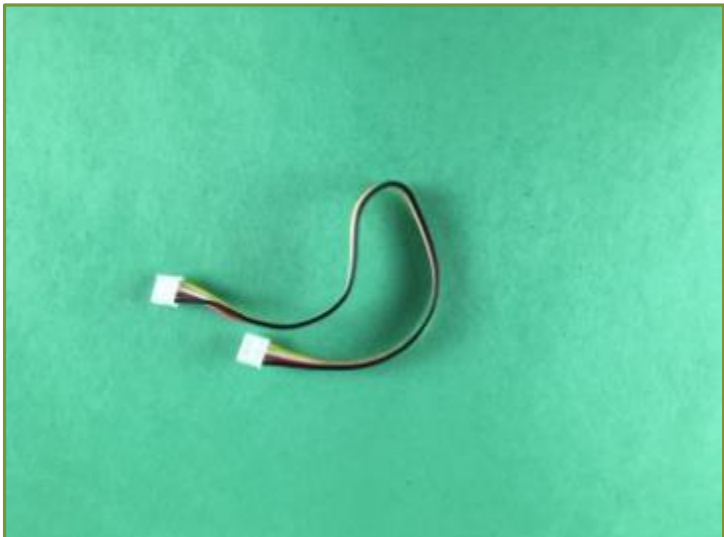
C - 4 Port I2C Hub



D - Grove Outdoor Temperature and Humidity Sensor



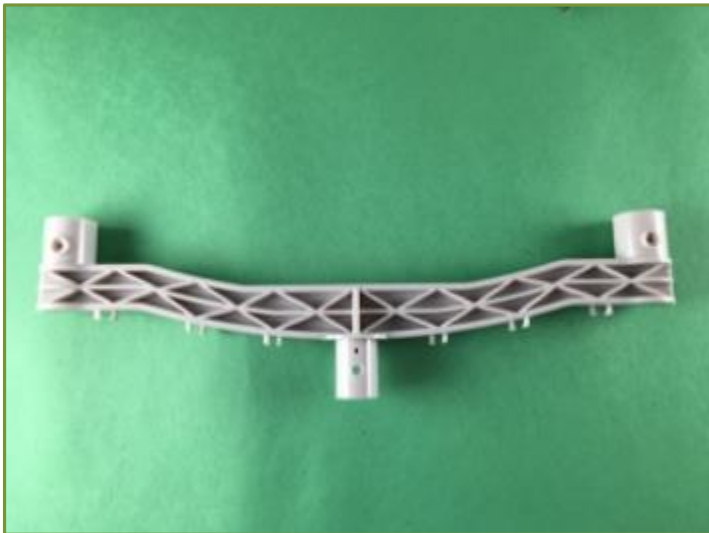
E - Real time Clock –
DS3231



F - Grove Cable (two included)



G - Wind Direction Wind Vane



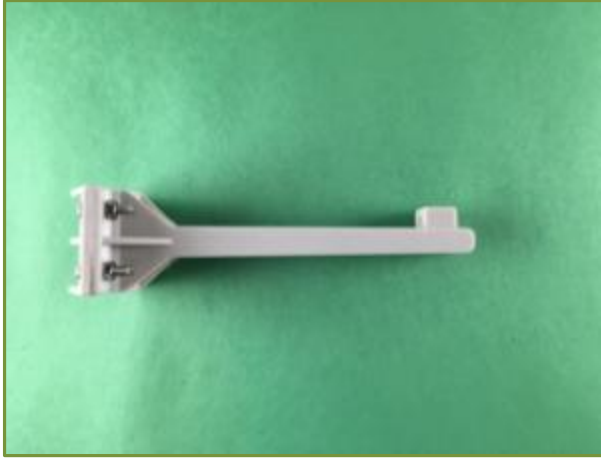
H - Bracket for Anemometer and Wind Vane



I - Rain Bucket



J. Wind Speed Anemometer



K - Rain Gauge Mounting Assembly



L – Wire Ties



M – Metal Mounting Masts for Weather Instruments



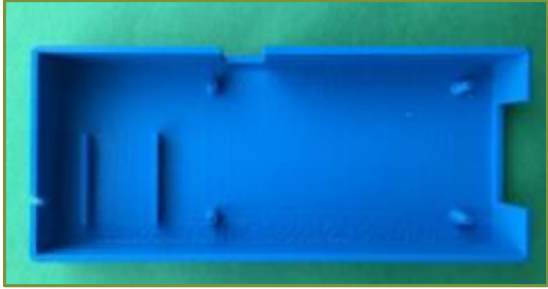
N – FTDI USB Cable for Computer to OurWeather Connection



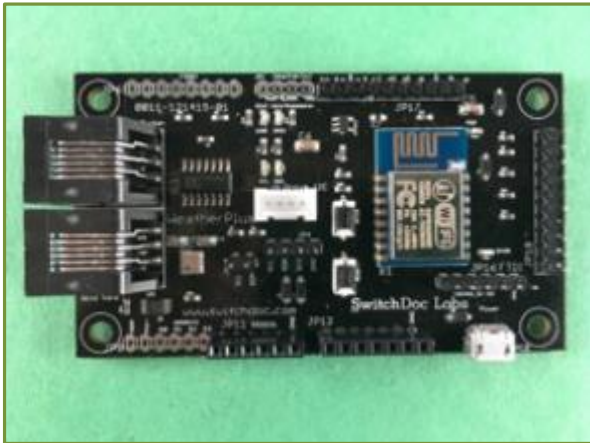
O – Mounting Brackets for Metal Masts



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

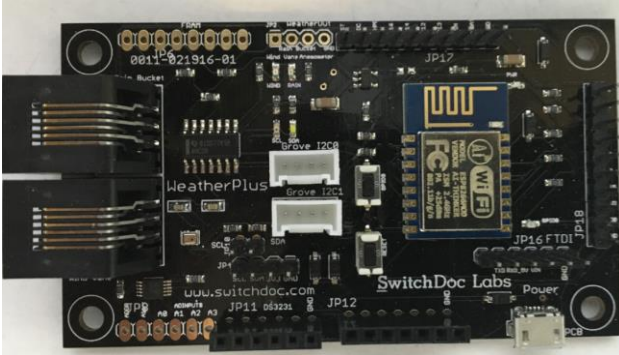


Q – Optional OurWeather Enclosure



R – WeatherPlus Computer Board (Rev 1)

Or



R - WeatherPlus Computer Board (Rev 2)

Both boards are functionally compatible and the Rev 2 board has an additional Grove I2C Port.

Step By Step Assembly

Building the Computer Module: If you don't have the optional OurWeather Enclosure Box (Q), then start at Step 3.

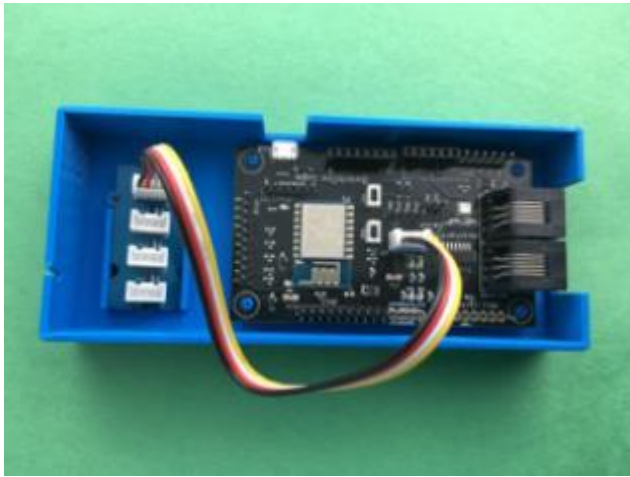
Step 1: Push the WeatherPlus board ® into the optional OurWeather Enclosure Box (Q). You can optionally use small screws to connect it to the box (not provided).



Step 2: Push the I2C Hub (C) between the provided tabs in the optional OurWeather Enclosure box (Q).



Step 3: Connect a Grove Cable (F) from the WeatherPlus Grove Connector (R) to one of the Connectors on the I2C Hub (C). Use the one on the top of the Hub as show, however, any socket will work.



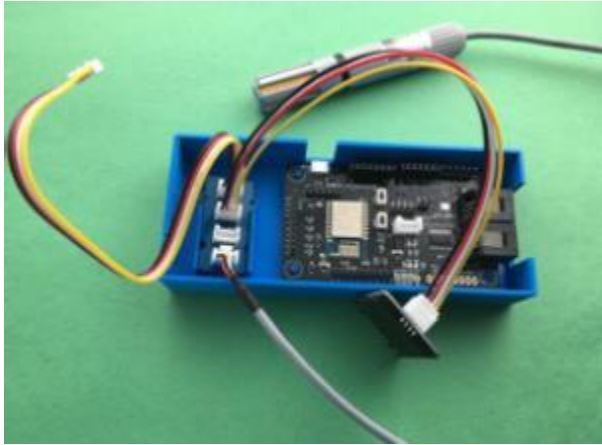
Step 4: Plug in the Grove Connector from the Outdoor Temp/Humidity Sensor (D) into the I2C Hub (C). Use the one on the bottom of the Hub (as shown); however, any socket will work.



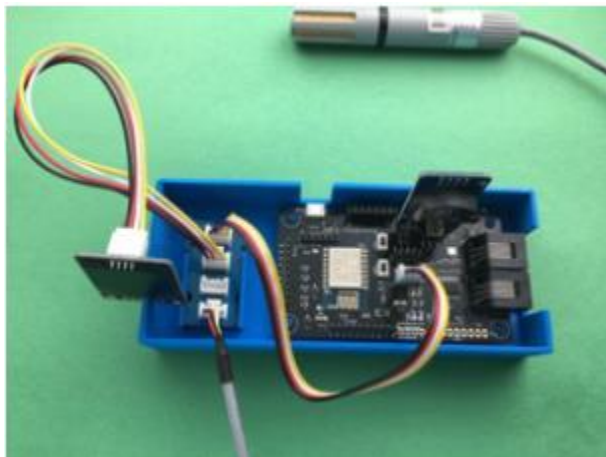
Step 5: Plug a Grove Cable (F) in the OLED Display (B).



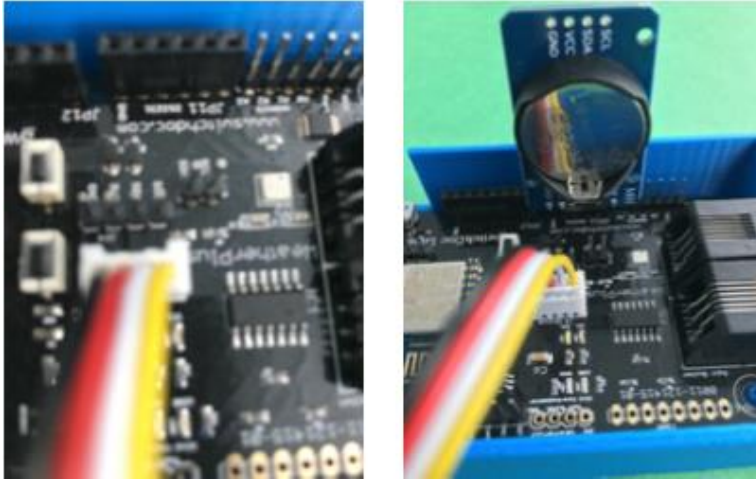
Step 6: Plug in the other end of the Grove Cable (F) from Step 5 into an open connector into the I2C Hub (C). Use the second from the top (as shown); however, any socket will work.



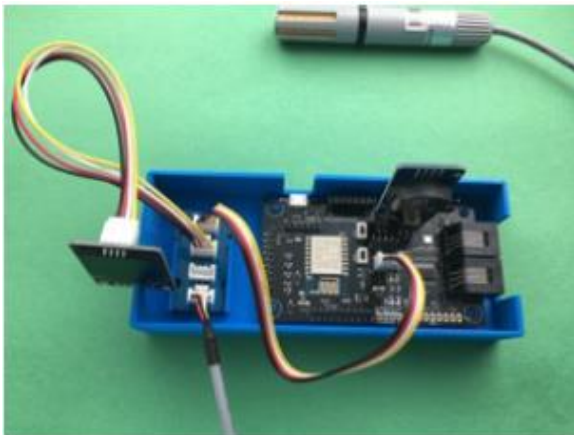
Step 7: Slide the OLED (B) into the slot on the right of the optional OurWeather Enclosure Box (Q).



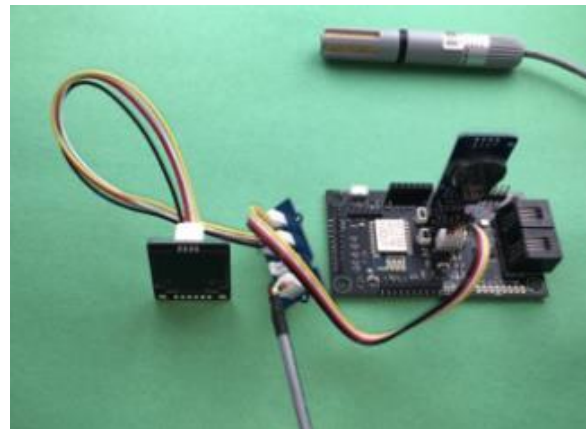
Step 8: Plug in the Real time Clock (E) into the Weather Plus Board (R) into JP11. Make sure the pins are aligned with the plug and the pinmarked GND matches the Pin on the board labeled GND. Note that the battery faces toward the inside of the WeatherPlus board (R). DO NOT PLUG THE BOARD IN BACKWARD. CHECK THAT YOU HAVE DONE IT CORRECTLY as shown below. The battery faces IN.



This completes the assembly of the Computer Module.



With OurWeather Enclosure Box (Q).



Without OurWeather Enclosure Box (Q).

Building the Weather Sensors

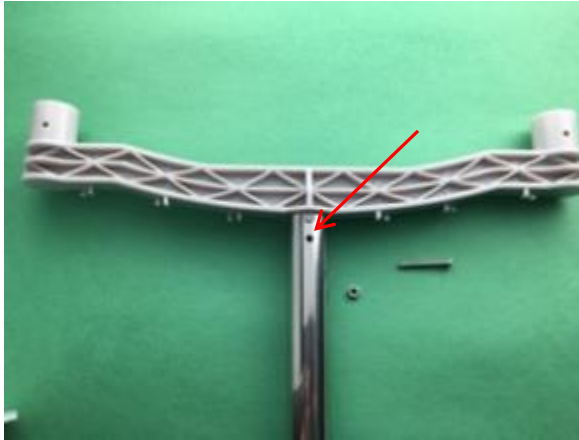
Step 9: Pick up the Metal Mounting Mast (M) with the mounting holds drilled in the top of the mast.



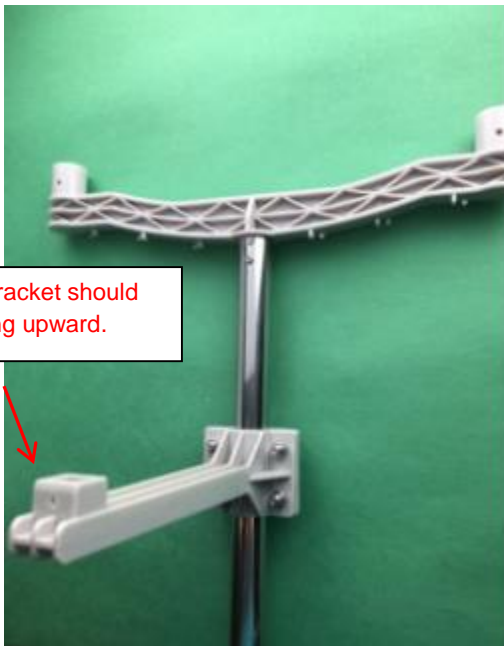
Step 10: Place the Bracket for the Wind Vane and Anemometer (H) into the Mounting Mast (M) from Step 9. Note the Mounting tab in the bracket and Key in the Mounting Mast and make sure they are aligned.



Step 11: Take a screw and bolt (P), remove the bolt, slide the screw through the hold in the Mounting Mast (M) from Step 10 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 Mounting mast. Note that the square bracket points toward the top of the Mast.



Step 13: Take the anemometer (J) and place it on the left end of the 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). Not the alignment tab on the Wind Vane.



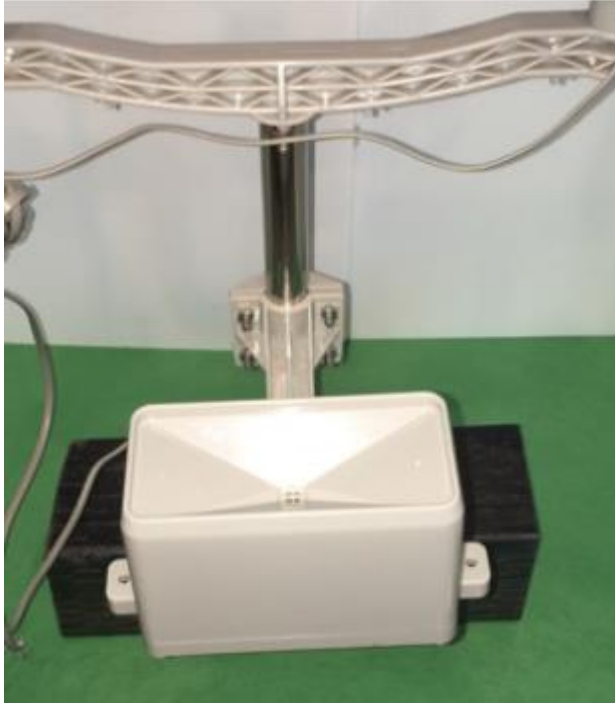
Step 16: Take a screw and bolt (P), slide it into the Wind Vane and Anemometer Bracket (H) under the Wind Vane (G) and tighten in place to secure the Wind Vane.



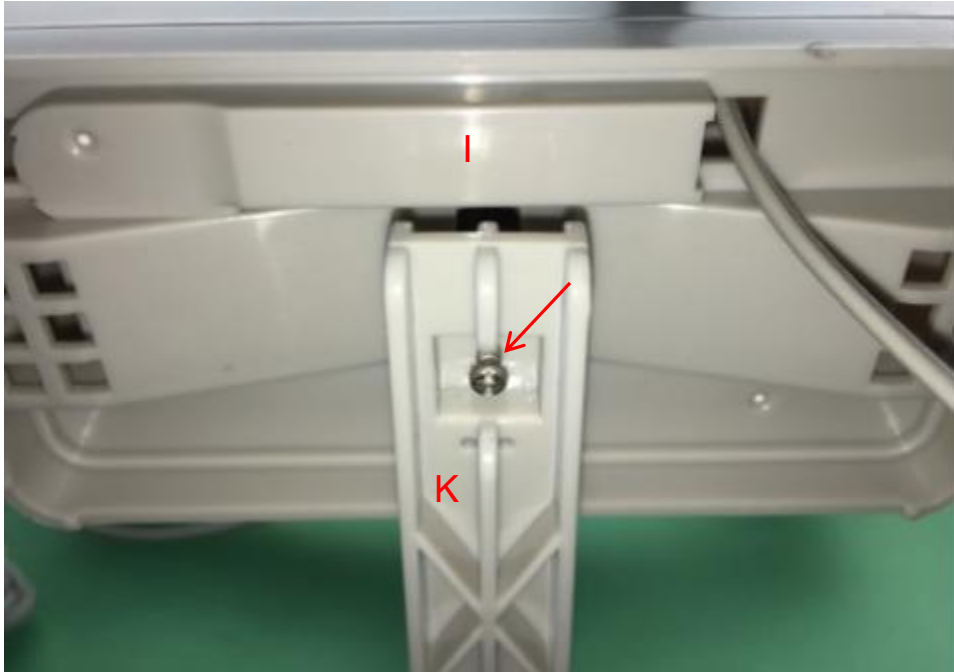
Step 17: Take the RJ45 plug on the cable from the Anemometer (J) and insert it into the bottom of the Wind Vane (G). The plug will only fit one way and will snap into place.



Step 18: Take the Rain Bucket (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 Gauge Mounting Assembly to secure the Rain Bucket.



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

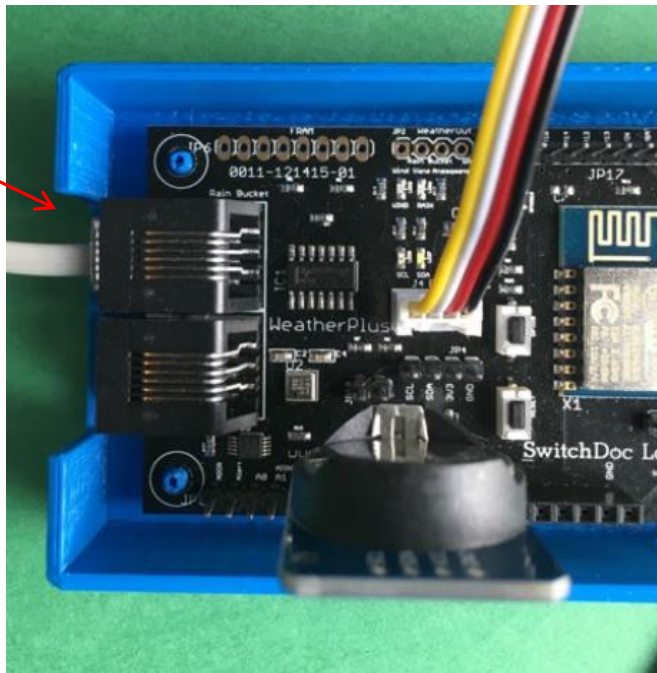


Step 21: Stand the Mounting Mast (M) up and secure it with books, wood or bricks to keep it steady for testing.

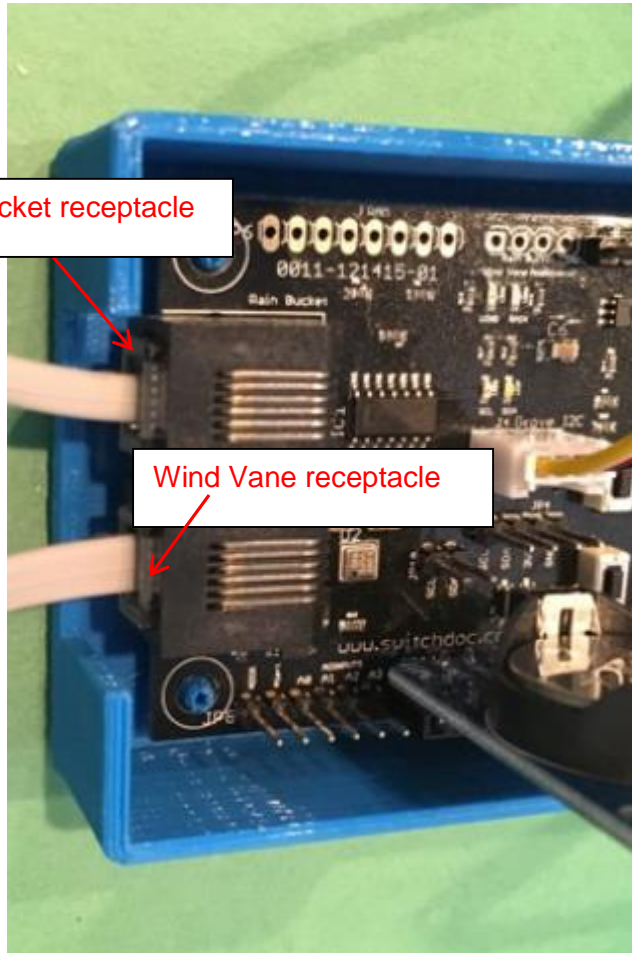


Step 22: Plug the RJ54 Cable coming from the Rain Gauge (I) into the Plug receptacle labeled Rain Bucket on the Weather Plus Board (R). Note that there are two plug receptacles on the WeatherPlus Board (R); one is labeled Rain Bucket and the other is labeled Anemometer / Wind Vane. If you plug the cable into the wrong receptacle, nothing will be damaged, but the Weather sensors will not work until you plug them in correctly.

Rain Bucket receptacle



Step 23: Plug the RJ54 Cable coming from the Wind Vane (G) into the plug receptacle on the WeatherPlus Board (R). Note that there are two plug receptacles on the WeatherPlus Board (R); one is labeled Rain Bucket and the other is labeled Anemometer / Wind Vane. If you plug the cable into the wrong receptacle, nothing will be damaged, but the Weather sensors will not work until you plug them in correctly.



This completes the WeatherRack assembly.

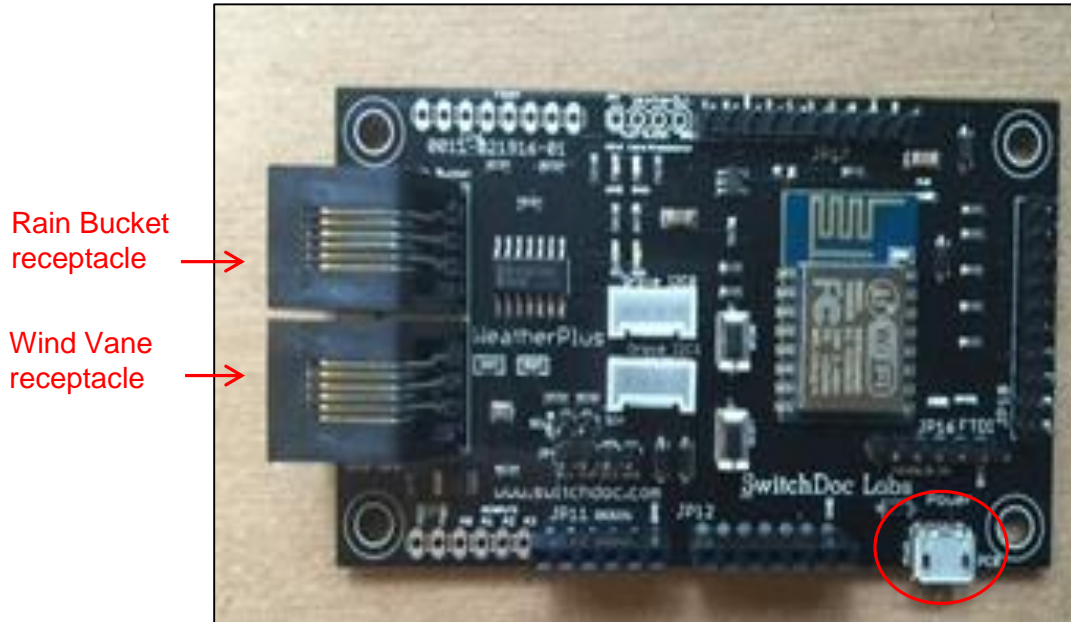
Note that you have two clamps (O) and four wire ties (L) remaining. You can use the clamps to install the WeatherRack assembly outdoors and use the wire ties to secure the cables from the WeatherRack to the Computer Assembly.

You will also have the Power Pack –see note on next page left over as well as the FTDI USB Cable (N). These are *advanced* users who want to reprogram the OurWeather WeatherPlus Board.

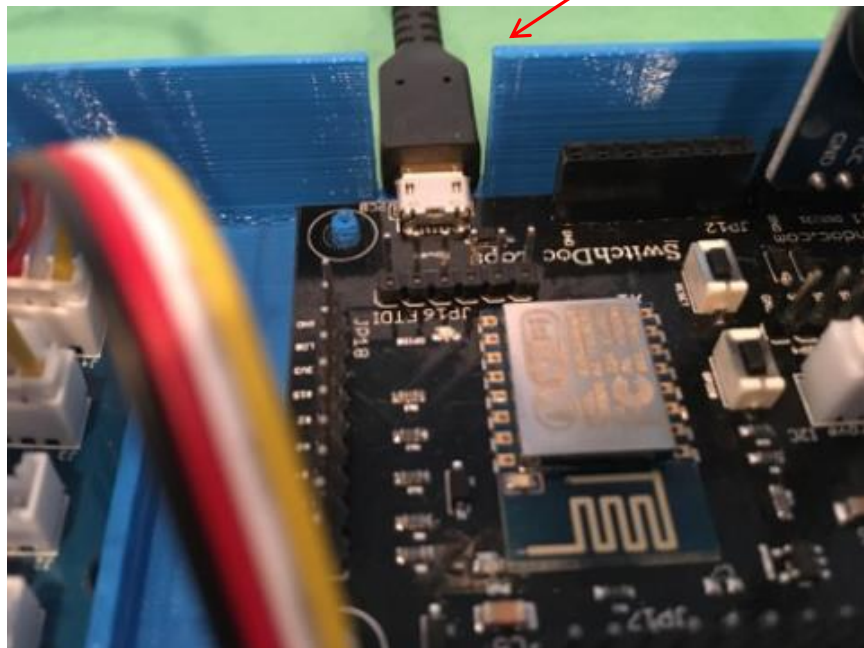
Next, we will power up the OurWeather, test our sensors and then hook it up to your local area network.

Testing the OurWeather Weather Station

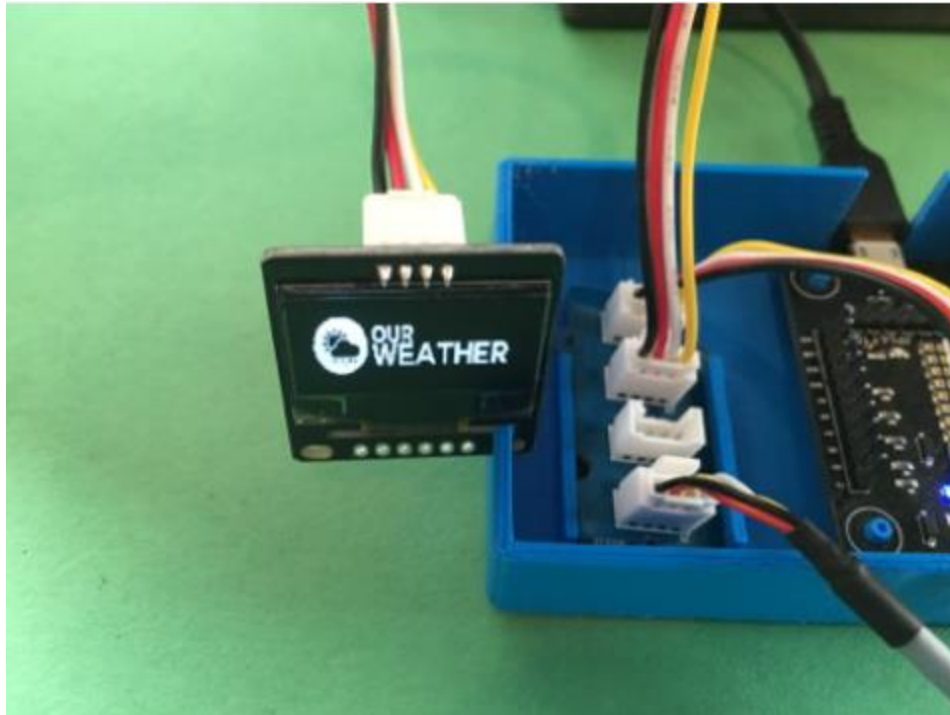
Step 1: Plug in the Micro USB Power Cable (A) into the micro USB Plug on the WeatherPlus Board (R).



Micro USB Plug



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 the 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 (A) into the micro USB power plug on the WeatherPlus Board



Note: If you don't want to connect to WiFi, just wait five minutes and OurWeather will start displaying your local weather information. To restart the sequence, power cycle OurWeather again.

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.

Note: Hitting reset or unplugging your OurWeather system will disconnect you from the OurWeather WiFi. You will need to do Step 5.

Step 1: Unplug the OurWeather power supply.

Step 2: Wait 10 seconds.

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

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

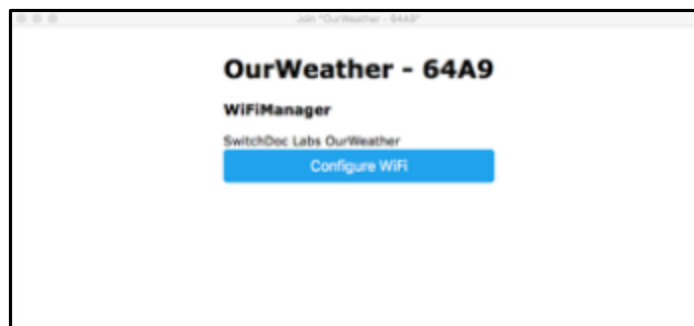


Step 5: Connect your computer or laptop WiFi to the Wireless Access Point name (OurWeather – 64A9 in our example above). Example on a Mac below:



Step 6: Open a web browser (Safari and/or Chrome are preferred – will work with most Internet Explorer versions) and type in <http://192.168.4.1> and shortly you will see the following screen.

Note that you only have five 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 WeatherPlus 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 Step 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 field 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: Station altitude in meters (barometric pressure). Default is 643
- Set Date: Set date of the real time clock in OurWeather. This can be left blank if clock is already set.
- Set time: Set time of clock (in 24-hour format). This can be left blank if clock is already set.

The screenshot shows a web browser window titled 'Config OurWeather' with the IP address '192.168.4.1' in the address bar. The page content is as follows:

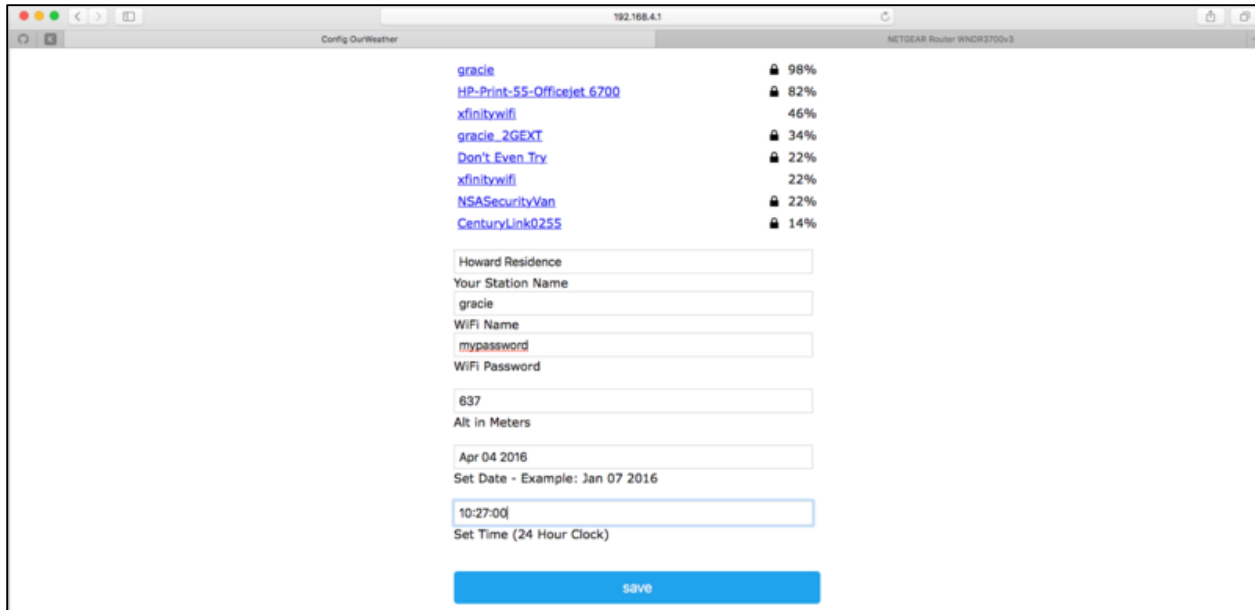
Network Name	Signal Strength
gracie	98%
HP-Print-55-Officejet 6700	82%
xfinitywifi	46%
gracie_2GEXT	34%
Don't_Even_Try	22%
xfinitywifi	22%
NSASecurityVan	22%
CenturyLink0255	14%

Below the list is a configuration form with the following fields:

- your Station Name:
- Your Station Name:
- WiFi SSID:
- WiFi Name:
- WiFi password:
- WiFi Password:
- altitude in meters:
- Alt in Meters:
- Set Date - Example: Jan 07 2016:
- Set Time (24 Hour Clock):

A blue 'SAVE' button is located at the bottom of the form.

- An example of this screen with the information fields filled out is on the following page. -



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 itself back to Step 4 and you can try again.

Step 10: You are now connected to your local WiFi and 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 OurWeather.

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



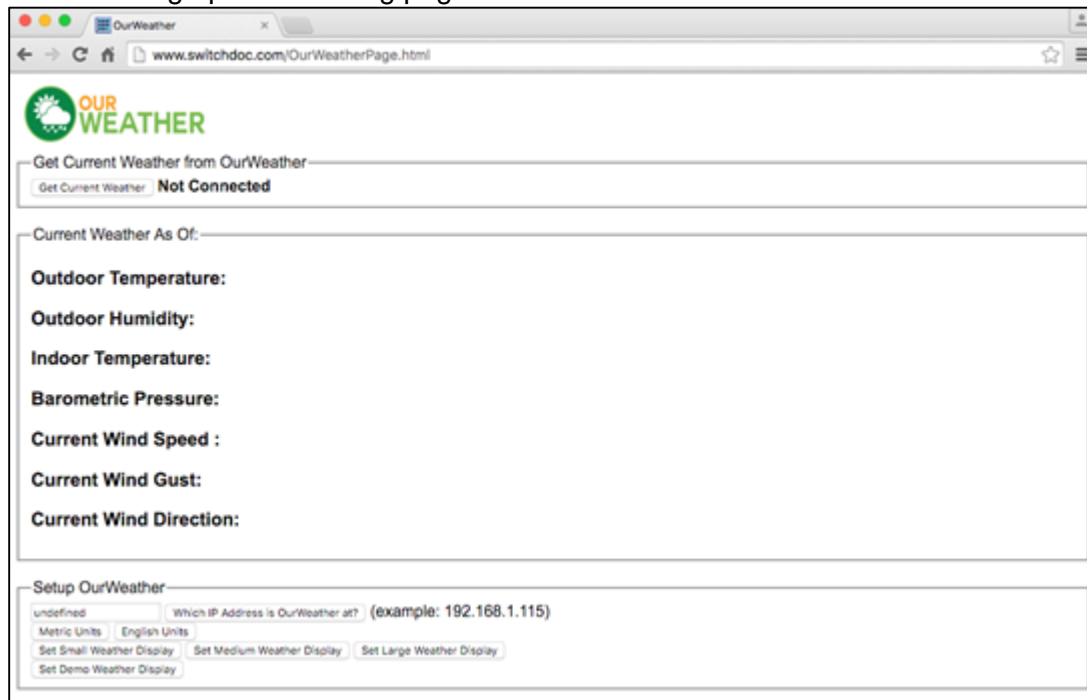
192.168.1.140 is the local IP number showing in the photo.

Your IP number will be different.

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

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

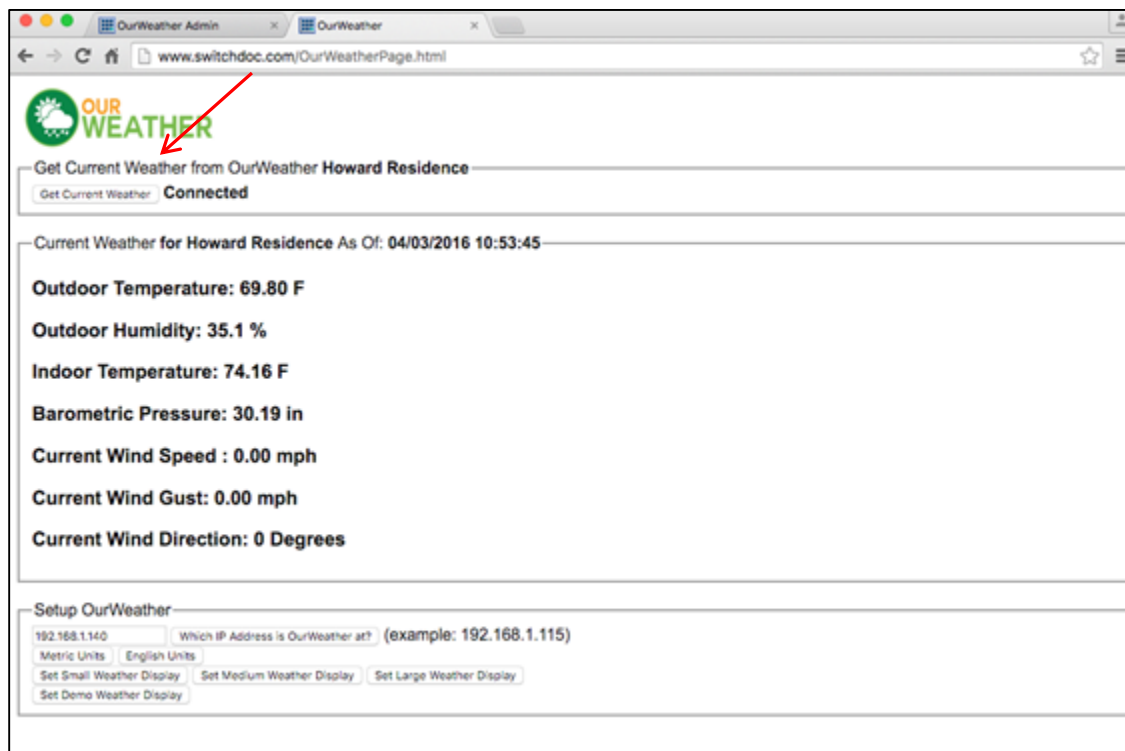
This will bring up the following page:



Step 5: Look under “Setup OurWeather” and enter your IP number gathered in Step 3 and enter that in the field 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.”



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.

Setup OurWeather

192.168.1.140 Which IP Address is OurWeather at? (example: 192.168.1.115)

Metric Units English Units

Set Small Weather Display Set Medium Weather Display Set Large Weather Display

Set Demo Weather Display

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 the following page. Note that the IP number will be filled in if you completed the procedure above for the OurWeather Page. If not, enter the IP number of your OurWeather.

OurWeather Admin Functions

192.168.1.140 Which IP Address is OurWeather at? (example: 192.168.1.115)

Old Password New Password Set Admin Password

Admin Password Set OurWeather to Defaults

Admin Password Reset WiFi Access Point

Admin Password Mmm dd yyyy (example: Jan 07 2016) hh:mm:ss (example: 13:14:33) Set Date Time

Check For Latest OurWeather Version

Admin Password Update OurWeather Software

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

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

Updating the OurWeather Software

The final buttons on the OurWeather Admin 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 for the latest version available for update.

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

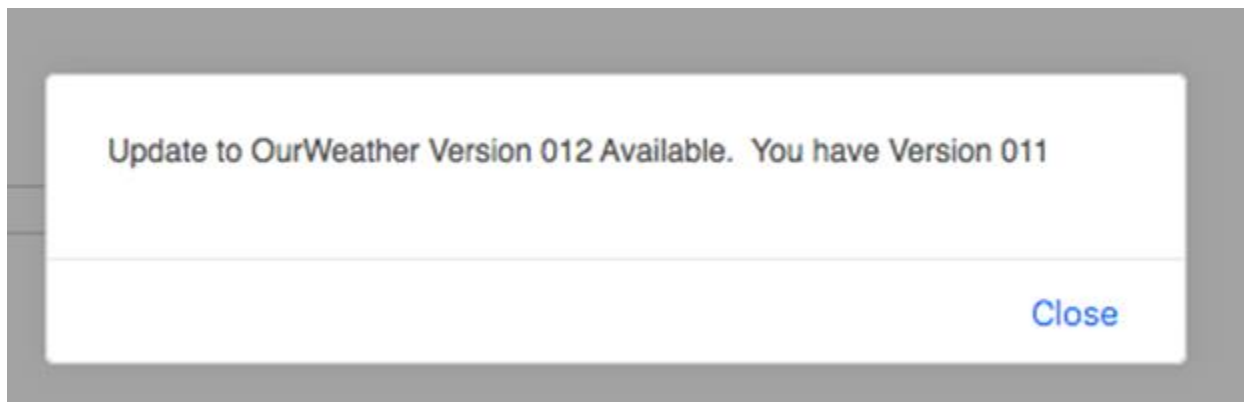


Note: Depending on your internet connection, you may have to repeat the update several times.

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



You can compare this version number to the available update version shown by clicking on the "Check For Latest OurWeather Version" button.



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.

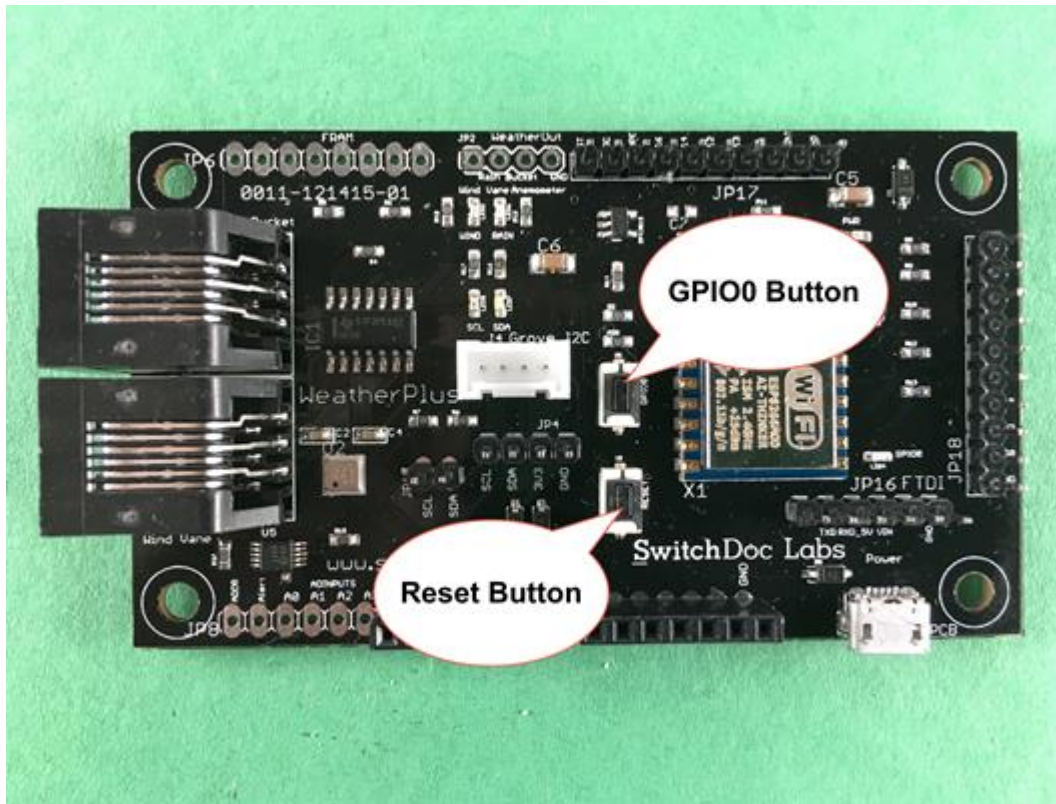
- Set OurWeather to Defaults – Reserved for future versions. This does nothing in software version 014 and prior. You can reset OurWeather entirely (including Admin password) by rebooting pushing the GPIO0 button when you see the OurWeather logo and holding it until you see the following page. Is there a screen shot of 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.
- Set Date Time – 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.

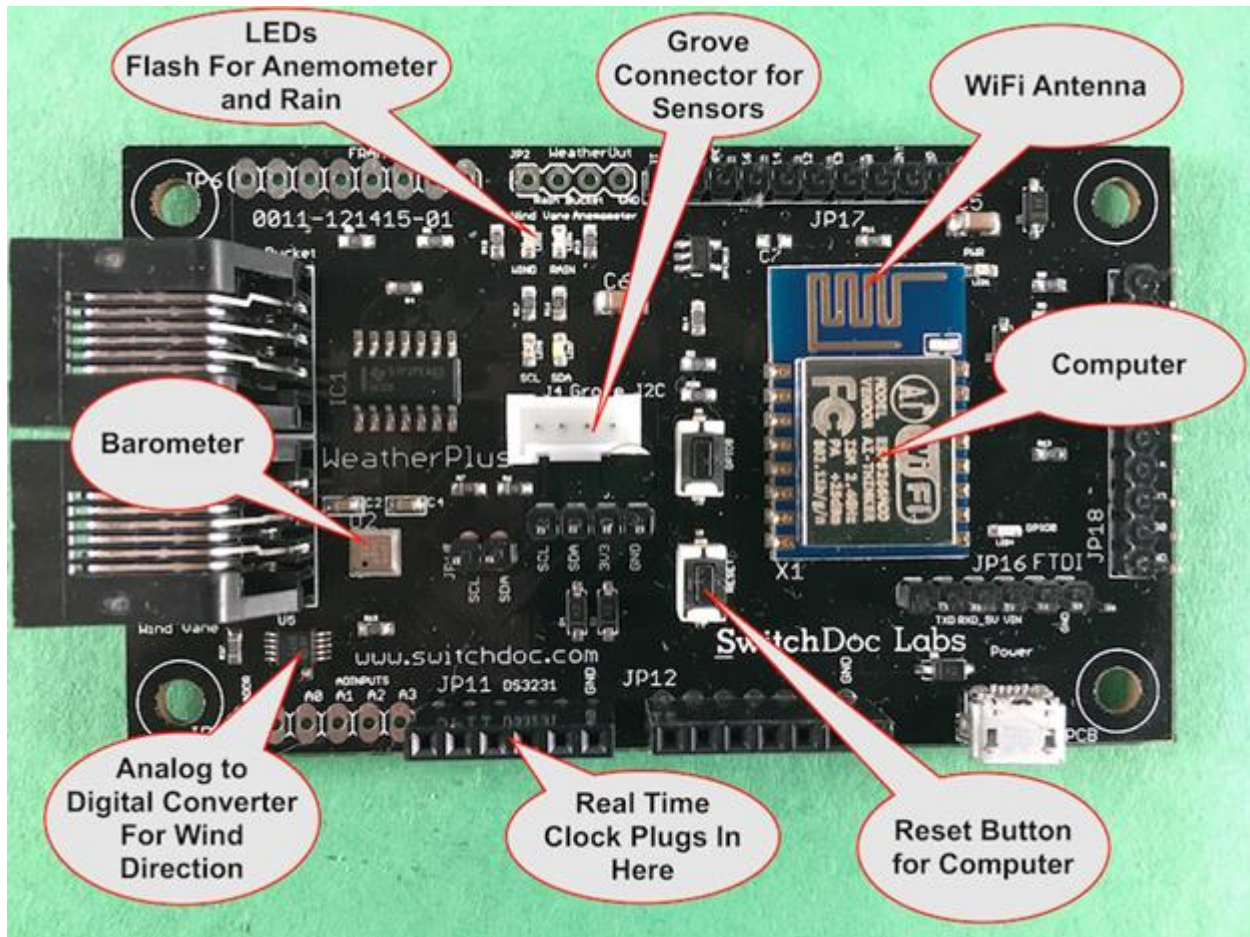
Buttons and Lights on the OurWeather Board

The OurWeather Weather Kit is built upon the SwitchDoc Labs WeatherPlus board. There are two buttons on the WeatherPlus board:

Reset button – Push this button to reboot the OurWeather kit.

GPIO0 – This button lights up the red LED on the board and can be used to reset the OurWeather kit to factory default values by pushing and holding the GPIO0 button down when the OurWeather logo appears and holding it for 30-seconds.





Troubleshooting Guide

Note: The only way you can really damage the WeatherPlus board is by plugging in the Real Time Clock backwards. Remember that the batter faces inward and the pins labeled GND align with each other.

The power light does not turn on when I plug in OurWeather.

- Check to see you have power at the AC outlet.
- Check to see you have actually plugged in the USB cable into the WeatherPlus board.
- Try a different micro USB 5V power supply.

The OLED display does not display anything.

- Check your grove connector wiring and make sure the OurWeather WeatherPlus board has power.

I see NaN as the Outdoor temperature and humidity.

- Check to see you have correctly plugged in the Outdoor Temperature and Humidity Sensor grove connector.
- Power cycle OurWeather.

Turning on the Wind Vane and the Anemometer does not change the display

- You have probably reversed the RJ45 plugs coming from the weather sensors. Turn the power off and trace and check the RJ45 connections as in the assembly manual above.

Rain bucket does not count

- You have probably reversed the RJ45 plugs coming from the weather sensors. Turn the power off and trace and check the RJ45 connections as in the assembly manual above.

I cannot connect to my local WiFi with OurWeather

- Reset OurWeather to the default value by plugging and unplugging the wall unit and then holding down the GPIO button as soon as the OurWeather logo appears and hold for 60-seconds. Then go through the procedure of setting up the WiFi again paying special attention to making sure you get the WiFi and Password correct. Upper and lower case is important!

I cannot see the OurWeather page except on my local network

- In order to view the page on the Internet, you have to port forward a port in your router to the OurWeather unit. This is an advanced project and will be in our Advanced Usage manual. Each router is different.

I have forgotten my OurWeather Admin password.

- Reset OurWeather to the default value by plugging and unplugging the wall unit and then holding down the GPIO button as soon as the OurWeather logo appears and hold for 60-seconds. Then go through the procedure of setting up the WiFi again paying special attention to making sure you get the WiFi and Password correct. Upper and lower case is important!