



Agrumino Lemon Dev Guide

rev 0.4

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Versione: February 2021

1 Introduction

This document provides a guide to install Agrumino Board and its libraries. Moreover it describes some example sketches, part of the Agrumino libraries.

2 Installation

2.1 Install the USB driver

Modern Windows installations seem to automatically install the USB driver. If you're on another platform, like Mac OS/Linux/Android or Windows, which doesn't recognize the Serial Port automatically, you can download the official driver from here: [CP2102 Driver](#).

2.2 Install the Agrumino Board on Arduino IDE

The Agrumino board is based on an ESP8266 WiFi chip. The official programming environment is Arduino, this is possible thanks to the Open Source project [ESP8266 Core for Arduino](#). We have forked this project and created a custom Agrumino core that includes all the libraries needed by the example sketches to ease the installation procedure.

Arduino allows installation of packages using Boards Manager. The package is available for Windows, Mac OS, and Linux (32 and 64 bit).

1. Install the current upstream Arduino IDE at the 1.8 level or later. The current version is available at the Arduino website.
2. Start Arduino and open File->Preferences window.
3. Enter this URLs comma separated

https://raw.githubusercontent.com/lifely-cc/arduino-json-manifest/main/package_lifelycom_index.json
http://arduino.esp8266.com/stable/package_esp8266com_index.json

into Additional Board Manager URLs field. You can add multiple URLs, separating them with commas.

4. Open Boards Manager (Tools → Board → Boards Manager...) and install Lifely Agrumino Board platform (and don't forget to select your Agrumino board from Tools → Board menu after installation).

You can find the official guide, plus additional installation options, here: [Arduino core for ESP8266](#).

2.3 Install the Agrumino libraries on Arduino IDE

The official *Agrumino* library comes together with the core installation. We provide a list of the libraries below only as a reference. **You don't need** to install any library.

- [WiFiManager](#) (2.0.3-alpha)

- [ArduinoJson](#) (6.15.2)

Thing Speak Json Post

- [NTPClient](#) (master 9beb84ba50ce37d4c60b08574e1c37b6f598cb6c)

OTA web:

- [ESPAsyncWiFiManager](#) (master bf342327f2fd0f0518bf4932b50c04732063b8d1)
- [ESPAsyncTCP](#) (master 15476867dcbab906c0f1d47a7f63cdde223abeab)
- [ESPAsyncWebServer](#) (master f13685ee97675be2ac9502d177d3024ebc49c1e0)
- [AsyncElegantOTA](#) (2.2.2)

3 Programming the board

The Agrumino Board can be easily programmed by pressing the “Upload” button on the Arduino IDE.

Be sure to select “Agrumino Lemon v4 (WT8266-S1 Module)” as a Board in the (Tools → Board) menu.

4 Arduino library usage

4.1 Examples using USB flashing mode

On this paragraph, example sketches of the Agrumino library are briefly presented. Notice that they are divided into three folders: QuickStart, Cloud, OTA and Advanced (File → Examples → Agrumino).

Accessing Wifi network

Concerning Cloud and OTA sketches, it is necessary to connect Agrumino Board to the wifi network. After uploading the sketch on Arduino IDE:

1. the board is setted up in Station mode and tries to connect to a previously connected Access Point
2. In case of unsuccess of point 1 (or in case of unsaved Access Point) the board is moved into Access Point mode and spins up a DNS and a Web Server (default ip 192.168.4.1, copy it from Serial Monitor)
3. using any wifi enabled device with a browser (computer, phone, tablet) connect to the newly created Access Point (which has a SSID such as Agrumino-XXXXXX, where XXXXX is a number)
4. Write IP of DNS server on your web browser and click on ‘Configure Wifi’. Choose one of the access point scanned, enter password and click save
5. Agrumino will try to connect. If successful, it stops control back your app. If not, reconnect to AP and reconfigure.

Further informations at official library page: [WifiManager](#).

4.1.1 QuickStart examples

Sketches to check basic feature of Agrumino, like reading sensor data, saving data on flash memory and check wifi connection.

- **AgruminoSample**
Simple sketch to read all the values from the Agrumino Board and print them in the serial console every 30 sec.
- **AgruminoBringUp**
Simple sketch to test Agrumino board and FLASH Memory of ESP8266 Module. In particular it is possible to read all the values of sensors and print them in the serial console. Moreover it is possible to clean, read, write and commit on memory to verify its integrity.
- **WifiClient (ESP8266 example)**
Sketch to check wifi connection. It is necessary to fill STASSID and STAPSK with personal wifi SSID and password.

4.1.2 Cloud examples

Sketches to send sensor data of Agrumino board to various cloud backends. All the sketches use deep sleep to save energy and keep a queue of samples in EEPROM (flash).

- **AgruminoDweet**
Sketch that reads every 1h all values from the Arduino board and update them to the Dweet.io service every 4h. It integrates FLASH management to collect all data before transmitting them. More details [here](#).
- **AgruminoThingSpeakHttpPost**
Same as the AgruminoDweet sketch but data are sent to the [Thing Speak website](#) with 4 different Http Post.
- **AgruminoThingSpeakJsonPost**
Same as the AgruminoDweet sketch but data are sent to the [Thing Speak website](#) with a single Json Post.

4.1.3 Advanced examples

Sketches that explore the usage of Agrumino with third-parties sensors, actuators, boards such as oled display, water pump and so on.

- **AgruminoOledSample**

4.1.4 OTA flashing to update firmware examples

Sketches that send sensor data to the cloud and at the same time demonstrate the usage of Over The Air updates.

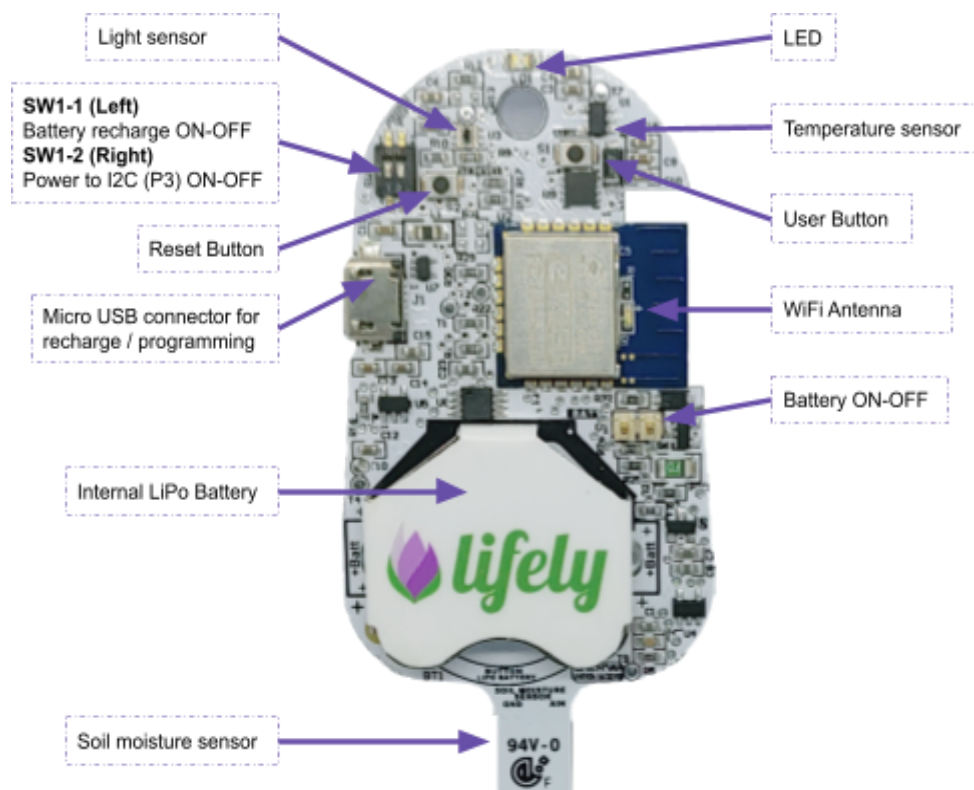
- **AgruminoDweetWebOTA**
This sketch is the same as the AgruminoDweet sketch moreover integrates the update of the firmware via OTA using a web page. Users can choose an executable from pc and upload it on the board using the address of the board.
- **AgruminoDweetHttpOTA**

This sketch is the same as the AgruminoDweet sketch moreover integrates the update of the firmware via OTA using a remote HTTP server. Each time the executable (.bin) loaded on the server is updated, the board downloads it automatically.

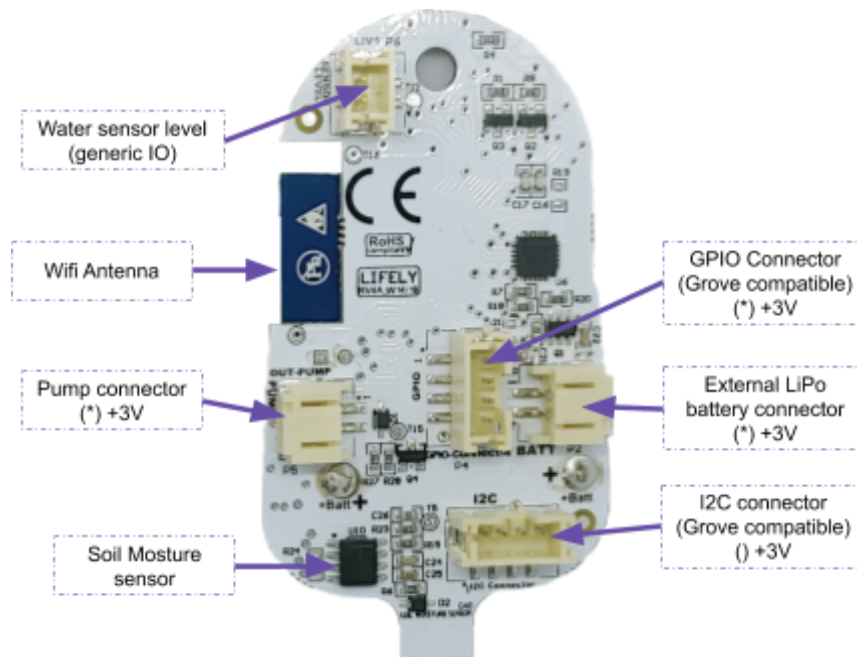
5 Hardware components

In the following paragraph are underlined the principal components of Agrumino Board, front and back sides. It is possible to see an interactive image at lifely page ([link](#)).

5.1 Agrumino board front



5.2 Agrumino board back



I2C Connector and GPIO Connector are compatible with the [Grove System](#).

Grove I2C and Grove Digital are supported out-of-the-box while Grove Analog can be used with an external [Grove-I2C-ADC](#).

6 Open issues

- JST-PH connector seems to be different from the Grove even if they fit well (see DigiKey [1597-1083-ND](#)).

7 Future development

- Watering with time duration
- Expose PCA9536 GPIO 2-3-4 Pins

8 FAQ & Common Errors

1. **error: cannot access ...**

Check from the (Tools → Port) menu that the selected board is the correct one and that it's connected.

2. **espncom sync error**

Press the reset button on the Agrumino (S2 on the Top-Left) and try again.

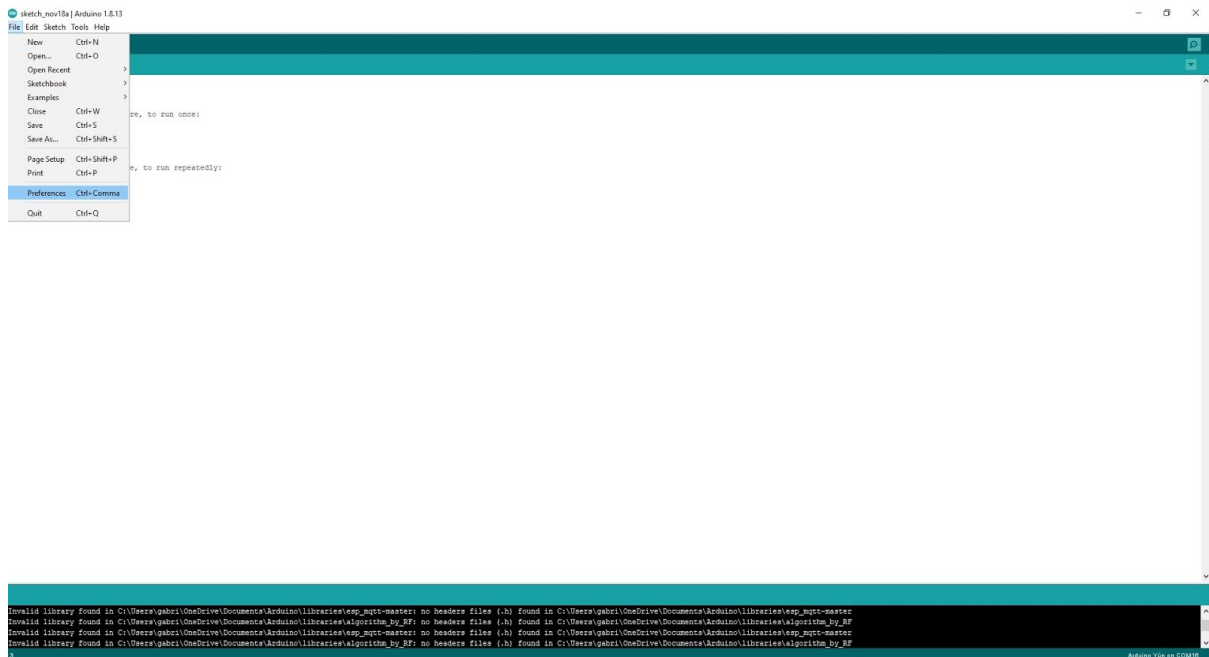
If the error happens again disconnect the Agrumino from the USB, remove and reconnect the jumper P1 and try again.

Visual Guide

In the first place install Arduino IDE from this link on your Pc, Notebook or Mac <https://www.arduino.cc/en/software>

After installing the Arduino Ide, connect Agrumino to your PC/MAC with micro usb cable and go to the next step.

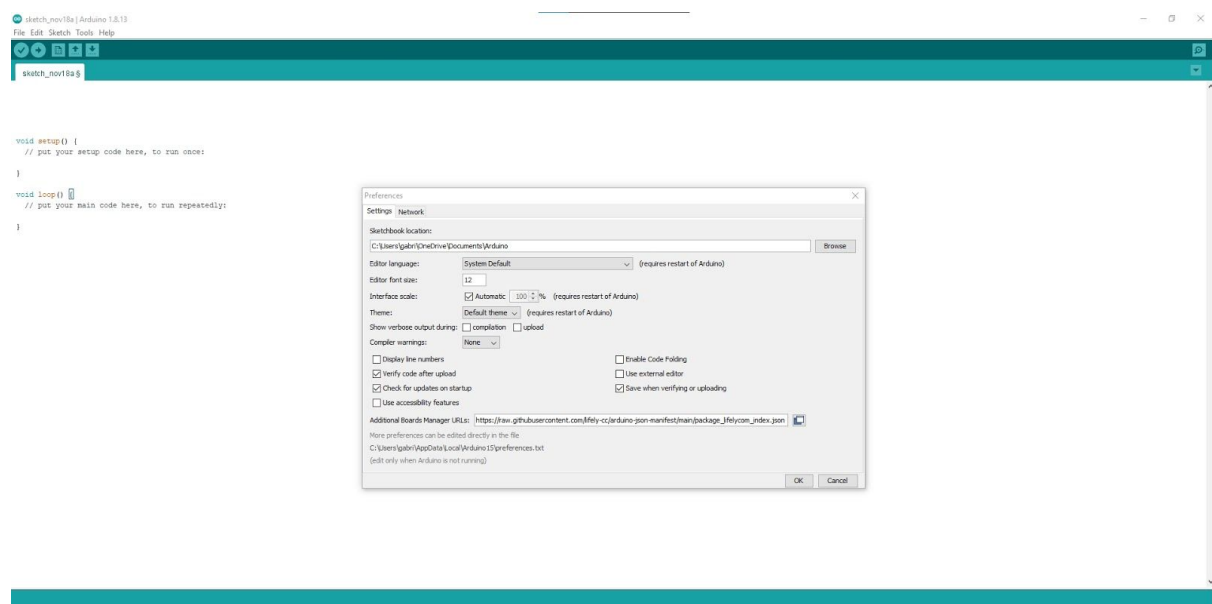
Open Arduino IDE and go to File ➡ Preferences, and click 



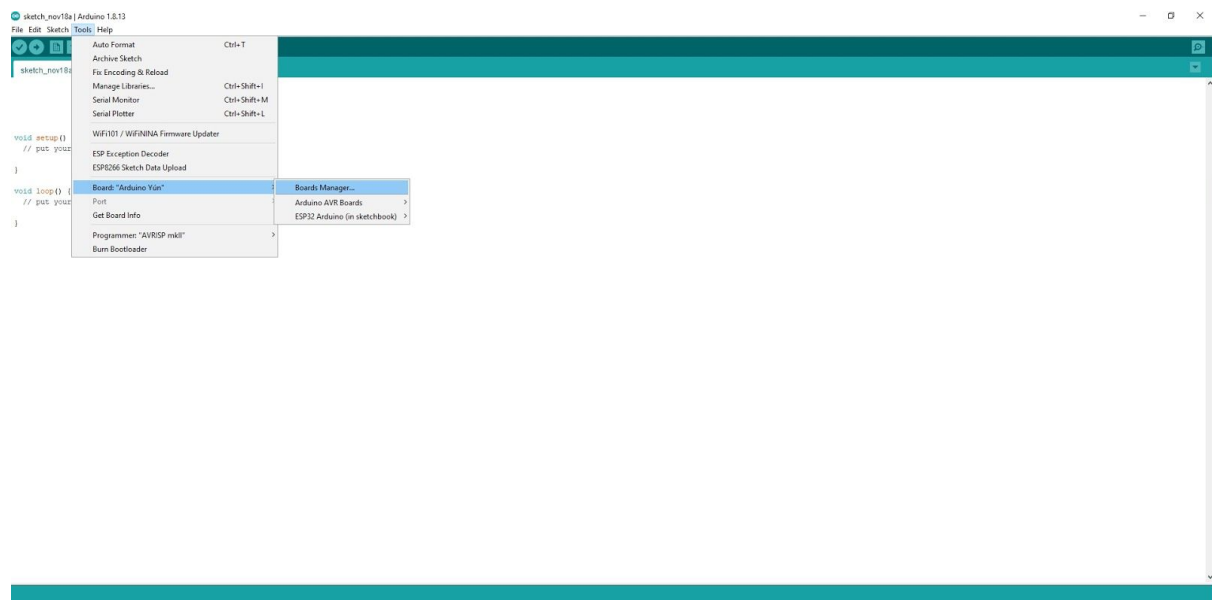
Now in text box “Additional Boards Manager URLs” copy and paste this link:

https://raw.githubusercontent.com/lifely-cc/arduino-json-manifest/main/package_lifelycom_index.json

and click  Ok

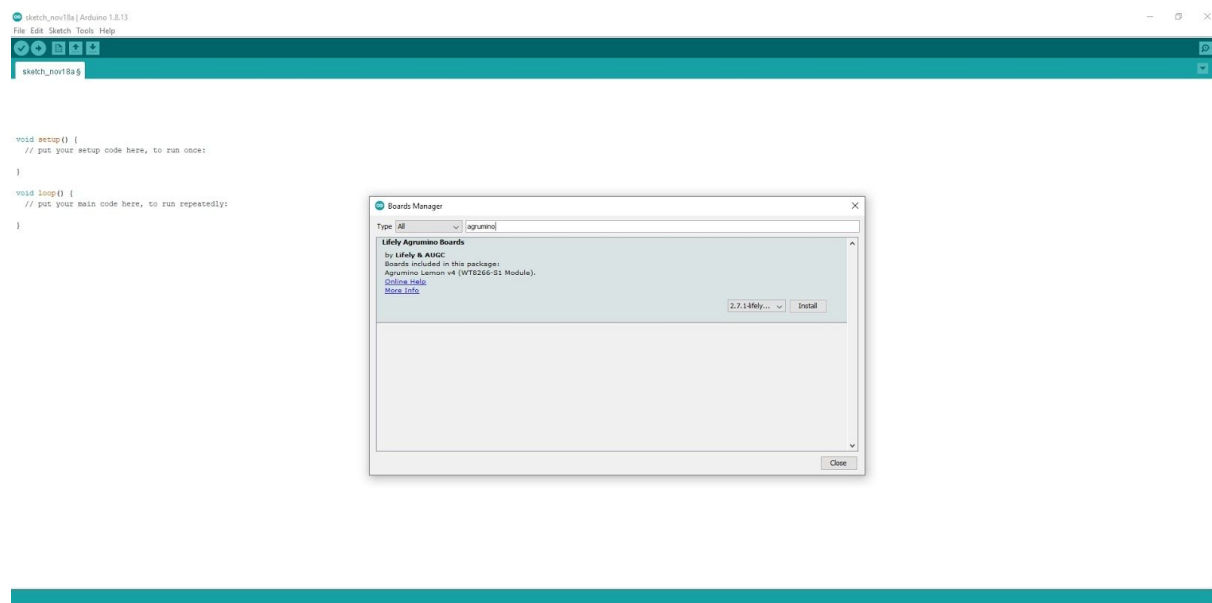


Now go to: Tools ➡ Board ➡ Boards Manager and click 



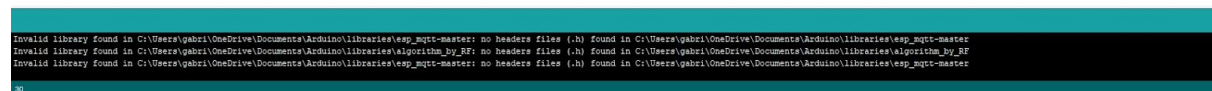
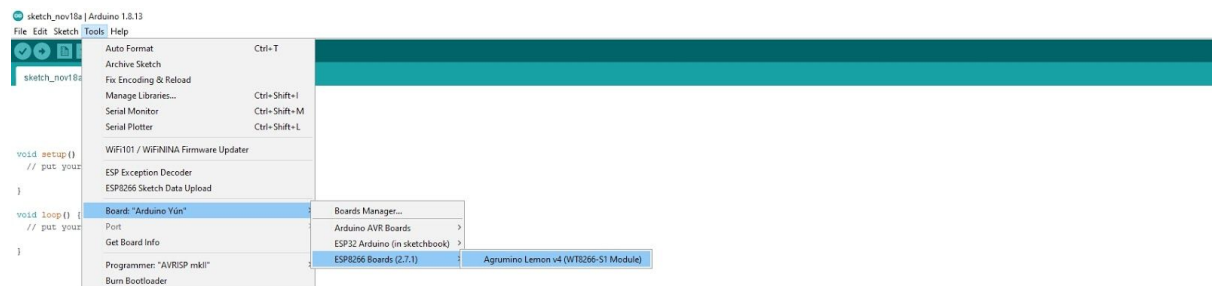
In text box write agrumino and click  Install.

After installing click  Close

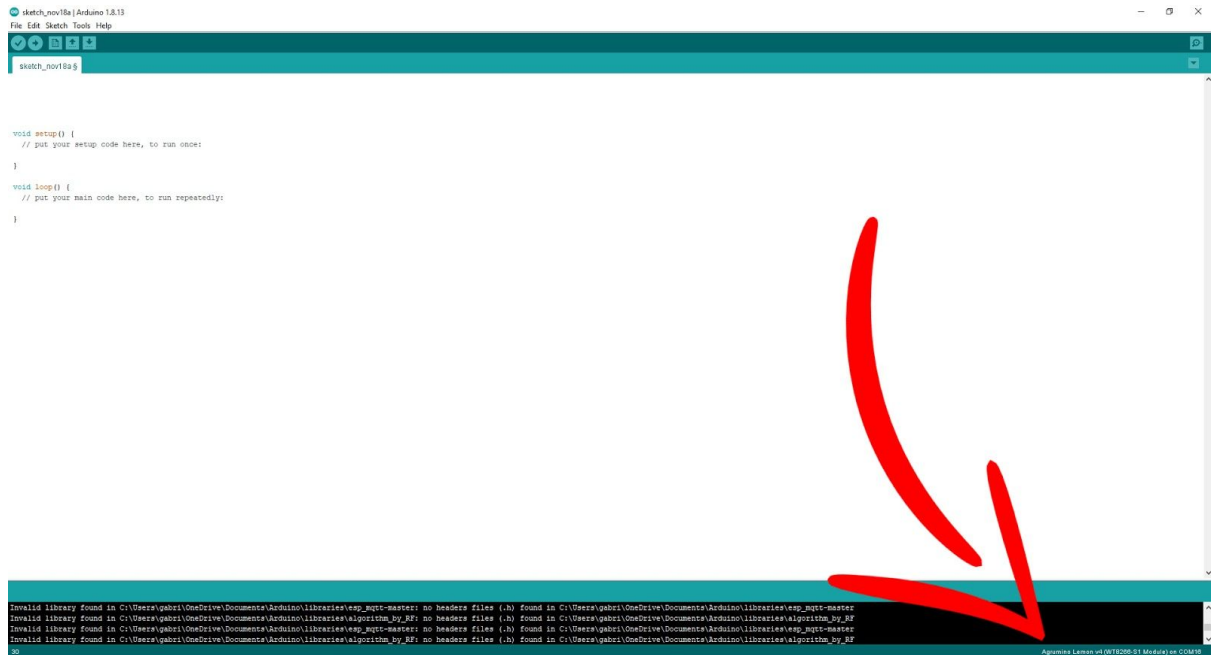


Go to Tools ➡ Board ➡ Esp8266 Boards (2.7.1) ➡

Agrumino Lemon v4 (WT8266-S1 Module) and click 



If the choice was successful, you should see “Agrumino Lemon” at the bottom right on Arduino Ide

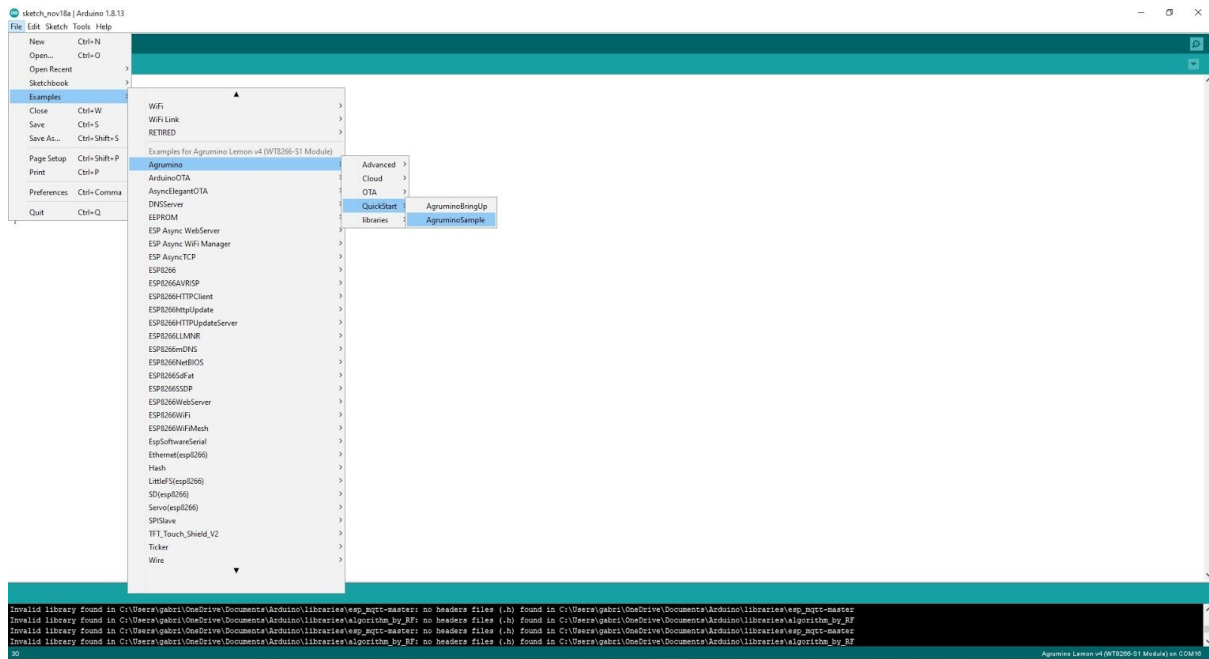


Now let's open a example sketch to upload it to your Agrumino

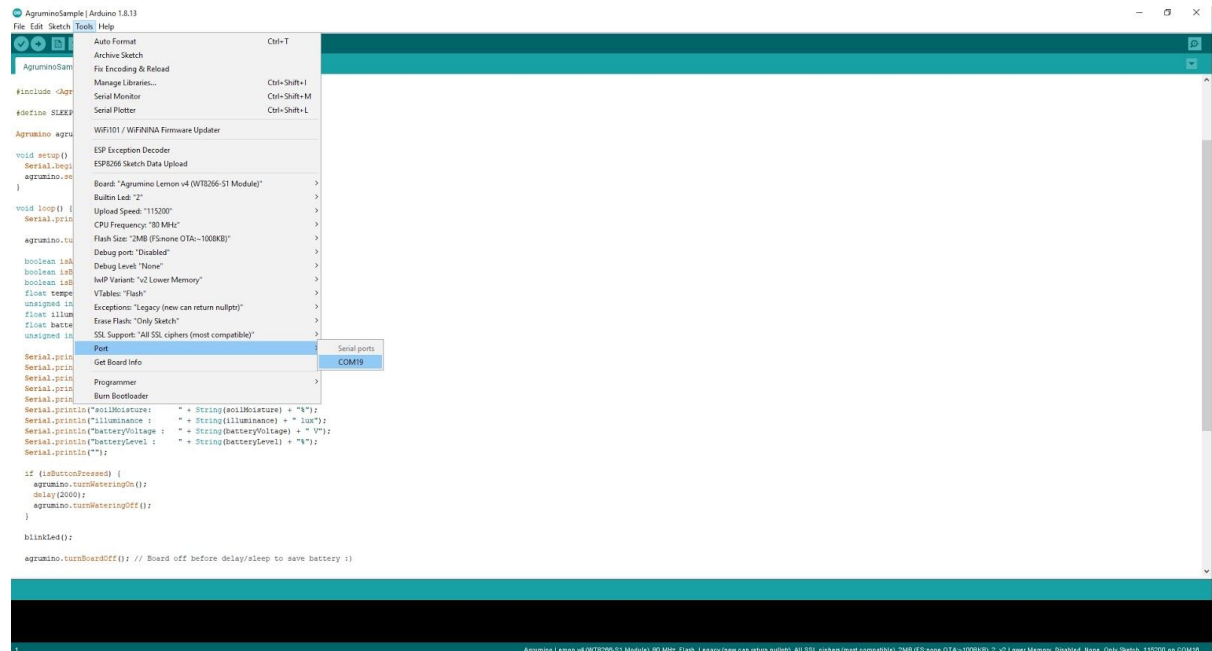
Go to:

File ➡ Examples ➡ Agrumino ➡ QuickStart ➡ Agrumino

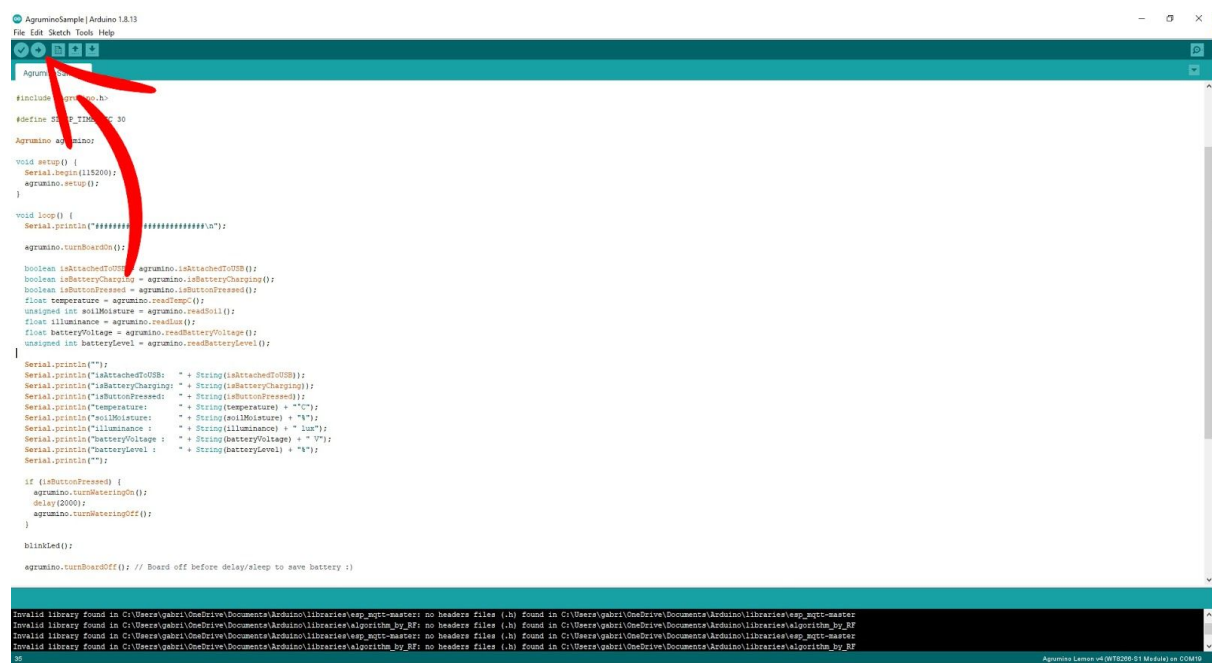
Sample and click 



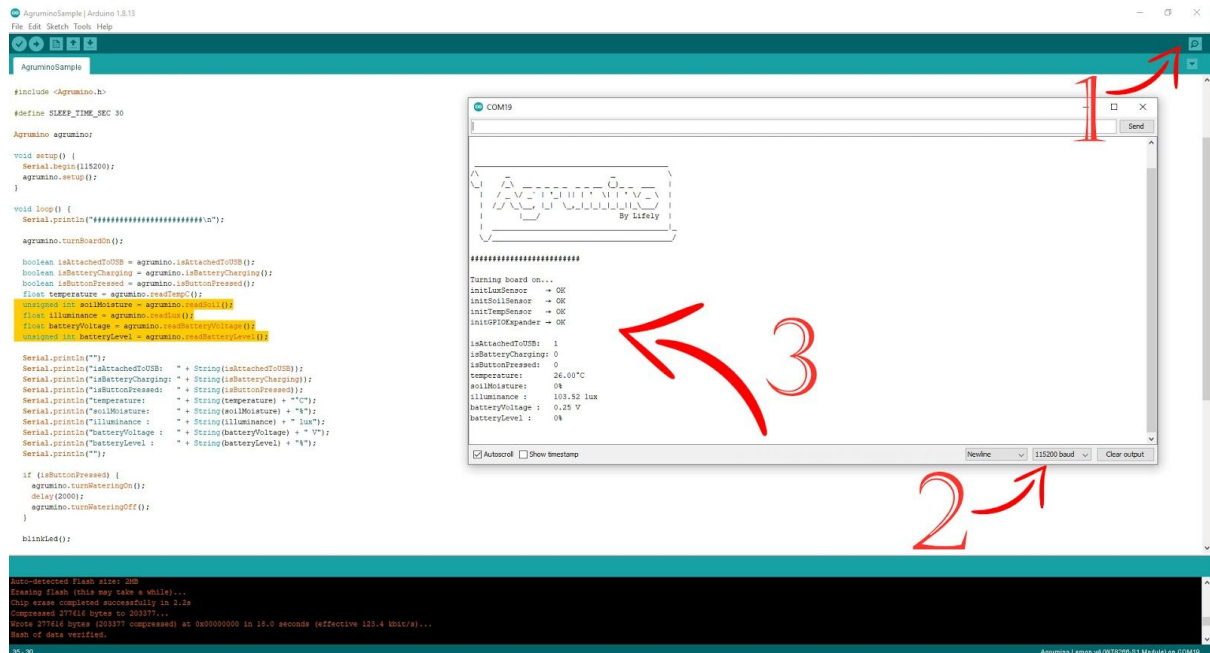
continue and click  Tools  Port, select your port and 



to upload Sketch to your Agrumino click   (look at arrow)



Click  this button  to open Serial Monitor (look at arrow 1)
after, change baud rate to 115200 (look at arrow 2)
and now you can see the board data (look at arrow 3)



Congratulations

