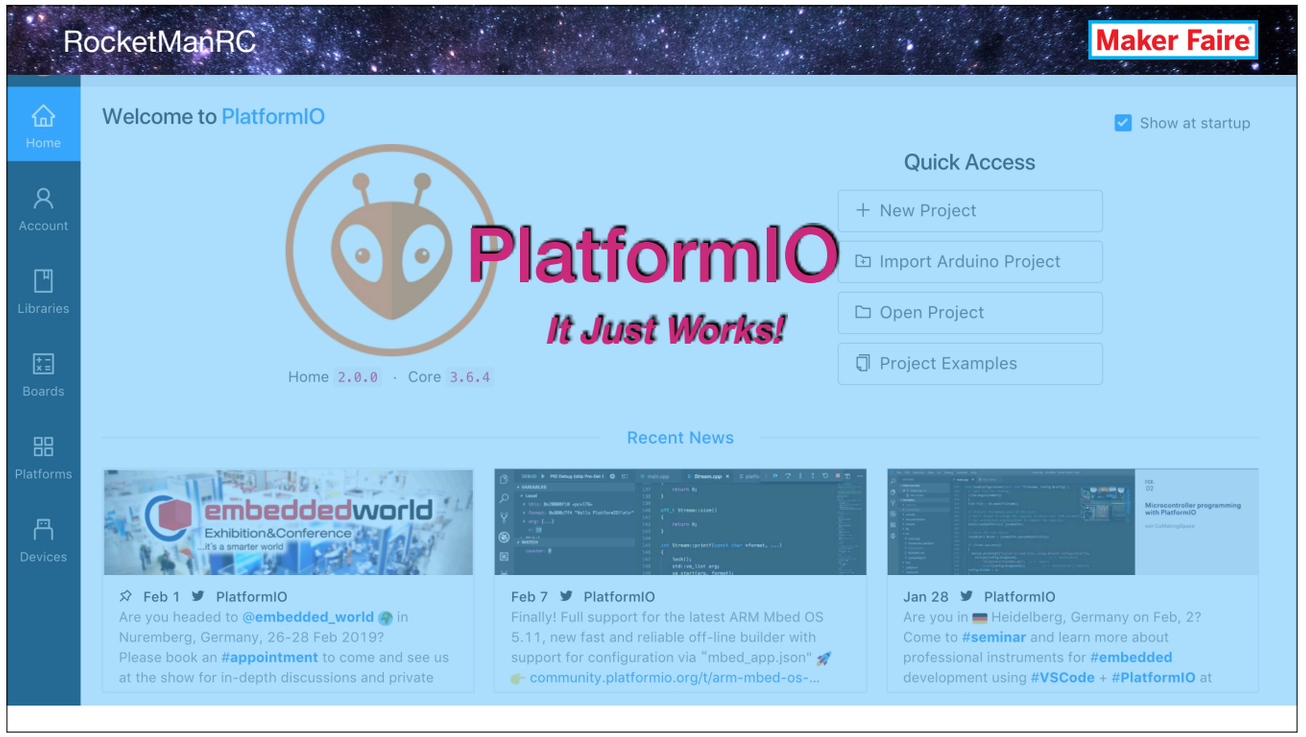
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Maker Faire

Presentation Objective

If you are a Maker using micro controllers as part of your projects you are likely using the Arduino IDE. I want to show you a much more productive development environment and convince you that you should try it: PlatformIO!

Rick MacDonald

http://www.rocketmanrc.com

Ivan Kravets the author sometimes calls it Platform-ee-oh

About Me

- I had a 40 year career in several industries including Aerospace a couple of times.
- My technical area of expertise is embedded systems, both hardware and software.
- I live in Atlantic Canada where we also have unpredictable weather like here!
- For the past year and a half I have been privileged to be a full time Maker, but I have always been an electronics hobbyist.
- I like to say that I am on “permanent sabbatical”!

Background

- Arduino Boards and the Arduino IDE have made microcontrollers accessible for many more people - 700,000 boards produced by 2013, probably millions by now!
- The Arduino IDE makes it easy to get started and there is lots of sample code available and open source projects to learn from.
- As much as I appreciate the whole Arduino ecosystem I have always been frustrated by the limitations of the IDE. Until I discovered PlatformIO!

IDE - integrated development environment

Since I have a professional software development background I found using the Arduino IDE to be painful!

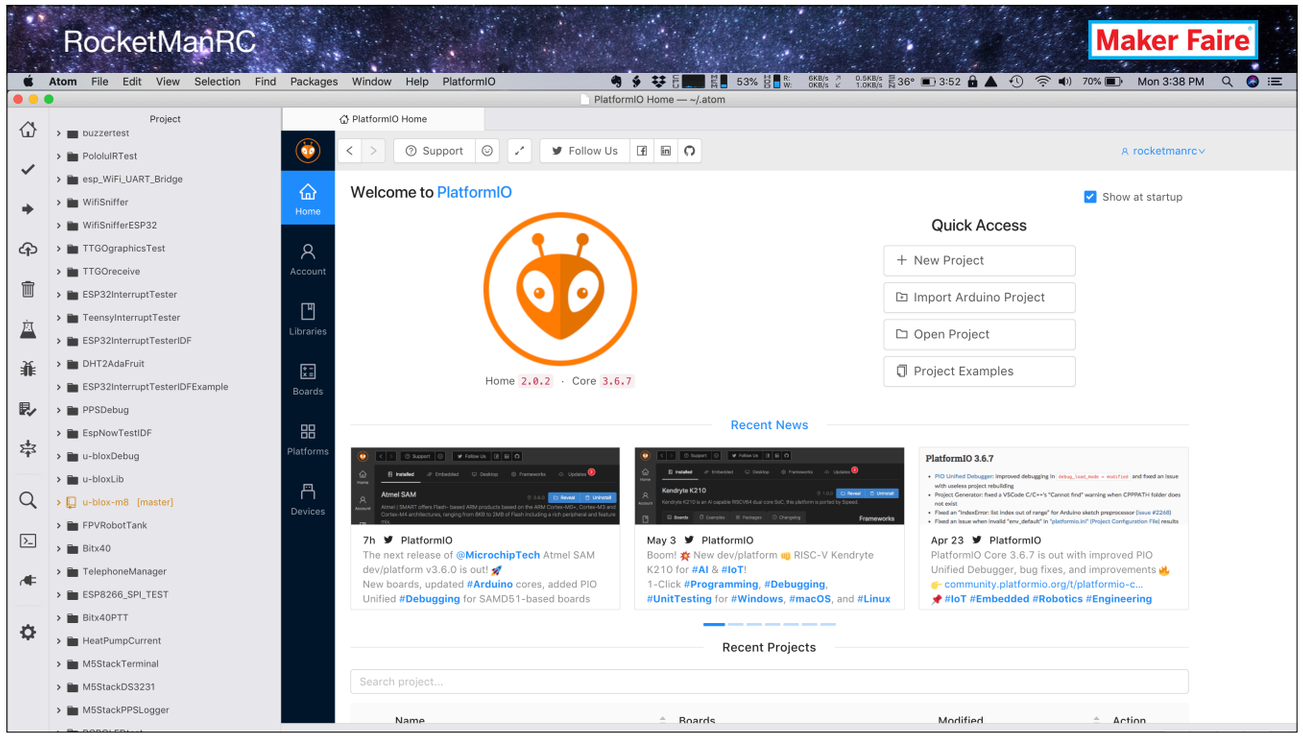
What is PlatformIO?

- PlatformIO is a cross platform code builder and library manager (written in Python).
- It integrates with many cloud and desktop IDEs and editors, only need to learn one development tool!
- Supports over 200 boards and automatically installs everything needed once a board is selected.
- PIO Plus (paid option) adds debugging, unit test and remote deployment.

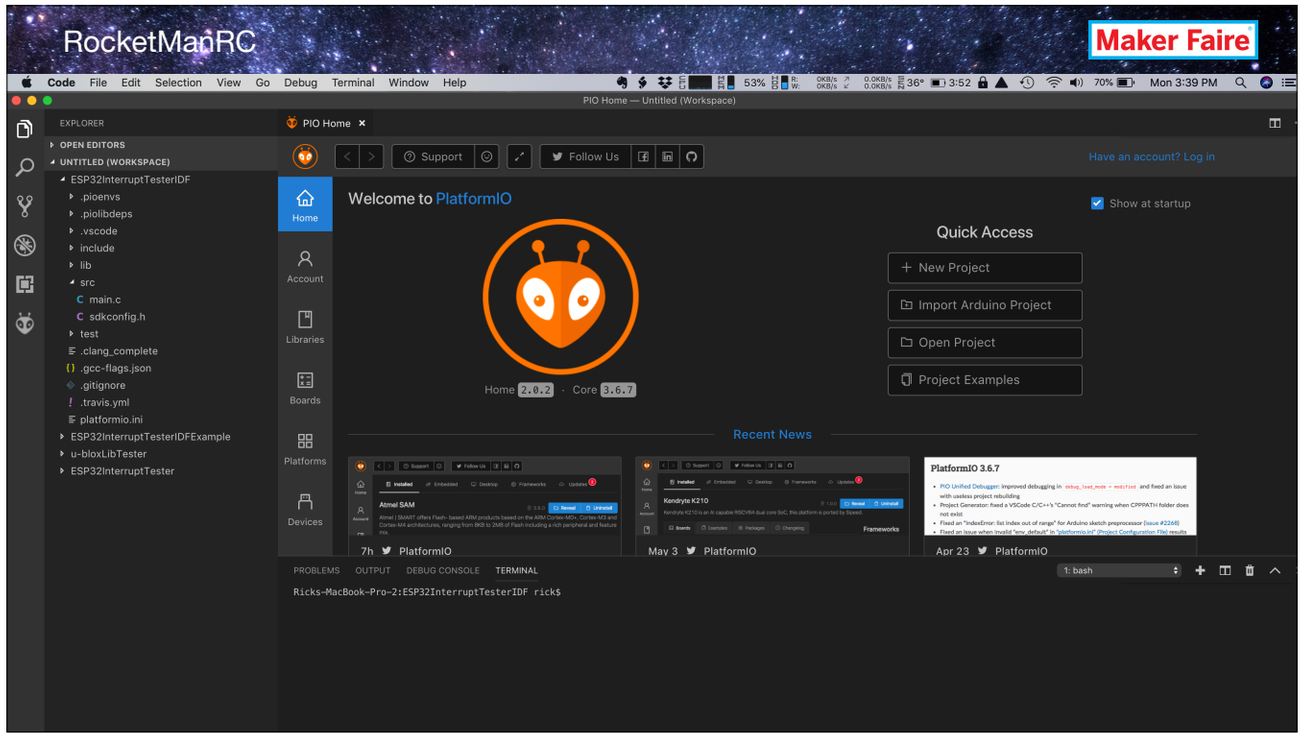
Setup

- Use from the command line or install in your favourite IDE.
- I use both Atom and VSCode (Atom much simpler and easier to get started with but VSCode better for debugging).
- Change the default projects folder using PlatformIO Terminal:

platformio settings set projects_dir ~/YourProjectDir



This is PlatformIO in the Atom IDE (Open Source by Github)

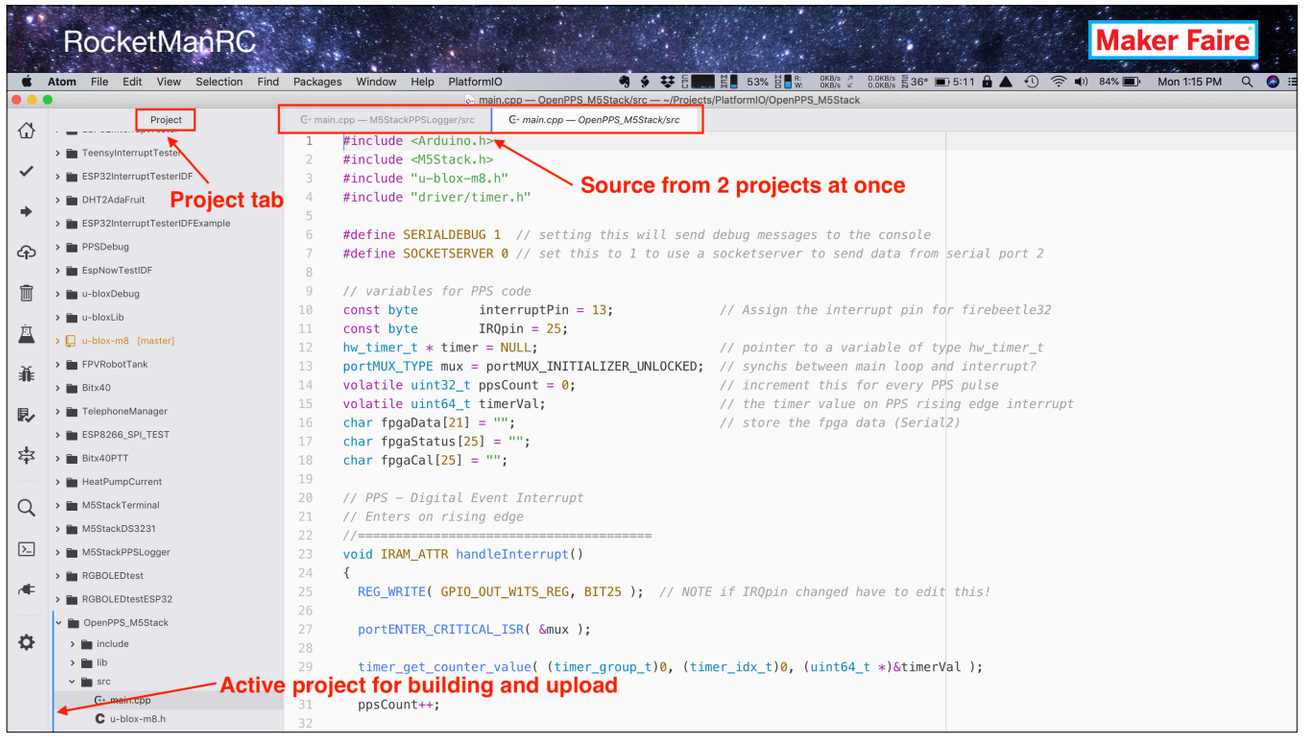


This PlatformIO in VSCode by Microsoft. The source code of VS Code is Open Source but the binary build by Microsoft are propriety (you could build your own instead if that was a problem).

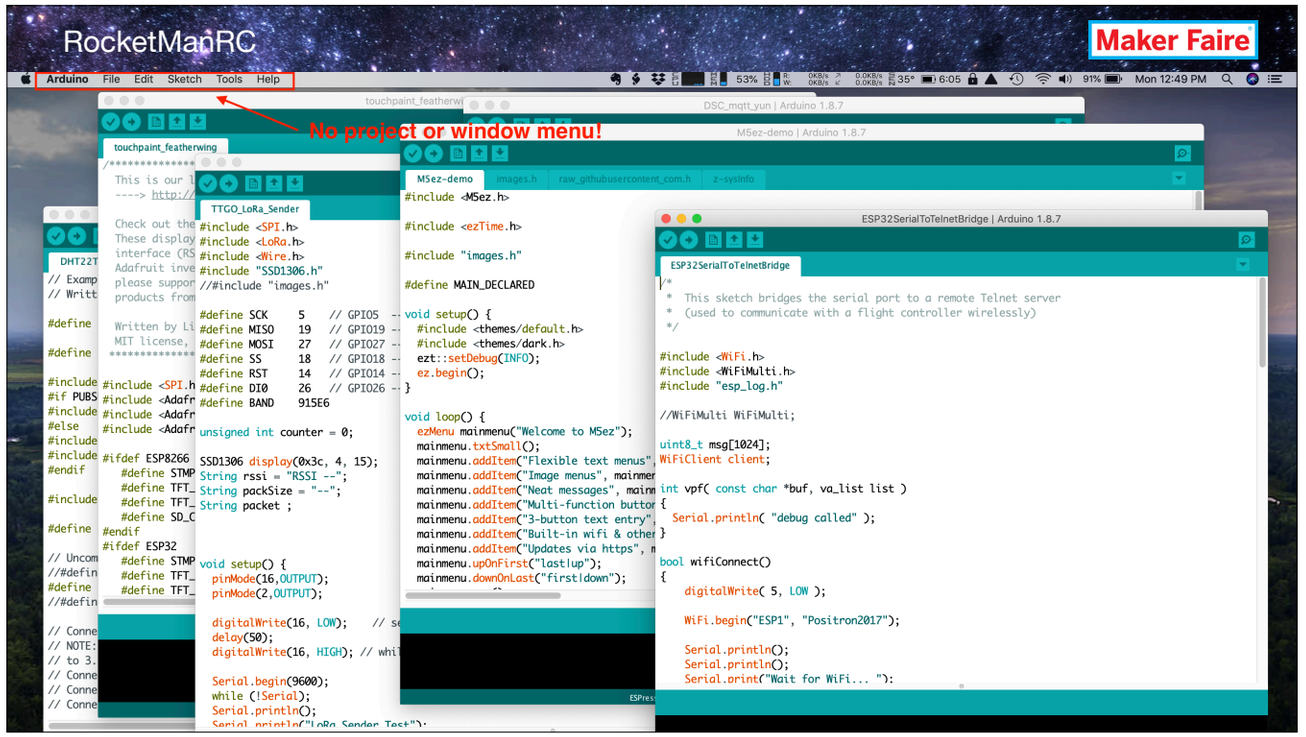
PlatformIO vs Arduino IDE Shootout!

Let’s just compare the key features, item by item…

I’m going to show mostly PlatformIO in Atom but sometimes VSCode



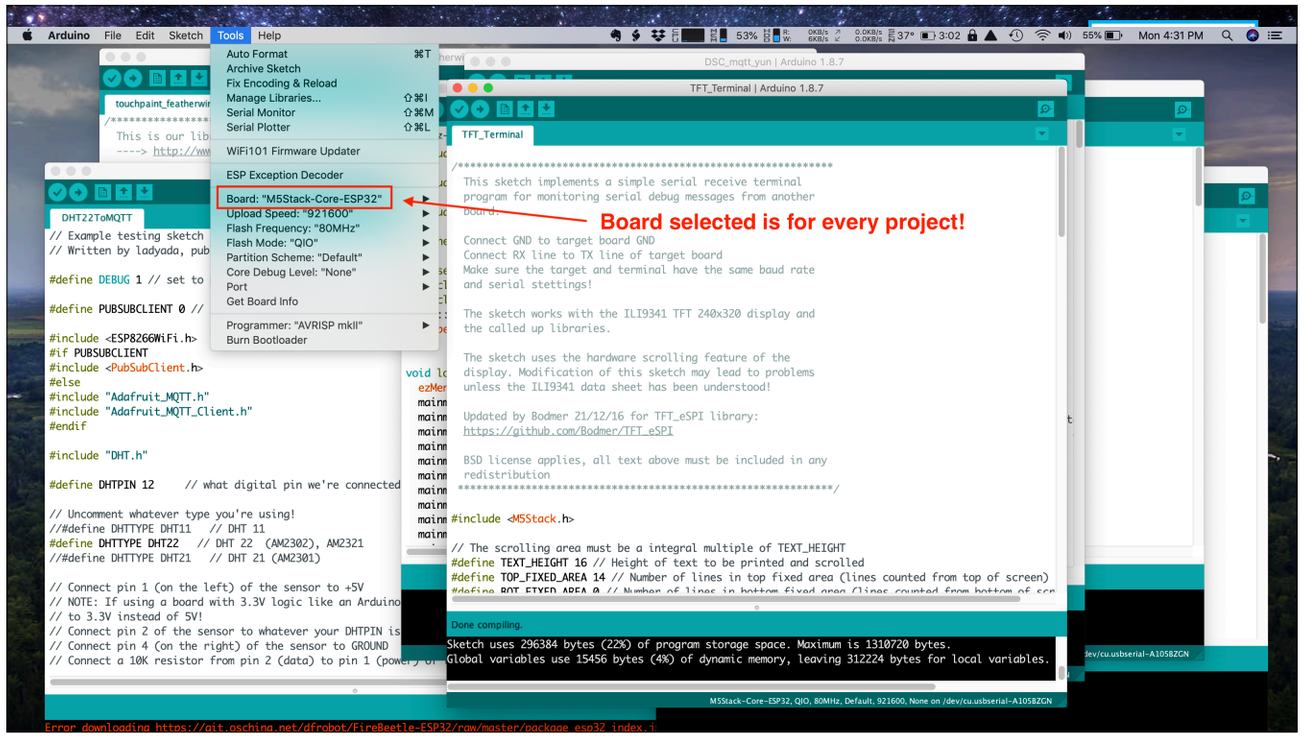
All the projects known to Atom are shown in the left hand pane. The active project is shown with the vertical blue bar on the left.
You can have source from two projects open at once in tabs or split the editing screen to see both at one.



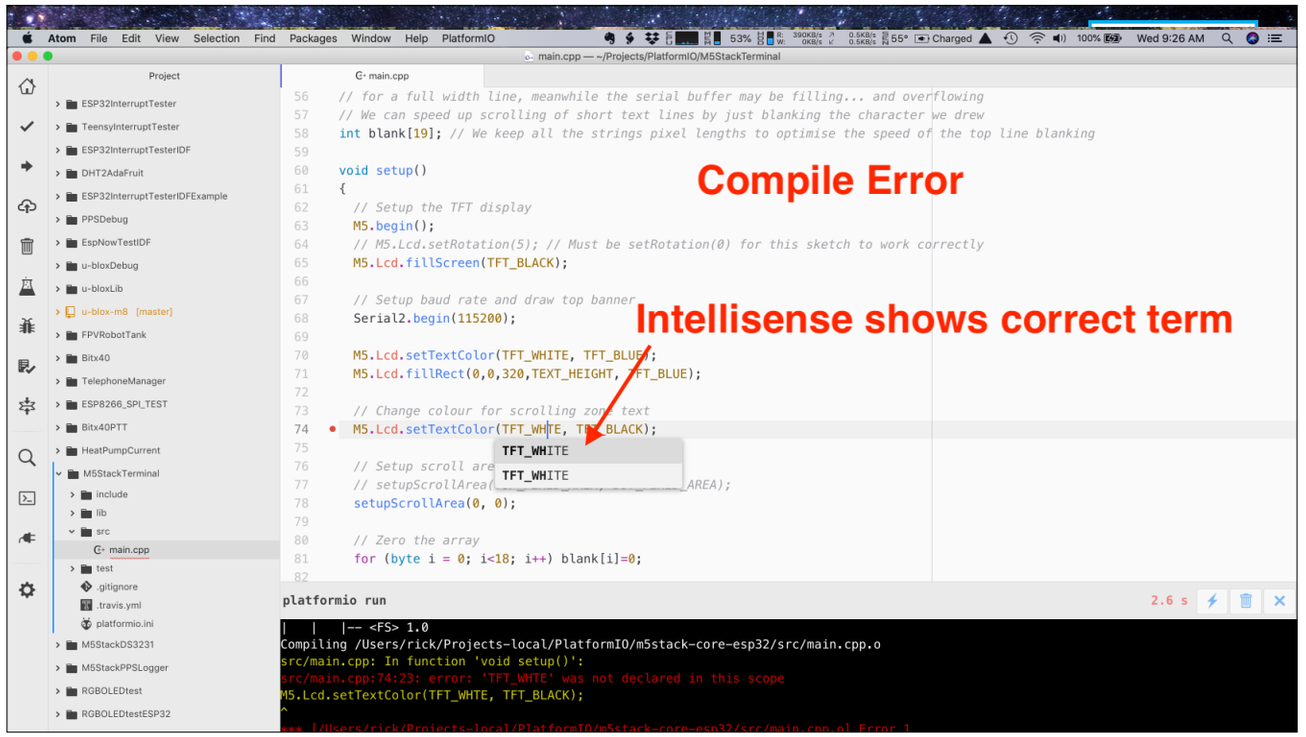
Arduino: this drives me crazy - you can’t even select the window/project you want from a menu!

PlatformIO has a configuration file for every project. Here I've highlighted the board selection but you can choose to have local libraries and what version you want.

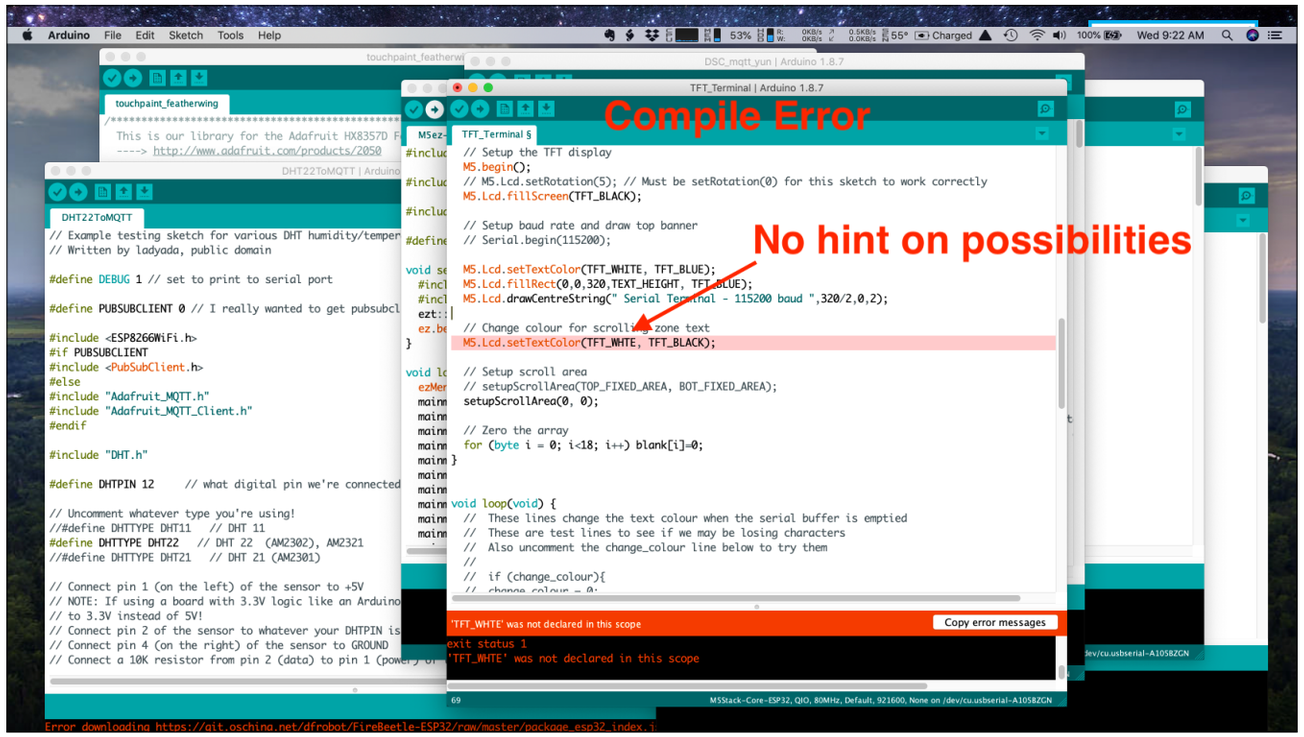
NOTE: Standard C++ requires declaration of forward references. Or you can import an Arduino project which will remove that requirement (but not really a good practice)



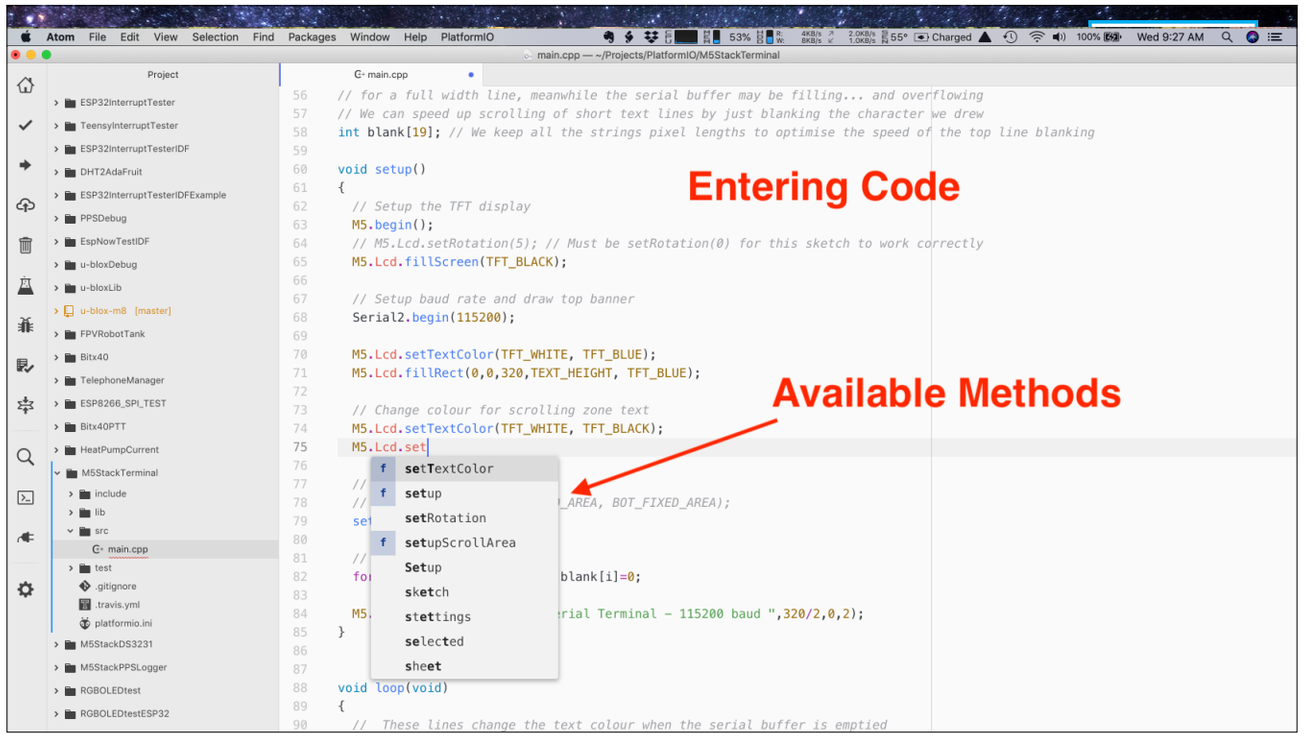
Arduino - board selection is for all projects. This is a real pain when you work on multiple projects at once!



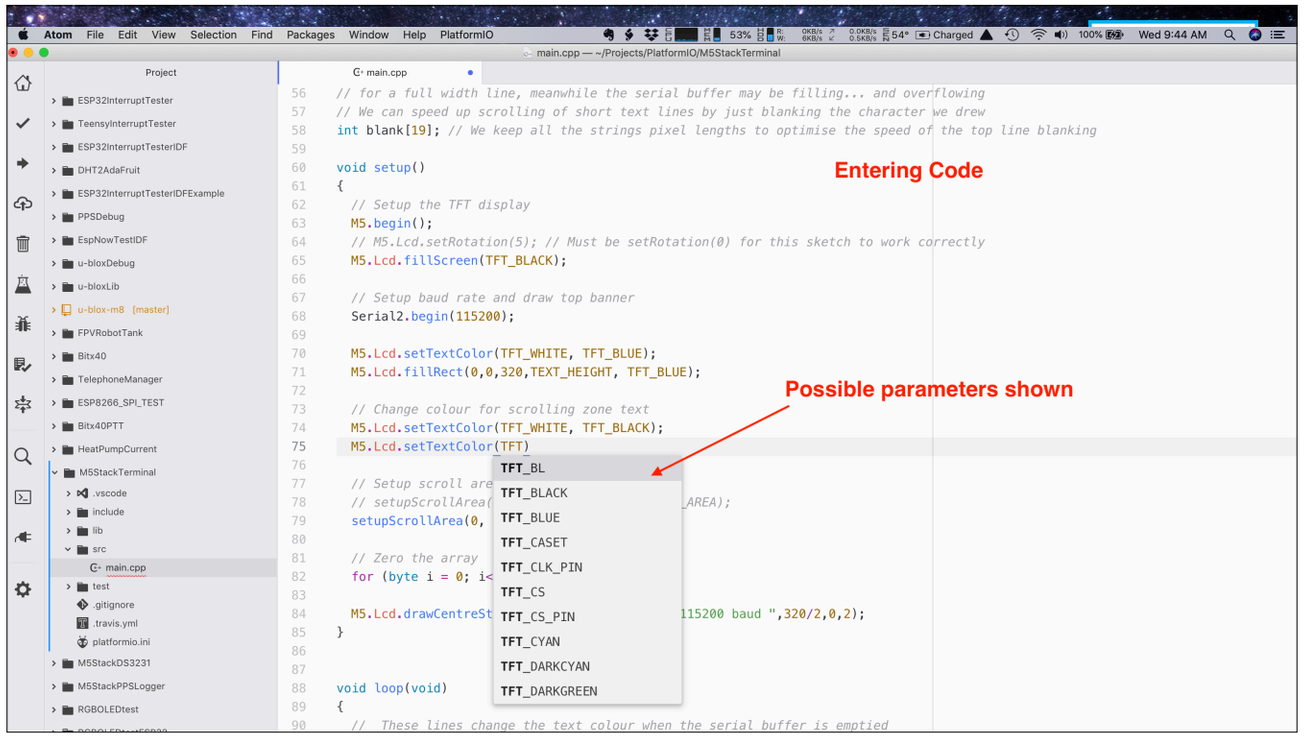
I misspelled TFT_WHITE and when I go to fix it it shows me what it should be (Intellisense)



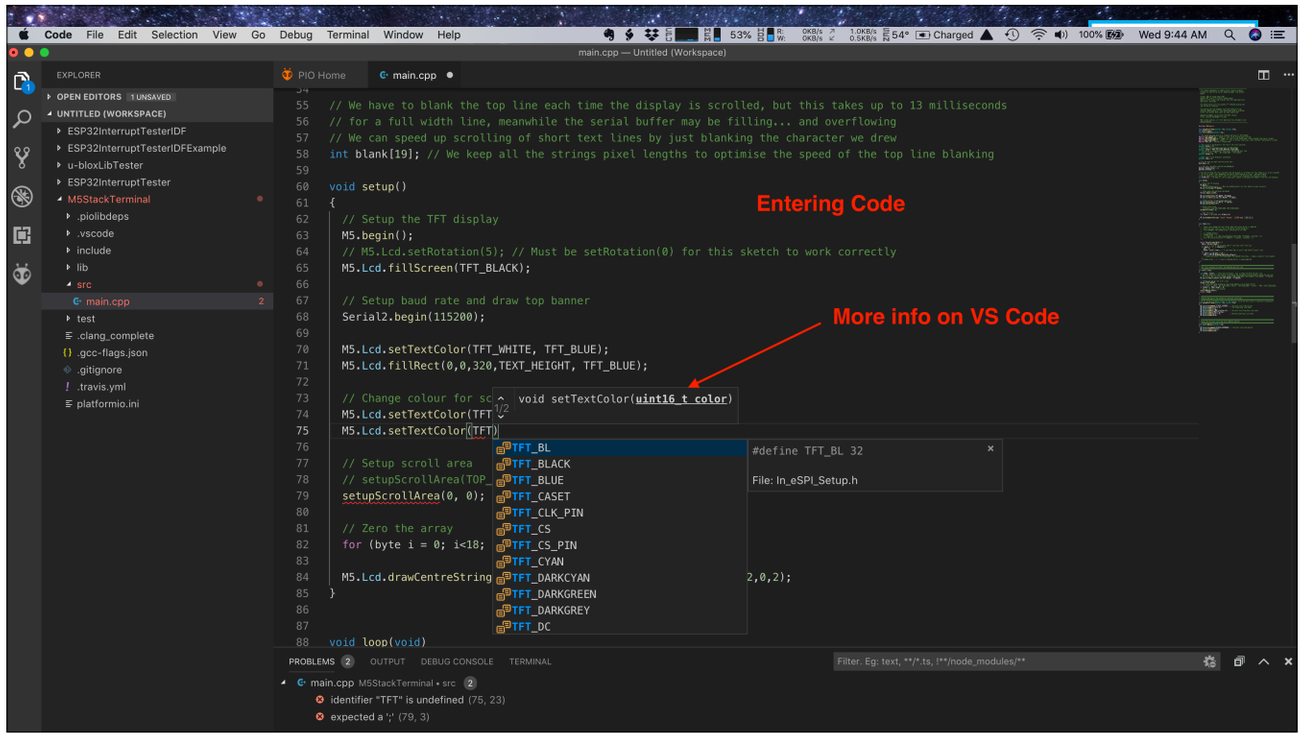
Arduino - you are on your own!



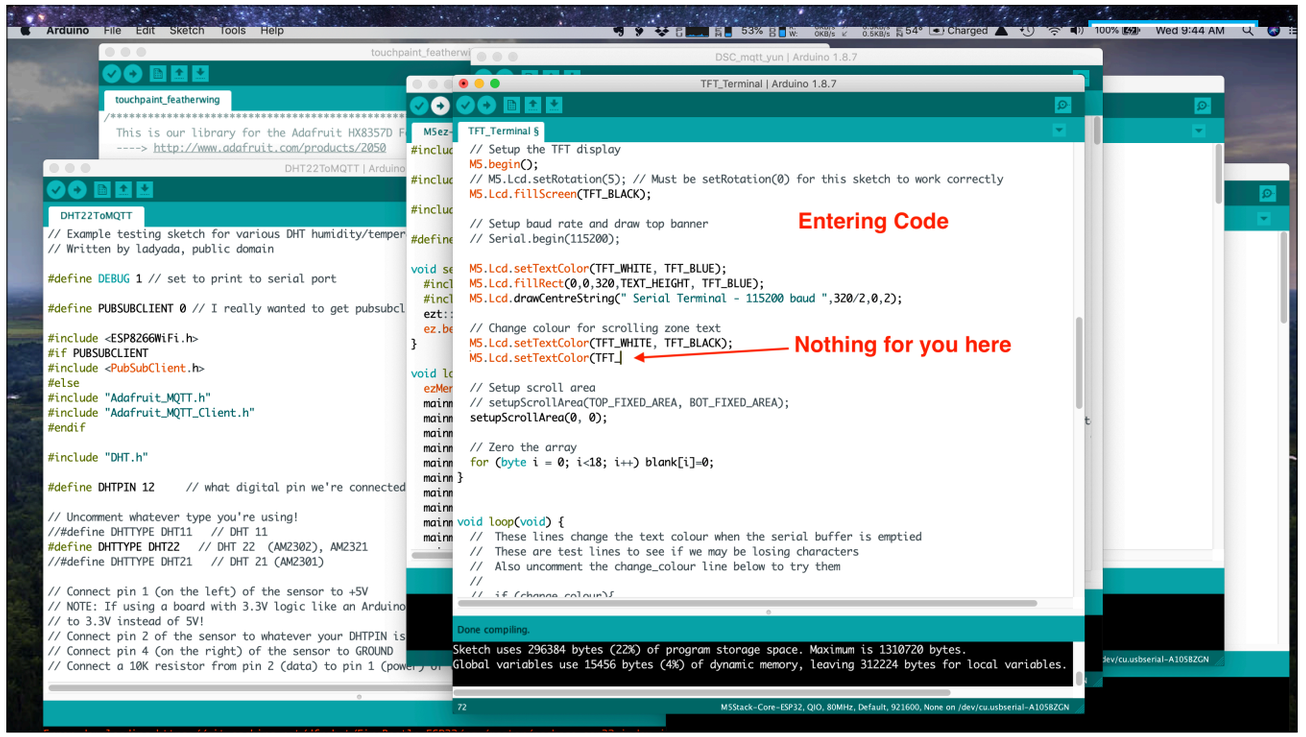
When entering code you are prompted with what is valid.



Also possible parameters shown.



Maybe even a bit more info in VS Code



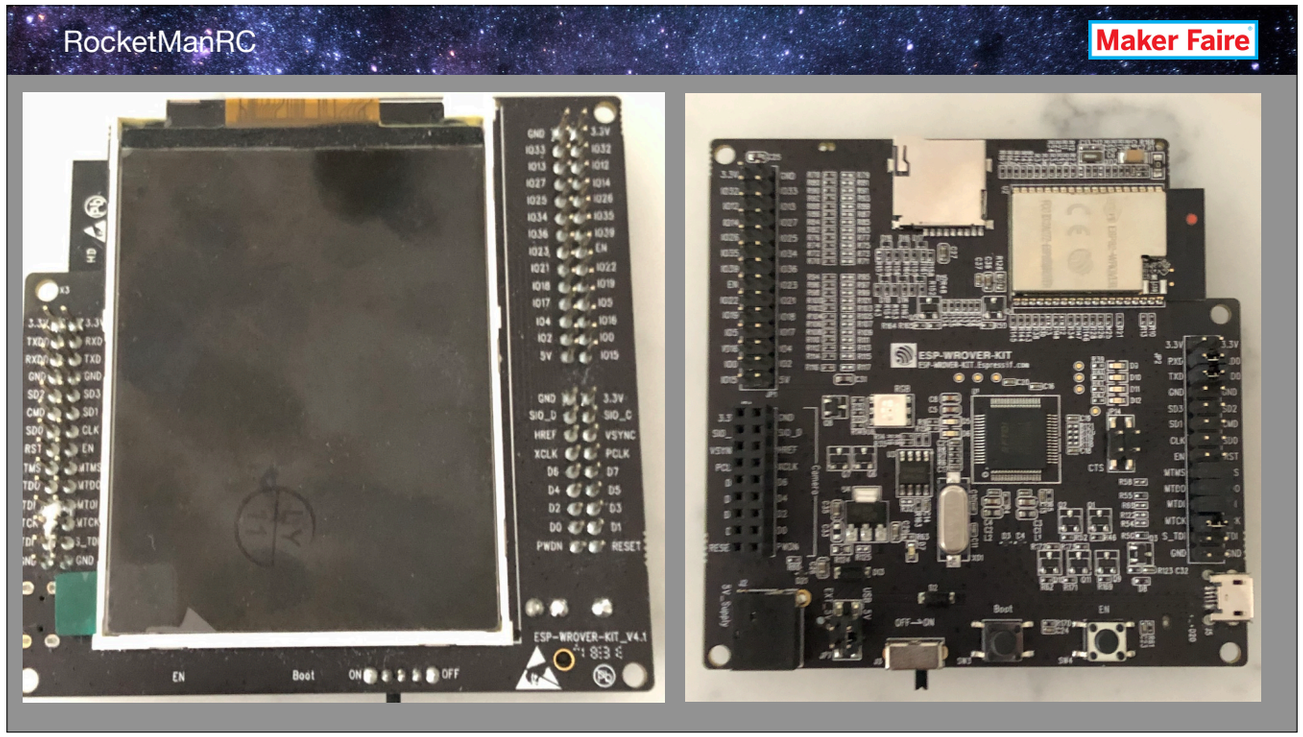
Arduino - no help for you here.

This is the end of the “shoot-out” hopefully you get the idea.

Debugging

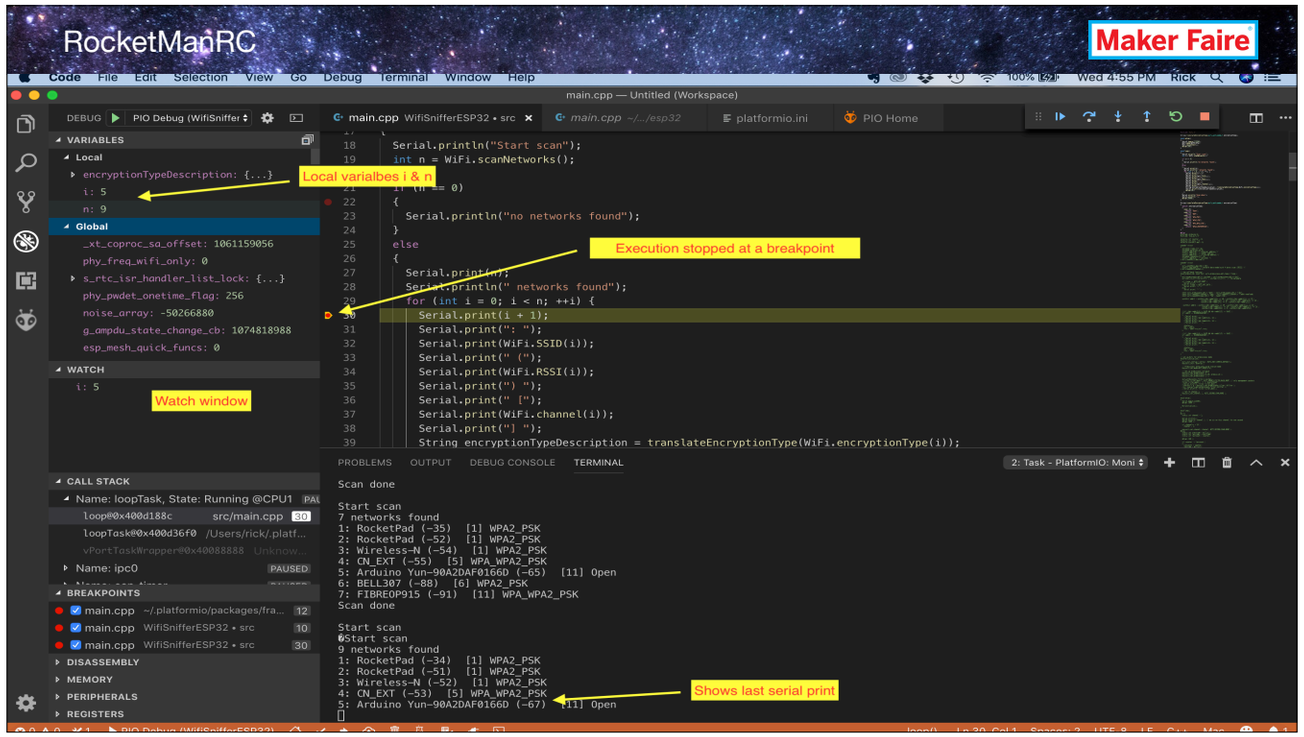
- Requires PIO Plus ($36/year non-commercial).
- Needs a debugging probe unless the board has one built-in.
- Works best with VSCode (but does work in Atom as well).
- Using a debugger can be very effective in some situations (e.g. memory being overwritten) although it is not essential.

A brief discussion about debugging… I am going to show this working with a simple WIFI scanner running on the ESP32-WROVER-KIT which has an FTDI debug probe built-in



This is Espressiv’s ESP-WROVER-KIT with FTDI debugger on board.

Available from Digit-Key of course!



Execution stopped at breakpoint.

Value of local variables and watchpoints shown.

Last serial print visible in the terminal window.

```
[env:esp-wrover-kit]
platform = espressif32
board = esp-wrover-kit
framework = arduino
monitor_speed = 115200
debug_tool = ftdi
```

The only configuration required is the last line!

Conclusion

- Give PlatformIO a try!
- Start with PlatformIO for Atom if VSCode seems too complicated.
- The debugger is available when you really need it (although a small yearly fee is required).

Thanks to Digi-Key for sponsoring this stage!

Questions?