

Setting up the environment needed to begin with STM32

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Hey guys,

So how are you guys? Hope you all are doing well.

From the last article, we told you that we will be looking into the programming side of STM32. But, we thought it would be much better for you guys, if we can give an idea about the hardware you need to do the programming with STM32 first. So today's article will be about the hardware you needed to program a STM32, and the step by step guide to settle them with your PC.

So the topics for today are as follows.

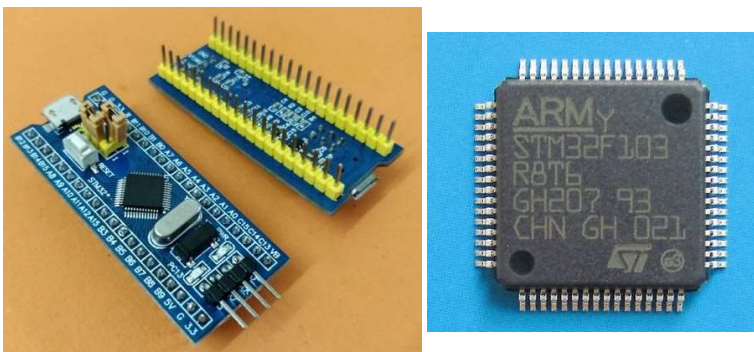
- 1 - Choosing a STM32 chip/Development Board for learning purposes
- 2 - Methods of programming the STM32 chip/Development Board
- 3 - Installing STM32CubeIDE

1 - Choosing a STM32 chip/Development Board for learning purposes

As I mentioned in the previous post, the STM32F1 series and the STMF4 series are the most suitable series for a beginner. For a price of RS 700-1000 range, you can easily buy a STM32F103C8 Development Board in Sri Lanka. F4 series's Nucleo Boards (having chips like STM32F401, STM32F411, etc) are a little bit high in cost in Sri Lanka. So because of the cost issue, we would recommend a STM32F103C8 board for testing purposes.

The chip we are using in our micromouse is STM32F405. The F4 series has a greater processing power and many other advantages (higher flash memory, SRAM, etc) than the F1 series, **but it should be mentioned that we can use the STM32F103C8 board to check every sensor, actuator, etc. that we are using in our mouse** . So that you don't need to wait until you completely build your mouse, you can check every function you are planning to use in your mouse, using the STM32F103C8 board (Bluepill).

Following shows a STM32F103C8 Development Board (Bluepill) & the chip (STM32F103C8) used in it



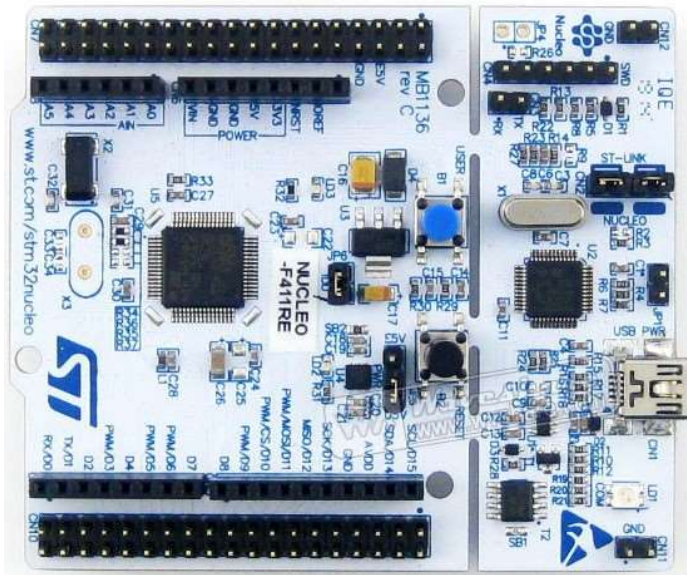
This one here is a STM32 Nucleo F411RE Development Board

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This is the STM32F405RGT6 chip (Chip we will be using in our mouse)



For this STM32 guide, the requirement of a STM32 development board or a built robot using a STM32 chip is mandatory.

2 - Methods of programming the STM32 chip/Development Board

Have you guys ever heard about a STLink or a TTL?

Normally, there are two main ways of programming a STM32 chip.

- 1 - Using a STLink
- 2 - Using USB - TTL converter

STLink

Mainly there are 3 types of STLinks.

- 1 - Standard STLink
- 2 - STLink Dongle
- 3 - On Board STLink

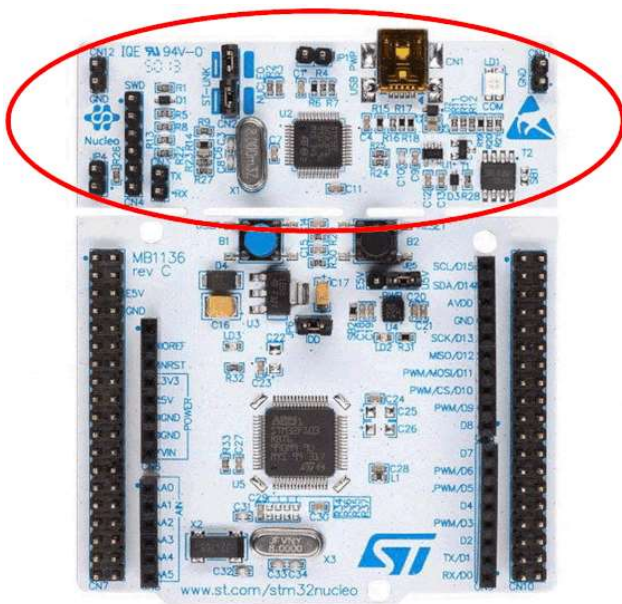
This one here is a Standard STlink and is a bit more expensive than a STLink Dongle and also has more debugging functionalities than a STLink Dongle.



This is a STLink Dongle and it is the most popular STLink type because of the lower price (RS 650 - 700) than the other types.



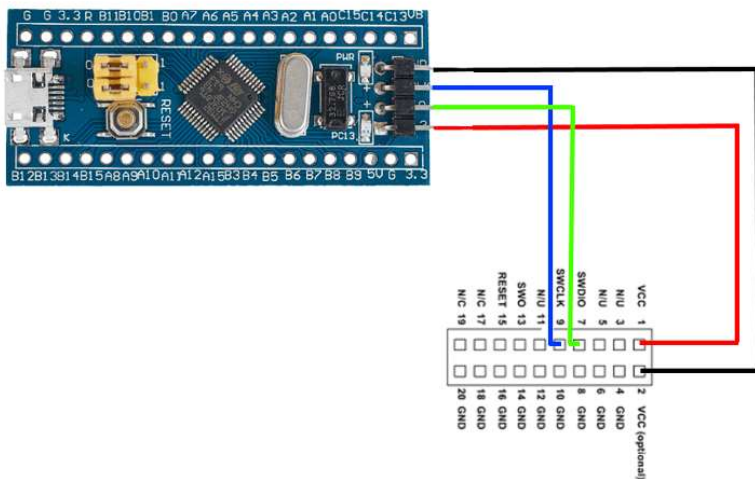
Onboard STLinks comes along with Nucleo development boards as shown in the following picture and you can also use this STLink to program any other STM32 chip. The advantage of Nucleo boards is, you can use USB - Mini cable to directly program your board.



There are 4 pins mainly required to program a STM32 chip using a STLink.

- 1 - VCC (Power pin)
- 2 - GND (Ground pin)
- 3 - SWCLK (Clock)
- 4 - SWDIO (Data)

Wiring diagram of a STLink dongle with STM32F103C8(Bluepill) Development Board is as follows.



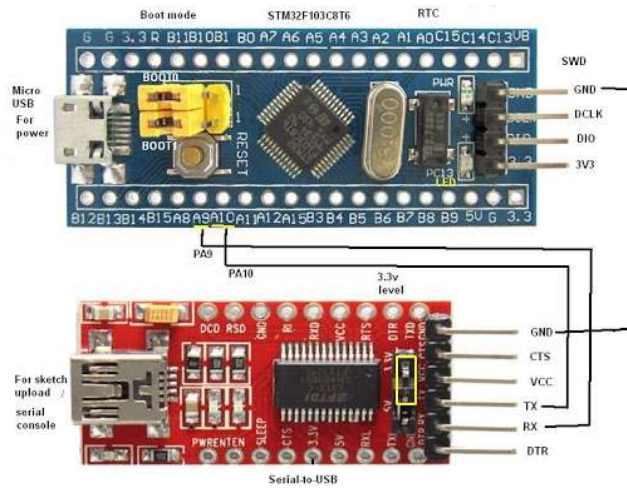
TTL

STM32F103C8 Development Board

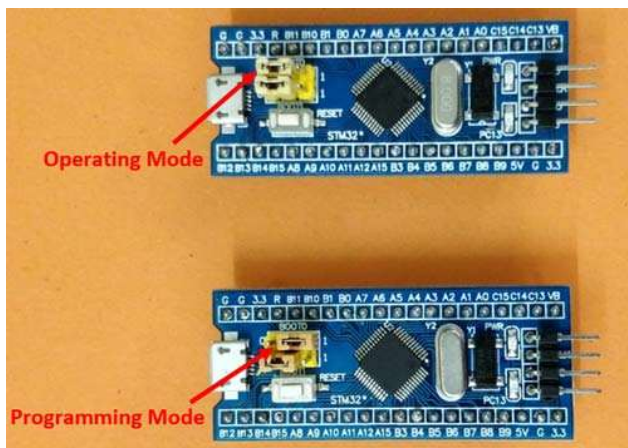
TTL

GND	to	GND
A10(RX)	to	TX
A9(TX)	to	RX
5V *	to	VCC

This picture shows the wiring.



But you need to be aware of one thing when using this method. Make sure the boot 0 jumper pin on the board is set to 1 (programming mode) while uploading the boot loader. Once the boot loader is flashed this pin can be changed back to initial position (operating mode).



To use this method to program a STM32 chip using STM32CubeIDE, you need an additional software called STM32 Flash Loader Demonstrator.

What actually happens is, first you write your code in STM32CubeIDE and get the .bin file or .hex file and then using STM32 Flash Loader, you can upload it to the STM32 chip.

It should be noted that using this method, you cannot debug your program using CubeIDE.

You can download STM32 Flash Loader Demonstrator using this link

- <https://www.st.com/en/development-tools/flasher-stm32.html>

3 - Installing STM32CubeIDE

Now, you have a STM32 chip/Development Board and a suitable programmer ready with you. Next step is installing the editor required to edit your code. We are using STM32CubeIDE as our editor and it is required that you also have the same if you are following this guide.

You can download STM32CubeIDE using this link as we mentioned in the previous post



STM32CubeIDE - STMicroelectronics

STM32CubeIDE - Integrated Development Environment for STM32, STM32CubeIDE-RPM, STM32CubeIDE-Lnx, STM32CubeIDE-Win, STM32CubeIDE-DEB, STM32CubeIDE-Mac, STMicroelectronics

If you're planning to download more products from ST, it will become easier if you have an account. Creating an account is absolutely free.

So see you guys.

Cheers!