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How to Program the STM32 "Blue Pill" with Arduino IDE



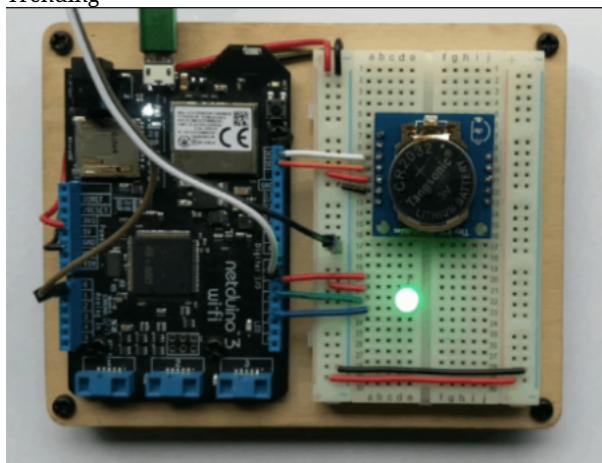
[Reginald Watson](#)

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July 06, 2019

This article shows you how you can program an STM32 F103C8T6 with Arduino IDE using UART.

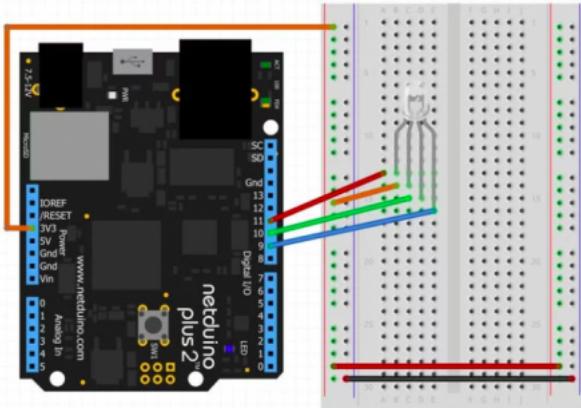
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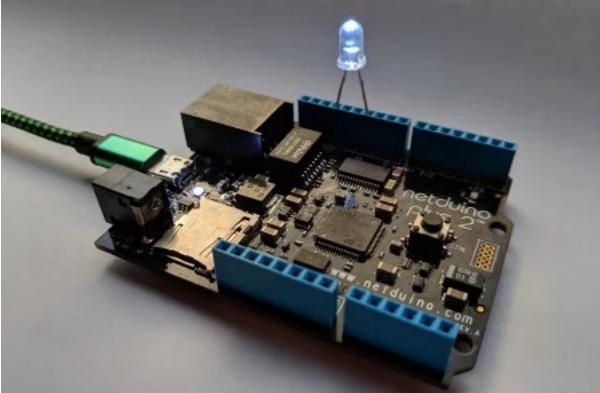
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Project

The STM32F103C8T6 board — also called Blue Pill — is a development board for the ARM Cortex M3 [microcontroller](#). It looks very similar to the Arduino Nano, but it contains a lot more features.

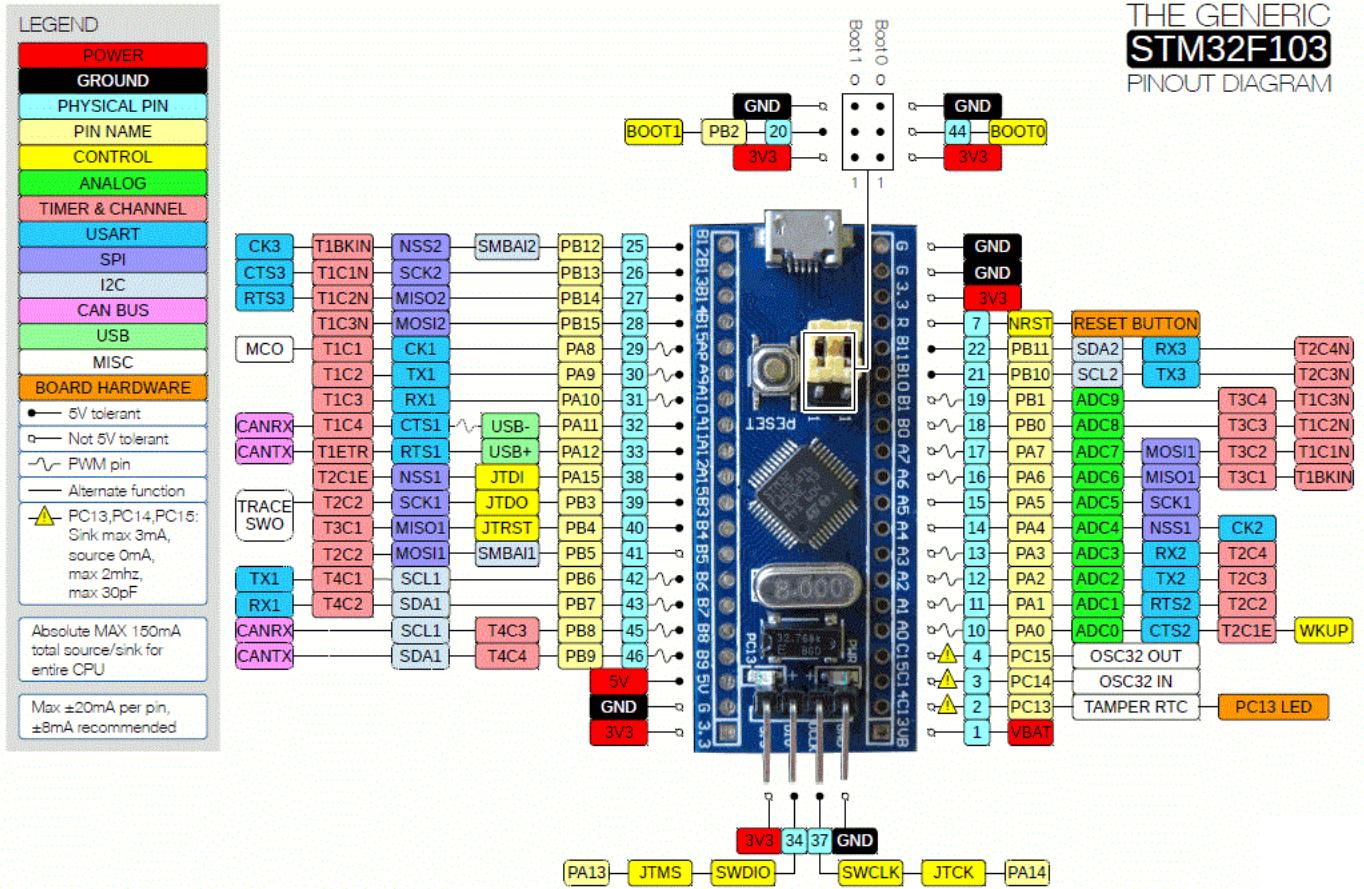
In this article, I will show you how to set up the STM32 with [Arduino IDE](#) and show you how to directly program from the USB UART module.

An Overview of the STM32 "Blue Pill"

If you take a look at this \$2 microcontroller, one of the first things you see are its jumper pins, which are used to work with the default USART boot loader. There is also a micro USB port on the board, but unfortunately it cannot be used for programming because it does not have an associated boot loader.

These boards are very cheap compared to the official Arduino board, and the hardware is open source. In addition to the microcontroller, the board can accommodate two crystal oscillators — one 8MHz crystal and one 32KHz crystal — that can be used to drive an internal RTC (real-time clock). As a result, the MCU can operate in deep sleep mode, making it ideal for battery-powered applications.

To program this board, we need to use a simple USB to UART converter, and then we can program it directly via USB from a computer.



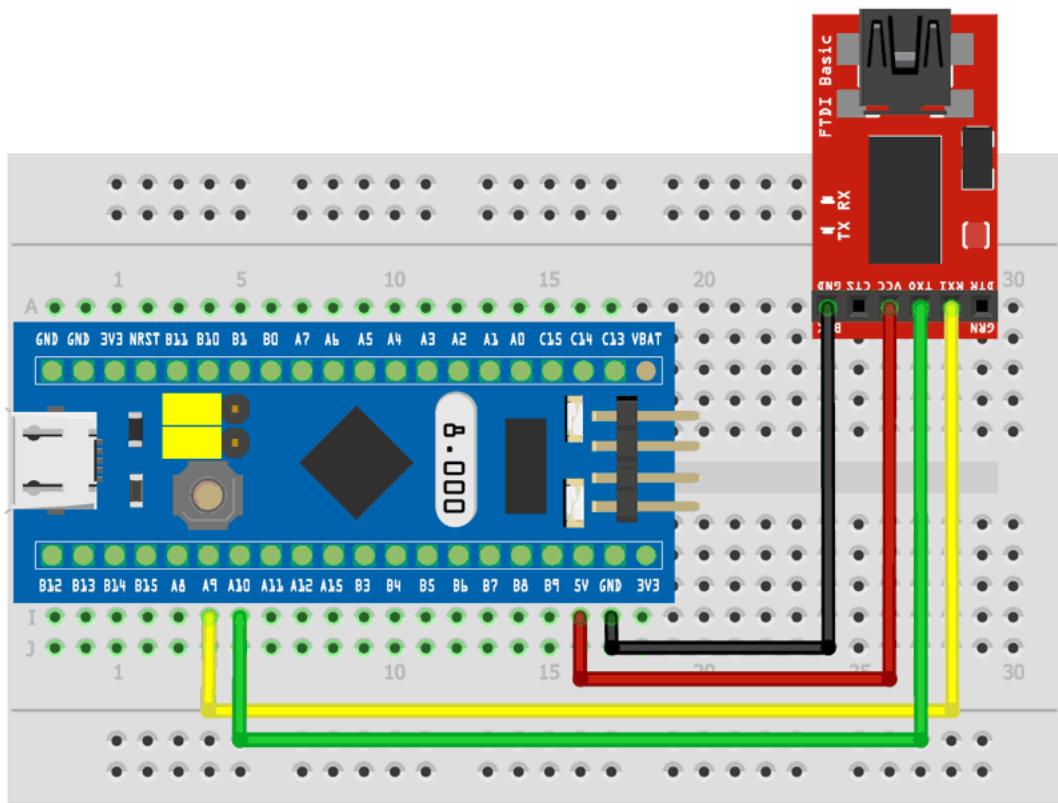
STM32 pinout

Required Materials

- STM32 F103C8T6
 - USB TO UART Converter (FTDI)
 - Jumper wires
 - Breadboard
 - Arduino IDE

Wiring the Project

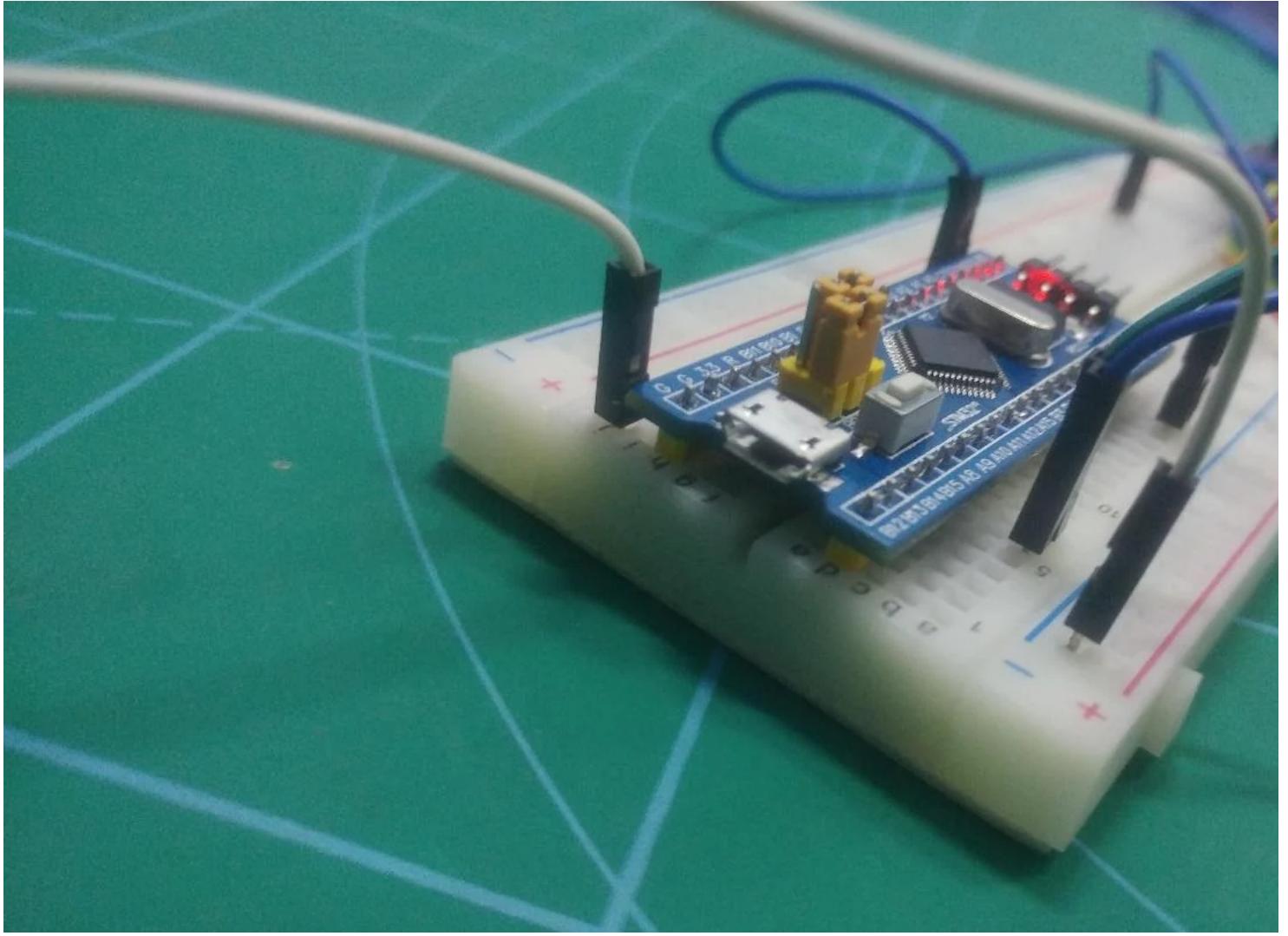
Connect the boards according to the connections shown in the Fritzing diagram below, and connect them with your computer.



FTDI >> STM32
Gnd >> Gnd
Vcc >> 5V
Rx >> A9
Tx >> A10

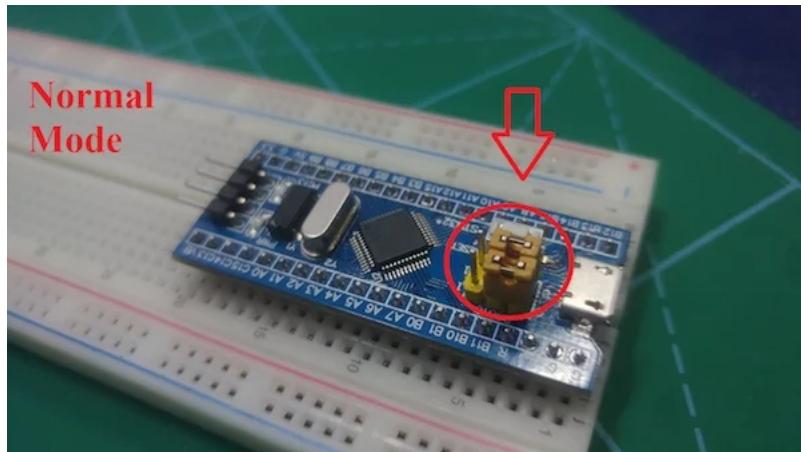
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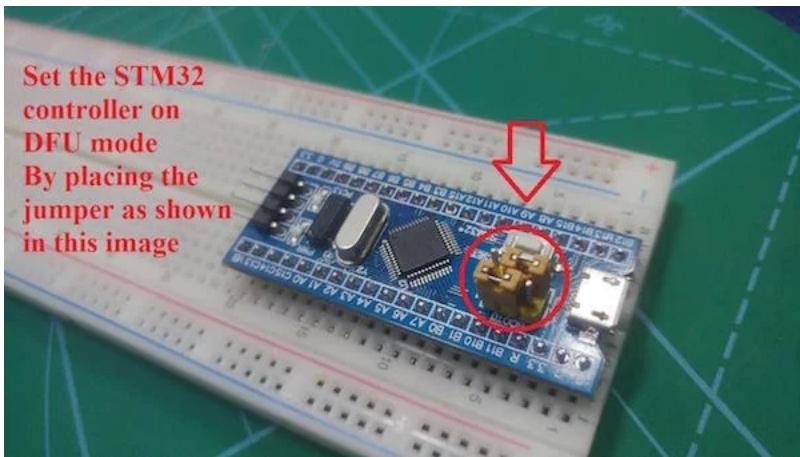
Fritzing diagram



The build set up with the jumper wires in place.

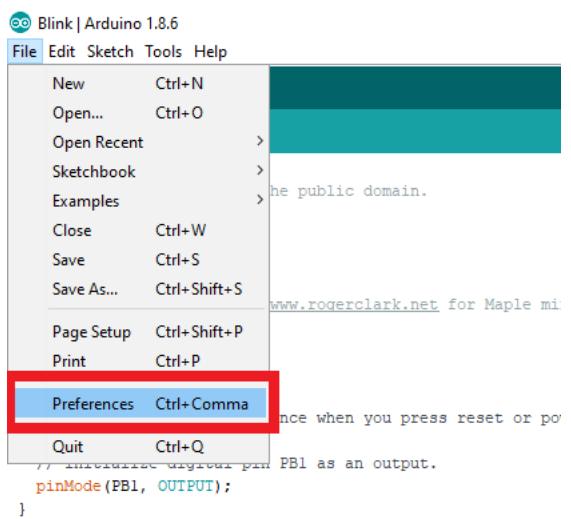
Connect the jumpers as shown below to set the board to DFU mode (device firmware upgrade) and press the Reset button.





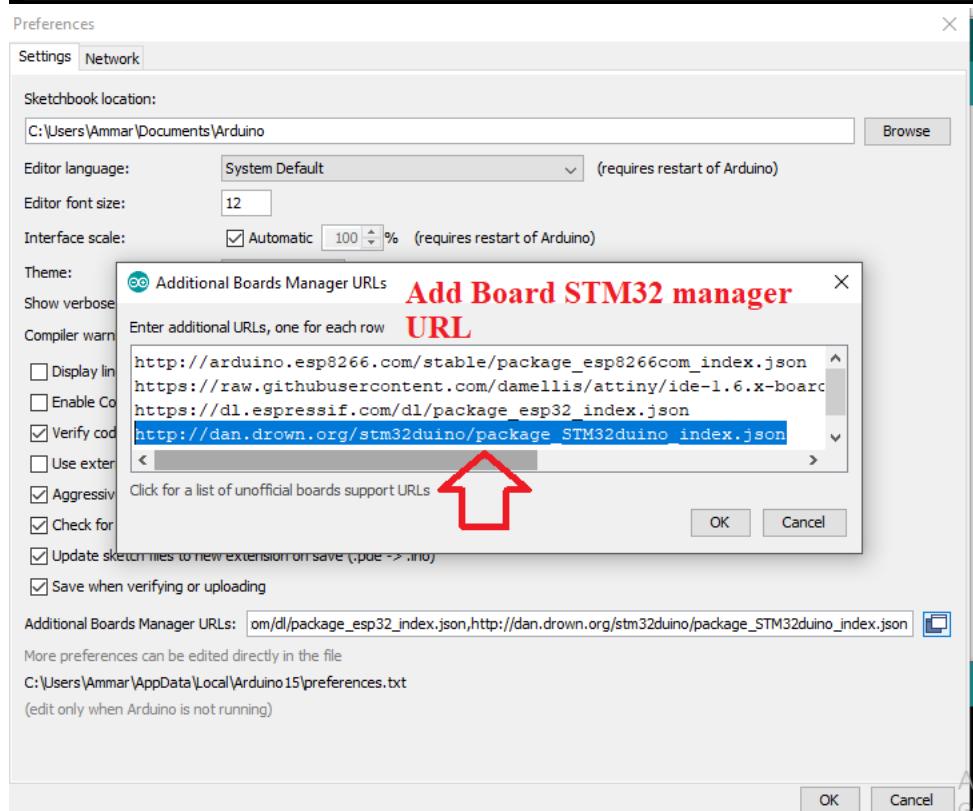
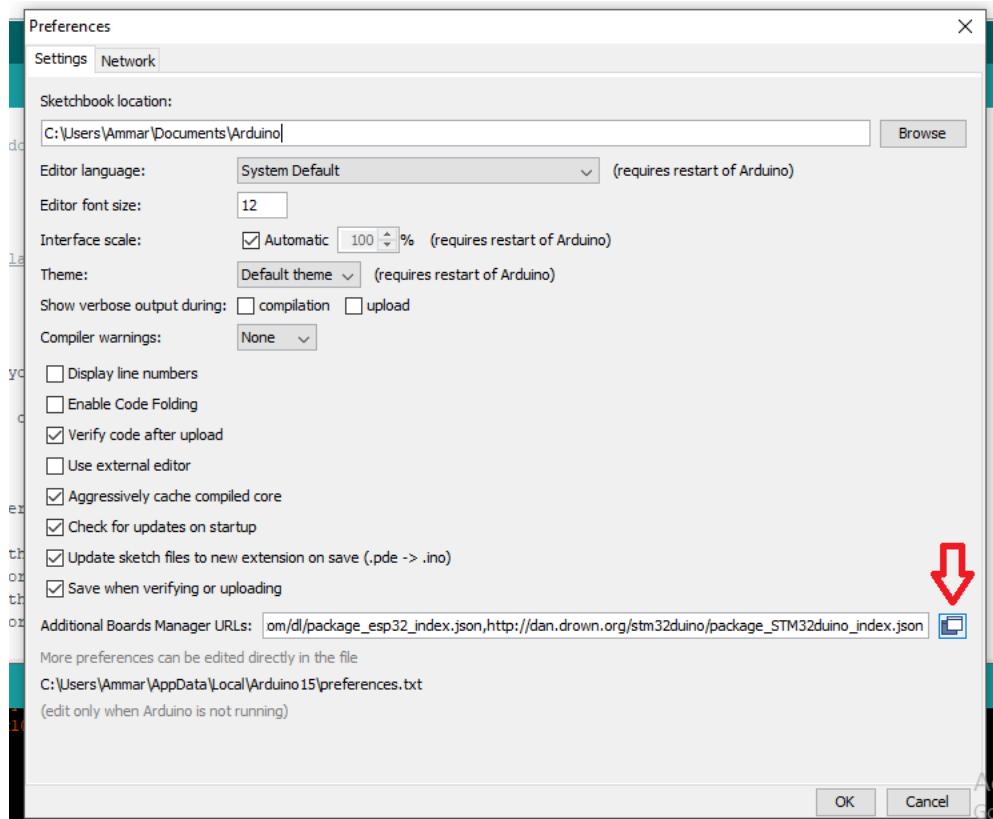
Setting Up the STM32 on Arduino IDE

Open Arduino IDE and select Preferences.

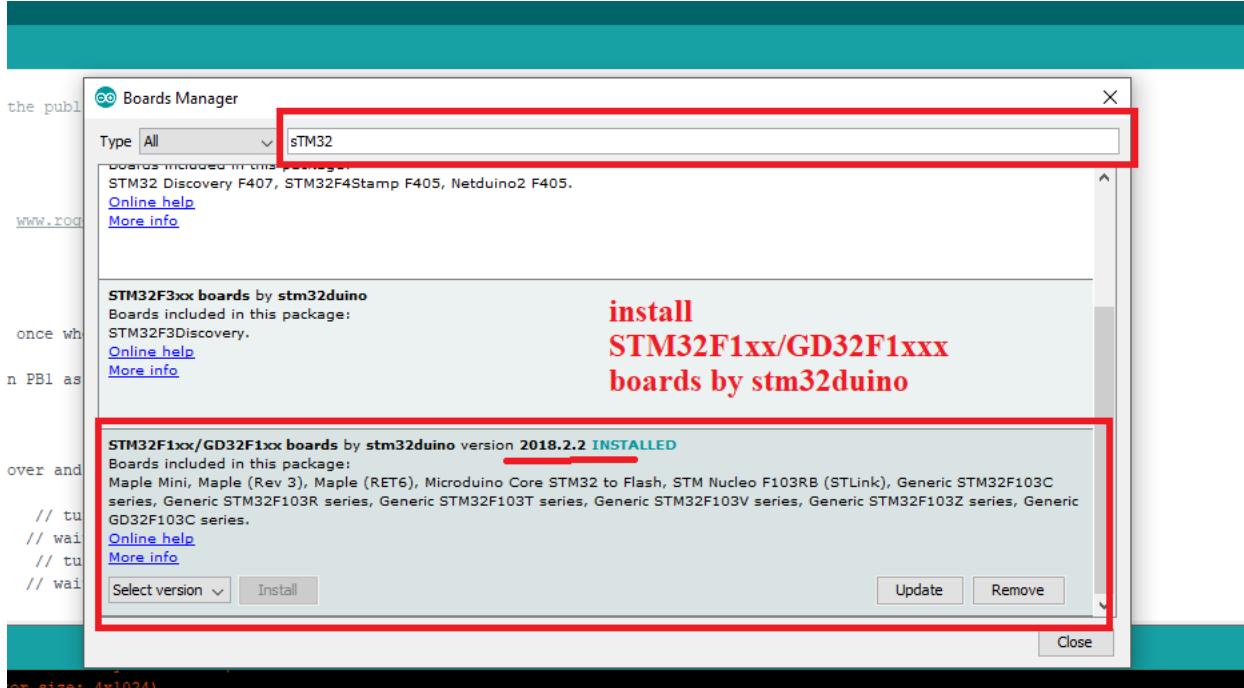


Click on the Additional Board URL option and add this URL after the comma:

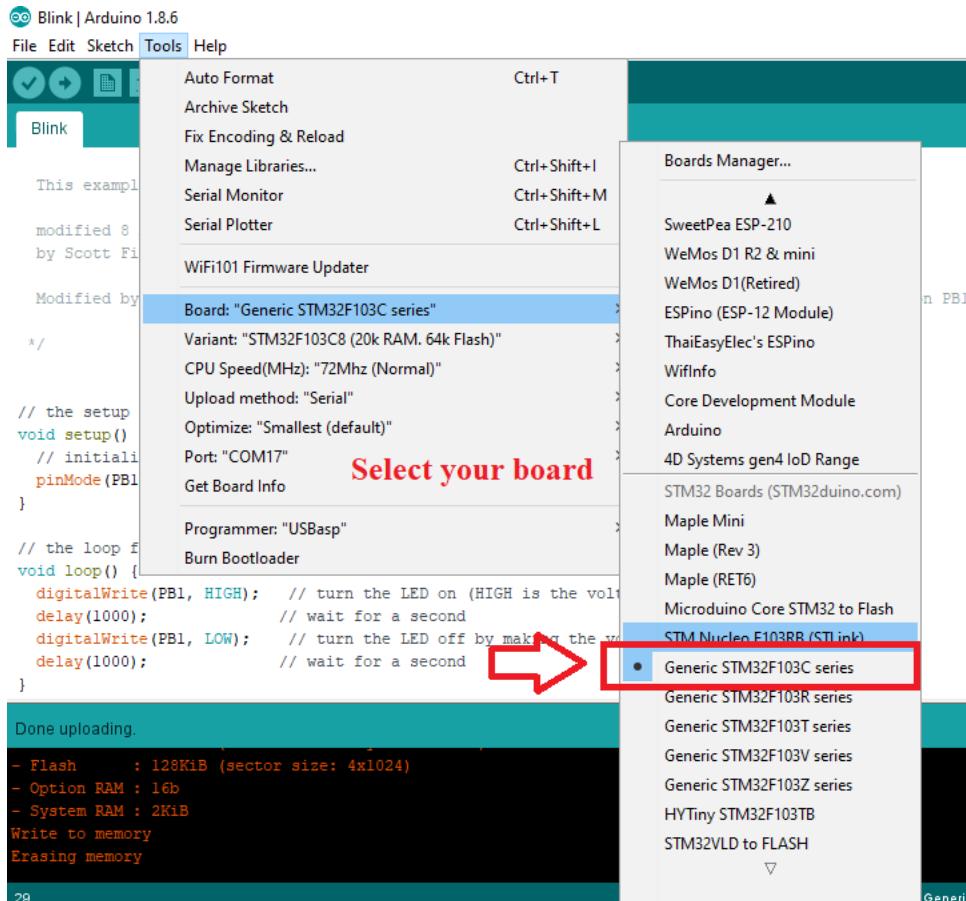
http://dan.drown.org/stm32duino/package_STM32duino_index.json



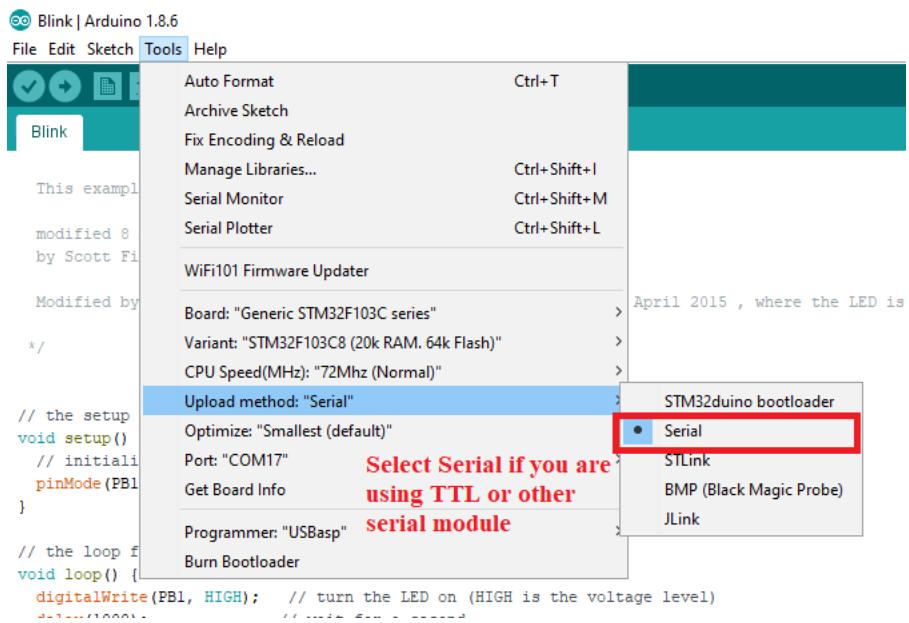
Next click on Tools → Board → Board Manager.



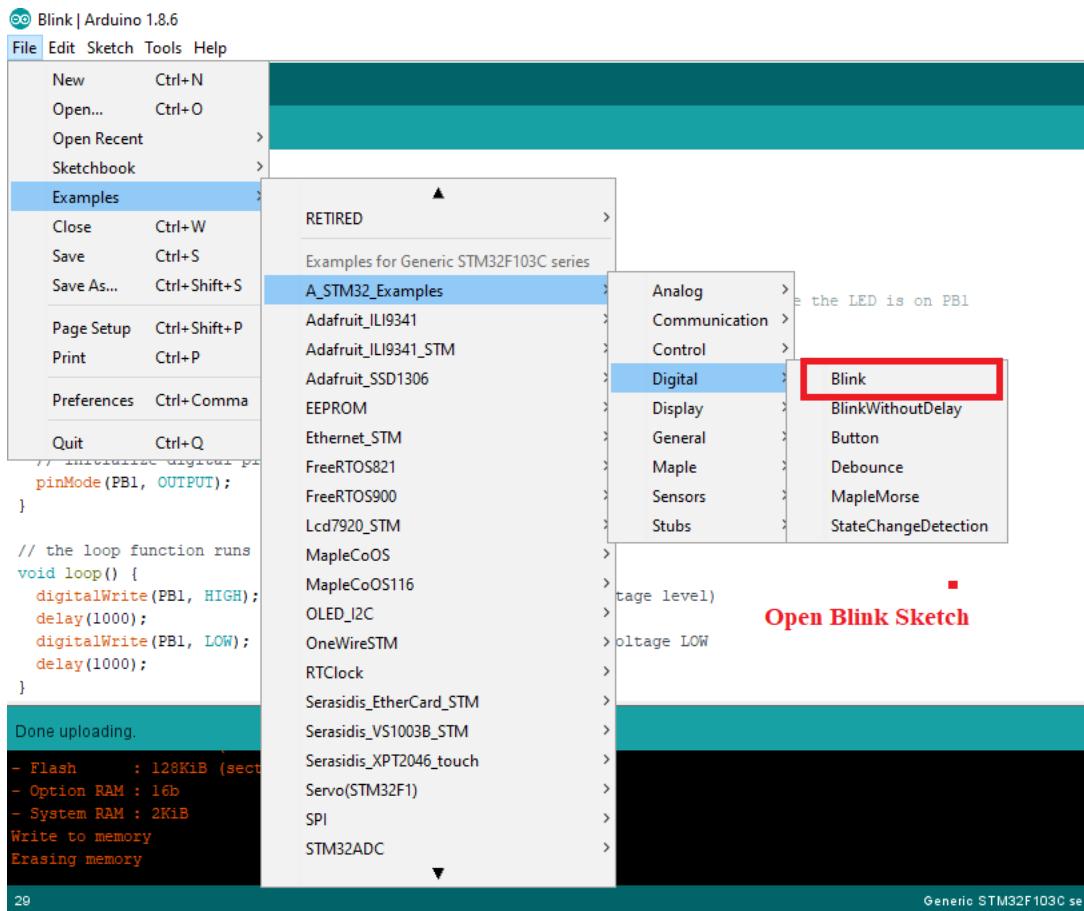
After performing the steps above, you can see the STM32 in the boards list. Now select the STM32F103C.



Because we are using a UART module for uploading the code, select Upload Method as Serial.



Choose the Blink sketch from the example.



Change the LED pin number with "PC13" as shown in the screenshot below. This is the name of the built-in LED in the board.

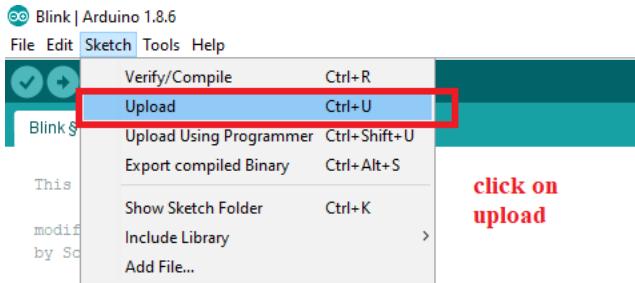
```
This example code is in the public domain.  
modified 8 May 2014  
by Scott Fitzgerald  
Modified by Roger Clark. www.rogerclark.net for Maple mini 25th April 2015 , where the 1  
*/  
  
// the setup function runs once when you press reset or power the board  
void setup() {  
    // initialize digital pin PB1 as an output.  
    pinMode(PC13, OUTPUT);  
}  
  
// the loop function runs over and over again forever  
void loop() {  
    digitalWrite(PC13, HIGH); // turn the LED on (HIGH is the voltage level)  
    delay(1000); // wait for a second  
    digitalWrite(PC13, LOW); // turn the LED off by making the voltage LOW  
    delay(1000); // wait for a second  
}
```

Project Source Code

```
void setup() {  
    // change pin PC13  
    pinMode(PC13, OUTPUT);  
}  
  
//infinite loop  
void loop() {  
    digitalWrite(PC13, HIGH); // turn the LED on (HIGH is the voltage level)  
    delay(1000); // wait for a second  
    digitalWrite(PC13, LOW); // turn the LED off by making the voltage LOW  
    delay(1000); // wait for a second  
}
```

Upload Code to Arduino IDE

Now upload the code.



click on
upload

Done uploading.

Sketch uses 8400 bytes (12%) of program storage space. Maximum is 65536 bytes.

Global variables use 2248 bytes (10%) of dynamic memory, leaving 18232 bytes for local variables. Maximum is 20480 bytes.

stm32flash 0.4

<http://stm32flash.googlecode.com/>

```
Using Parser : Raw BINARY
Interface serial_w32: 115200 8E1
Version      : 0x22
Option 1     : 0x00
Option 2     : 0x00
Device ID   : 0x0410 (Medium-density)
- RAM       : 20KiB (512b reserved by bootloader)
- Flash     : 128KiB (sector size: 4x1024)
- Option RAM : 16b
- System RAM : 2KiB
Write to memory
Erasing memory
```

```
Wrote address 0x08000100 (3.05%)
Wrote address 0x08000200 (6.10%)
Wrote address 0x08000300 (9.14%)
Wrote address 0x08000400 (12.19%)
Wrote address 0x08000500 (15.24%)
Wrote address 0x08000600 (18.29%)
Wrote address 0x08000700 (21.33%)
Wrote address 0x08000800 (24.38%)
Wrote address 0x08000900 (27.43%)
```

25

Congrats Done !

Activate Win
Go to Settings to

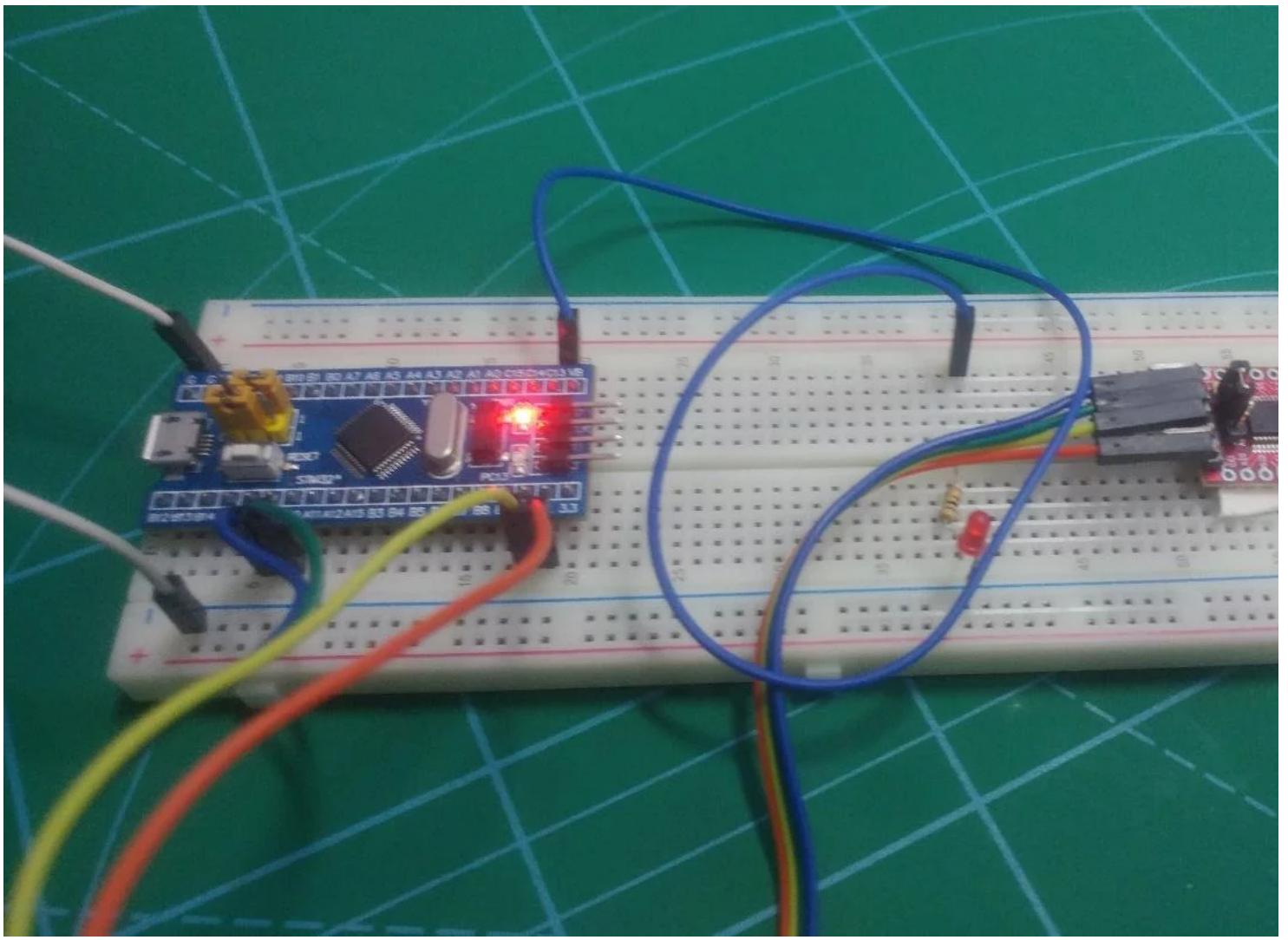
Generic STM32F103C series, STM32F103C8 (20k RAM, 64k Flash), Serial, 72Mhz (Normal)

A successful upload!

Conclusion

If the program has been successfully uploaded, you should see the green LED flash at 1-second intervals. You can also use this program to increase or decrease the delay of the LED light.

After uploading the program, you should change the jumpers back to Normal mode so that the next time when you start the board, the uploaded program will automatically start executing.



The complete build.



Reginald Watson

I love challenging myself by creating new projects using different microcontrollers to see what I can come up with.
Author

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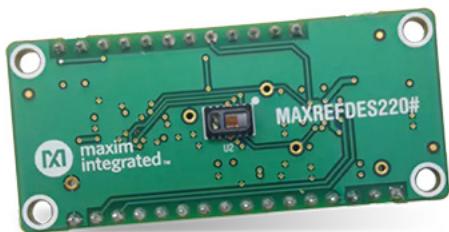
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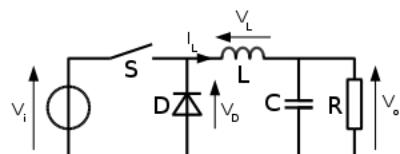
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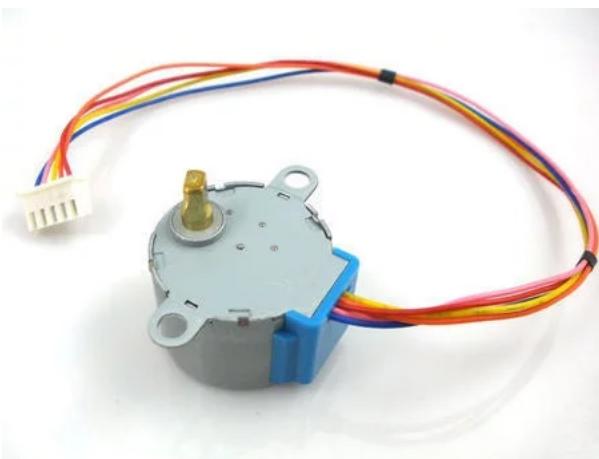
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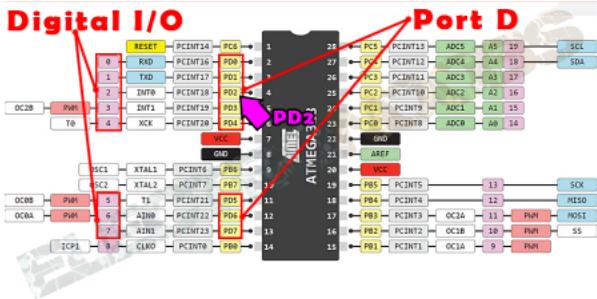


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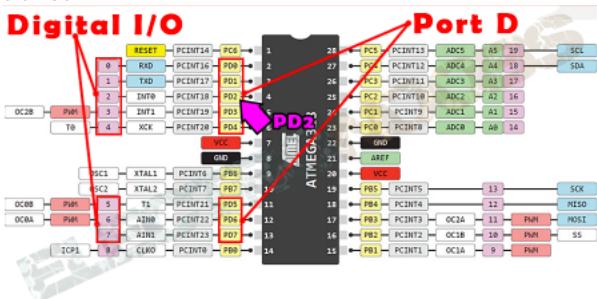


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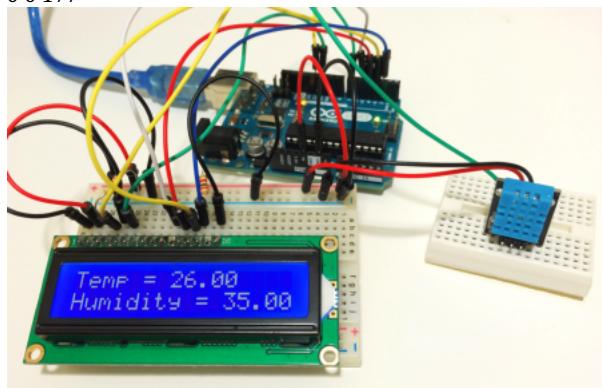


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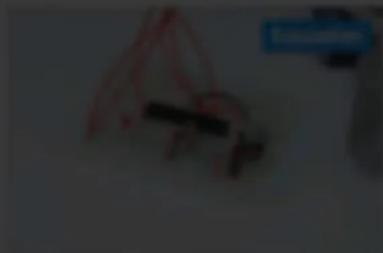
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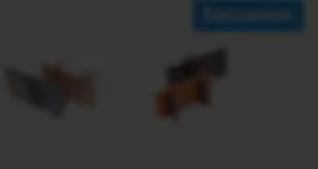
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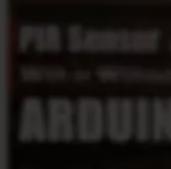
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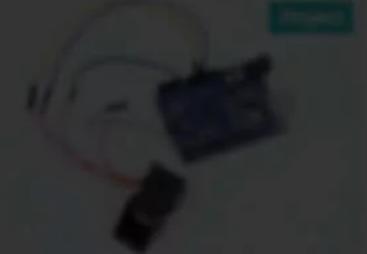
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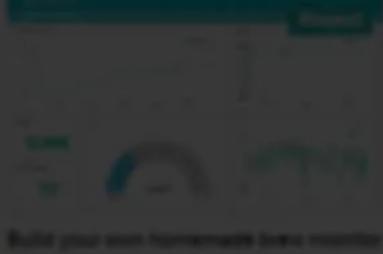
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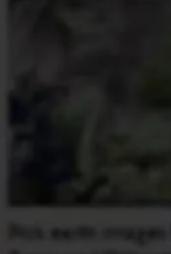
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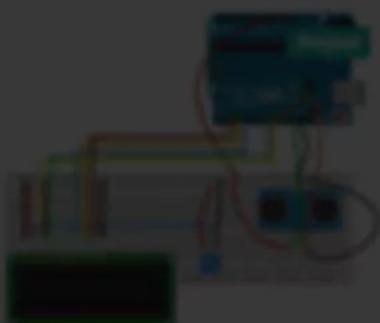
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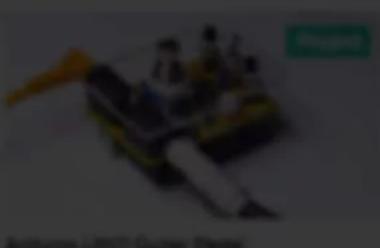


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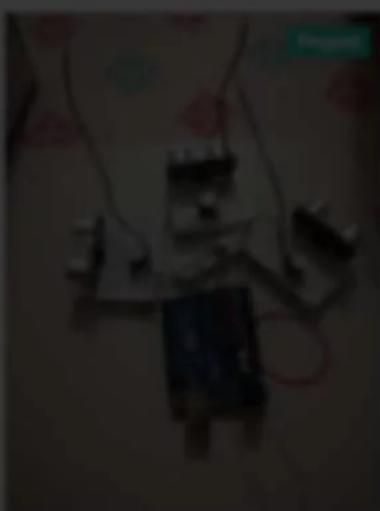


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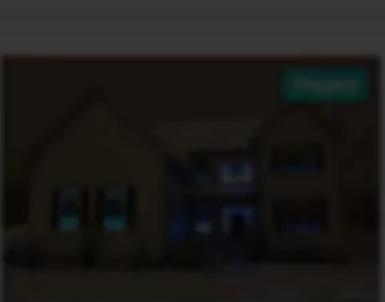
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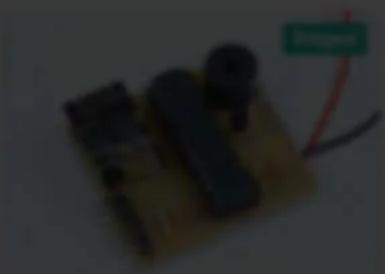


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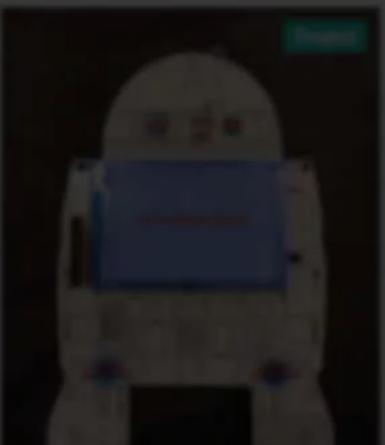


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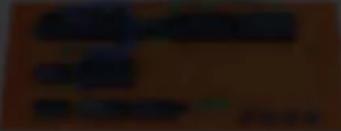


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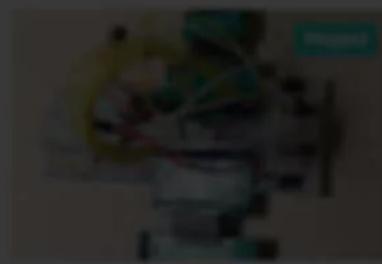


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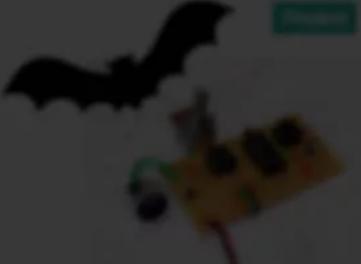


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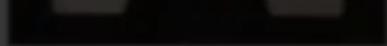


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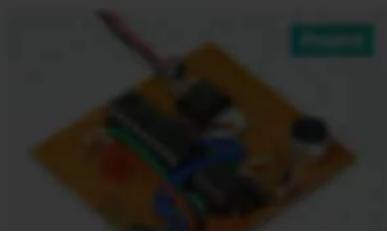


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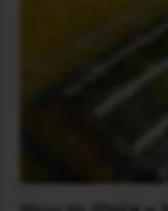
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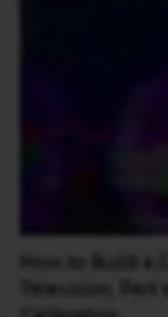


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[Quote of the day](#)

“One man’s “magic” is another man’s engineering. “Supernatural” is a null word.”

- Robert Heinlein