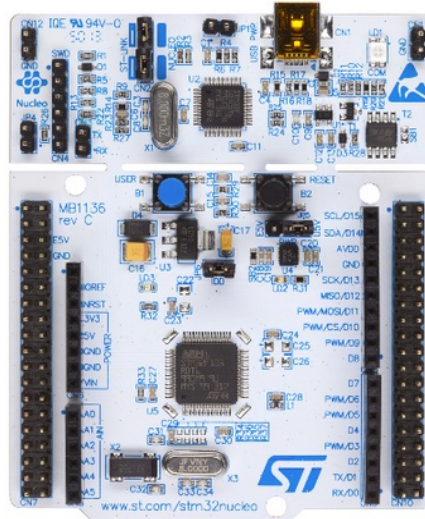


How to use NUCLEO-F401RE and Mbed



[What is Mbed](#)

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What is Mbed

The **mbed** development platform is the fastest way to create products based on ARM microcontrollers.

The project is being developed by ARM, its Partners and the contributions of the global mbed Developer Community.

In practice Mbed is online compiler tool.

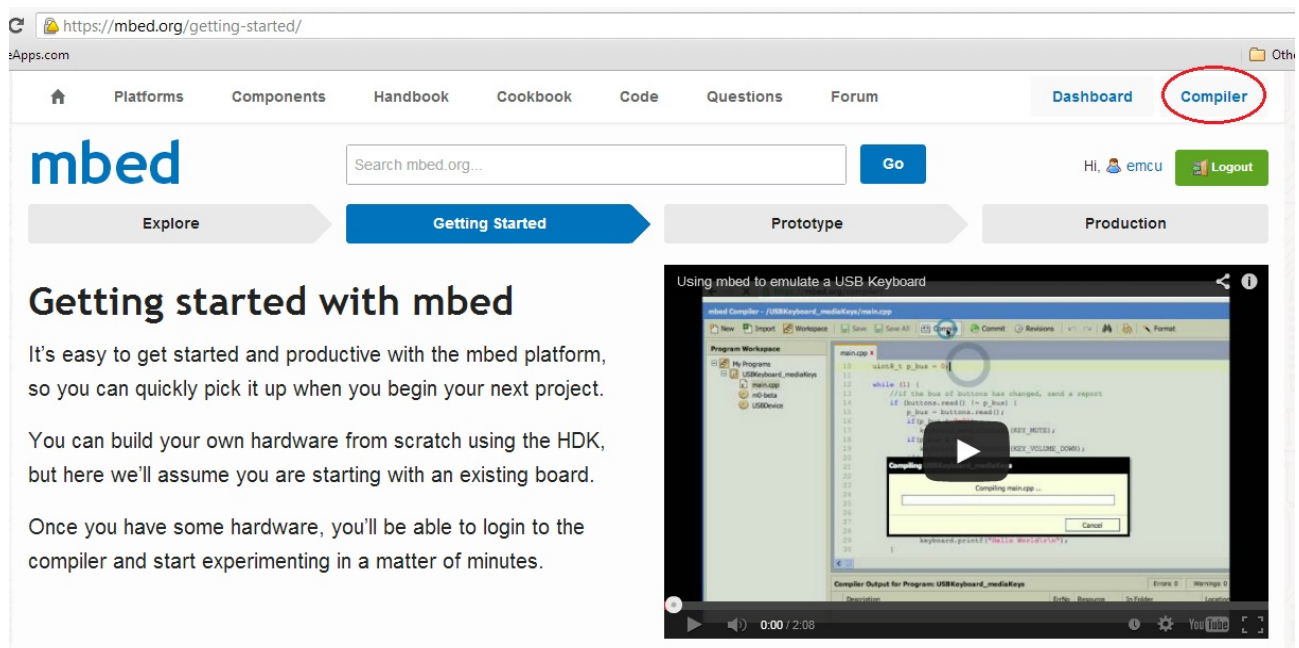
This means that for use it is necessary have a Internet connection.

More info are [here](#).

First you must **register on Mbed**.

Next follow the [getting started example](#).

The **online compiler** is in the first page after you are login on Mbed, see below.



The screenshot shows the Mbed website interface. At the top, there's a navigation bar with links: Home, Platforms, Components, Handbook, Cookbook, Code, Questions, Forum, Dashboard, and Compiler (highlighted with a red circle). Below the navigation bar is a search bar and a 'Go' button. The main content area is titled 'Getting started with mbed' and includes a video player. The video player shows a code editor with C++ code for emulating a USB keyboard. The code includes a while loop that reads a button and sends a report to the keyboard. The video player has a play button and a progress bar.

Getting started with mbed

It's easy to get started and productive with the mbed platform, so you can quickly pick it up when you begin your next project.

You can build your own hardware from scratch using the HDK, but here we'll assume you are starting with an existing board.

Once you have some hardware, you'll be able to login to the compiler and start experimenting in a matter of minutes.

Using mbed to emulate a USB Keyboard

```
1 // USBKeyboard_mbed.cpp
2
3 #include "mbed.h"
4 #include "USBKeyboard.h"
5
6 USBKeyboard keyboard;
7
8 int main() {
9     while (1) {
10         // If the Bus of buttons has changed, send a report
11         if (buttons.read() != p_bot) {
12             p_bot = buttons.read();
13             keyboard.press(KEY_RIGHT);
14             keyboard.release(KEY_RIGHT);
15             keyboard.press(KEY_Y, KEY_Z, KEY_X);
16             keyboard.release(KEY_Y, KEY_Z, KEY_X);
17         }
18     }
19 }
```

Update the USB driver for ST-LINK-v2

NOTE:

Do this update only if the: [Update the FW on NUCLEO-F401RE](#) fails.

Update the usb driver for ST-LINK-v2, chose it from the list below.

[STSW-LINK003](#) ST-LINK/V2 USB driver for Windows 7, Vista and XP

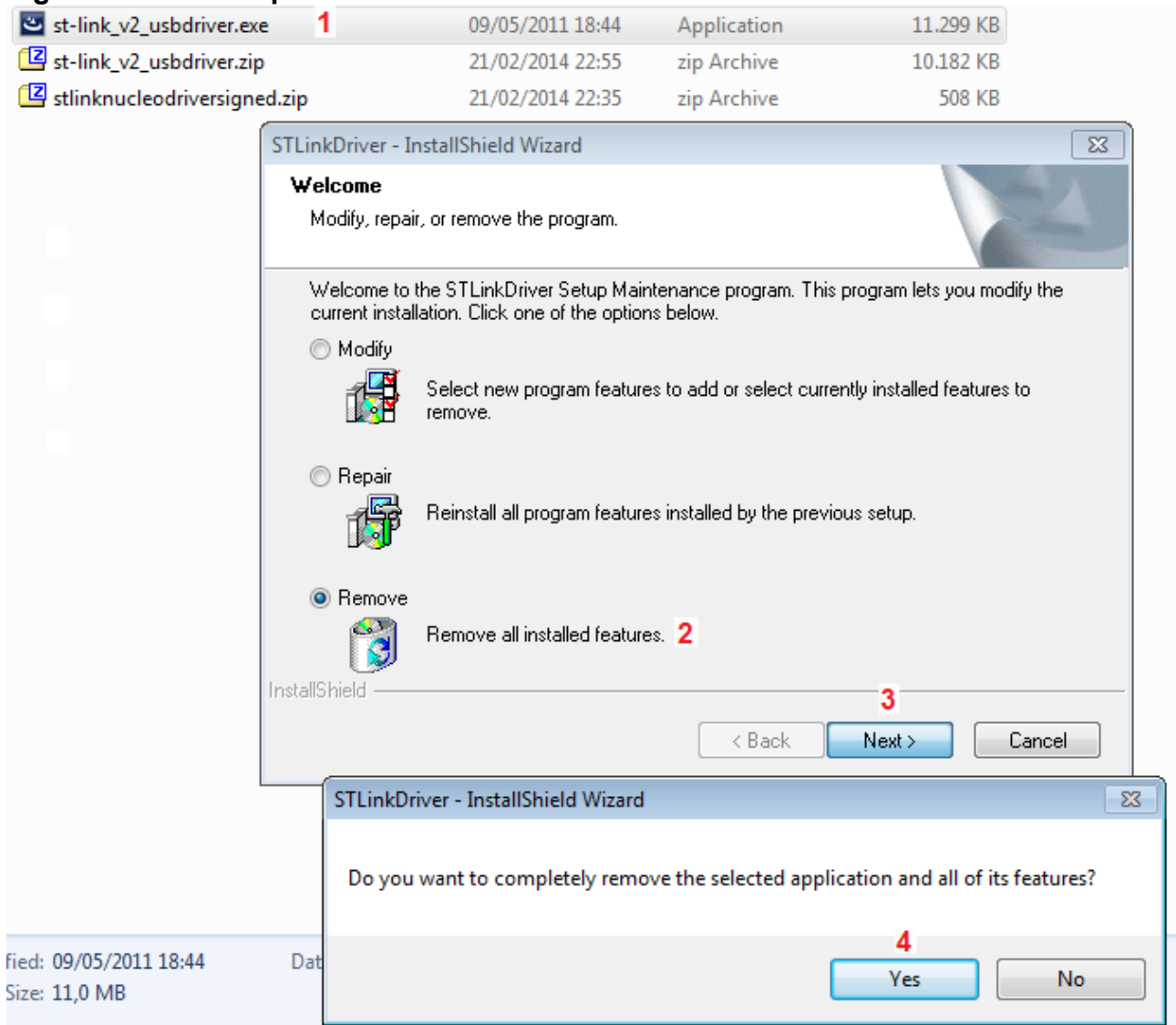
[STSW-LINK006](#) ST-LINK/V2 USB driver for Windows 8

Unzip the file and run it, with the privilege of ADMINISTRATOR, the file is:

st-link_v2_usbdriver.exe

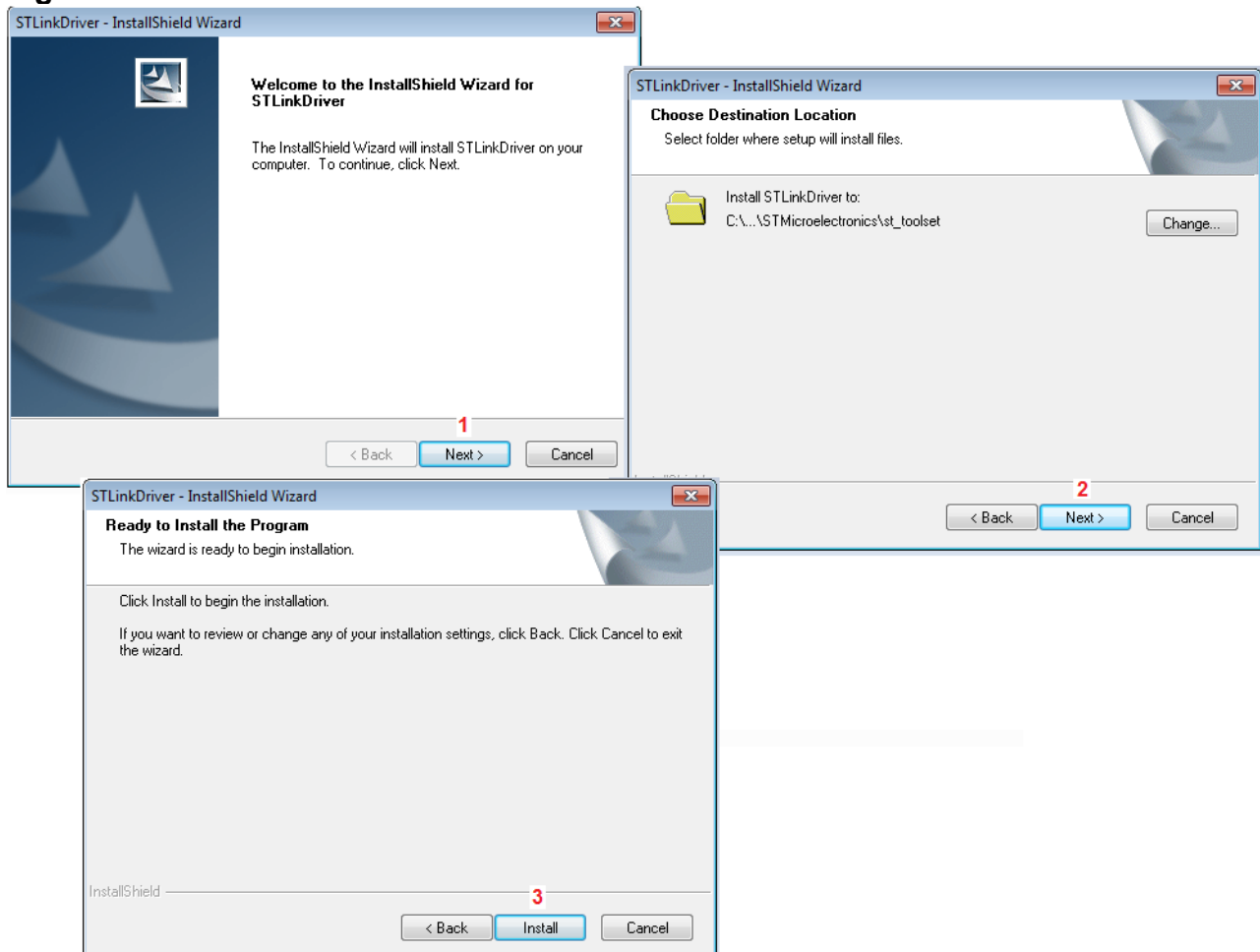
If the USB drive **is already installed** on your PC, first remove it (Fig.1) and next re-install it (Fig.2), see below.

Fig.1 – remove the previous installation



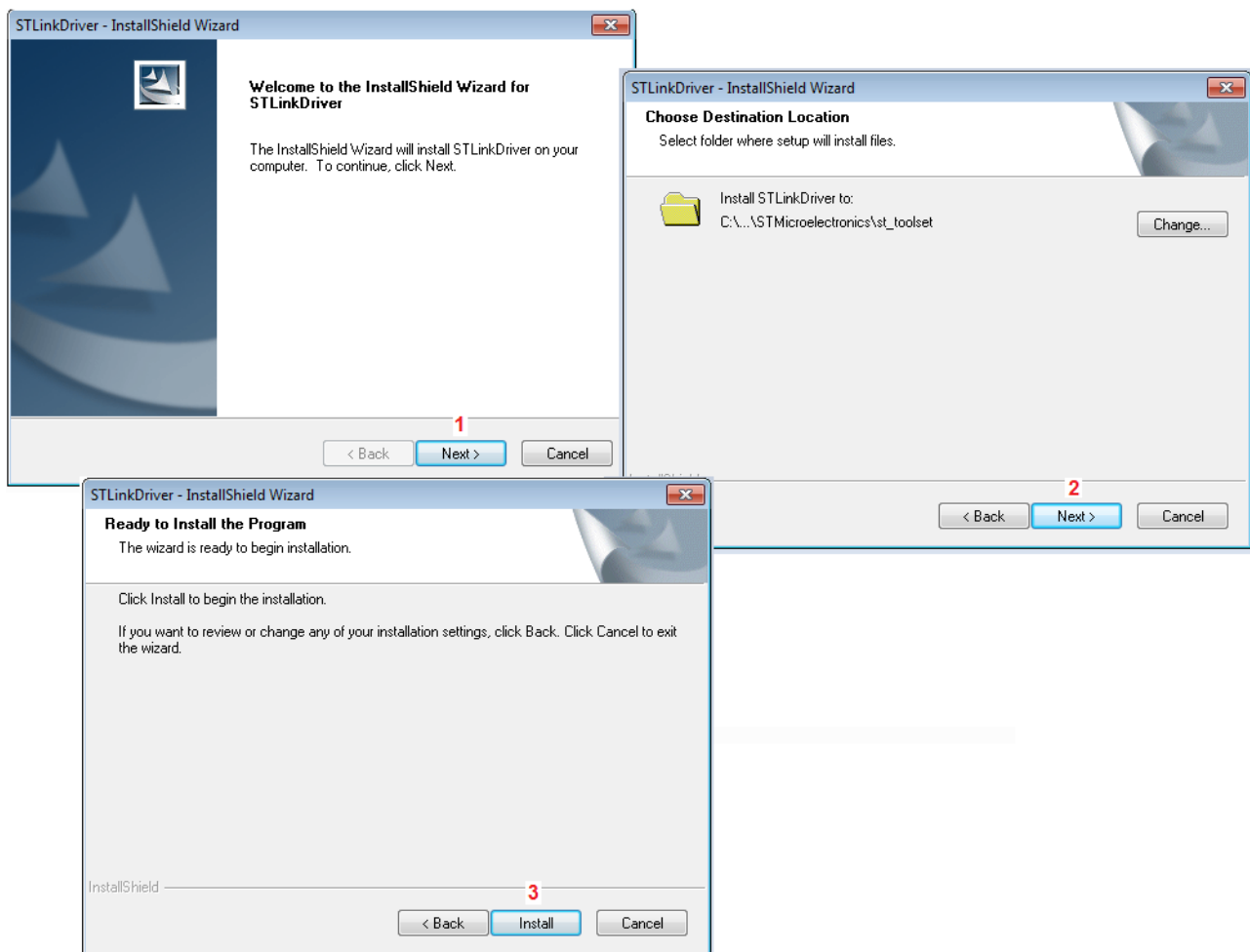
Now re-run the **st-link_v2_usbdriver.exe** and follow the steps below (1...3).

Fig.2



By: www.emcu.it see [here](#)

If the USB drive **is not already installed** on your PC, follow the steps below (1...3).



Click [HERE](#) to go on top

Update the FW on NUCLEO-F401RE

Go [here](#) and download the FW update.



<http://mbed.org/teams//ST/wiki/Nucleo-Firmware>

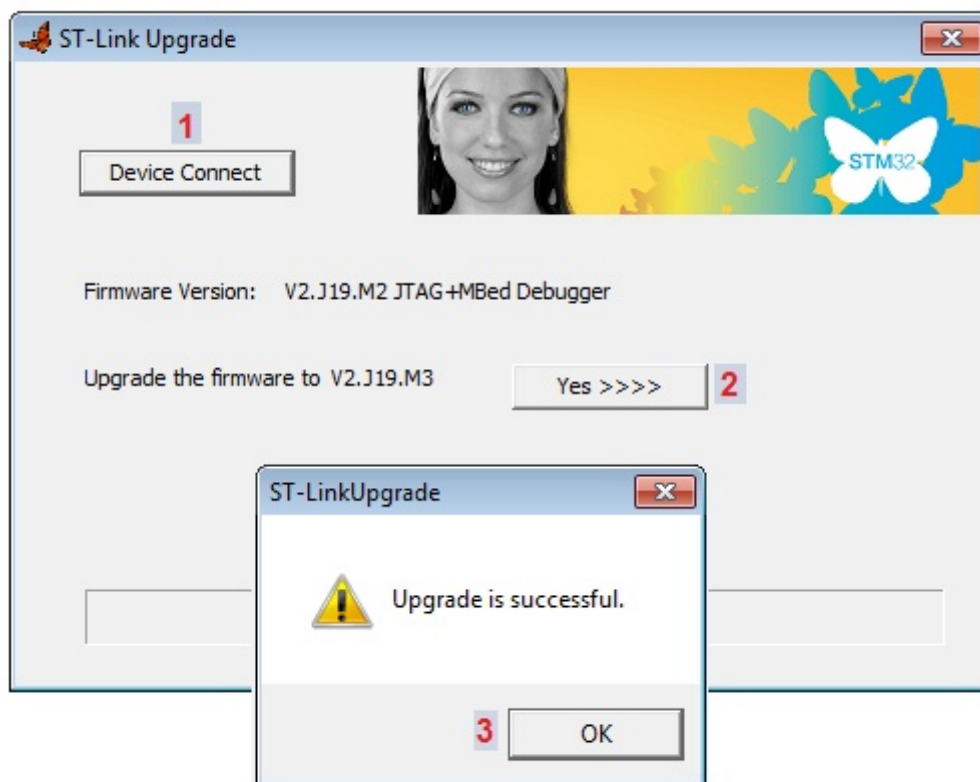
Extract and run **either dpinst_amd64.exe or dpinst_x86.exe** depending on whether you are on a 64bit or 32bit machine.

Follow the prompts.

To verify the operation, you may check using the [Nucleo firmware](#) installer.

In practice download the fw update for ST-LINK-v2 and run it (also with ADMINISTRATOR privilege), see below.

Name	Date modified	Type	Size
 ST-LinkUpgrade.exe	13/02/2014 15:44	Application	659 KB
 STLinkUSBDriver.dll	13/02/2014 15:44	Application extens...	84 KB



In case of problems do this:

Execute the: [Update the USB driver for ST-LINK-v2](#)

Execute again: [Update the FW on NUCLEO-F401RE](#)

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SW examples

From this [link](#) you find my doc, examples, etc, regarding **NUCLEO boards**.

From this [link](#) you find the **Mbed NUCLEO-F401RE** doc, example, etc.

For use the **NUCLEO-F401RE Mbed examples** you must before [register on mbed](#) and after **add the platform to your compiler**, to do do this click on the: **Add to your mbed Compiler** (see below).

The Nucleo-F401RE board provides an affordable and flexible way for users to try out new ideas and build prototypes with a high-performance STM32F401RET6 microcontroller.



Firmware update required

Please make sure you have updated your Nucleo board to the latest firmware, which fixes a number of known issues.



ST

A world leader in providing the semiconductor solutions that make a positive contribution to people's lives, both today and in the future.

Buy now

Add to your mbed Compiler

Now we need to use the example: [Nucleo_blink_color_led](#) for do this, select it, see below

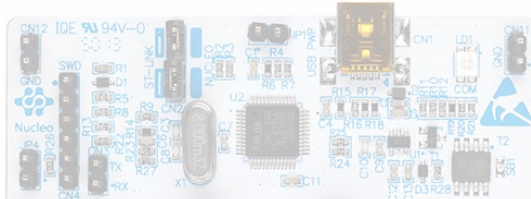
Please make sure you have updated your Nucleo board to the latest firmware, which fixes a number of known issues.

The ArduinoTM connectivity support and ST Morpho headers make it easy to expand the functionality of the STM32 Nucleo open development platform with a wide choice of specialized shields.

The Nucleo-F401RE board does not require any separate probe as it integrates the ST-LINK/V2-1 debugger/programmer.

Each STM32 Nucleo board allows agile development with fine-tuning of both hardware and software on-the-fly at each prototyping stage. Investment in application shields is also protected as most shields can be used across various projects leveraging the scalability and diversity of the STM32 family.

life.augmented
Nucleo F401RE
Arduino Headers



Example programs

Nucleo_pwm 2 15
Output a pwm signal. Nucleo , pwm , STM , stm32

Last updated: 4 days ago

Nucleo_blink_led 3 194
Blinky LED test for the ST Nucleo boards blink , led , Nucleo , STM , stm32

Last updated: about 14 hours ago

Nucleo_blink_color_led 2 29
Example program that uses the color LED of the mbed application shield (via arduino headers) with ST Nucleo board color , F103RB , led , mbed , Nucleo , shield , ST

Last updated: 4 days ago

Nucleo_i2c_master 1 0
Read external LM75 temperature sensor using I2C master. I2C , LM75 , Nucleo , STM , stm32 ,

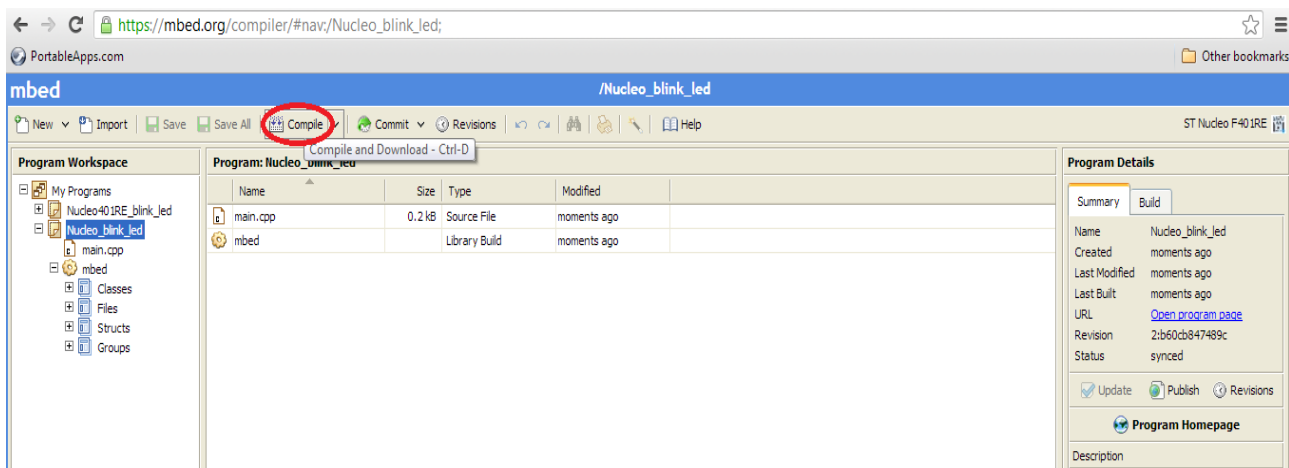
and from the new windows that appears select:
Import this program
see below.

Click [HERE](#) to go on top

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After importing the project **click on the Compile icon**, see below.



and save the **bin** file in a directory.

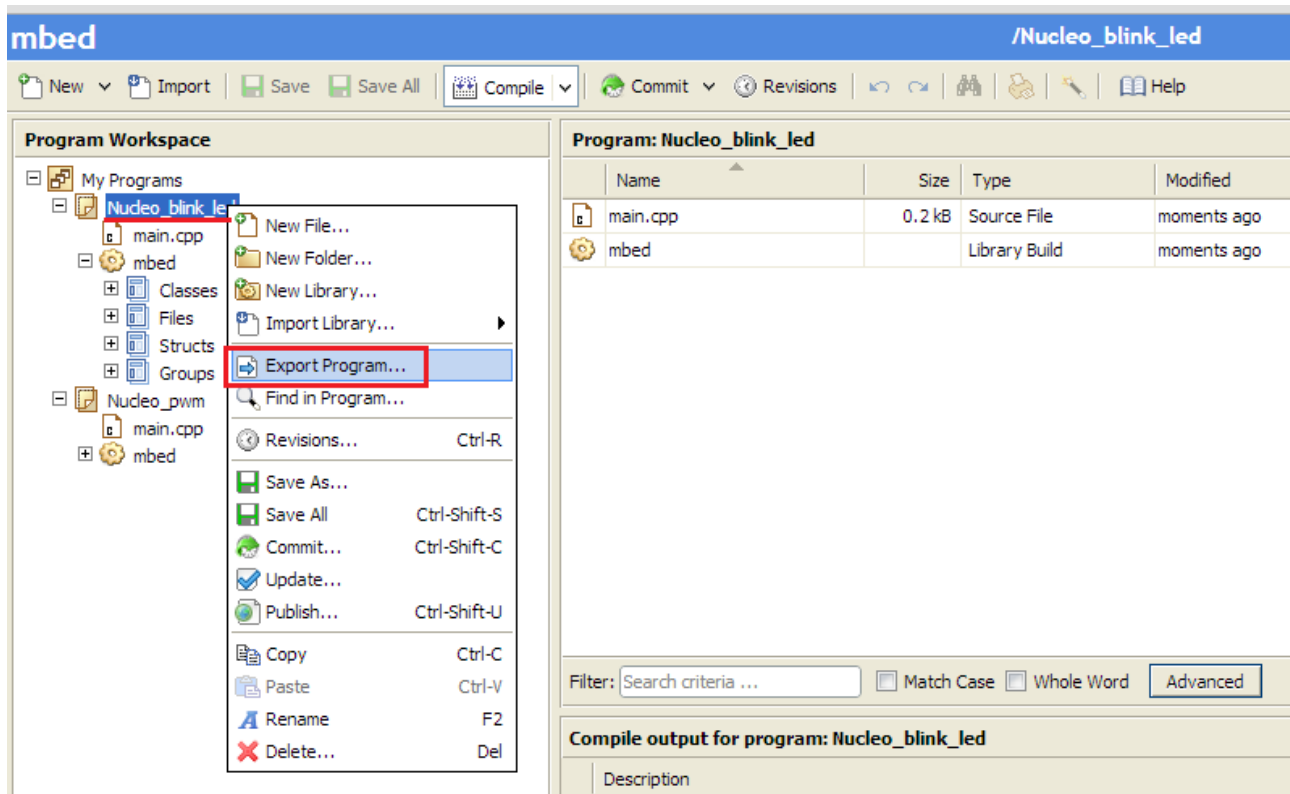
Now for programming NUCLEO-F401RE use [ST-LINK-Utility](#).
At the end of the programming you must see the green LED that blinking.

Click [HERE](#) to go on top

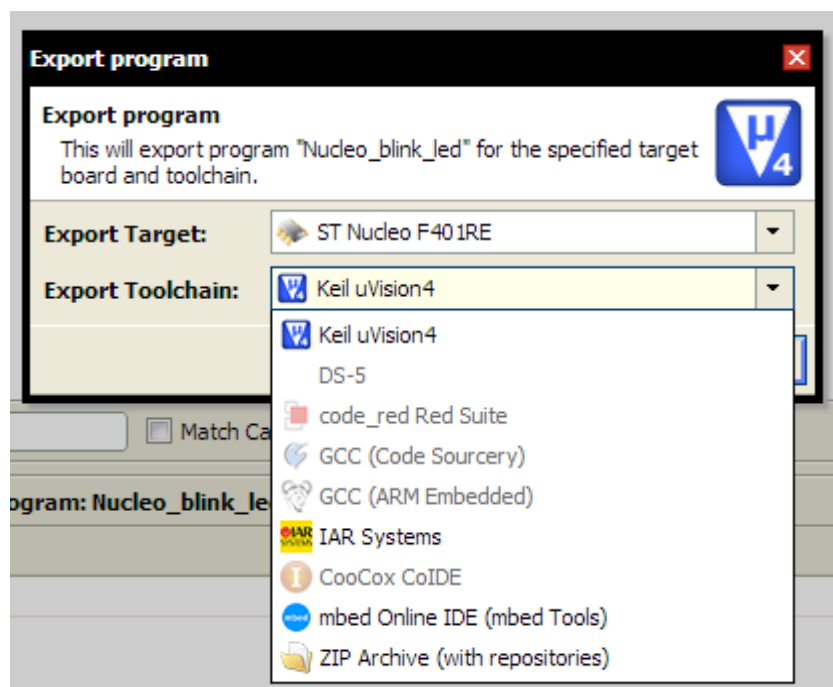
Export your programs to KEIL, IAR, etc

First: select the program that you need export..

Second: click on it with the right mouse button and from the window that appear select Export Program, see below.



From the new window that appear select the name of the toolchain and click on EXPORT button.



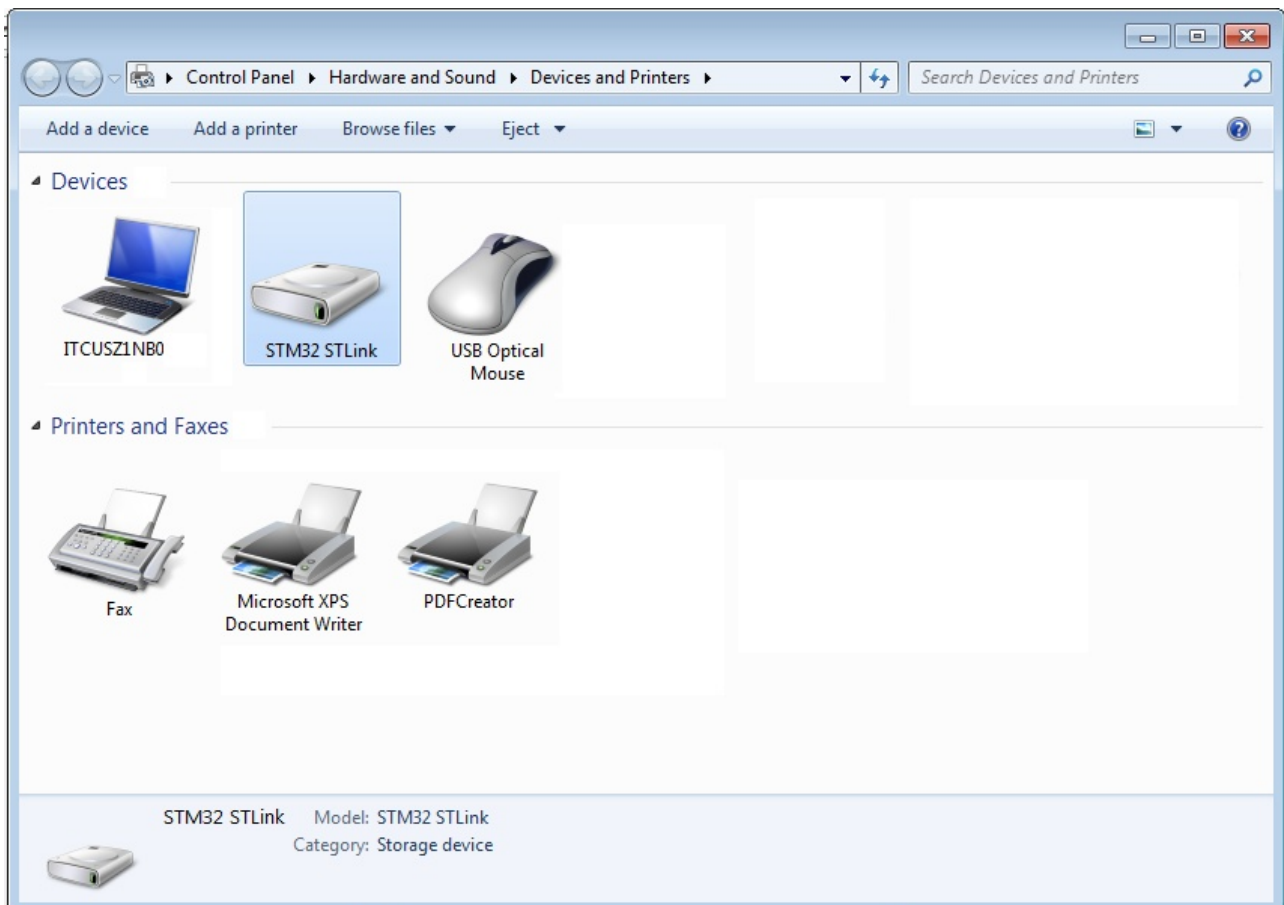
A minimum debug using pc.printf

Up to now is not present a serious debug tool in Mbed, the only possibility that you have is to use the **pc.printf** or **printf** that send a message (text, variable, etc) via USB port to the PC.

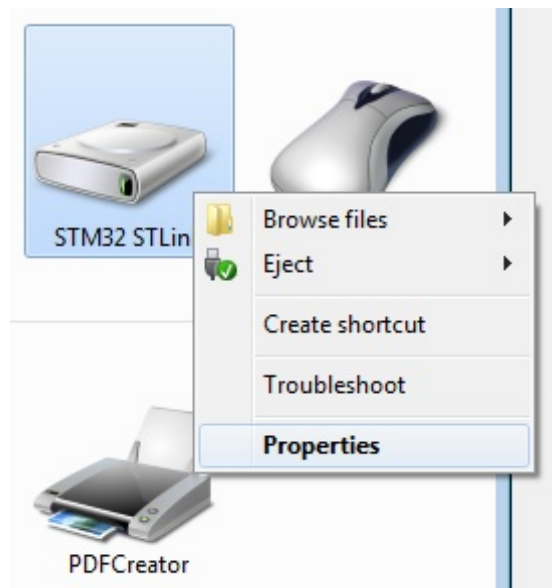
The PC see the NUCLEO-F401RE as a **Virtual COM Port**.

If you select: **START -> Device and Printer**

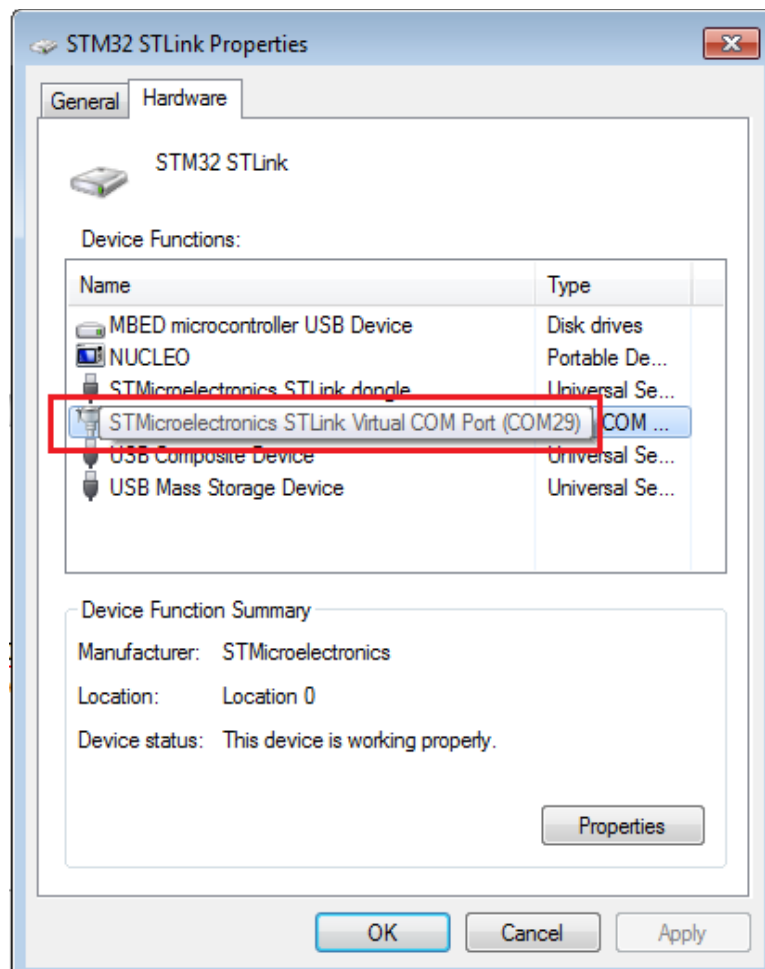
You must see something like below.



Now select the **STM32 STLink** and **click on it using the right button** of the mouse. From the window that appear select **Properties**, see below.



From the window that appear select **Hardware**.
You must see something like below.
My Virtual COM Port is **COM29**.



Now use the example [Nucleo_printf](#) and **programing** your **Nucleo-F401RE**.
Below there is the content of **main.cpp**

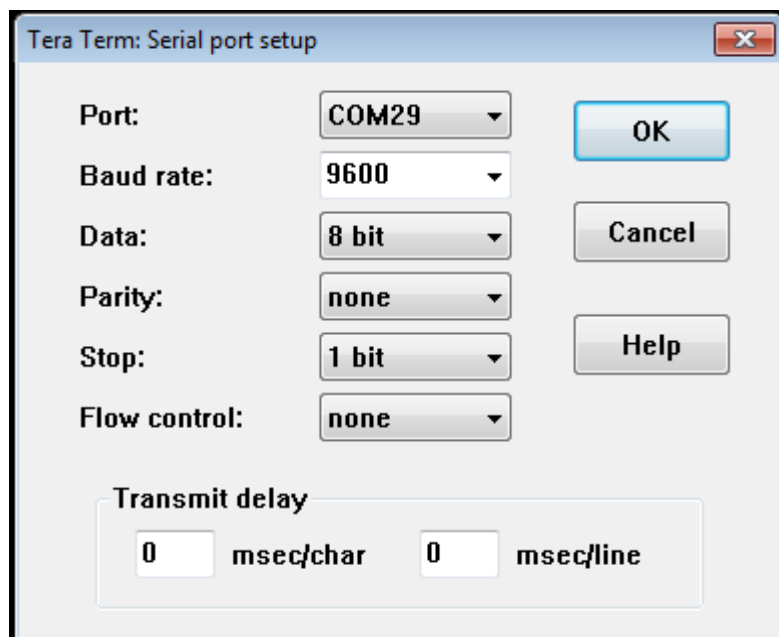
```
#include "mbed.h"

Serial pc(SERIAL_TX, SERIAL_RX);

DigitalOut myled(LED1);

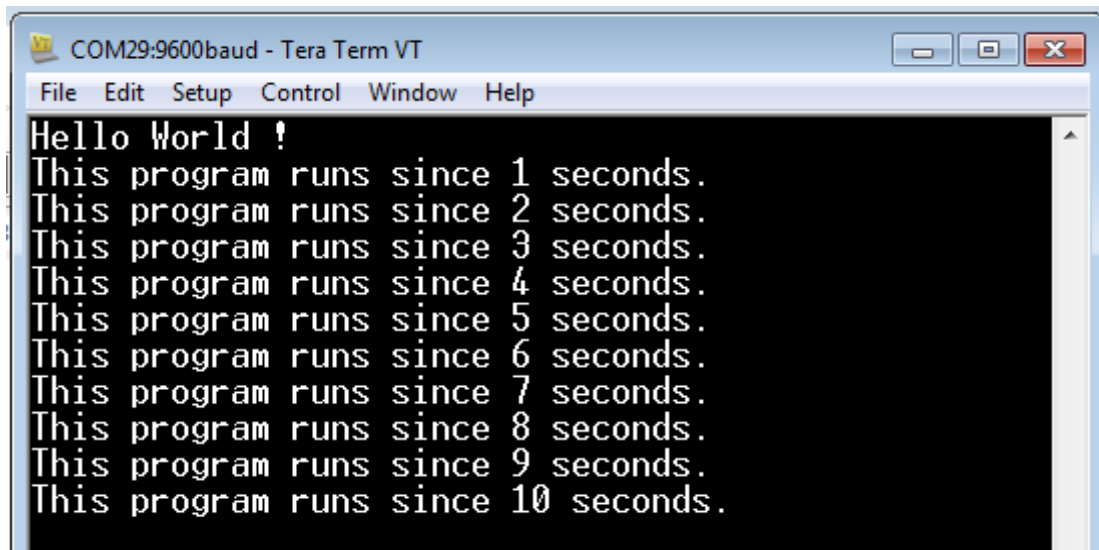
int main() {
    int i = 1;
    pc.printf("Hello World !\n");
    while(1) {
        wait(1);
        pc.printf("This program runs since %d seconds.\n", i++);
        myled = !myled;
    }
}
```

Configure your [TeraTerm](#) (on Windows7) using the following parameters:



On your PC, you must see something like below.

By: www.emcu.it see [here](#)



A screenshot of a Tera Term VT terminal window. The window title is 'COM29:9600baud - Tera Term VT'. The menu bar includes 'File', 'Edit', 'Setup', 'Control', 'Window', and 'Help'. The terminal output shows 'Hello World !' followed by ten lines of text: 'This program runs since 1 seconds.', 'This program runs since 2 seconds.', 'This program runs since 3 seconds.', 'This program runs since 4 seconds.', 'This program runs since 5 seconds.', 'This program runs since 6 seconds.', 'This program runs since 7 seconds.', 'This program runs since 8 seconds.', 'This program runs since 9 seconds.', and 'This program runs since 10 seconds.'.

And on the **NUCLEO-F401RE** you must see the **green led** that **flashing**.

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LINKs

- [NUCLEO eva board](#)
- For who has Windows7 we suggest to install **TeraTerm**
http://en.wikipedia.org/wiki/Tera_Term
download it from this link: <http://ttssh2.sourceforge.jp/index.html.en>