Howto program the power board ?

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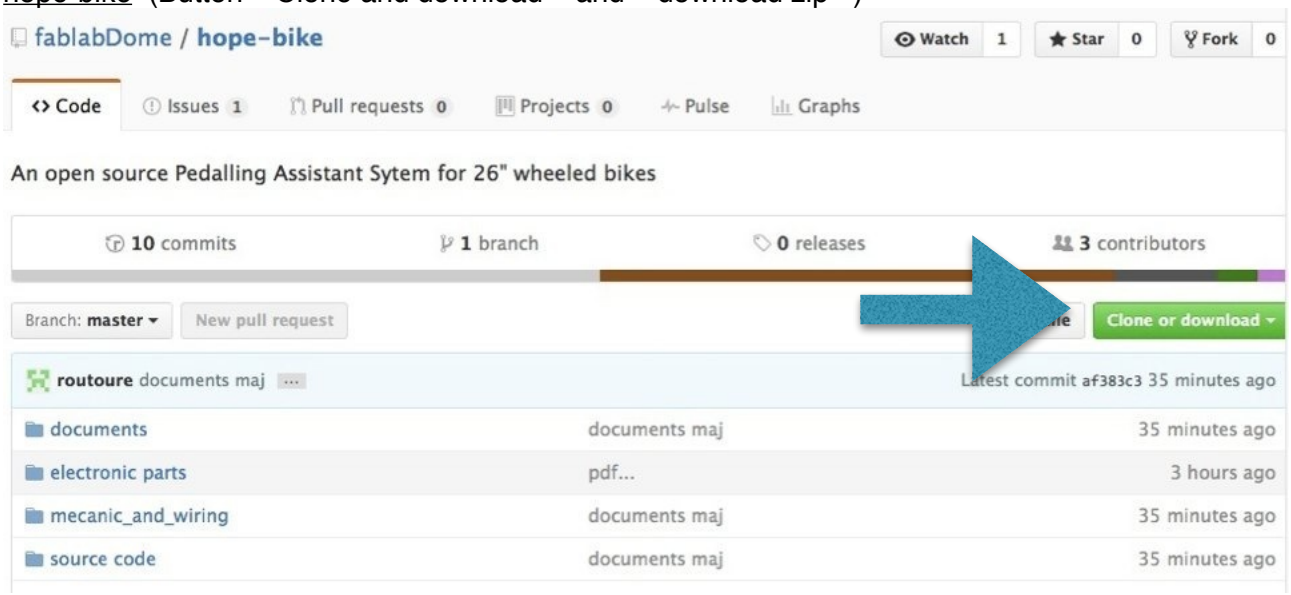
The power board is used for controller the brushless motor and to transfer and modulate the electrical power to this motor. The power board communicates with the control board using a 3 wires bus called BIONET (BIONET stands for Bike Open Network) described in the GitHUB documentation.

Requirements

The power board uses 2 micro-controllers PIC12F and PIC16F from microchip. To program these devices, a MPLAB LCD 3 programmer is required. To compile or download the software in the power management card, you need to install the microship IDE environement MPLAB avalaible on the microship web site : http://www.microchip.com/mplab/mplab-x-ide. Make sure that the XC8 compiler is installed.

Download the complete files in the GitHub repository of the project. https://github.com/fablabDome/hope-bike (Button « Clone and download » and « download zip »)



Hardware preparation

If not, you need to un-solder jumpers W1 to W3 and W4 has to be soldered. See photo below for the location of these solder bridges.

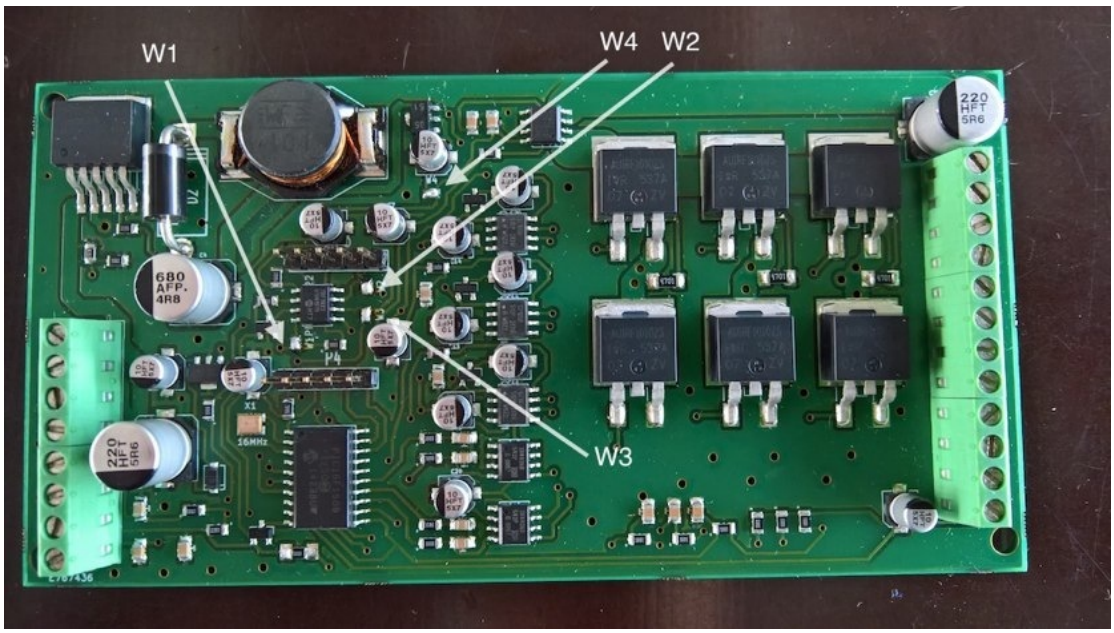
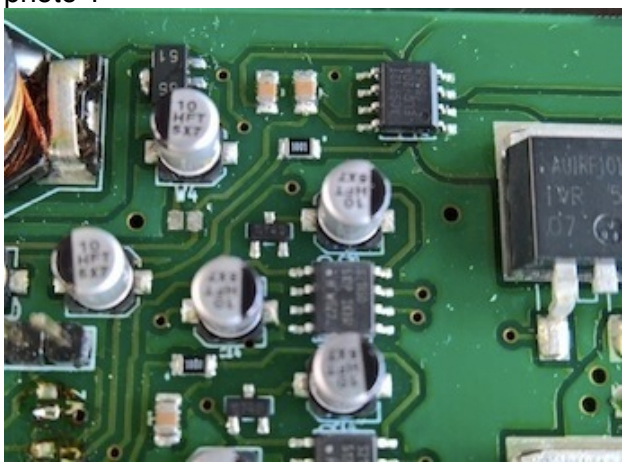


photo 1


détails of the board with W4.It is unsoldered in the photo but has to be soldered for the programmation of the micro-controller.

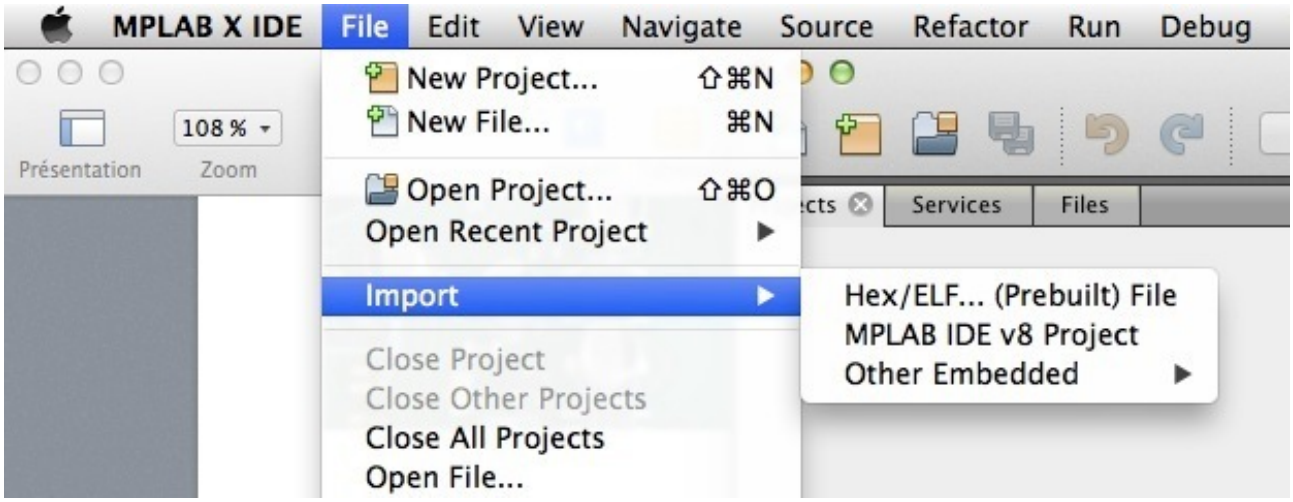
Put a strap between the port 1 and 2 of the left connector (the 8 port connector with screws in photo 1)

start the MPLAB X IDE.

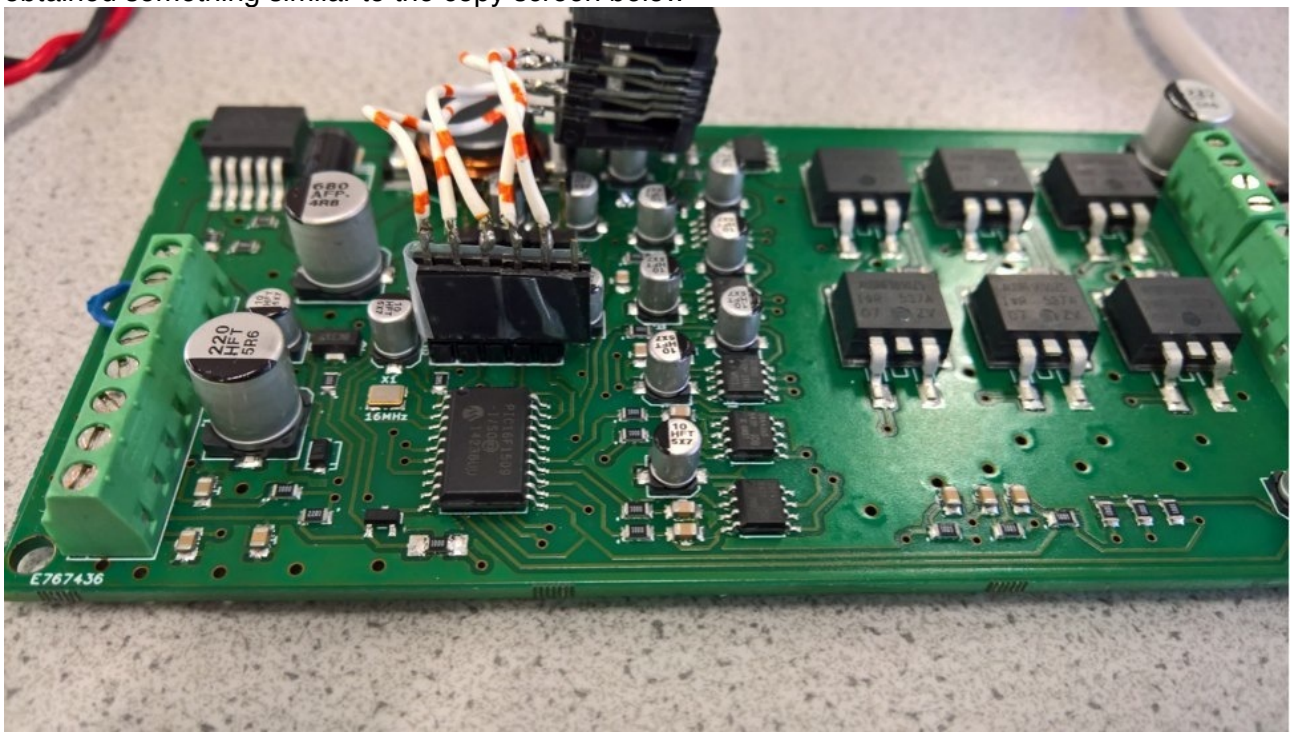
Let’s start with the PIC16F. If some projects have been already open, close it.

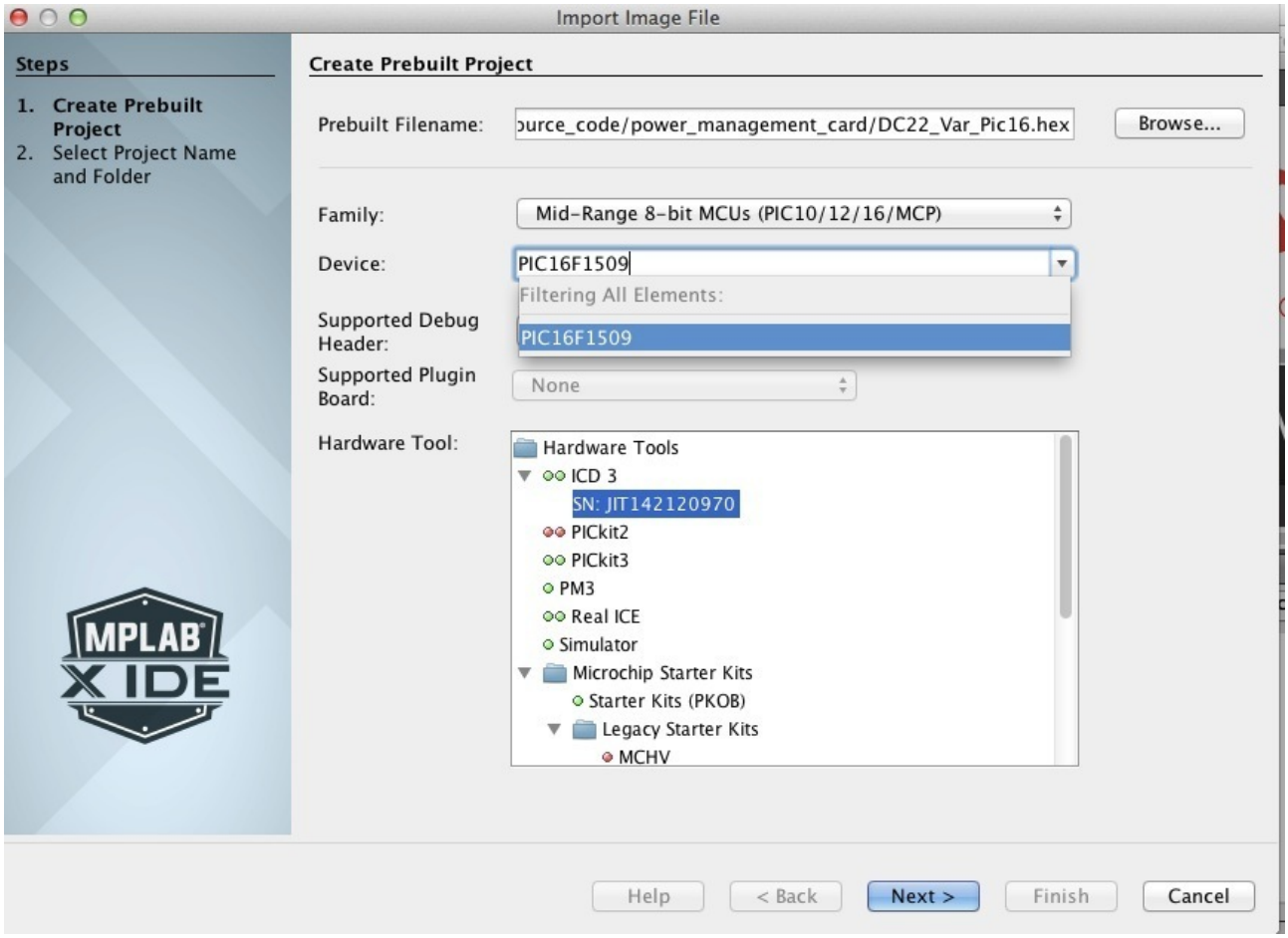
PIC 16F programmation

Import the Hex files using (File ->Import-> Hex/Elf..(Prebuilt) file that you should find in the / source_code/power_management_card/DC22_Var_Pic16.hex



Select the programmator that you own and the kind of microcontroller (PIC16F1509). You should obtained something similar to the copy screen below

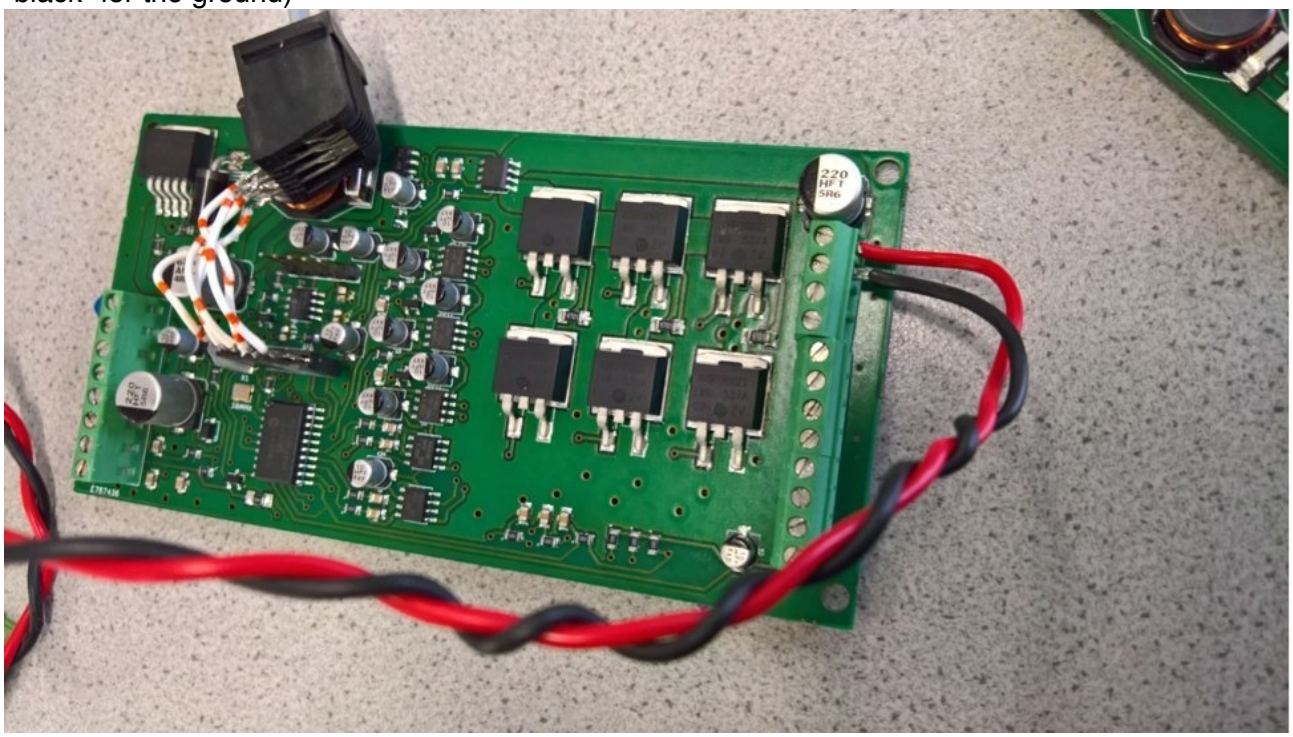




Select NEXT> and save the project without overwriting the previous project.

Connect the programmer according to the documentation of your programmer. See below for our case.

Apply a power supply (between 30 and 40 V) to the board (First pin -red- = 30-40 V and second pin -black- for the ground)



Test that A 5 V is avalaible on W4 bridge.

Click on the « make and program » button.  .

In the LCD3 should yould obtain the following messages :

```
Connecting to MPLAB ICD 3...

Currently loaded firmware on ICD 3
Firmware Suite Version.....01.43.35
Firmware type..............Enhanced Midrange

Target voltage detected
Target device PIC16F1509 found.
Device ID Revision = 2

The following memory area(s) will be programmed:
program memory: start address = 0x0, end address = 0x51f
configuration memory

Device Erased...

Programming...
Programming/Verify complete
```

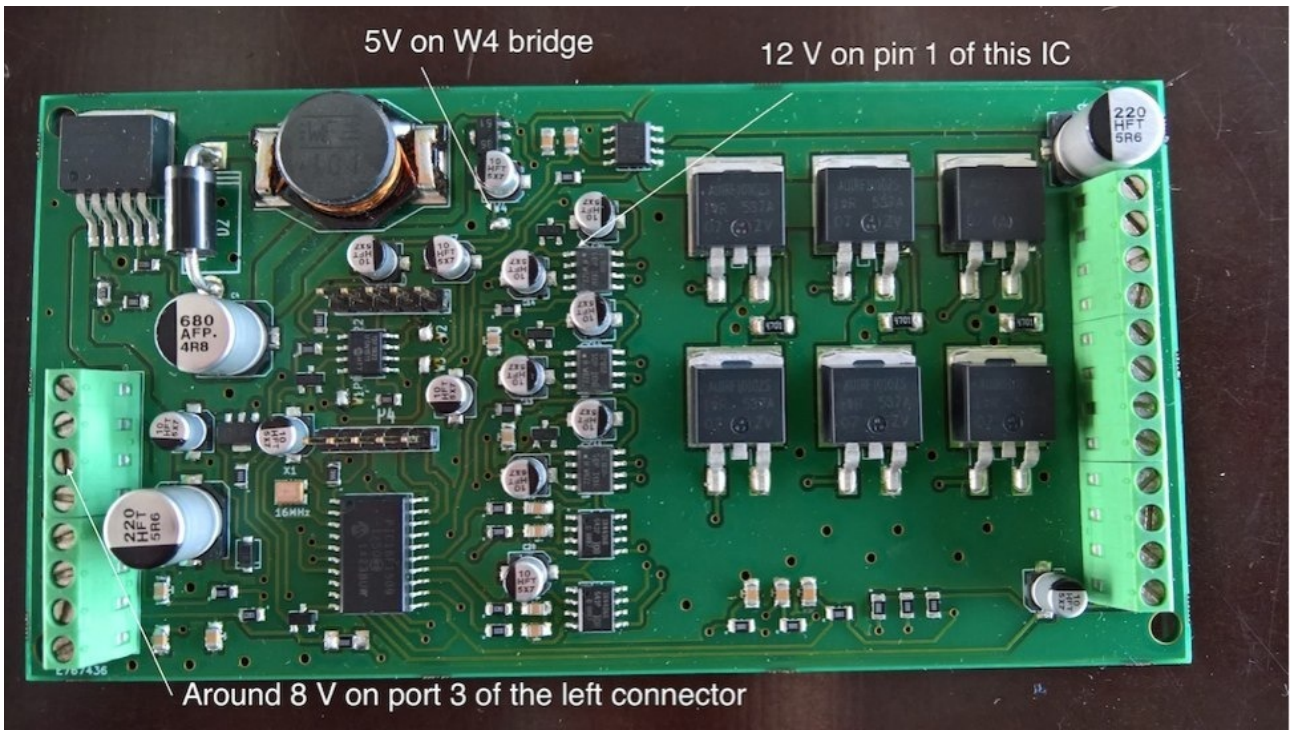
PIC 12F programmation

For the PIC12F, you have to open the entire project called « Pic12F » in the MPLAB IDE and click on the « make and program » button.  .

Final hardware tasks :

- Solder the W1 and W3 bridge

- control the voltage (cf photo in the next page):
- on the W4 bridge : you should obtain 5 V
- on the port 3 on the left connector ; you should obtain around 8 V
- on the port 1 on IC


5V on W4 bridge
12 V on pin 1 of this IC
Around 8 V on port 3 of the left connector