

Muonhunter one board version programming instructions for version  
 ”rev 1 06/09/16”

muonhunter.com - Mihaly Vadai

February 26, 2017



## 1 Safety warnings

These instructions are made for board version "rev 1 06/09/16", check this on your board before continuing.

Follow the assembly instructions very carefully, soldering the wrong components can cause malfunction and dangerous operation.

Once you are finished with your kit, ask us to check before switching it on.

Operate the kit from a battery powered device without connecting it to the mains electricity.

Wear goggles when soldering.

Do not touch the high voltage components when operating the circuit.

Do not use the kit without the GM tubes connected.

Disconnect the micro USB connector when switching off the circuit.

The circuit is safe to touch after one minute after switch off.

Do not use the kit in a humid or wet environment.

Make sure the kit is kept dust free.

The high voltage capacitors have have a  $4.7M\Omega$  resistor in series to limit the current of the discharge. Not using the correct value of for these resistors will make the kit dangerous to use. It will damage the Geiger-Müller tubes at the same time, too.

## 2 Disclaimer

SINCE THE MUON HUNTER IS AN ELECTRONIC KIT, THE ENTIRE RESPONSIBILITY OF SAFELY ASSEMBLING AND OPERATING THE CIRCUIT IS WITH YOU, THE USER. ALTHOUGH THE MUON HUNTER WAS DESIGNED USING ORIGINAL, RELIABLY SOURCED COMPONENTS, THERE IS NO WARRANTY FOR THE MUON HUNTER HARDWARE AND SOFTWARE, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE THE MUON HUNTER HARDWARE AND SOFTWARE "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE HARDWARE AND SOFTWARE IS WITH YOU. SHOULD THE HARDWARE OR SOFTWARE PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.



### 3 Programming or updating the microcontroller

1. Remove the jumper from the microcontroller. See figure 1.
2. Connect your kit to a laptop using the micro USB cable. Make sure the ST microcontroller is in the socket the right way around. See figure 1.
3. The ST automatically connects to the computer and you will see it as a traditional USB flash drive.
4. Create a free account on <https://developer.mbed.org/> if you haven't done it already.
5. Navigate to <https://developer.mbed.org/platforms/ST-Nucleo-F303K8/> and choose Add platform to compiler on the left hand side.
6. Navigate to: <https://developer.mbed.org/users/mva111/code/muonhunter-K8/>
7. Click on the "Build repository link". This should take you to: <https://developer.mbed.org/users/mva111/code/muonhunter-K8/compile> See figure 2.
8. Click on compile button below the NUCLEO-F303K8 option. Make sure this device is selected from the list. See figure 3.
9. Then click on "Download muonhunter-K8.NUCLEO\_F303K8.bin" See figure 4.
10. Save it onto the ST USB flash drive. The red light should flash on the kit and then it'll restart automatically. See figure 5.

### 4 Changing the firmware

You can develop your own firmware for the kit, or change the existing firmware to your liking. You just have to follow the instructions above, except for click on "Import into Compiler" instead of "Build repository" in step 5. See figure 6. Then you would have to create a free account on the web site. From then on you can develop, compile, test and publish your own firmware version.

### 5 Troubleshooting

1. If the kit is not working as it should, reload the firmware on the microcontroller first. The link above always has the latest version of the firmware.
2. Press the reset button on the white board.
3. For other options see the link here: <http://www.muonhunter.com/assembly-instructions.html>

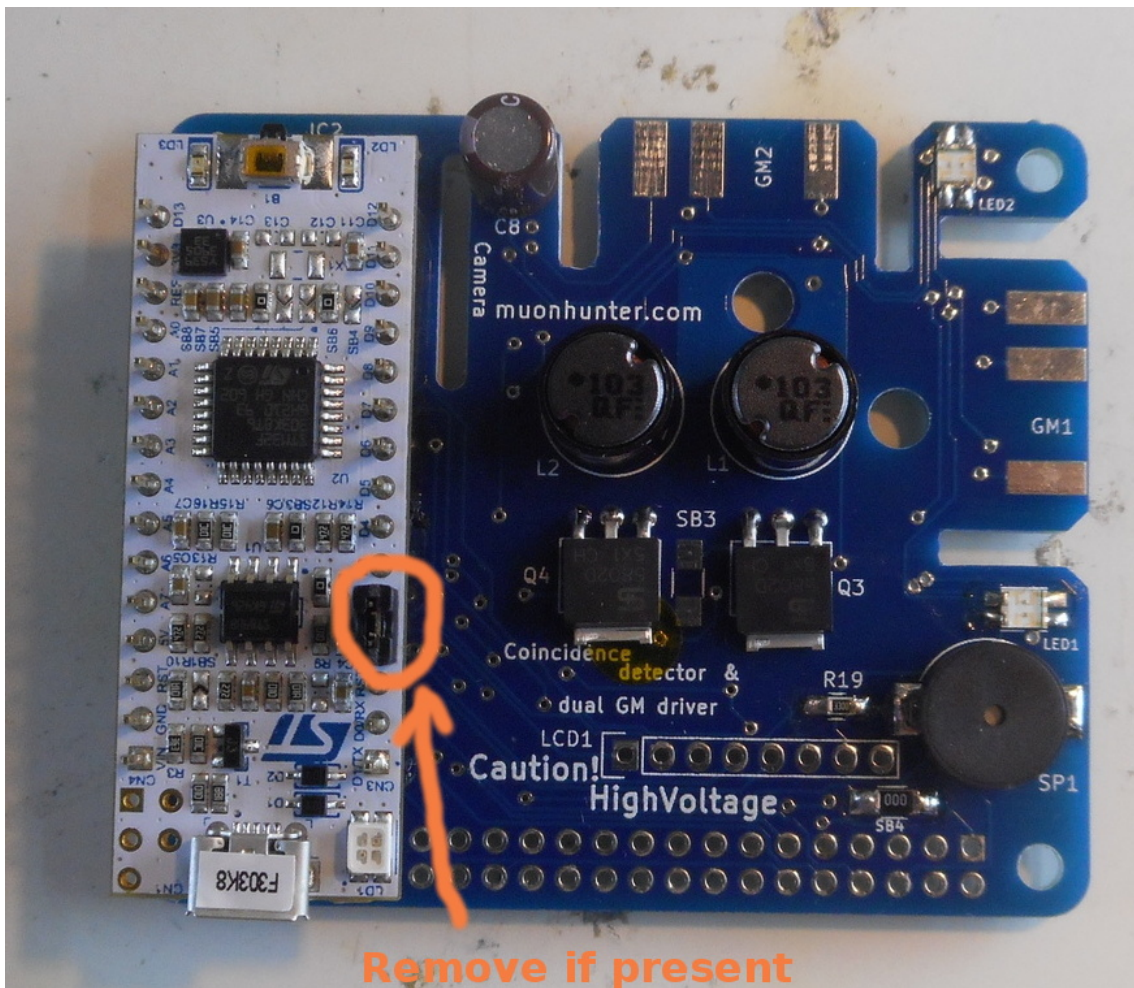


Figure 1: ST micro

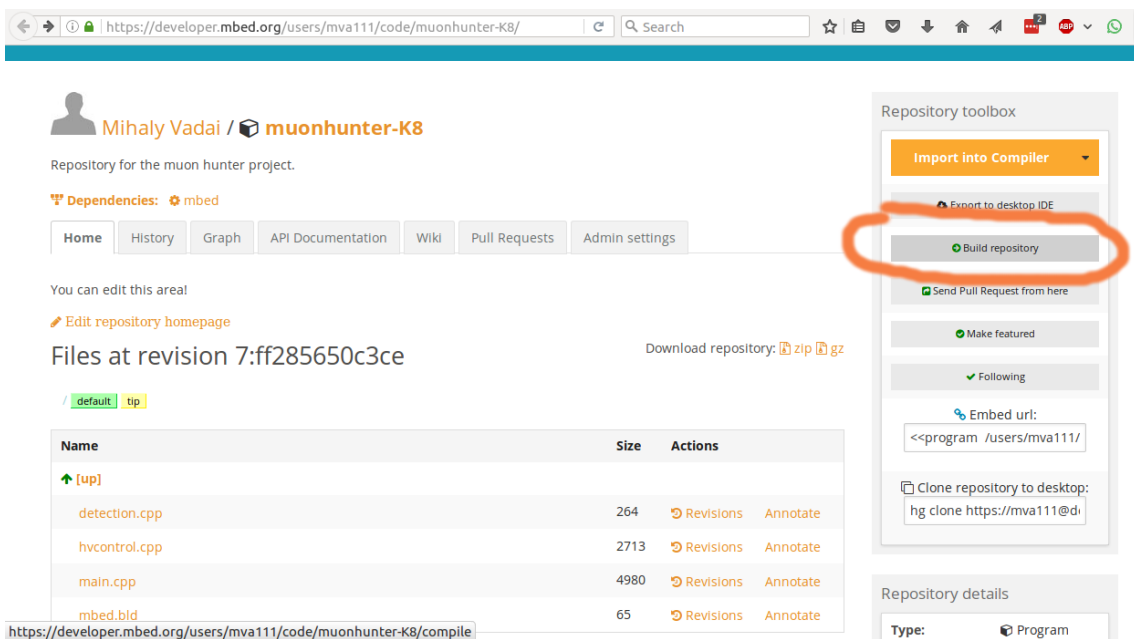


Figure 2: Click on the "Build repository link".

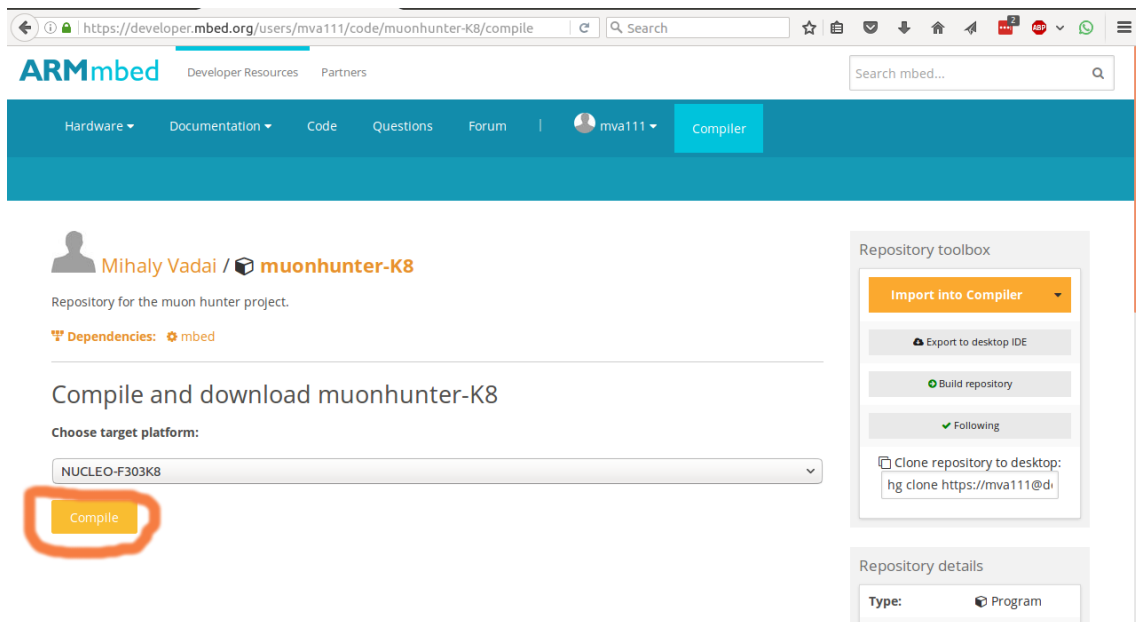


Figure 3: Click on compile button below the NUCLEO-F303K8 option.

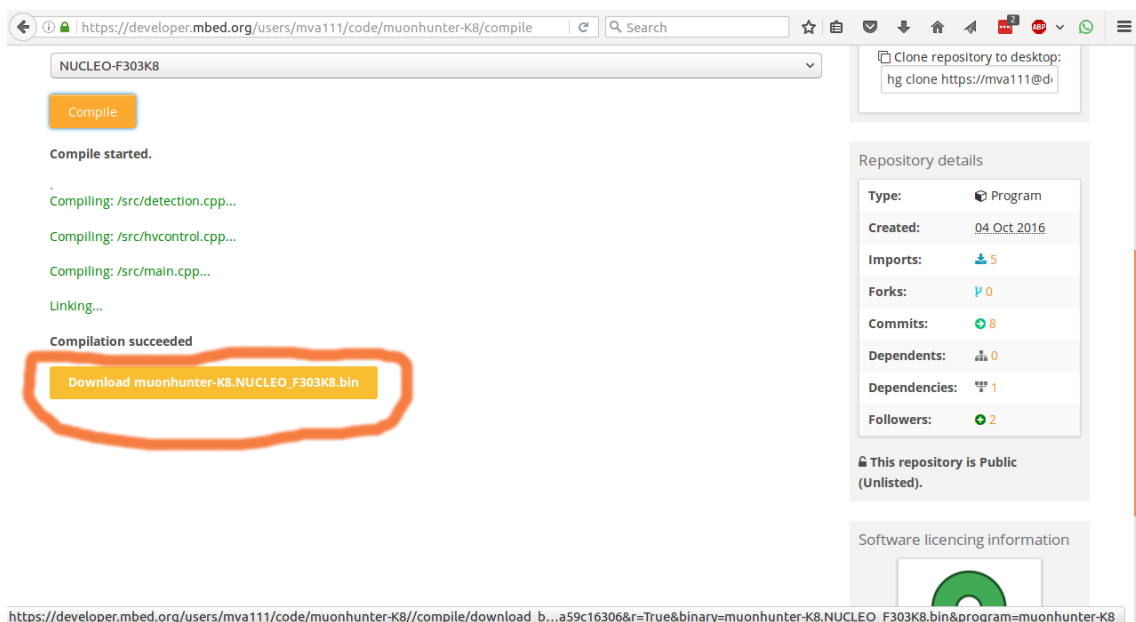


Figure 4: click on "Download muonhunter-K8.NUCLEO\_F303K8.bin"

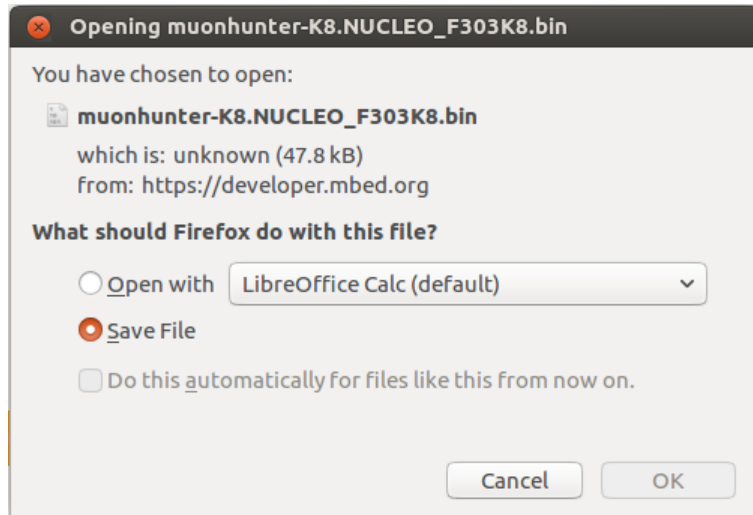


Figure 5: Save the compiled binary onto the ST USB flash drive.

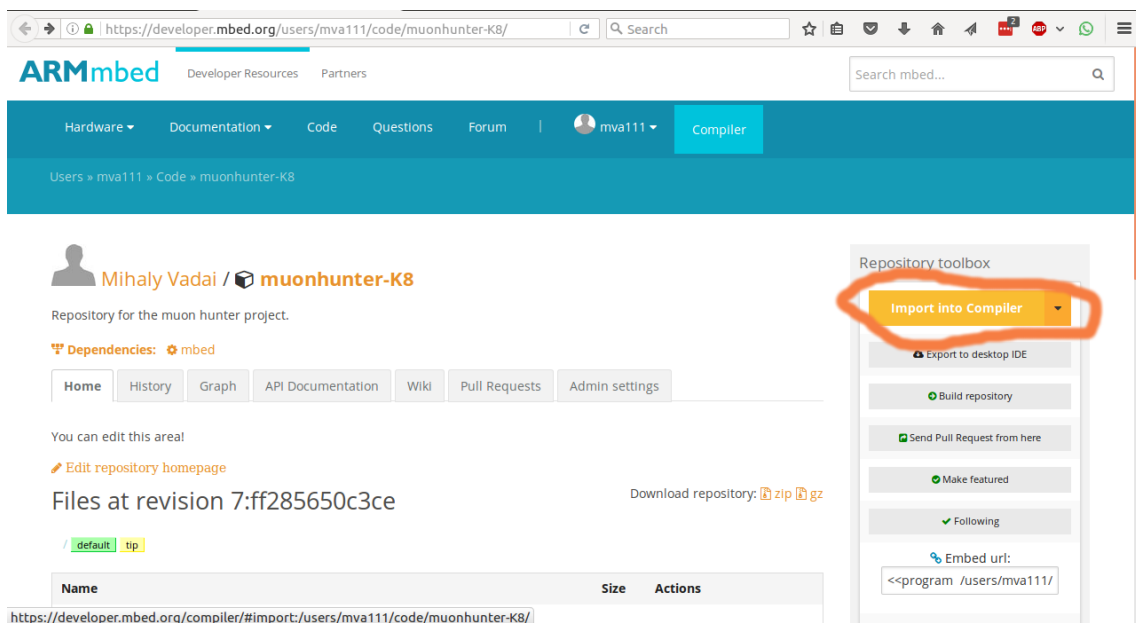


Figure 6: To change the firmware, click on "Import into Compiler".