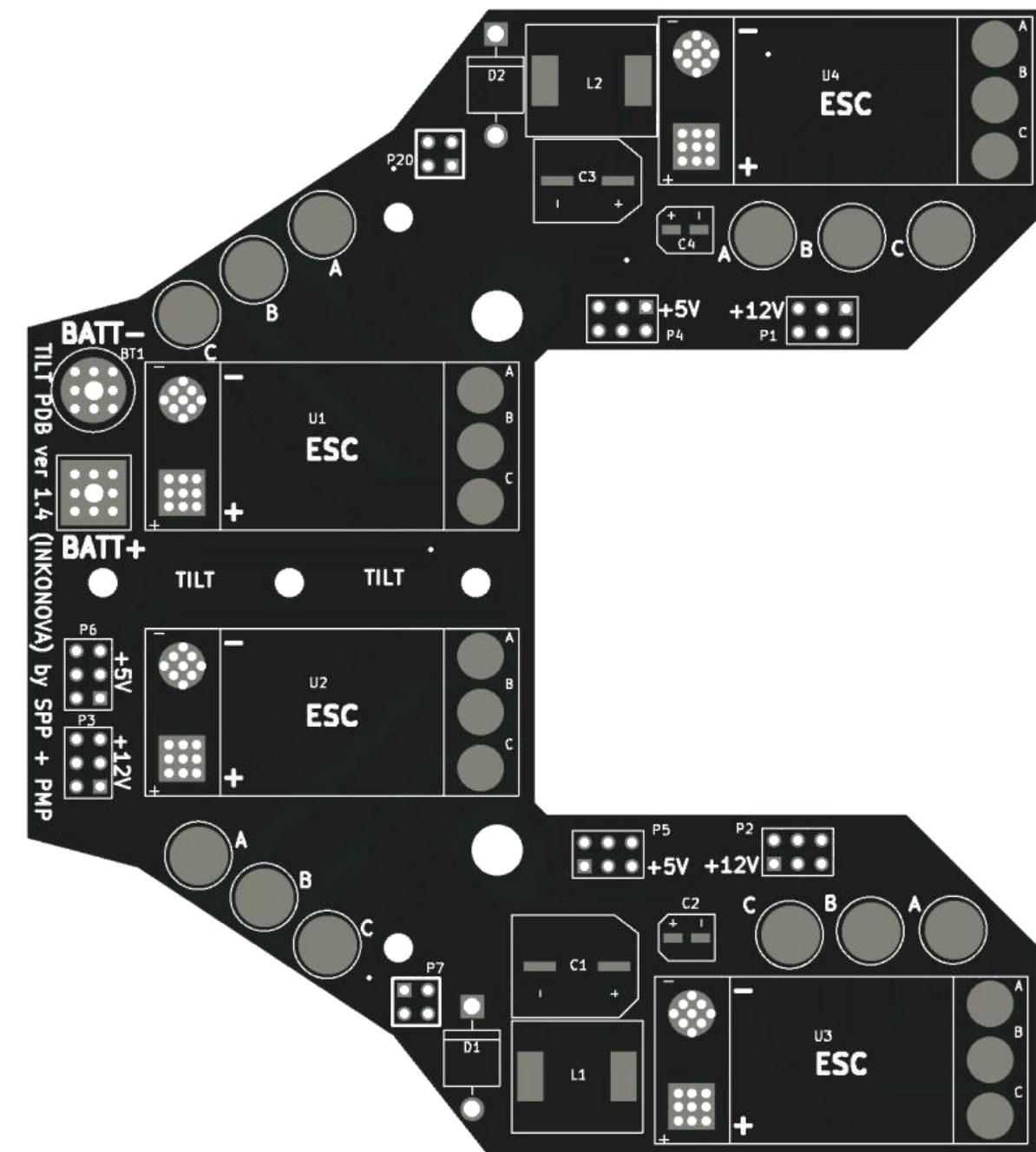


# Power Distribution Board (PDB)

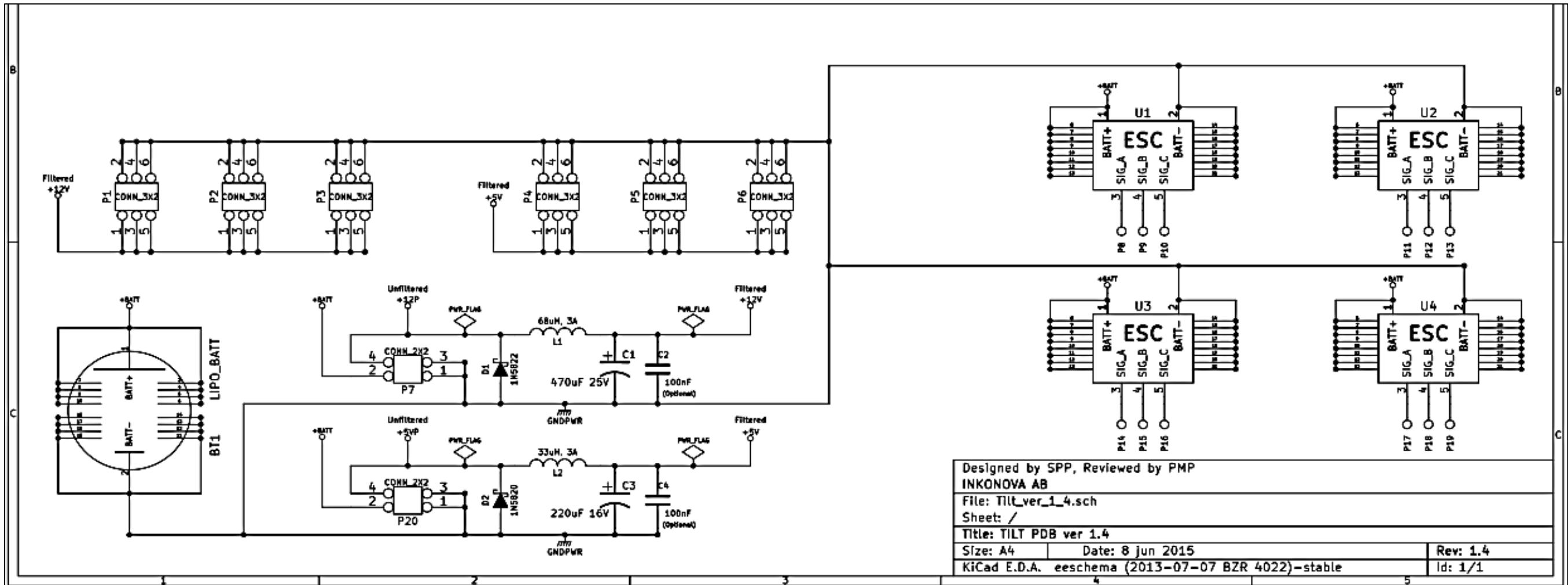
Power Distribution Board or PDB of Tilt Drone Racer has been specifically designed to withstand high racing electrical requirements along with voltage supply filtering. The first commercial version of Tilt PDB is released with version 1.4. Following are the features of the PDB:-

1. 4 ESC terminals with 30A current rating can be used on the PDB.
2. Can withstand high current up to 120A on the battery terminals.
3. Voltage filtering circuitry for clean supply at different locations of the racer drone. Uses LM2596 filter circuit design.
4. 3 access terminals for +12V voltage. A total of nine 12VDC supply points are provided.
5. 3 access terminals for +5V voltage. A total of nine 5VDC supply points are provided.
6. Clean access to ESC soldering pads and separate access to ESC output motor soldering pads.
7. High current access drill pads for better current propagation throughout the circuit.
8. Ground copper pour for low noise generation.
9. Clean design and enhanced appeal.



# Circuit and notes

The PWR\_FLAG (power flag) in the schematic below denotes the type of electrical connection on the power terminal and is not a component used in the circuit.



The filter circuit used is a standard LM2596 filtering circuit. If you wish to use a different regulator to generate +5V and +12V, you can do it. **An additional 100nF capacitor is also provided for high frequency noise reduction in the circuit but do not solder it yet: the small capacitor that both filter sets include are not usually necessary, test without them first if your FPV camera gets white lines when the motors are spinning. If you see lines, install the small cap in the line (5 or 12 V) where you have the camera connected (or the vtx line if the camera is powered by the vtx). Then, rotate the Naze so that the USB port is NOT in the same**

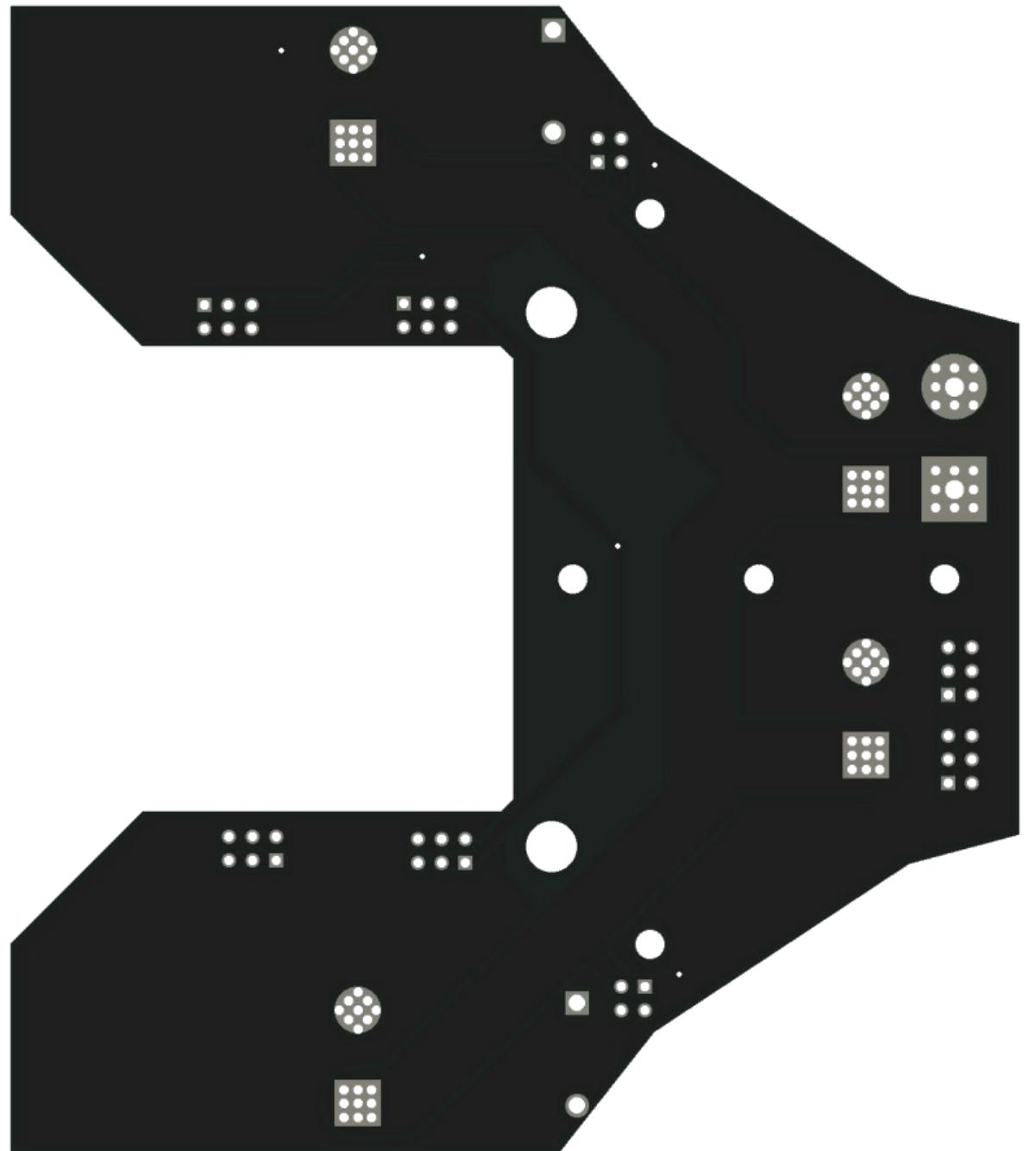
**side of the small cap you used: we found out that this small cap is exactly in the way of the USB port. Good news are that, as mentioned, from the beginning we put that small cap as optional, in case of need and that you won't usually need both small caps (leaving you one of the TILT sides free to connect the USB. We are already changing the PDB design to correct this and other small issues (labeling for instance).**

The user will take BATT+ and BATT- (GND) terminals from connector P7 and P20. Generate +5VDC and +12VDC on two separate voltage regulator modules. Connect +5VDC output of the user's voltage regulator module between pin 1 and 2 of connector P7. Likewise connect +12VDC between pin 1 and 2 of connector P20. Filtering circuit will furthermore filter the output of the user's voltage regulator and will distribute it at various locations of the PDB.

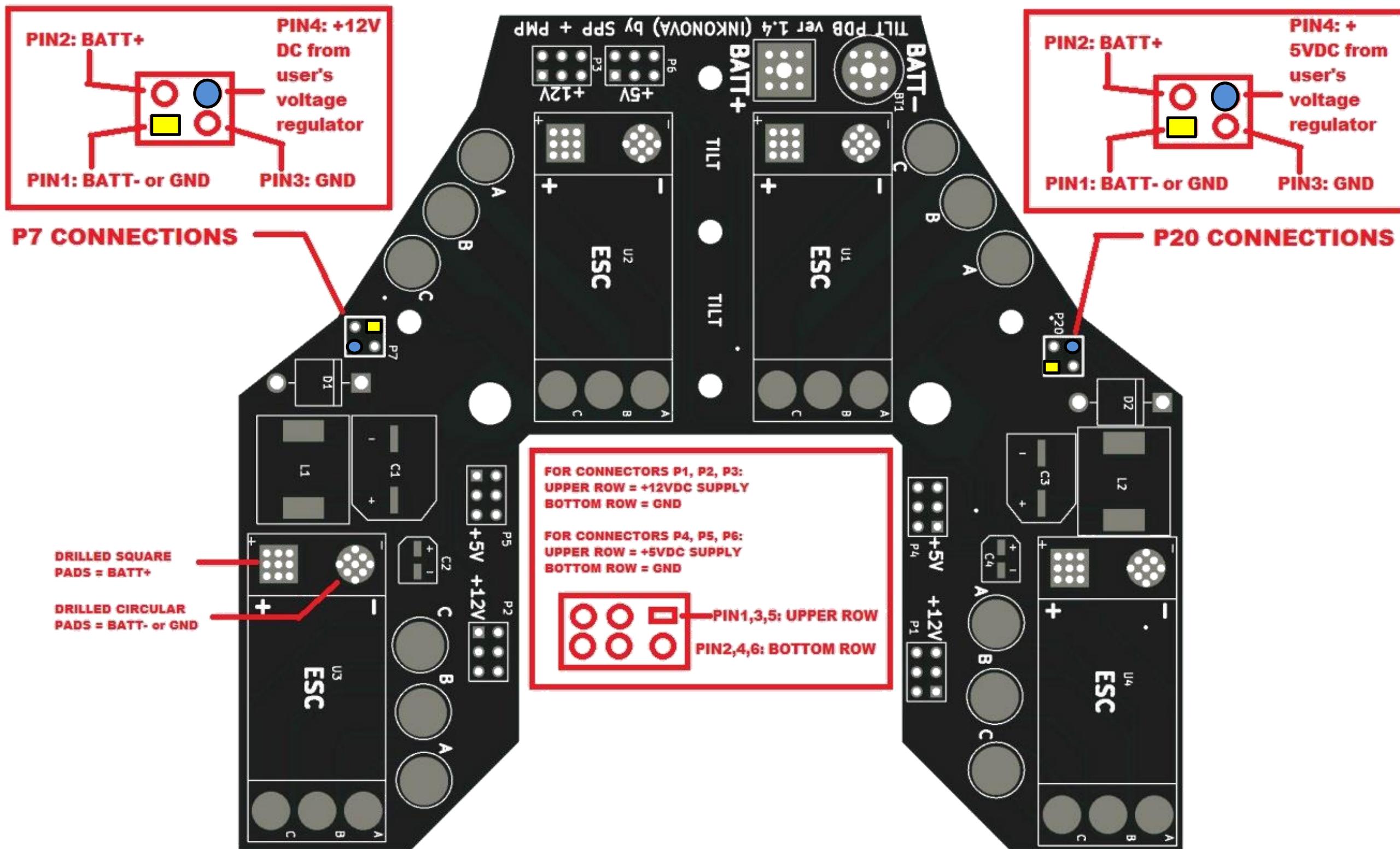
# Soldering advices

Tilt Drone Racer is built for professional users only. The use of PDB is open but needs to be handled with responsibility. Following are the general guidelines while soldering on the PDB:-

1. Always clean the tip of your soldering iron while soldering on the terminals. If the heat transfer is incorrect or excessive, the copper pads may wear off or in worst case tear off.
2. Use male pin header connectors to solder the voltage terminals of +5V and +12V. Directly soldering the pads with wire can cause shorts when the drone suffers a crash.
3. Protect exposed tracks of PDB from touching bottom side of carbon fiber chassis. Some 3D printed carbon fiber parts can transfer current through its body which can cause unwanted shorts to the system. Use low noise electrical insulation tape.
4. Use heat shrinks to cover the exposed battery terminals after soldering.
5. Do not use the system in rain. Exposure to water can cause electrical issues in the system and on the PDB. If exposed to water, put the system in uncooked rice jar so that the rice absorbs all the moisture. Always check the continuity of the circuit between ground and other voltage terminals to guarantee the electrical safety.
6. Do not solder when the system is powered ON.
7. Do not drill the PDB at any pads or body. It may hamper the performance and can also cause undesired electrical issues.



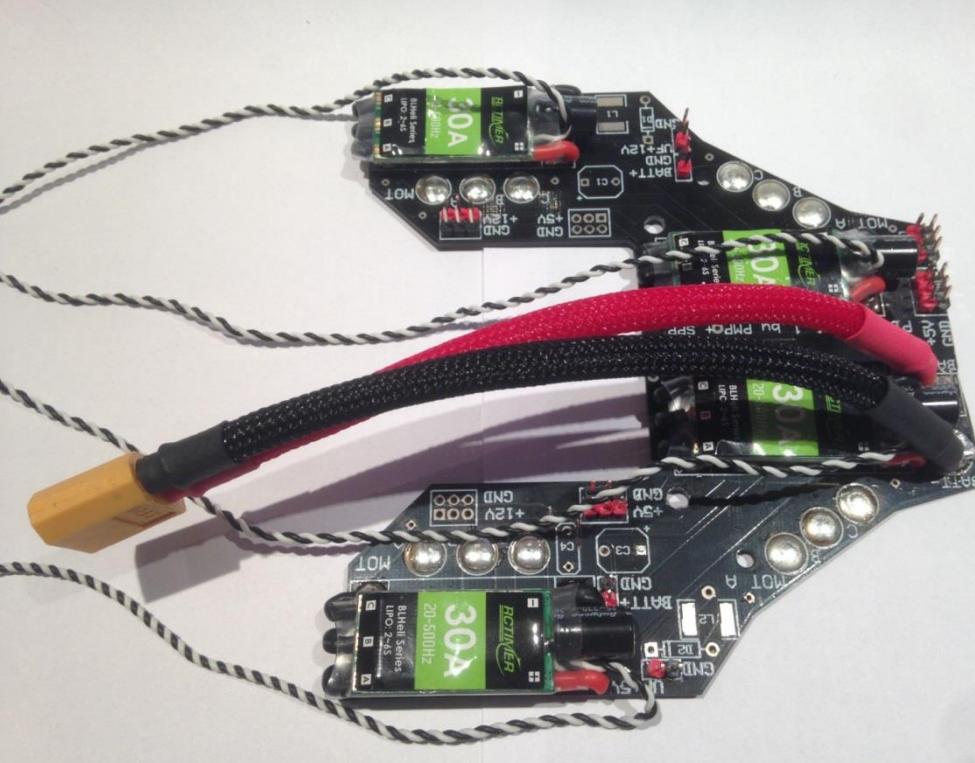
# Important Pin Connections

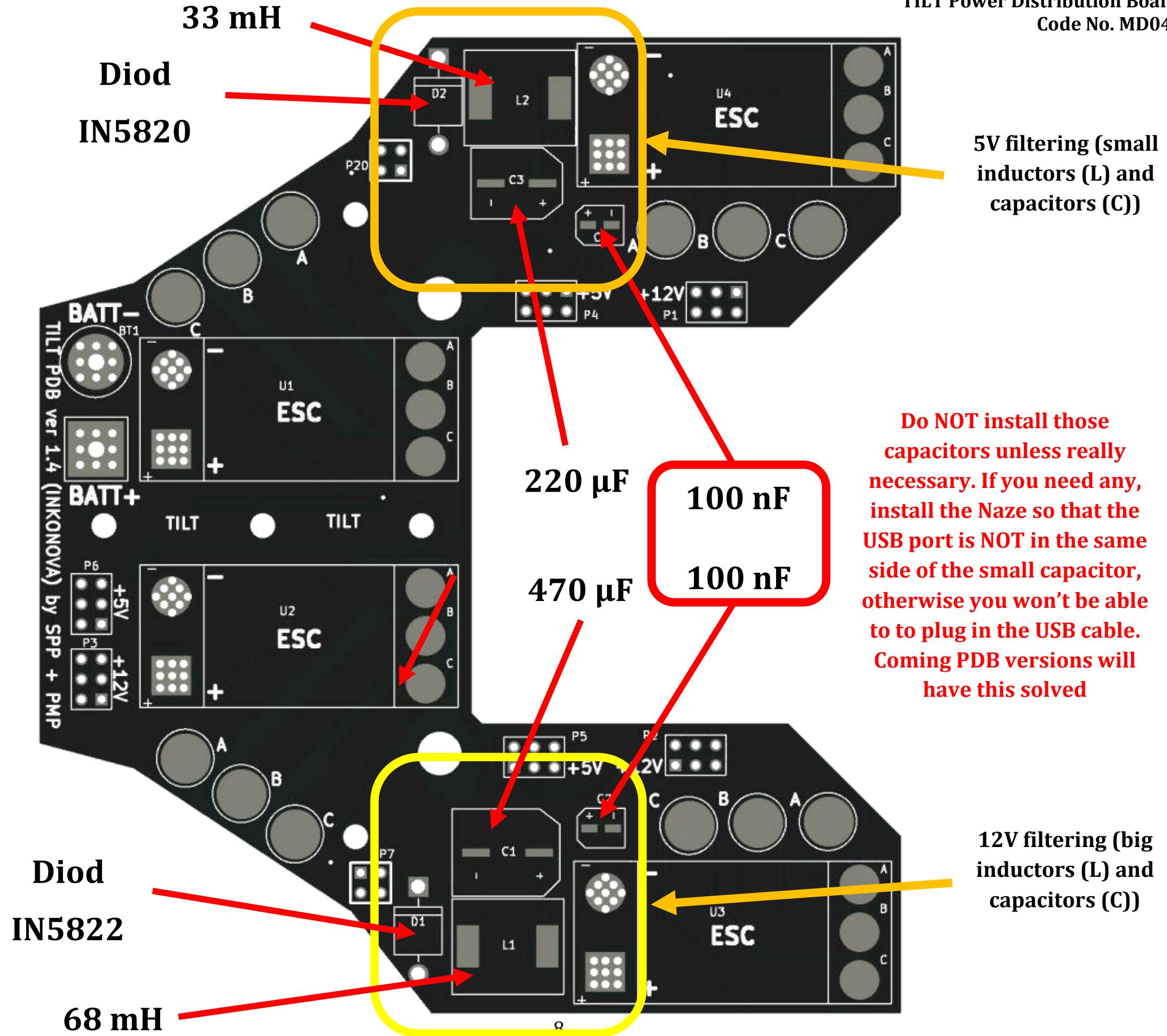


# Soldering the components

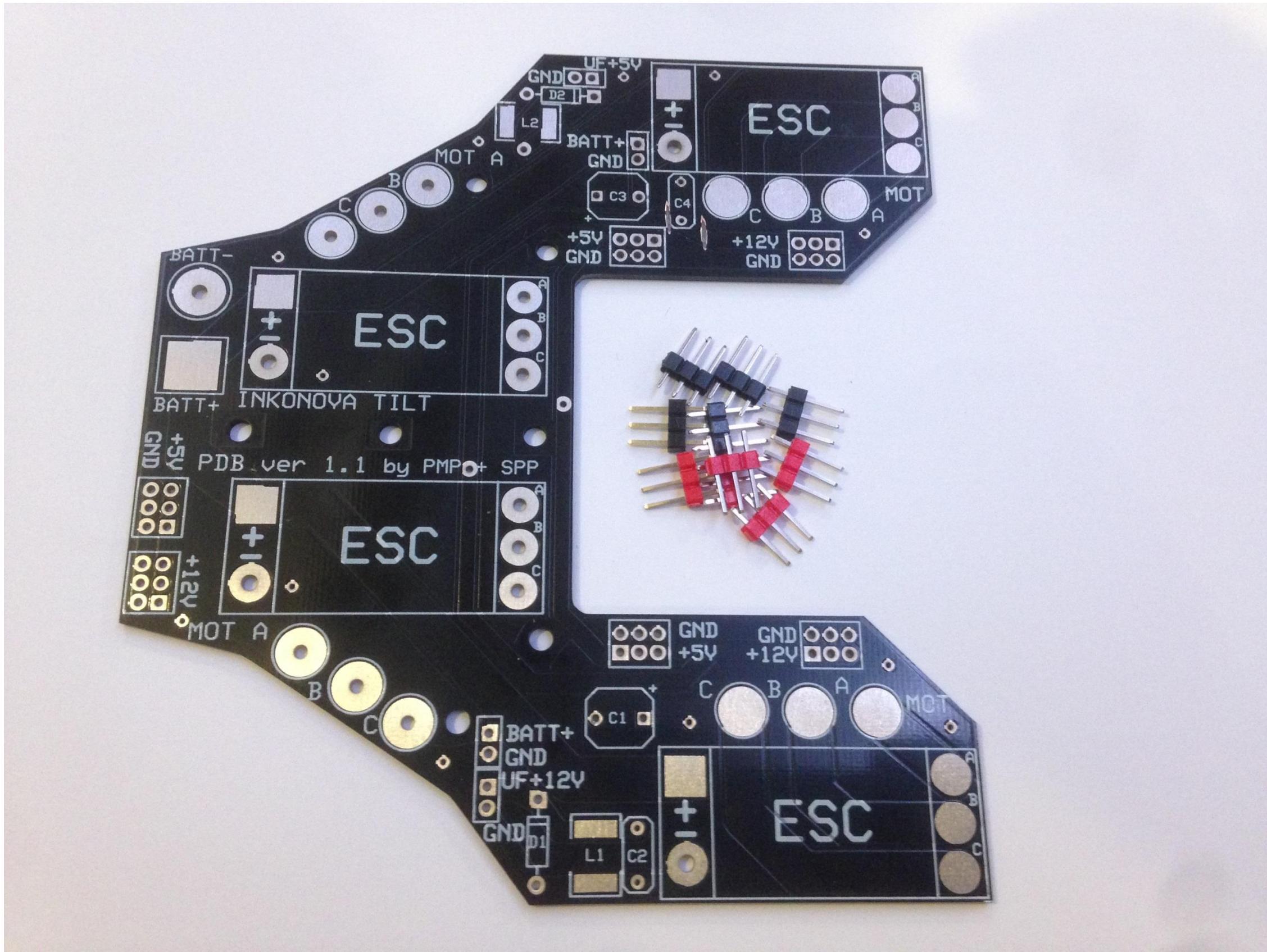
Don't get scared just because they are SMD, they are relatively easy to solder thanks to their size. Please check these videos, it will give you an idea of how to do it:

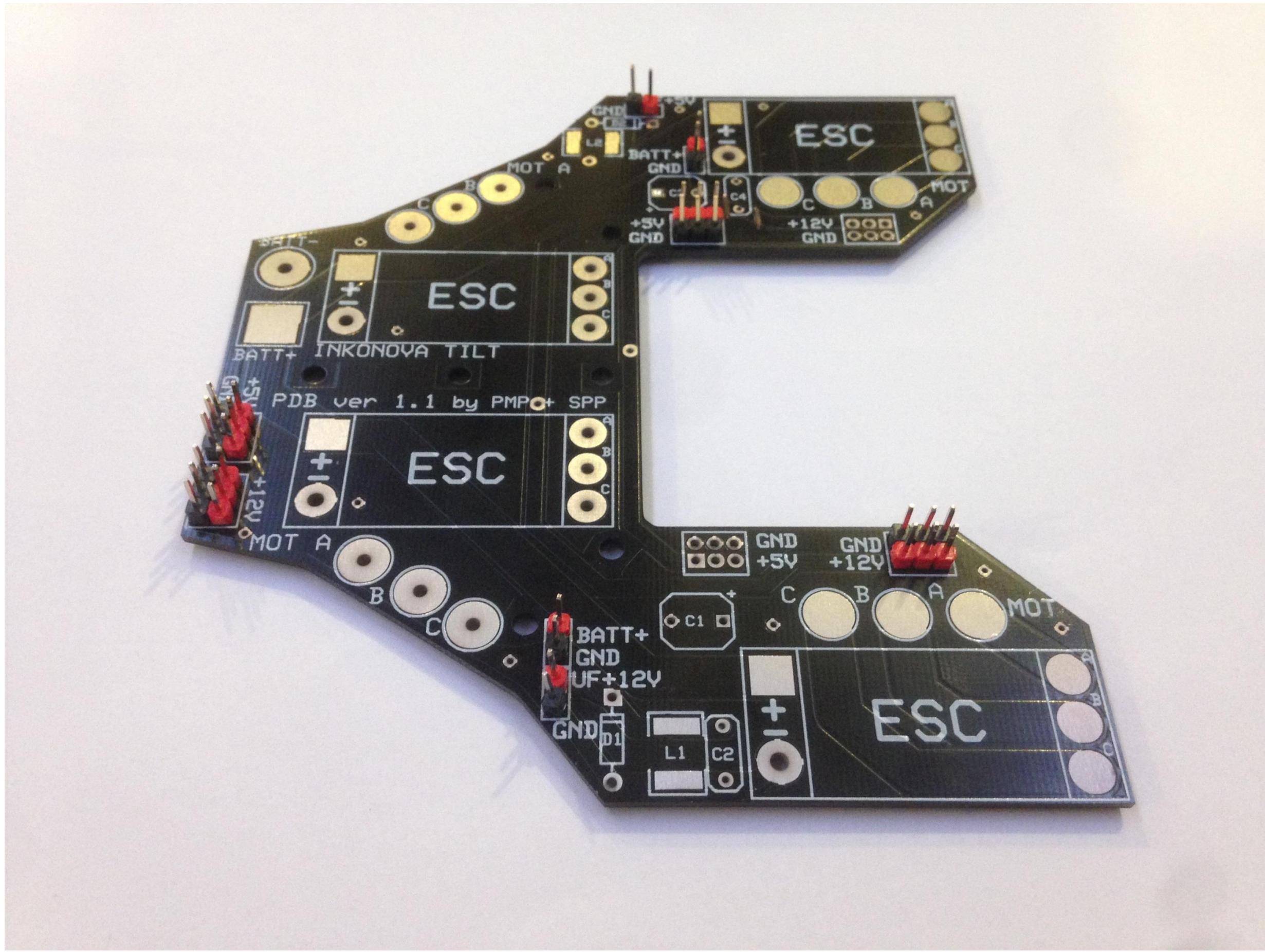
- <https://www.youtube.com/watch?v=sLYVZUpL0K0>
- <https://www.youtube.com/watch?v=xZzhvUyjoI4>

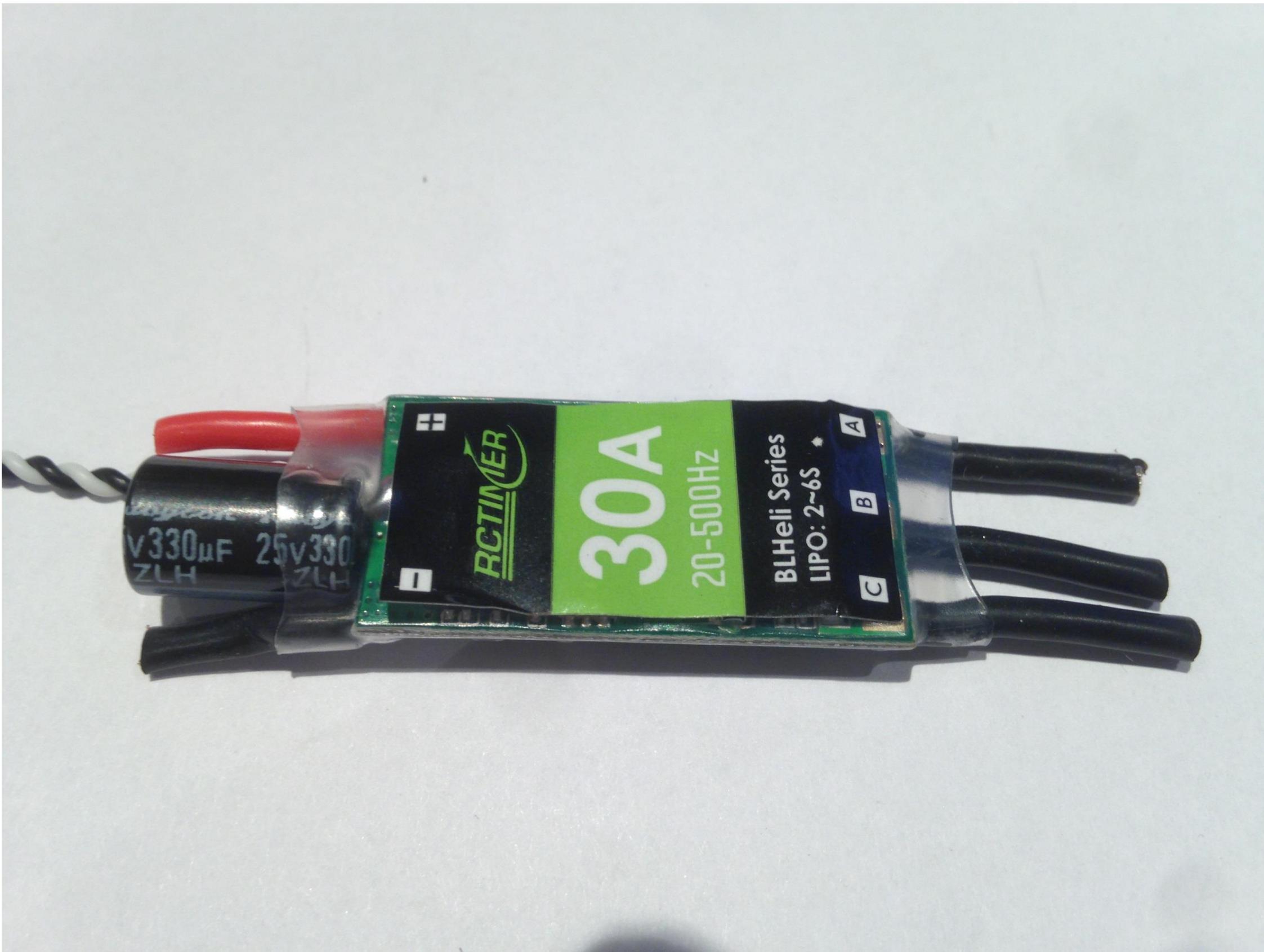
PARTS	HARDWARE	Cut the ESCs cables as follows: power cables to 16 mm from ESC board edge; motor cables to 18 mm from ESC board edge. Solder the ESC's motor cables as shown in the picture. Then turn it back, bent the power cables 180 degrees and solder those in the PDB. Add the battery cables.
<ul style="list-style-type: none"><li>• Same as step 8a *</li><li>• 1x battery cable red</li><li>• 1x battery cable black</li><li>• 1x XT60 male connector</li></ul> <p>* Refer to the PDB manual for detailed instructions</p>	<ul style="list-style-type: none"><li>• None</li></ul>	

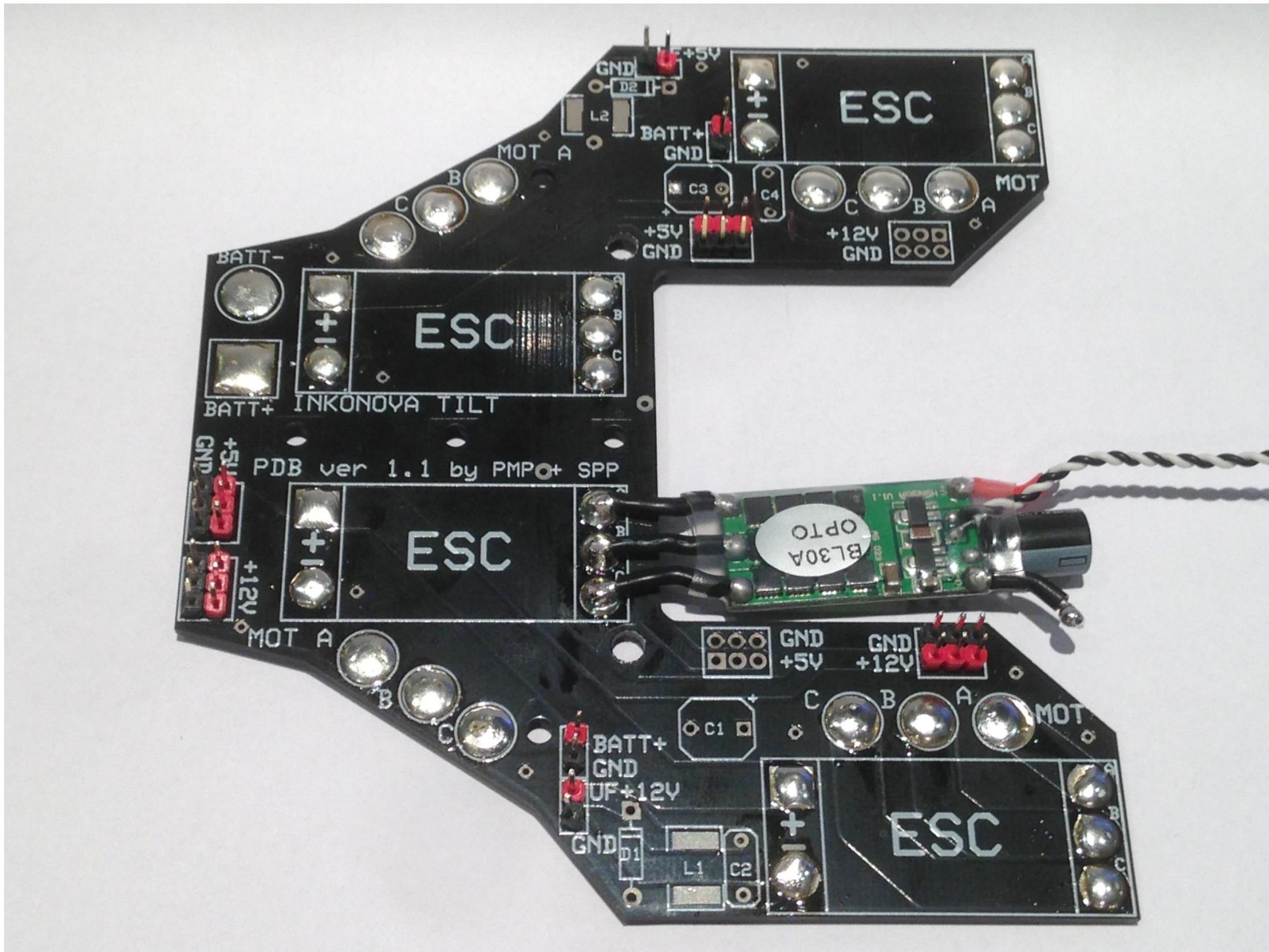


## IMAGES TO USE (soldering steps)

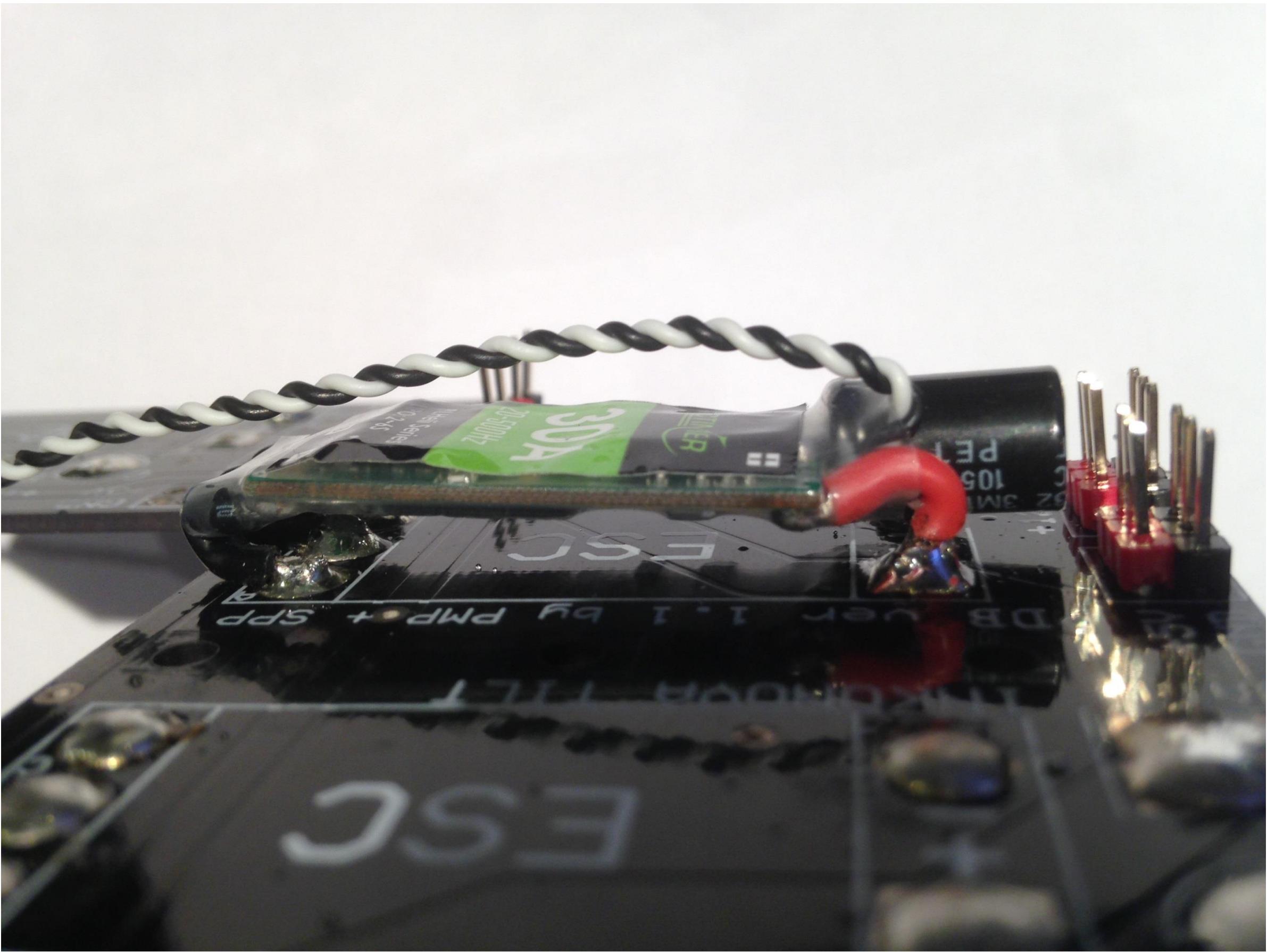


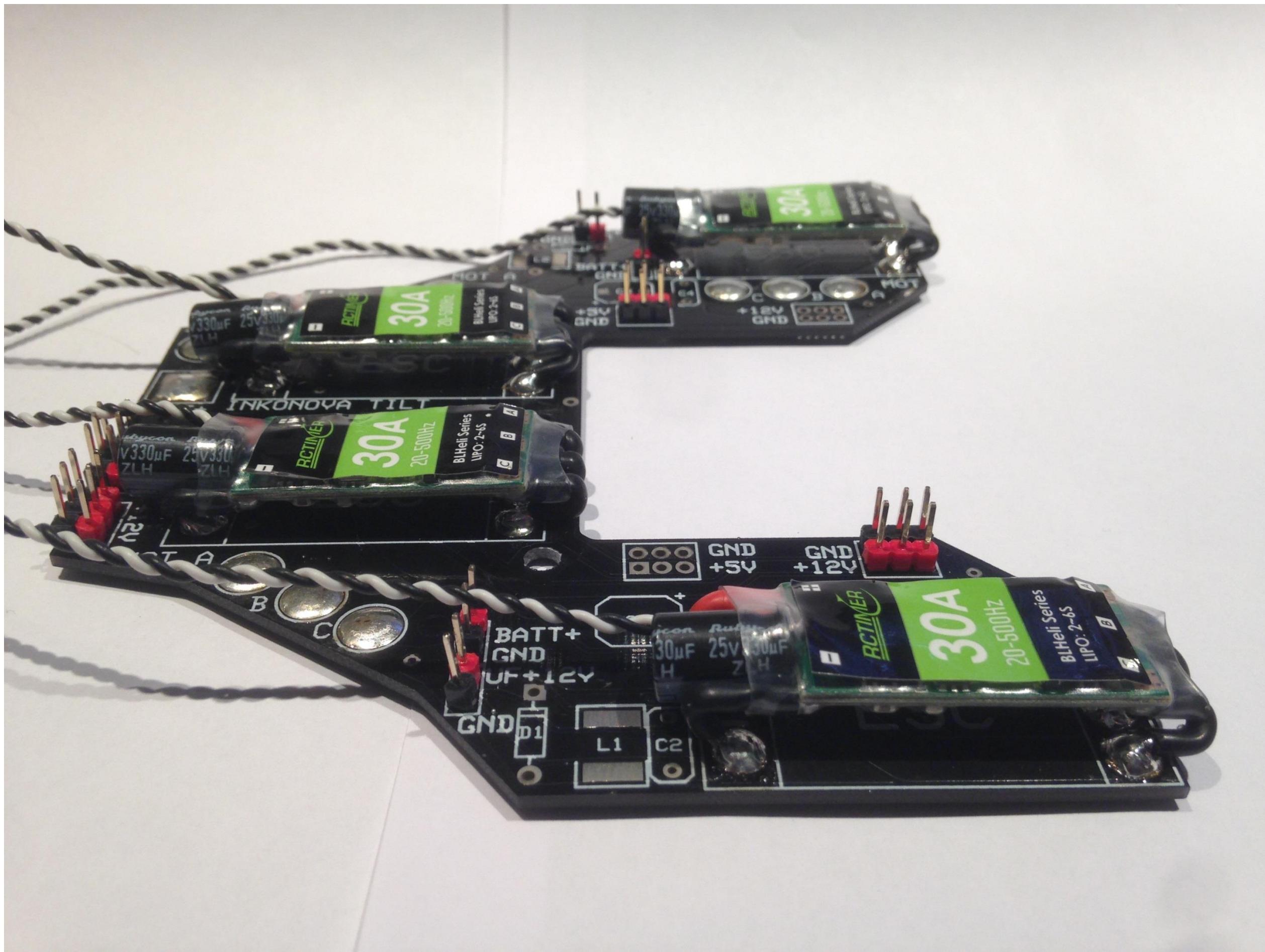


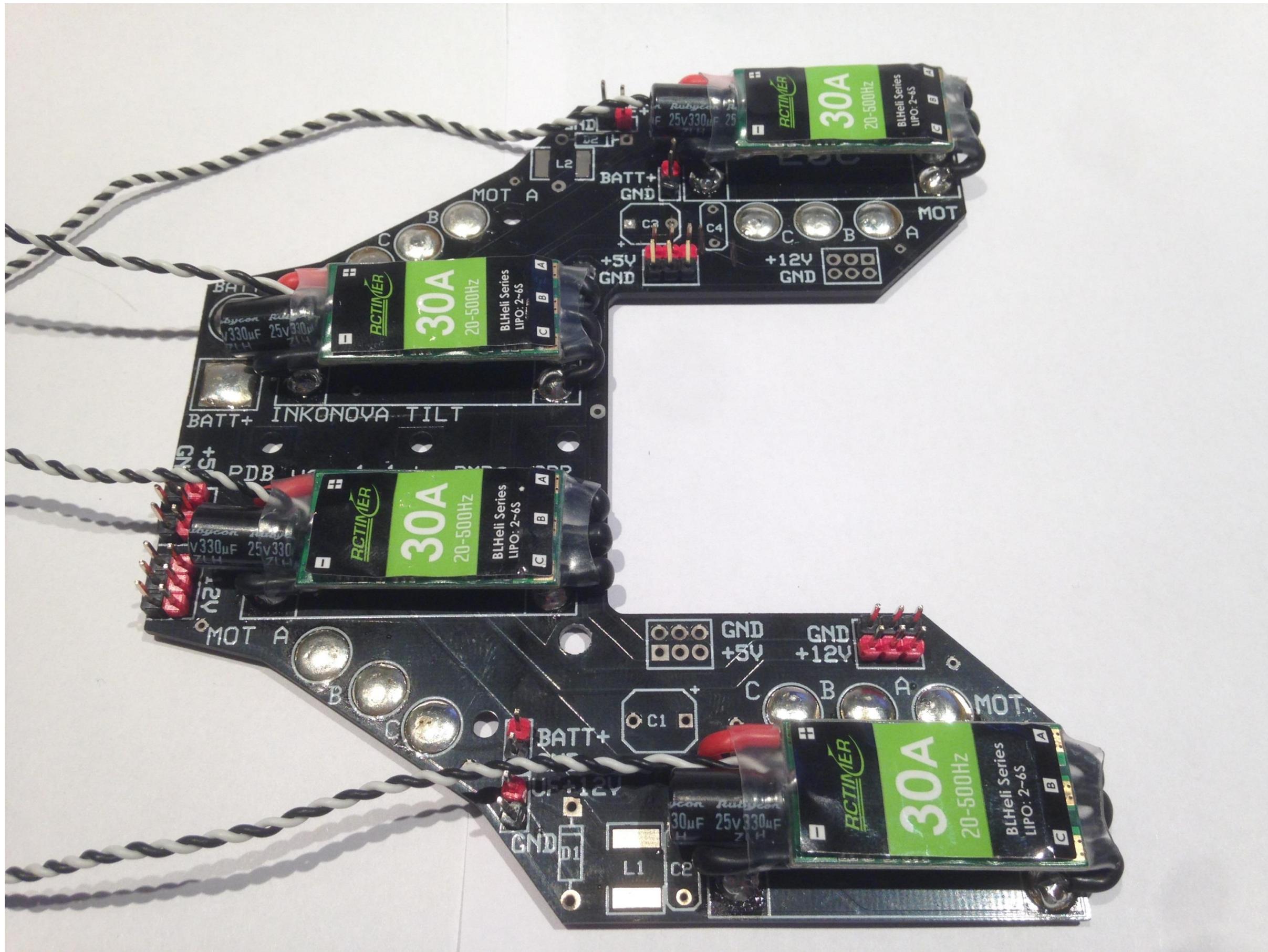


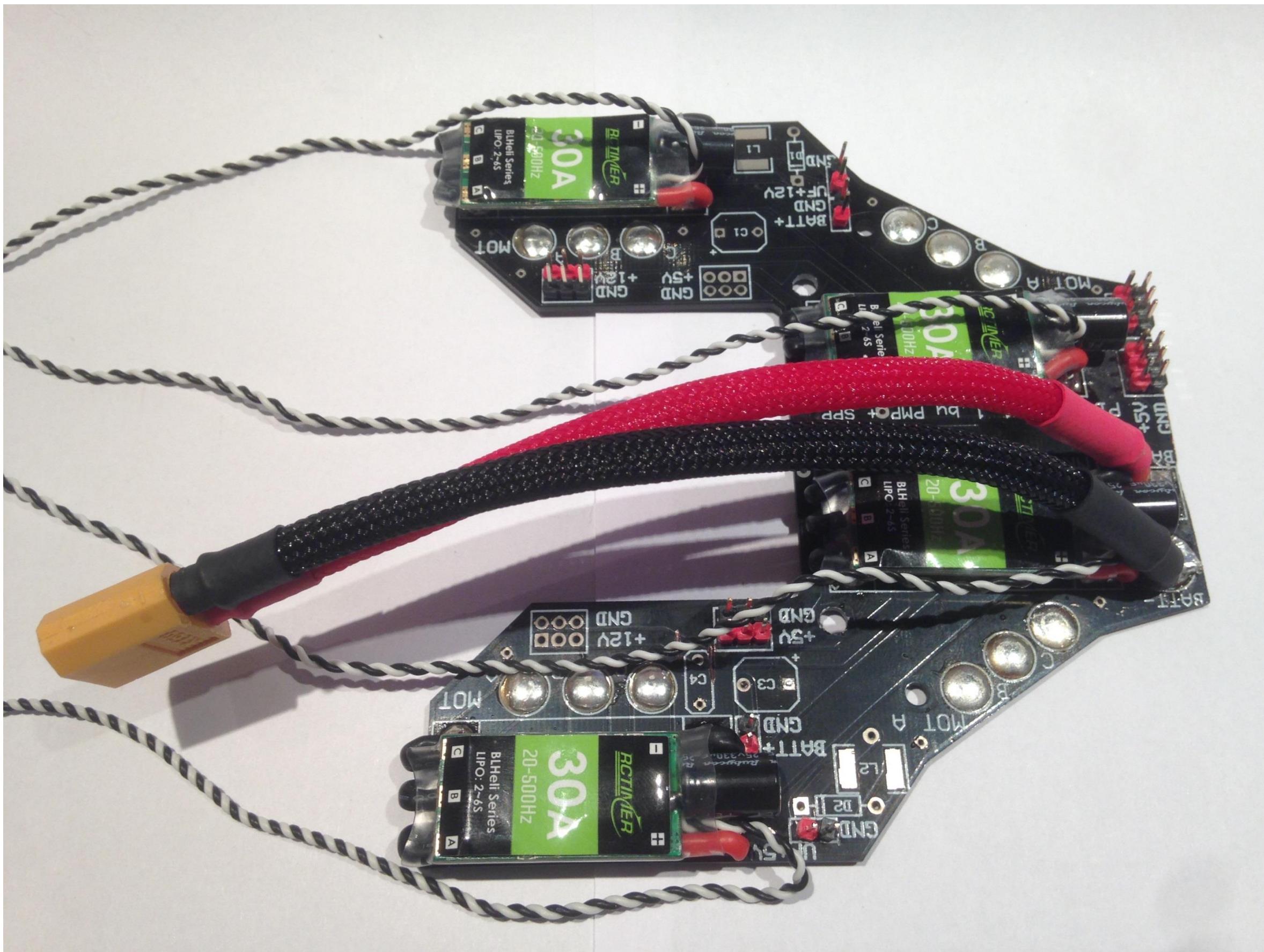


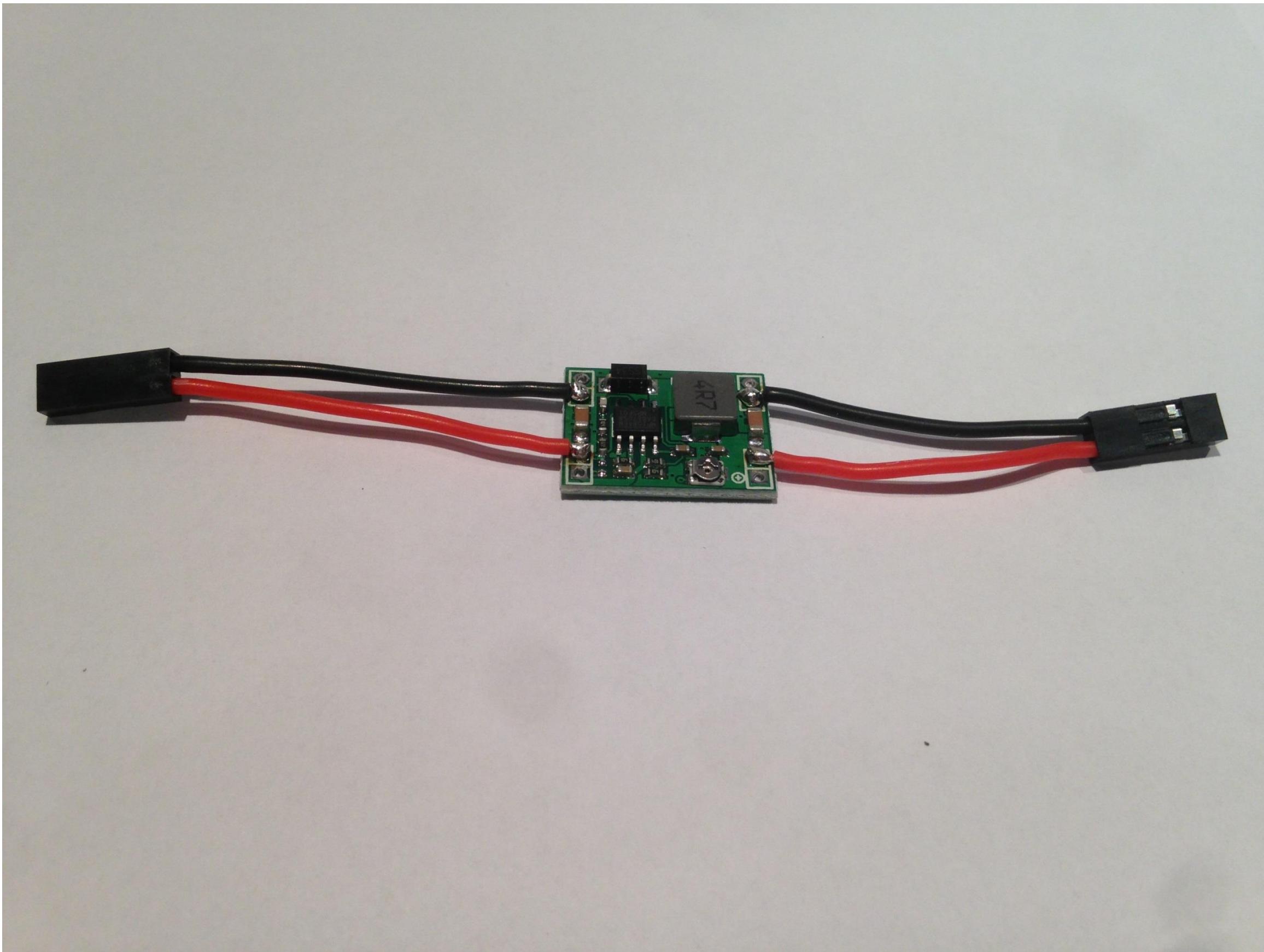
**NOTE: the PDB version shown here is previous than the one you got. Check that the positive and negative cables are properly oriented, meaning you will solder the ESCs in the flipped 180 deg with respect to these pictures. This is to have the MOSFETS on the top for better cooling.**

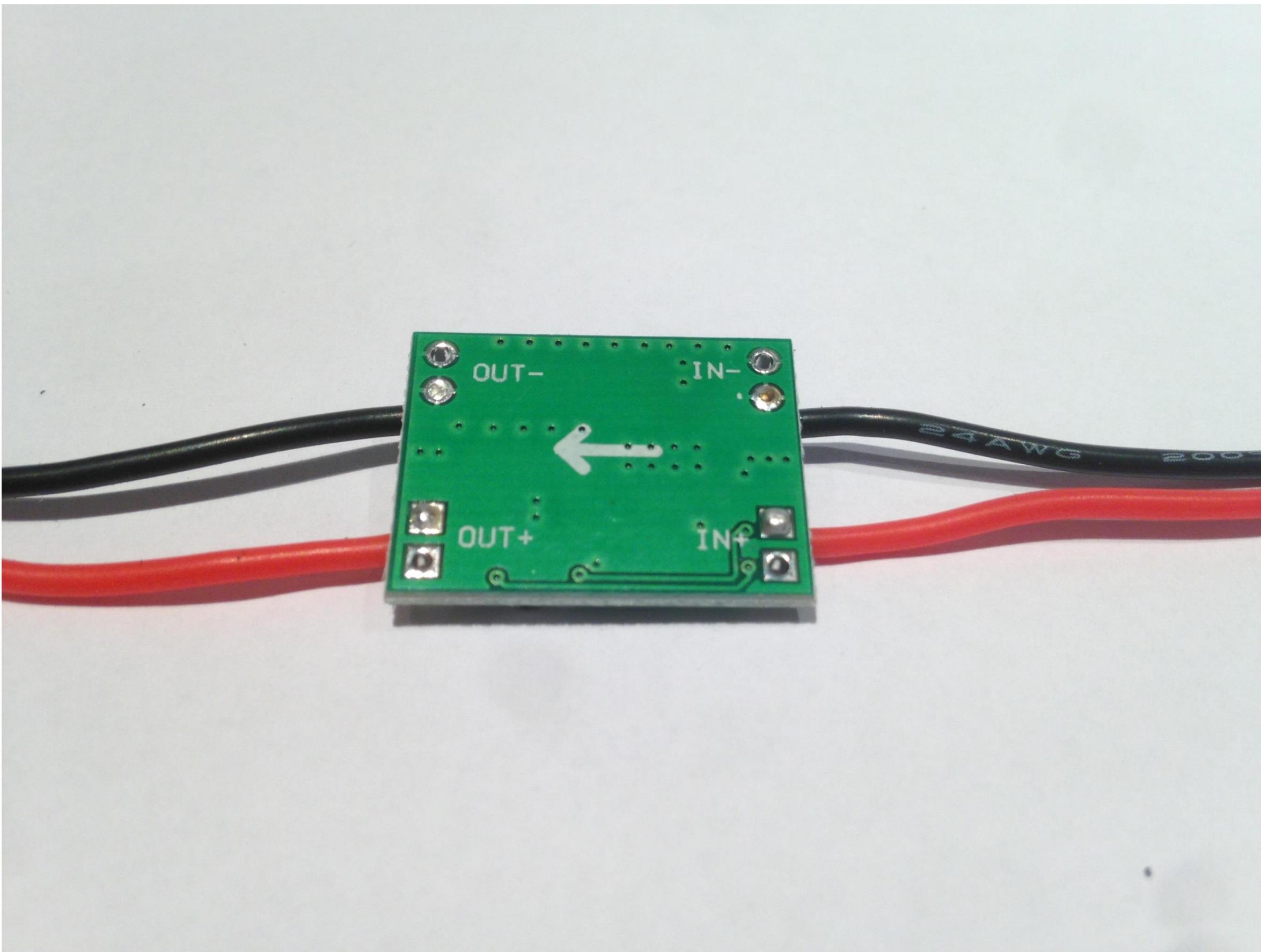


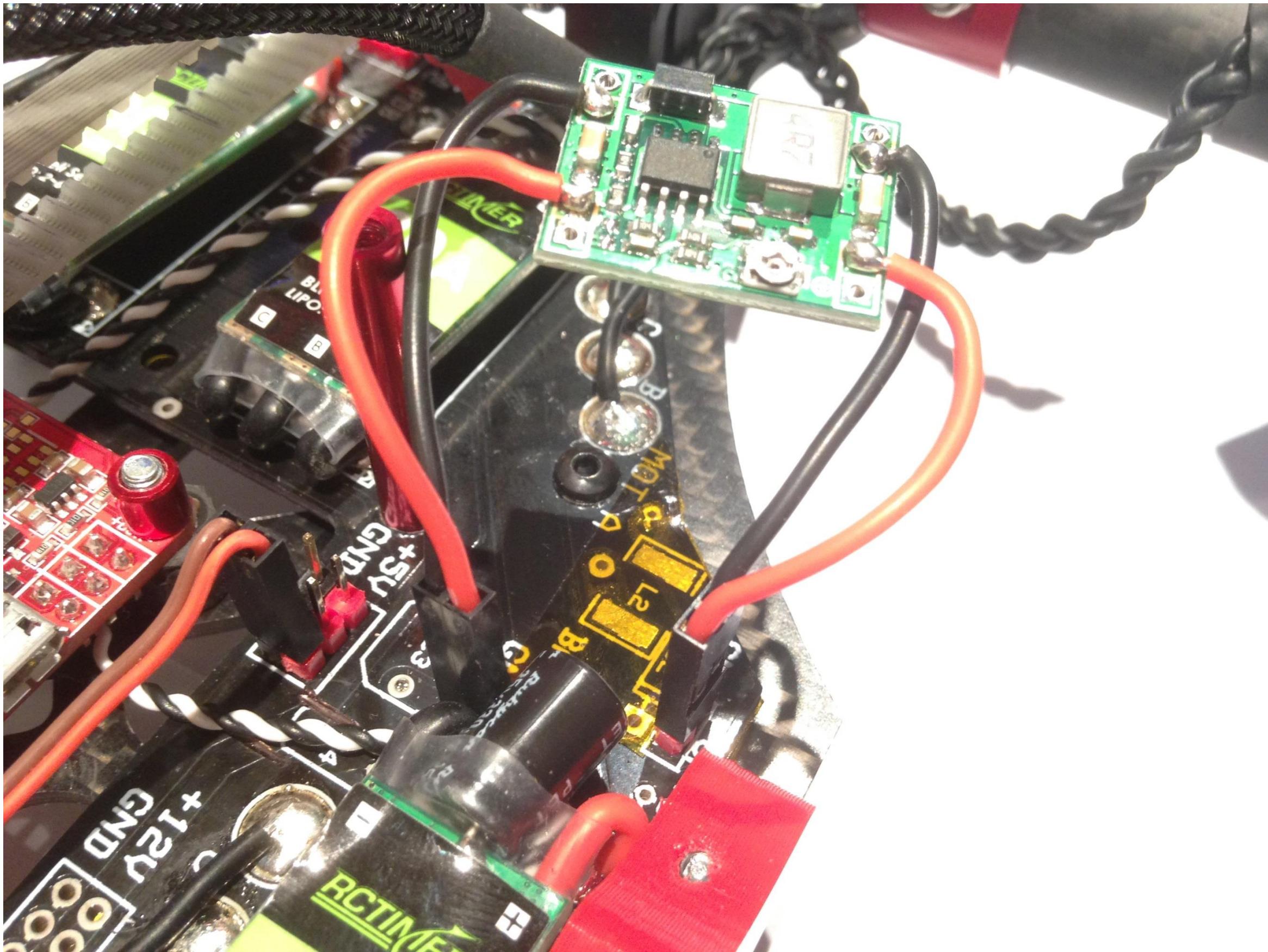


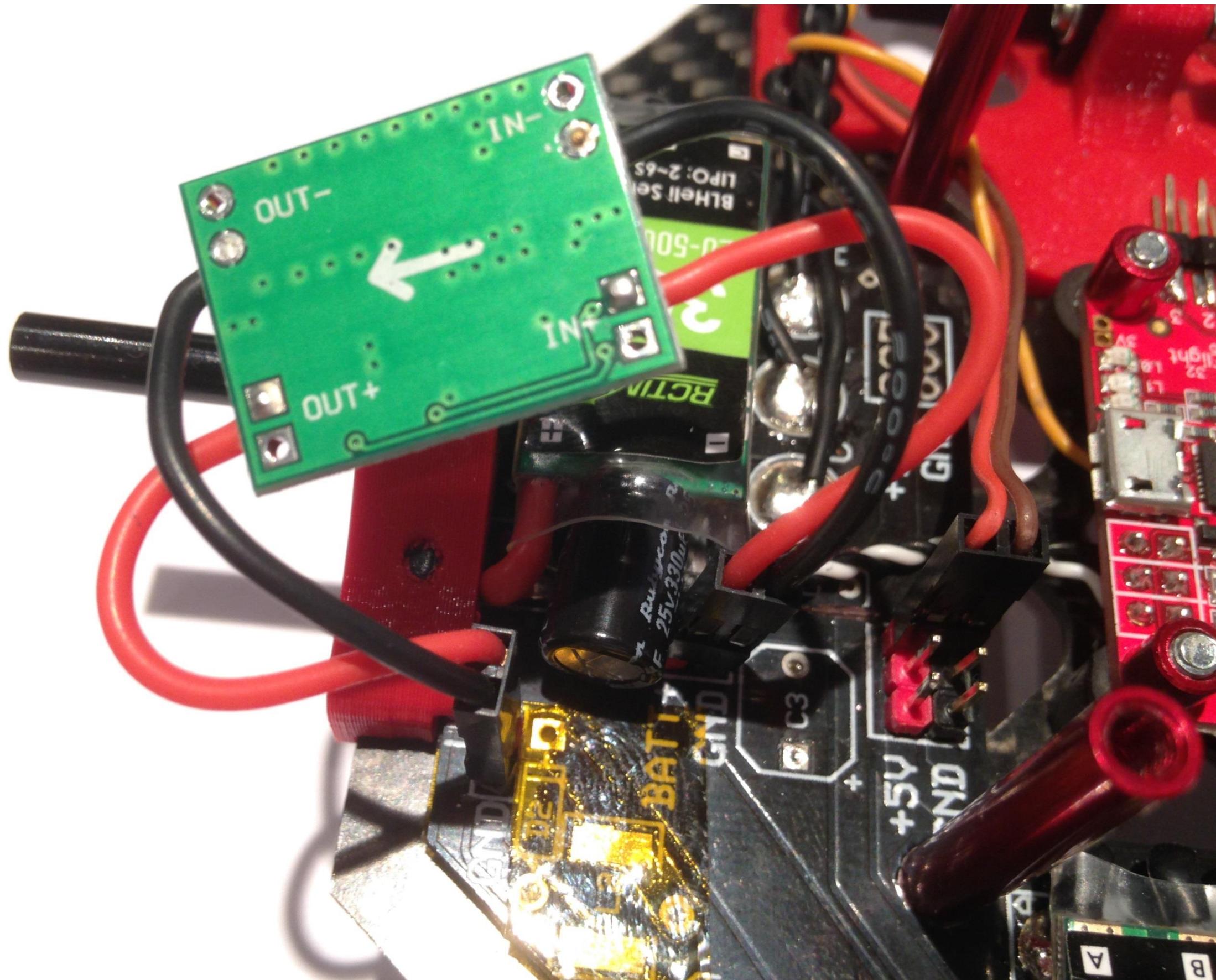












**Code Number: MD04001-00-2207 rev.2**

**Revision Date: 22/07/2015**

Inkonova AB (Makerspark)  
Kornhamnstorg 49  
111 27 Stockholm  
Email: [info@tilt-drone.com](mailto:info@tilt-drone.com)



**INKONOVA**  
ENGINEERING CONSULTANCY INNOVATION