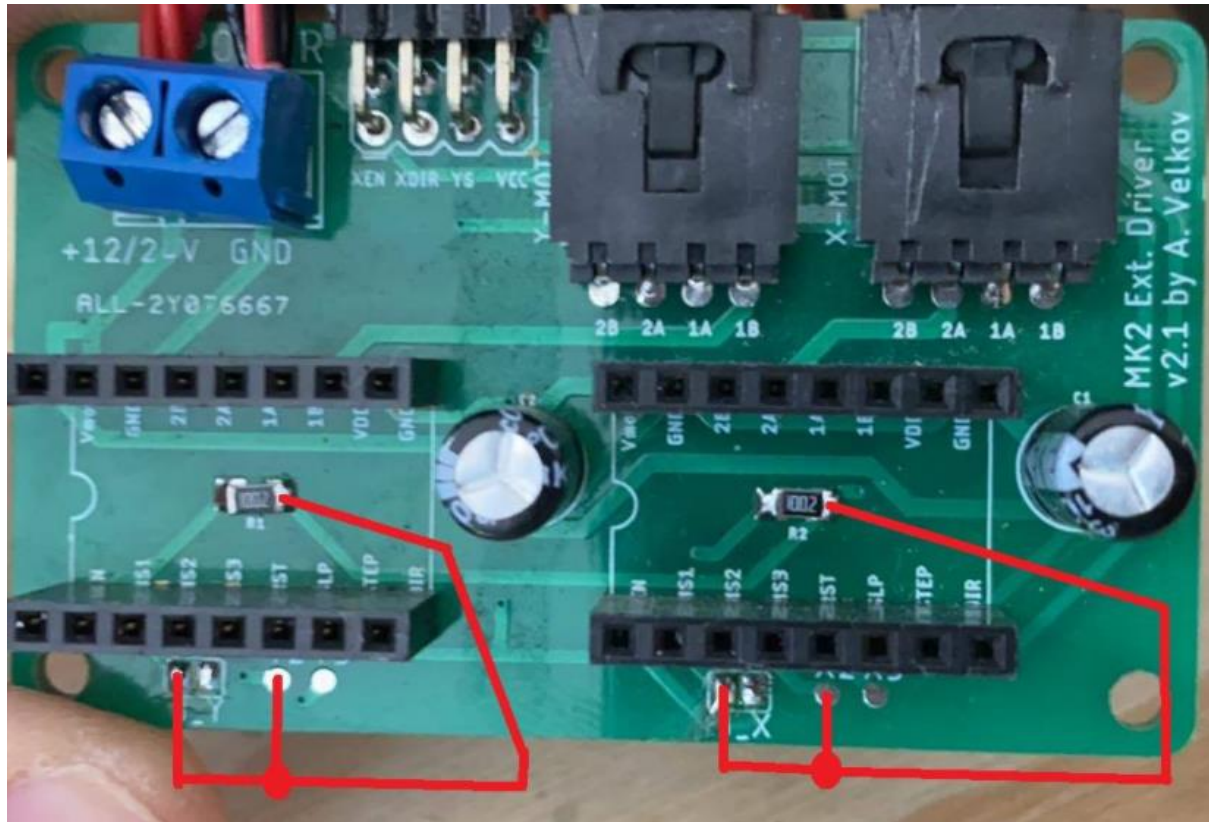# Converting v2.1 to v2.4 and use TMC2209

When I created v2.1 there was no TMC2208 or TMC2209. It was designed for TMC2100.
That's why you need to make some modifications to work with those.
I recommend buying TMC2209 in STANDALONE mode.

De-solder the jumpers (J_Y and J_X) on both boards and wire them as shown on the picture below:

Be very careful and check everything with multimeter.
When done check for shorts between GND and VDC pin.

Next you need to cut the black cable connectors (Marked X Y Z etc.) from the gray data cable that go
to mini-rambo and leave only the 8-pin connector going to the ext. driver board.
You will solder them to your mini-rambo later by the installation manual. They should look like this
at the end:

Next you need to follow the guide for v.2.4 here:
https://drive.google.com/open?id=1o_A4ZHai253kLMRttBMnLbEIv-KRri8t

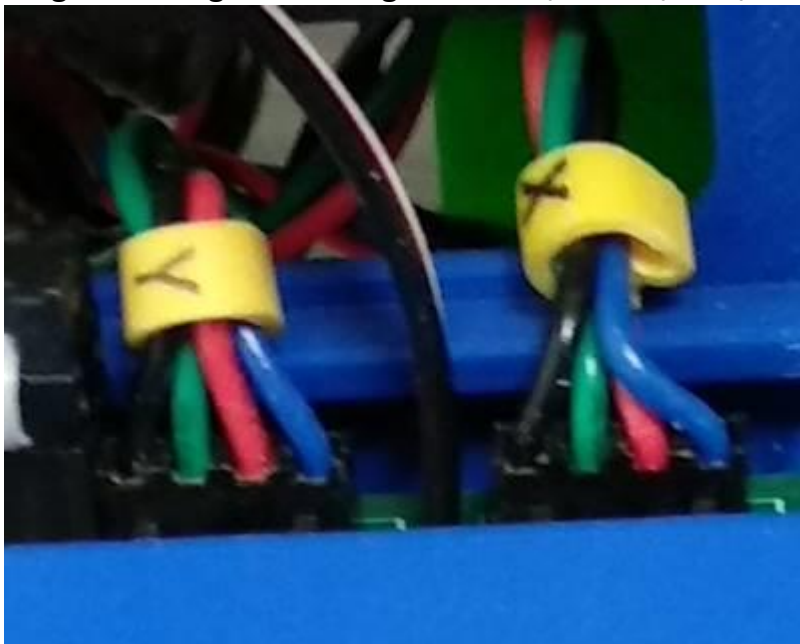Also follow the manual for second board for Z axis if you have a second board.

One more important thing:

Most probably after plugging the board your motor axes will be inverted (X moving backwards instead of forward etc.).
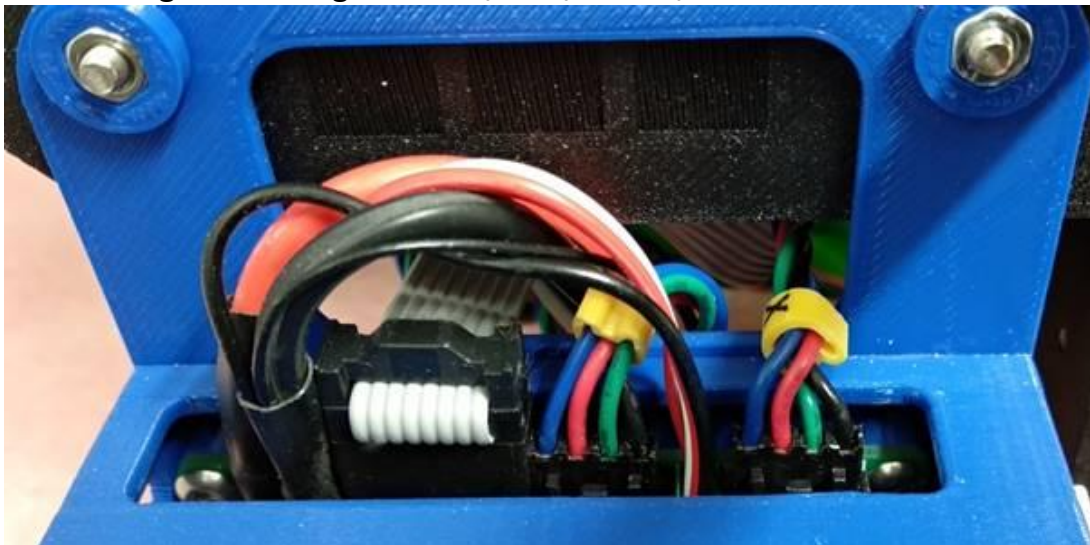If so you will need to swap the wires on each motor harness (X, Y). Use a needle and remove them carefully from the connector, swap them and plug them back:
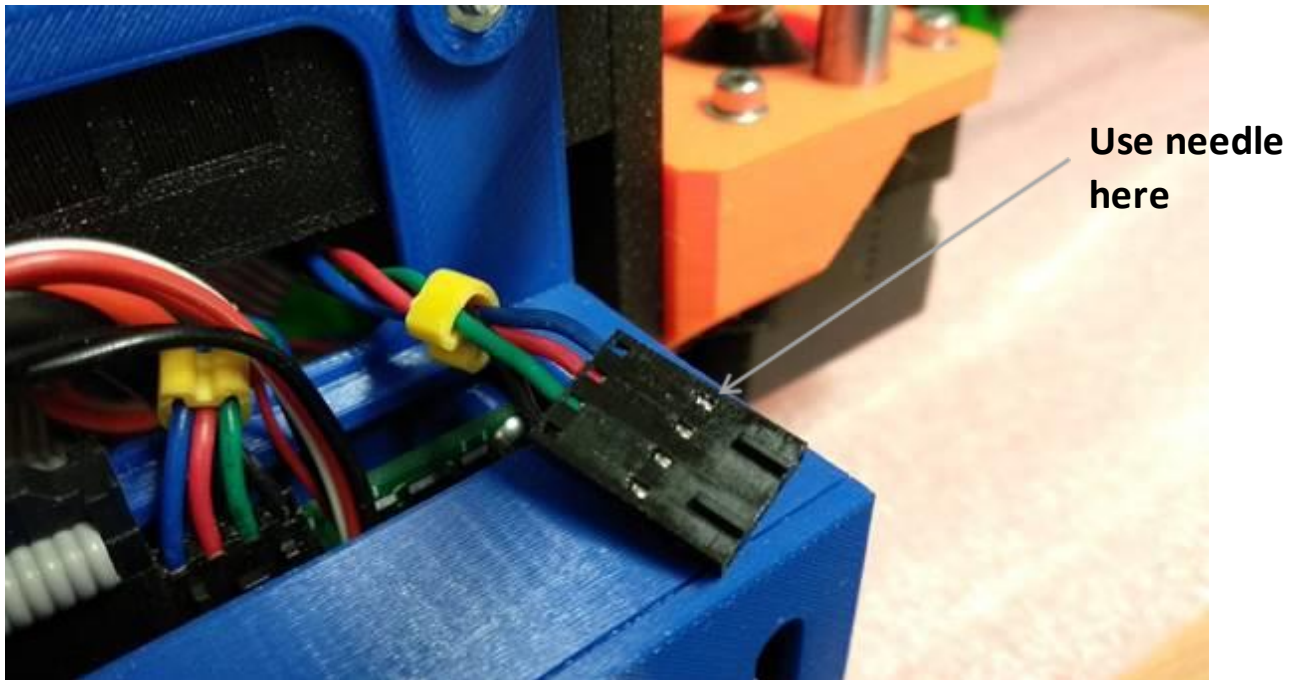
So, we need to invert (switch) all wires on the X and Y motor connectors. Since connectors cannot be plugged in the opposite way you'll have to use a small needle to pull all pins from the connectors and plug them back in reverse order:

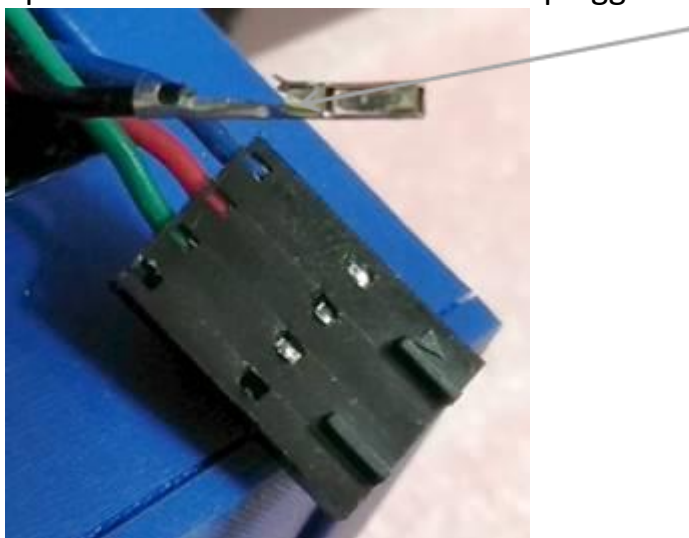Original wiring: Left to right – **Black, Green, Red, Blue**

New wiring: Left to right – **Blue, Red, Green, Black**
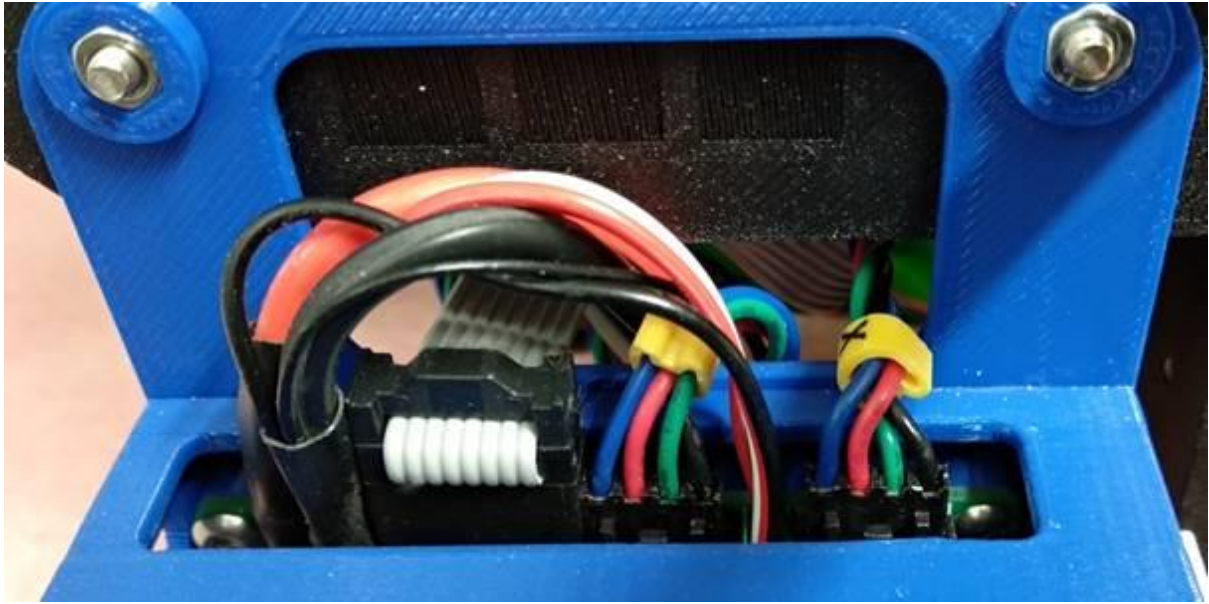
Use needle here

There's a small metal part that's preventing the pin to come out, you'll have to push it down with the needle. When assembling back you'll have to pull it back up in order for the connector to be pluggable again:

Wire colors should look like this:

That info should be enough for you to complete the mod with v2.1 and TMC2209.

Once again, read the manuals in advance, make a step-by-step plan and act when ready and sure what you're doing.
I know it's not an easy mod, but it's worth it, believe me 😊