Building the Gugusse 2.2 Control PCB for use with the Gugusse Compact

Gerber Files are provided in the Gugusse Compact Zip file. You can order an 8cm X 10cm PCB by uploading those files to a company that makes PCBs in small runs. A parts list is below with Digikey part numbers. You may be able to source these parts elsewhere but this will give you numbers to look up if you need them. We would suggest getting extras of inexpensive parts in case there are any problems.

The instructions below build the board from the most shallow to the tallest components. Be very careful when soldering components not to "splash" any solder between pins. This is a pretty easy project to complete but the soldering of the Pi connector will take a little time especially. If you have any questions about how to orient anything, see the last picture.

Some parts have been removed from the design because of changes in the design of the Gugusse compact. Because of this, some pictures show components that have been removed. The final picture shows what the board should look like when completed.

There is a guide to retrofitting a previously built board at the end.

Purchased Parts Required:

| ITEM	Digikey Part Number	QTY	NOTES
CONN HEADER VERT 4POS 2.5MM	455-2249-ND	6	
CONN HEADER VERT 2POS 2.54MM	WM4800-ND	1	
CONN HEADER VERT 4POS 5.08MM	A1212-ND	1	
METRO MINI 328 V2 CP2102N USB C	1528-1374-ND	1	
TMC2209 STEPPER DRIVER BOARD	1460-TMC2209SILENTSTEPSTICK-ND	3	
LOGIC LEVEL CONVERTER - BI-DIREC	1568-1209-ND	1	
TRANS NPN DARL 60V 5A TO220	TIP120GOS-ND	3	
RES 1K OHM 2% 1/4W AXIAL	2368-QW210-ND	3	There may be cheaper options
RES 500K OHM 1% 1/4W AXIAL	1135-1620-ND	1	There may be cheaper options
RASPBERRY PI GPIO TALL HEADER	1568-1462-ND	1	
CONN SIL HDR MALE PIN 32POS TIN	952-2521-ND	3	(Buy an extra at least).
SMALL ADHESIVE HEAT SINK		3	See last picture.

Start by soldering in all of the smaller devices like the resistors. Note: **The Gugusse Compact does not require the 100 Ohm, 10K Ohm, and 100K Ohm resistors and the LM211P shown on the PCB.** Install the 500K and 1K Resistors as shown below. Install a wire across pins 2 and 7 where the two LM211P chips formerly were. Also install a wire across where the 100 Ohm resistor formerly was. The rest of the resistors remain empty.
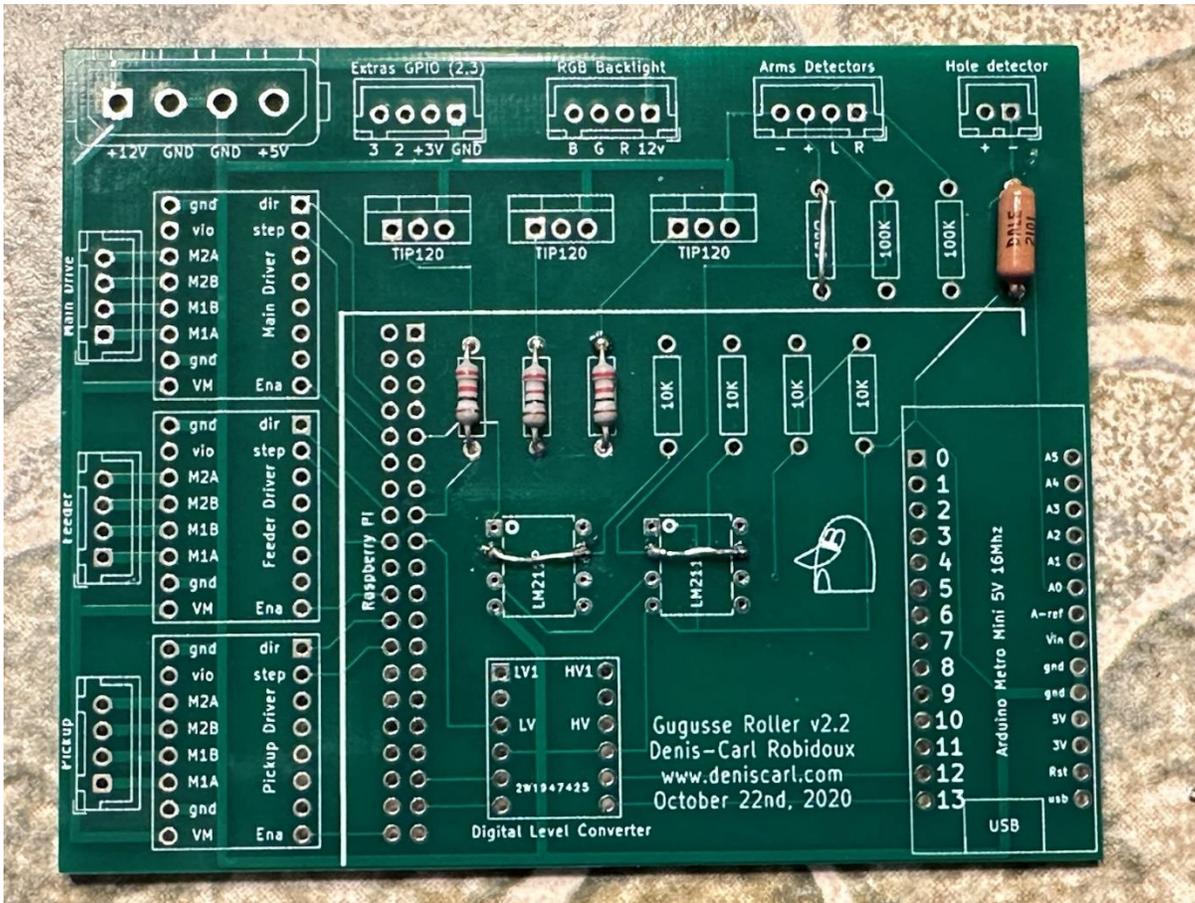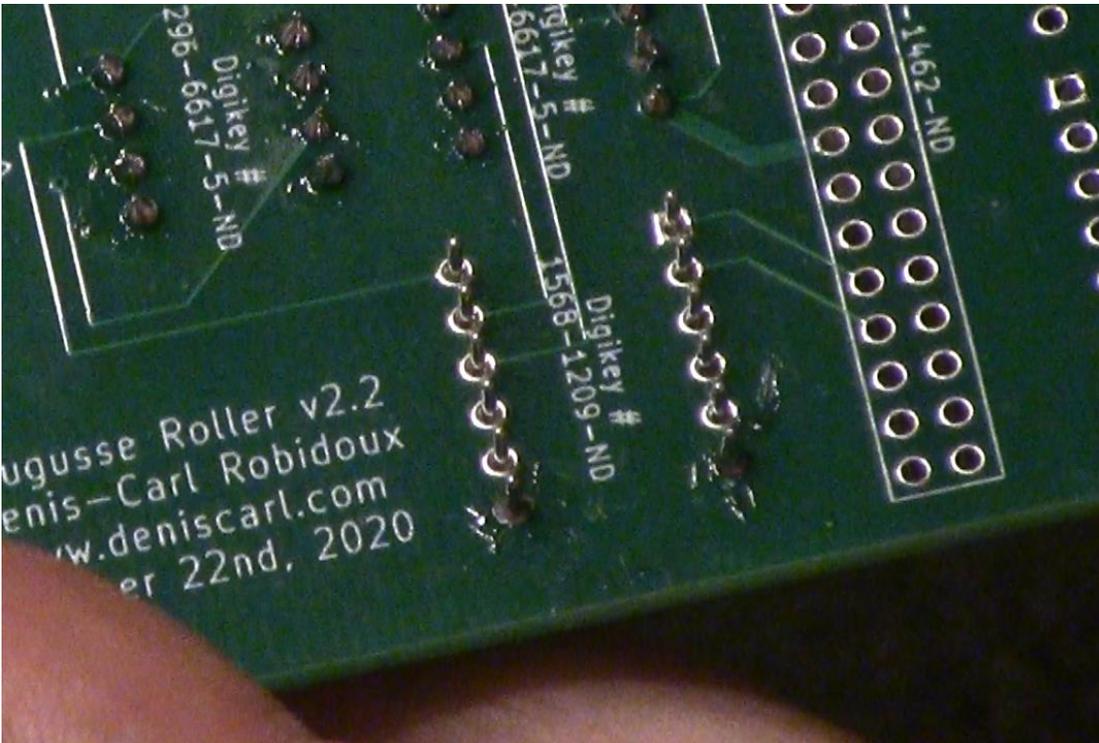

Insert 6 Support Pins for the Digital Level Converter with the long side going through the board.
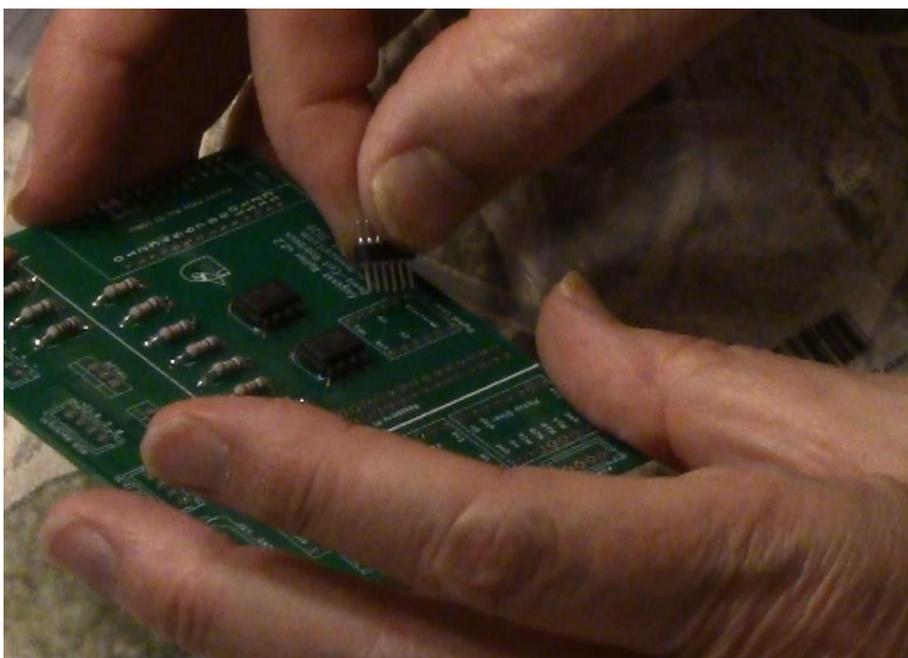
Put some tape over it to hold it when you turn over the board to solder it in.
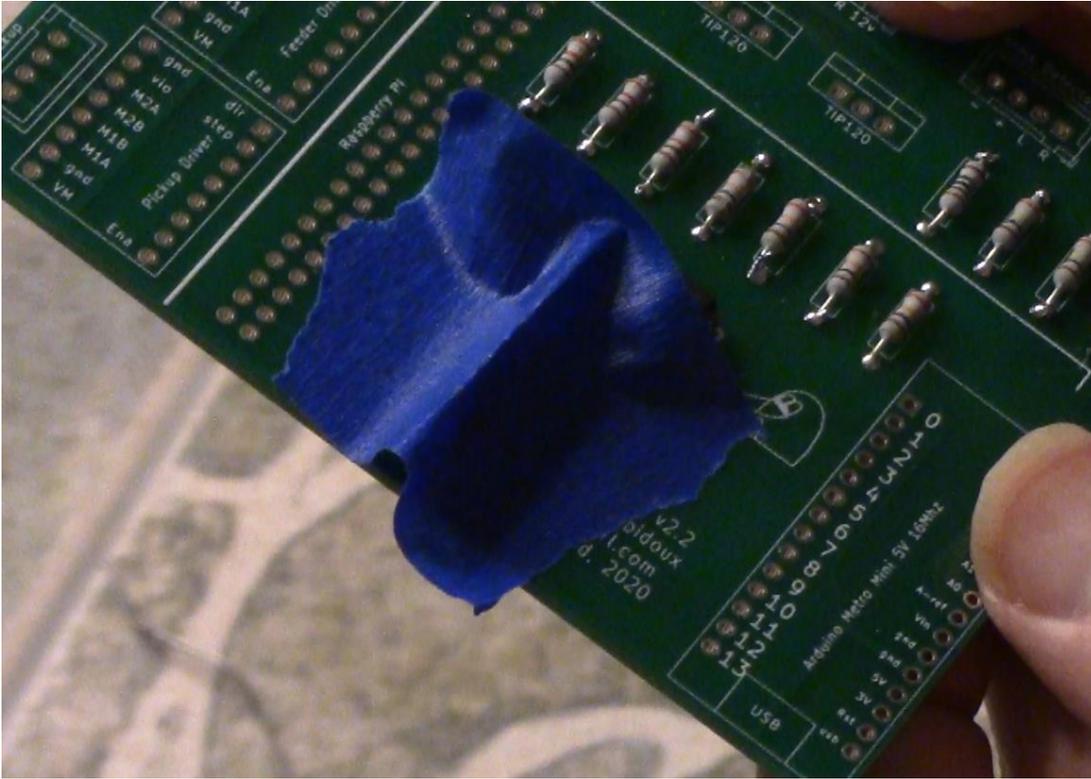

Solder only one pin on each of the rows of pins.

Test fit the Digital Level Converter to make sure the alignment is good and the component is in the right position.   If the component won't go on, heat one of the soldered pins and move it so it will. If the component will sit properly on the pins, solder all connections on both sides of the board.
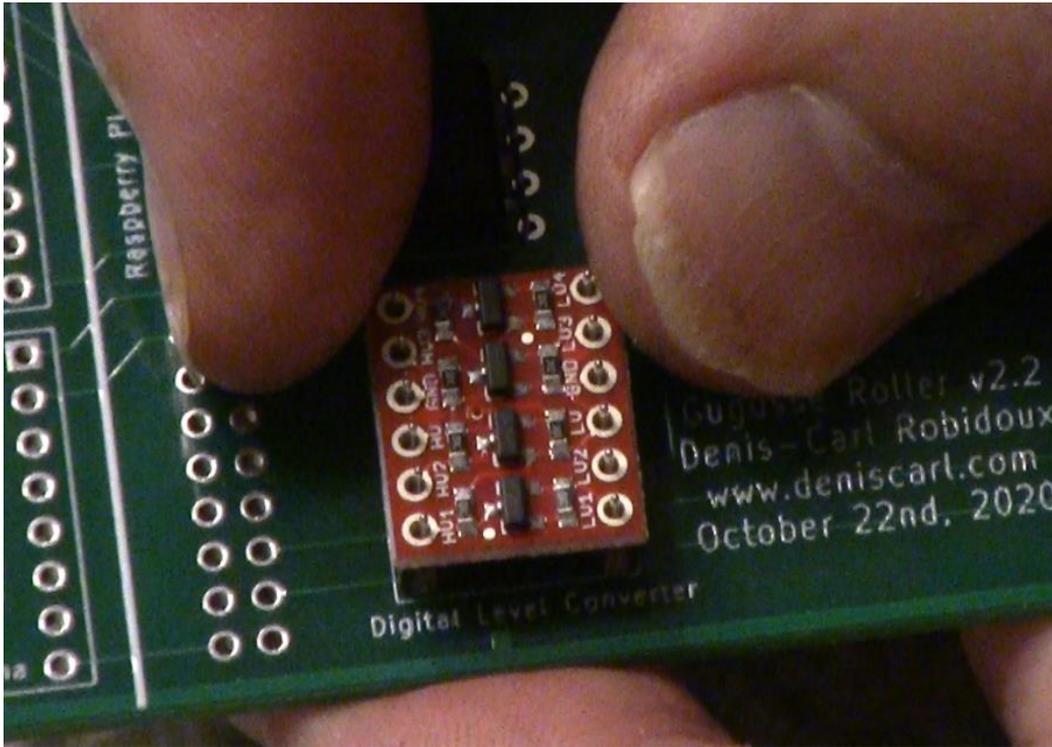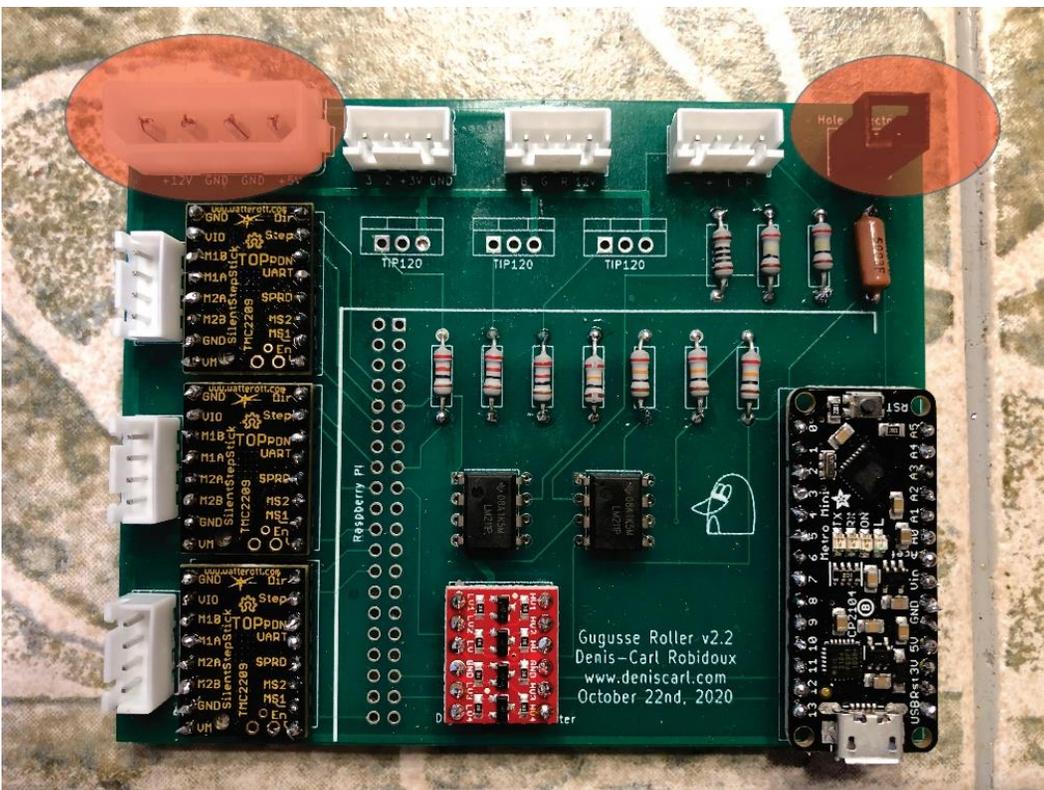

Repeat the process for the Arduino and the three Stepper Driver modules being sure that they are all oriented properly.
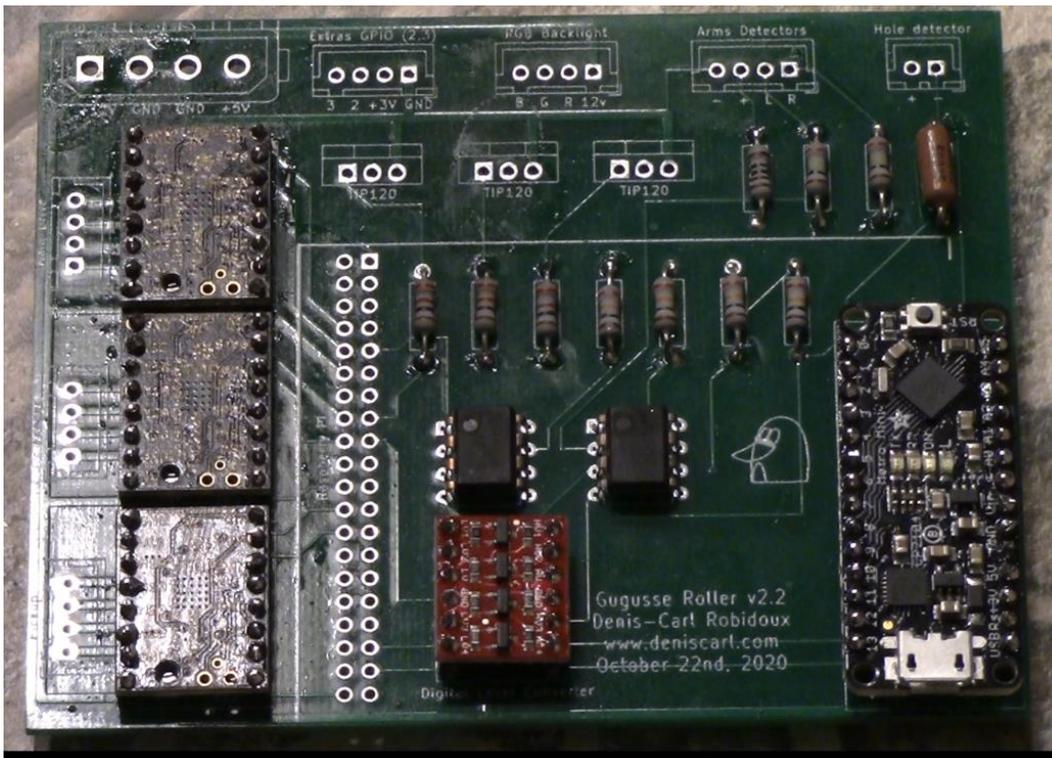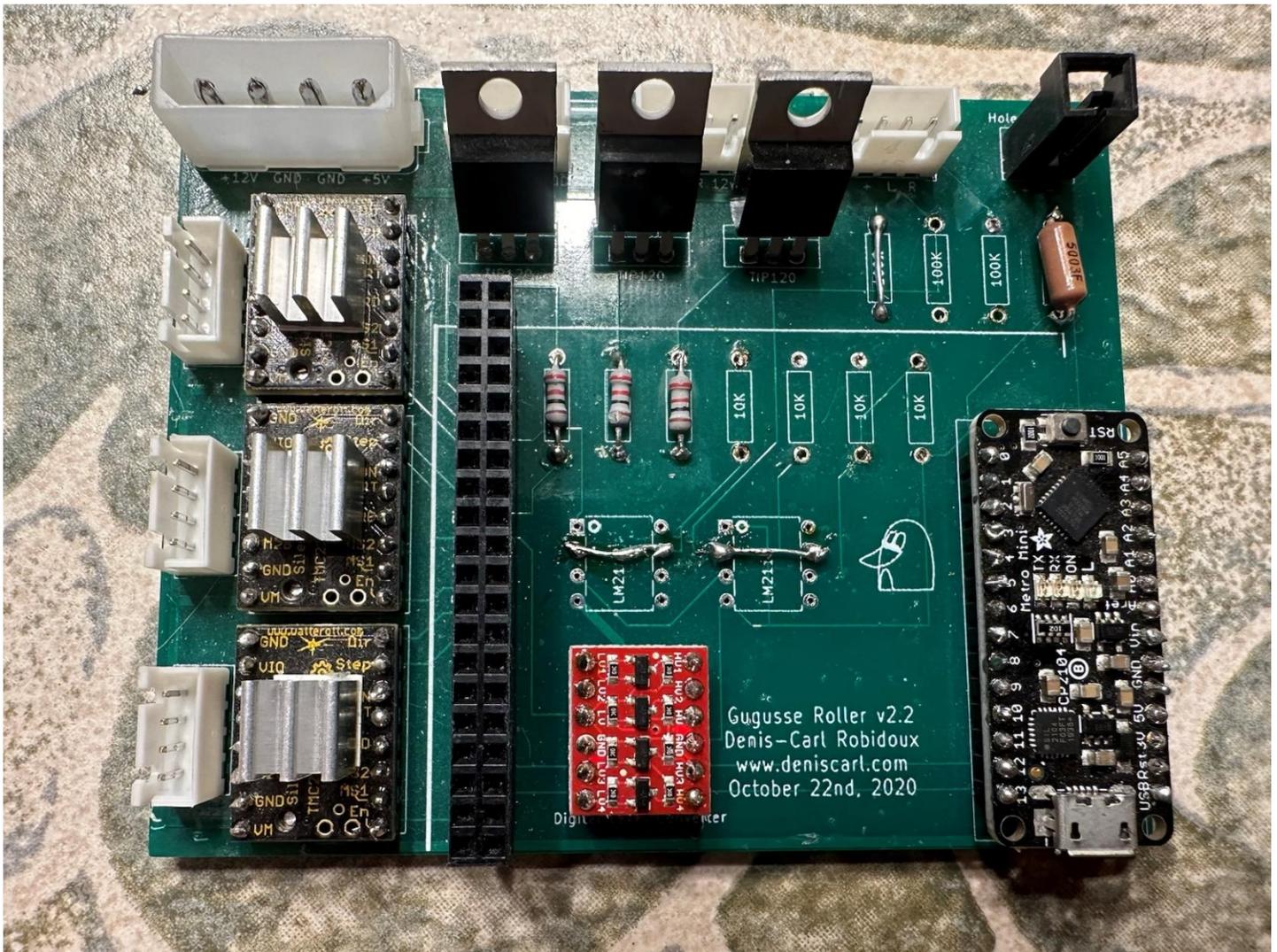
Install the connectors highlighted next:
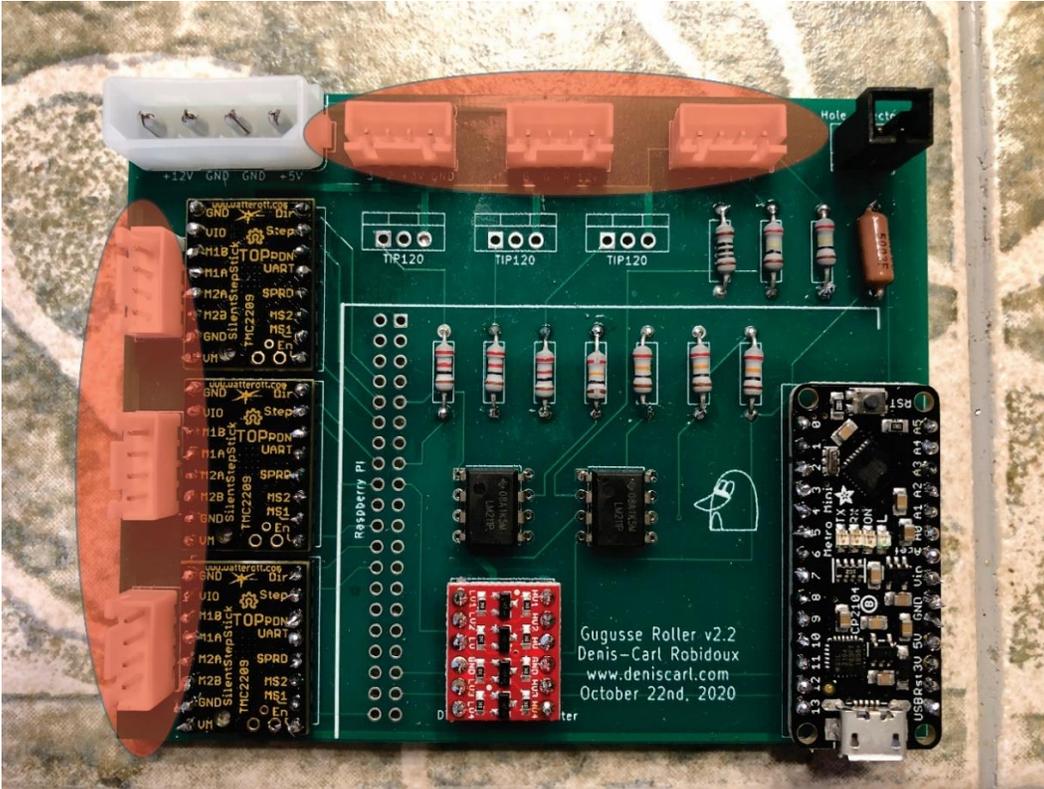
Install the larger Connectors next as highlighted:

Follow this with the TIP 120 transistors and the 40 pin Raspberry Pi connector. Put some small heat sinks on the Stepper Driver controllers to dissipate some of the heat. Your board is complete.

Gugusse Compact and all related devices designed by Denis-Carl Robidoux.
Documentation by Al Warner.

Compact Modifications

If you built the Gugusse 2.2 PCB prior to the when the Gugusse Compact was designed, you can convert the PCB to work more efficiently. To do this:

1) Remove the two LM211P ICs.
2) Remove the two 100K Resistors.
3) Remove the one 100 ohm Resistor.
4) Remove the four 10K Resistors.
5) Solder a Jumper wire across where the 100 Ohm Resistor was.
6) Solder a Jumper wire on Pins 2 and 7 on the spots where both LM211Ps were on the board.

Your PCB should look like the picture below:
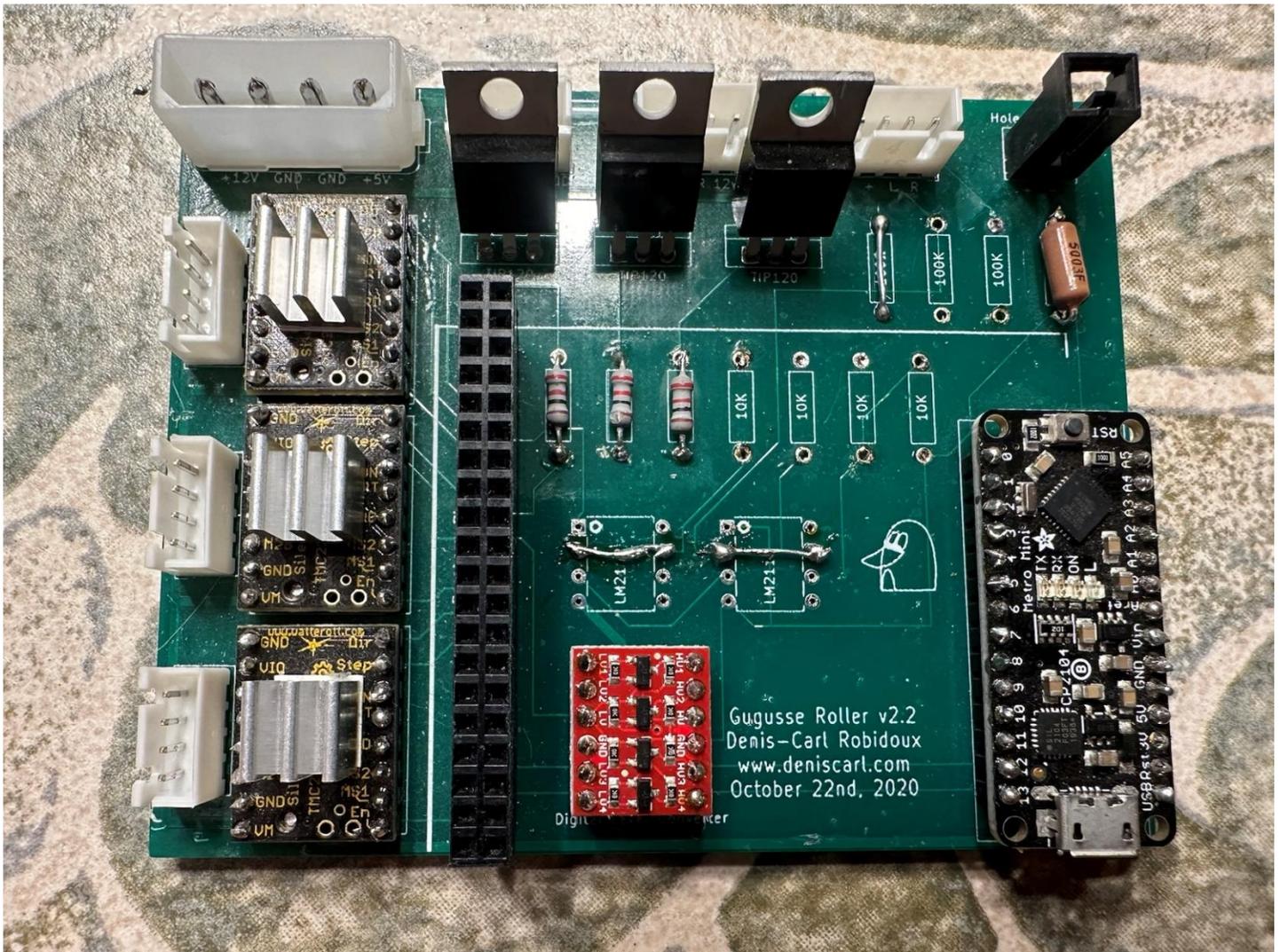
Software Update

Currently the default software distribution is set up for the 3.1 PCB so the already installed software will need to be updated to work with the older 2.2 PCB. If you haven't installed the Raspberry Pi operating system yet, please follow the "OS and Software Install Guide" on the Gugusse Website to configure your system.

Open a terminal window and type the following, one line at a time (and hit [Enter] after each).

```
cd GugusseRoller

git fetch -a

git checkout old_boardV2

rm hardwarecfg.json

python3 MotorsAndFtpSetup.py
```

Configure the Motors and FTP settings and Save and Exit.