

Open Source Rover: Electronics Assembly Instructions

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1 PCB Assembly

1.1 Motor & RoboClaw Connectors

Table 1: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
OSR Control Board	E1	1		6 Pos Side Term Block	E3	10	
6 Pos Top Term Block	E4	5		5 Pos Header socket	E5	5	
5 Pos Header socket	E6	5		Solder Iron	N/A		

1. Begin by soldering the 6 Position Side entry terminal Block **E3** into the top side on the edge of the board shown below. They will be labeled with schematic reference designators J17-J26. Be sure that the wire terminal faces **OUTWARD** on all these connectors. These are the terminal blocks that will run motor power, encoder power, and encoder signals between the motors/encoders and the RoboClaw motor controllers.

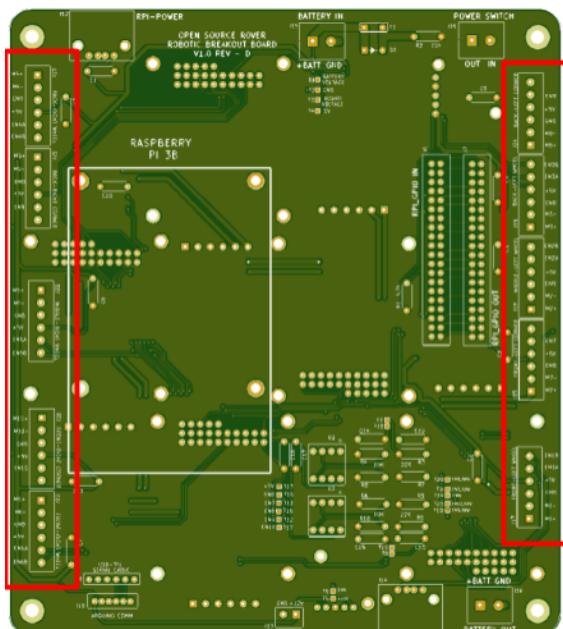


Figure 1: Assembly Step 1

2. On the Bottom of the board now solder the 6 Position Top entry terminal blocks **E4**. They will be labeled with schematic reference designators J1-5. The orientation of the wire terminal face should be AWAY from the each of RoboClaw outlines. See below image for direction. These will run battery power to the RoboClaw motor controllers, and the +/- signals for both motors into the PCB.

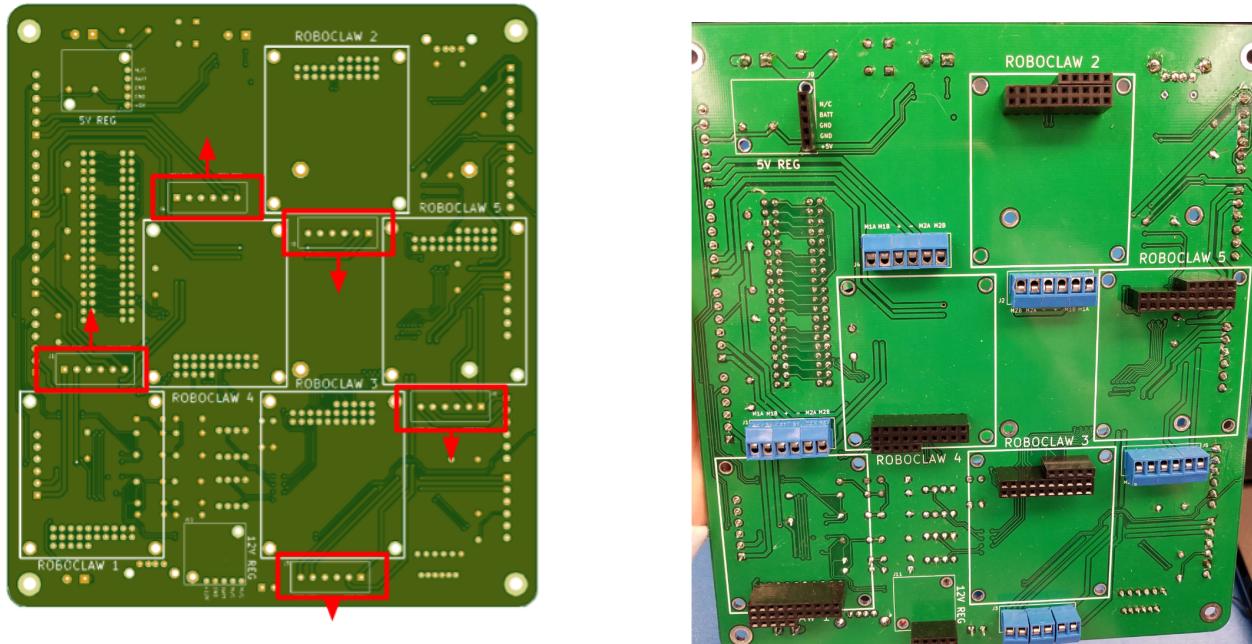


Figure 2: Assembly Step 2

3. On the Bottom of the board solder the 20 Position Female socket header connector **E5** as well as 5 Position Female socket header connector **E6**. They will be labeled with reference designators RoboClaw 1-5. These are the digital signal pins for the RoboClaw motor controllers.

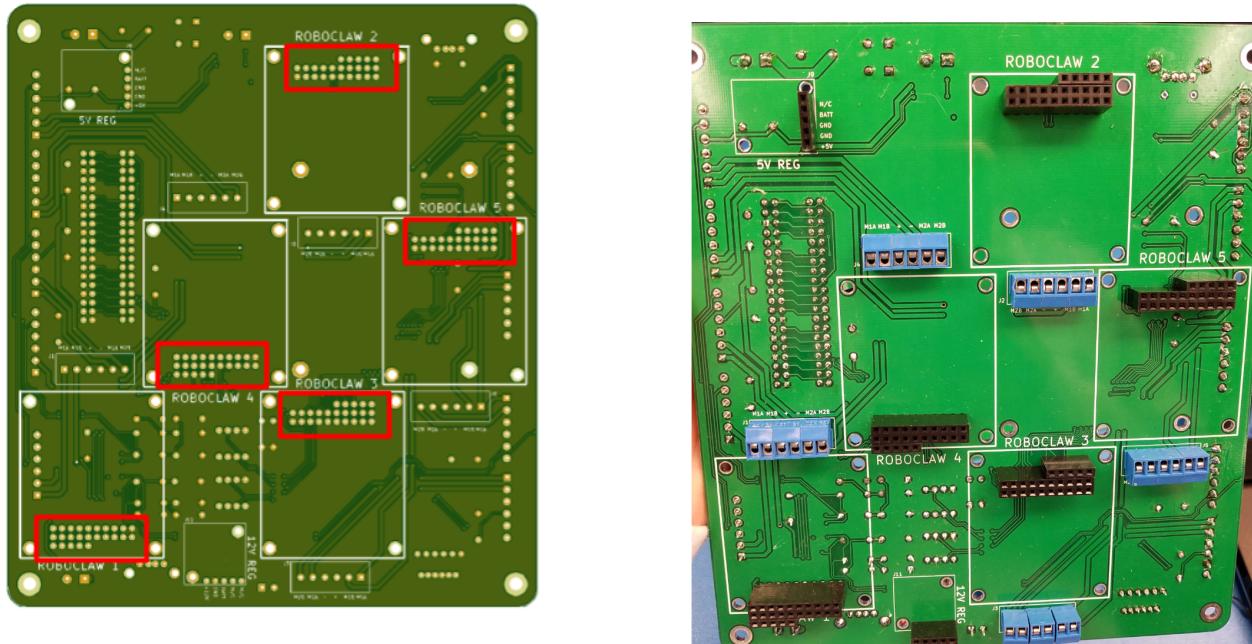


Figure 3: Assembly Step 3

1.2 Resistors and Capacitors

Table 2: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
OSR Control Board	E1	1		4.7K 1/4 Watt Resistor	E7	1	
10K 1/4 Watt Resistor	E8	4		22K 1/4 Watt Resistor	E9	4	
10K 1/2 Watt Resistor	E10	1		100nF Capacitor	16	E11	

1. Solder the resistors and capacitors on the top of the board, by comparing the reference designator on the board to the part number listed below. Some of the capacitors are used to store energy for powering components to help protect against voltage fluctuations, and others are used as noise filtering mechanisms on analog signals. The resistors are needed to control the voltage that components see.

Table 3: Resistor/Capacitor reference

Item	Parts list Ref	Schematic/Board Ref
4.7K 1/4 Watt Res	E7	R1
10K 1/4 Watt Res	E8	R4,6,8,10
22K 1/4 Watt Res	E9	R3,5,7,9
10K 1/2 Watt Res	E10	R2
100nF Cap	E11	C1-17

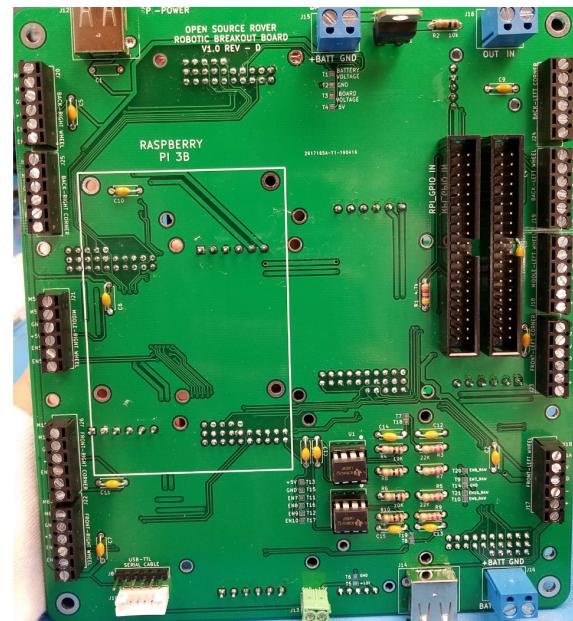
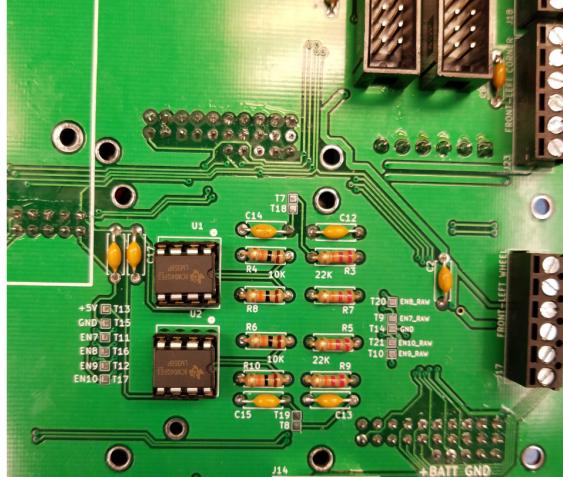


Figure 4: Assembly Step 4

1.3 Voltage Regulator connectors

Table 4: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
OSR Control Board	E1	1		5 Pos Header socket	E6	2	
				Soder Iron	N/A		

1. On the Bottom of the board solder the 5 Position female header sockets **E6**. They will have Schematic reference designators of J9 and J11. These connectors are what the 12V and 5V voltage regulators will slot into.

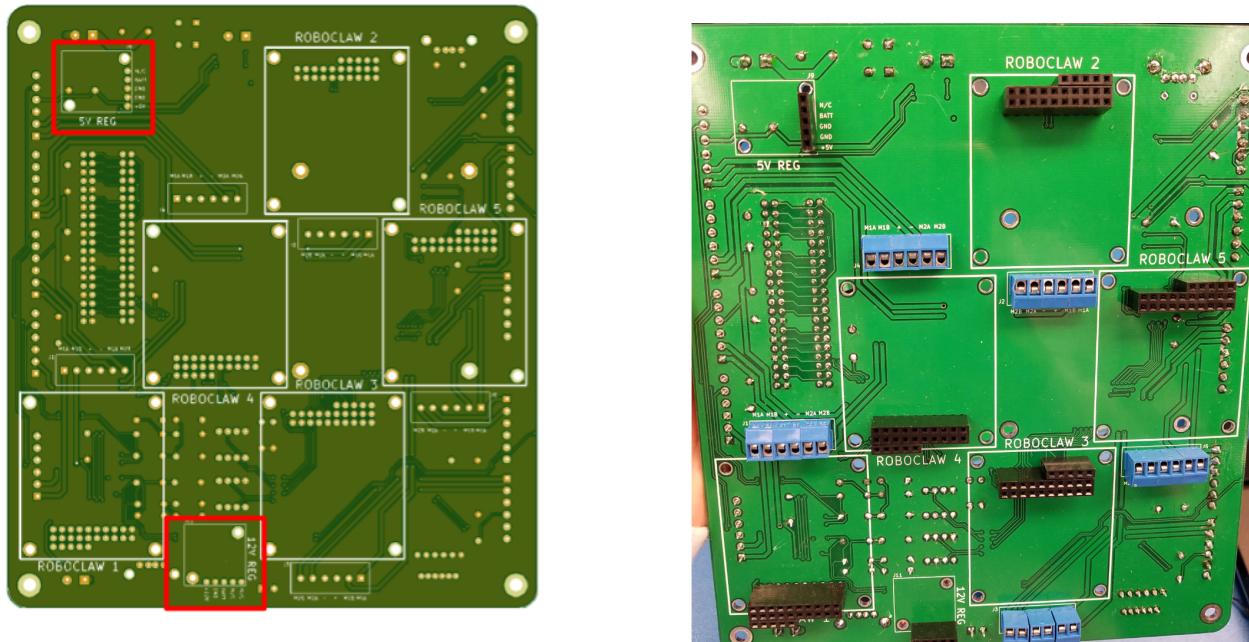


Figure 5: Assembly Step 5

1.4 Power Connectors

1.5 Voltage Regulator connectors

Table 5: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
OSR Control Board	E1	1		2 Pos Side Terminal Block	E12	3	
				Solder Iron	N/A		

1. On the top of the board Solder the 2 Position Side entry terminal blocks **E13**. These will have schematic reference designators J14-16. Ensure that these components face OUTWARDS.

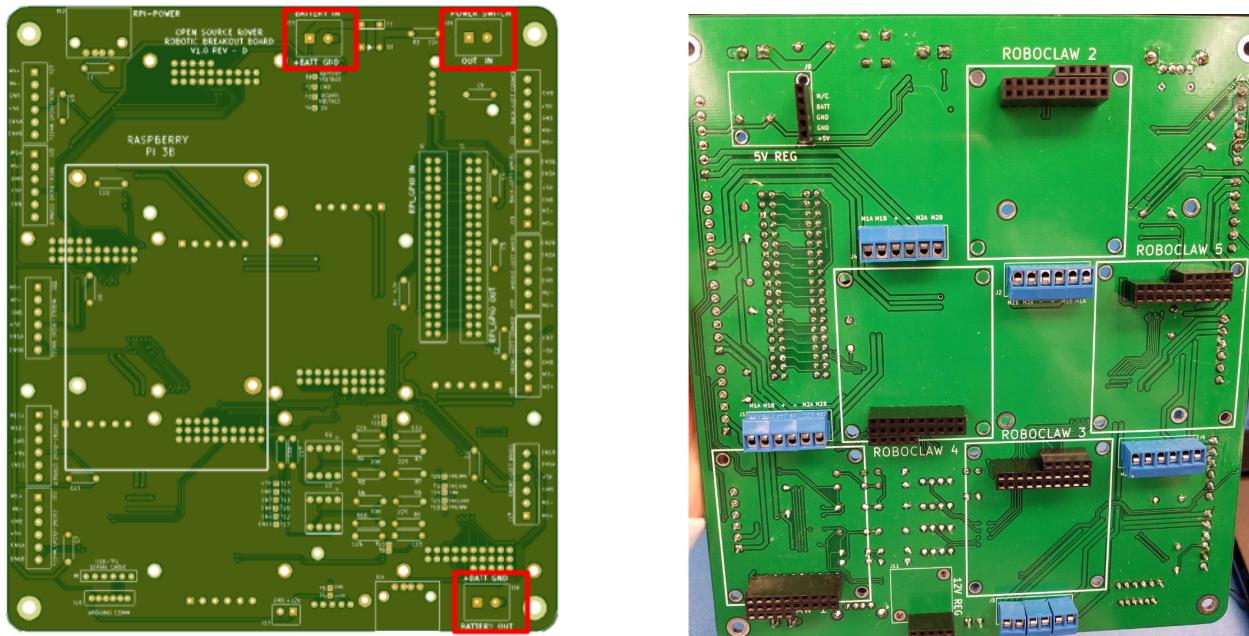


Figure 6: Assembly Step 6

1.6 Op amp DIP socket

1.7 Voltage Regulator connectors

Table 6: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
OSR Control Board	E1	1		8 Pin DIP Socket	E33	2	
				Soder Iron	N/A		

1. On the top of the board solder the 8 Pin DIP socket **E33**. It will have schematic reference designator U1-2. Orientation does not matter.

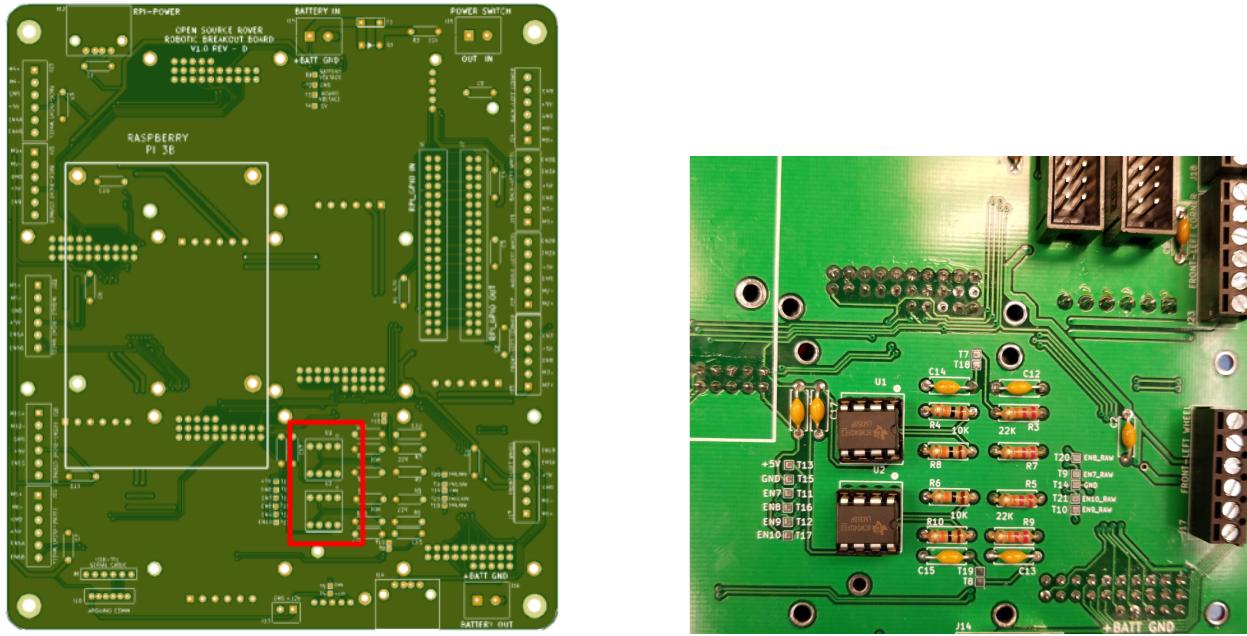


Figure 7: Assembly Step 6

1.8 RPi GPIO connector and misc headers

1.9 Voltage Regulator connectors

Table 7: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
OSR Control Board	E1	1		40 Pin Header connector	E13	2	
40 Position Header Pins	E15	1		6 Position JST Connector	E14	1	
				Soder Iron	N/A		

1. On the Top of the board solder the 40 position header connectors **E13**. The Clocking notch on the headers should face **OUTWARD**. The schematic reference designators are **J6** and **J7**.

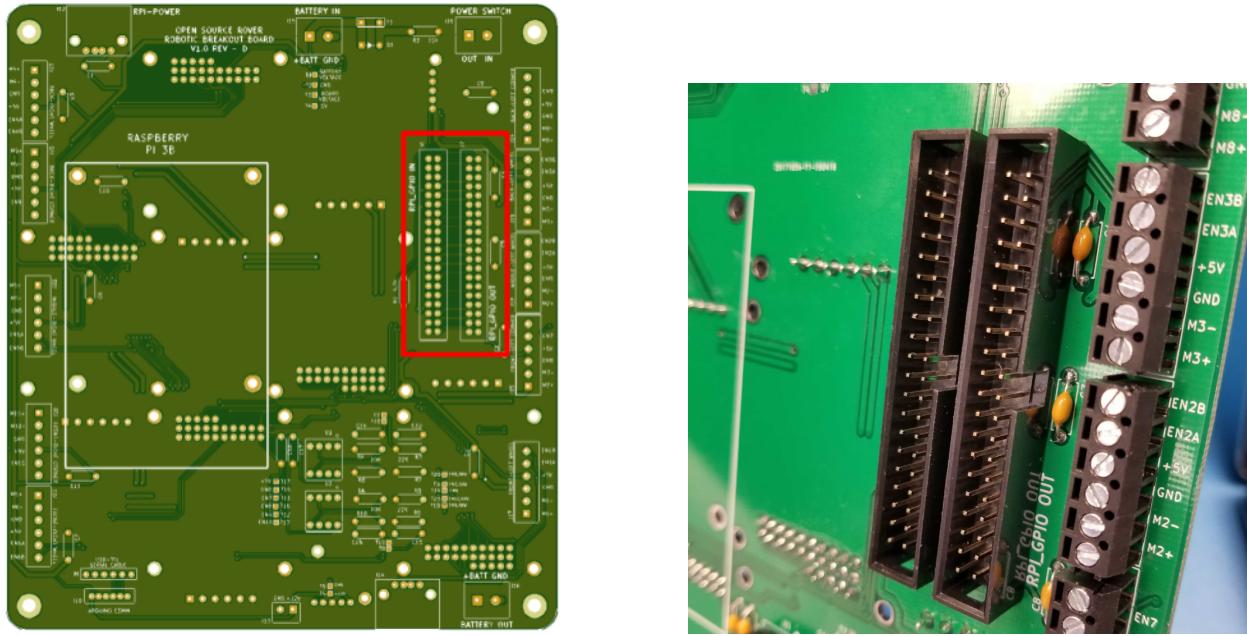


Figure 8: Assembly Step 7

2. Take the 40 pin header pins **E15** and break it into a 6 pin segment. On the top of the board solder this into schematic reference designator **J8**. Then solder the JST connector **J14** into the **J10** schematic reference designator. The opening in the pins on the JST connector should face **INWARD**.

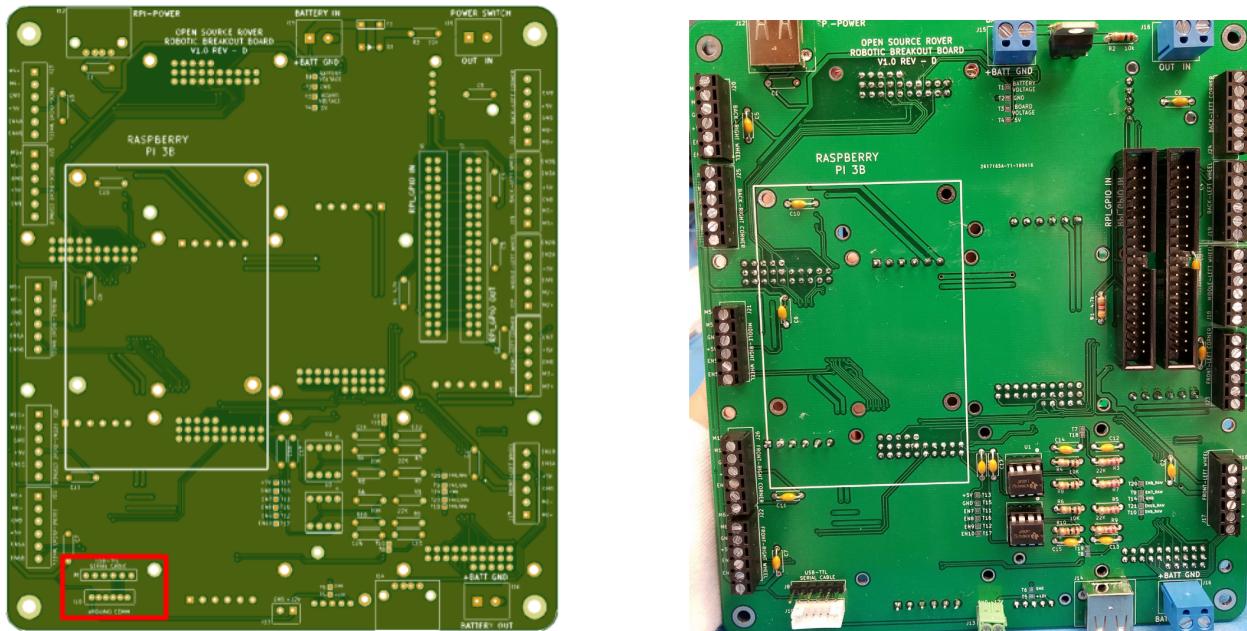


Figure 9: Assembly Step 8

1.10 USB connectors

Table 8: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
OSR Control Board	E1	1		USB Connector	E34	2	
				Soder Iron	N/A		

1. On the top of the board solder the USB Connector **E34**. It will have reference designator J12 and J14.

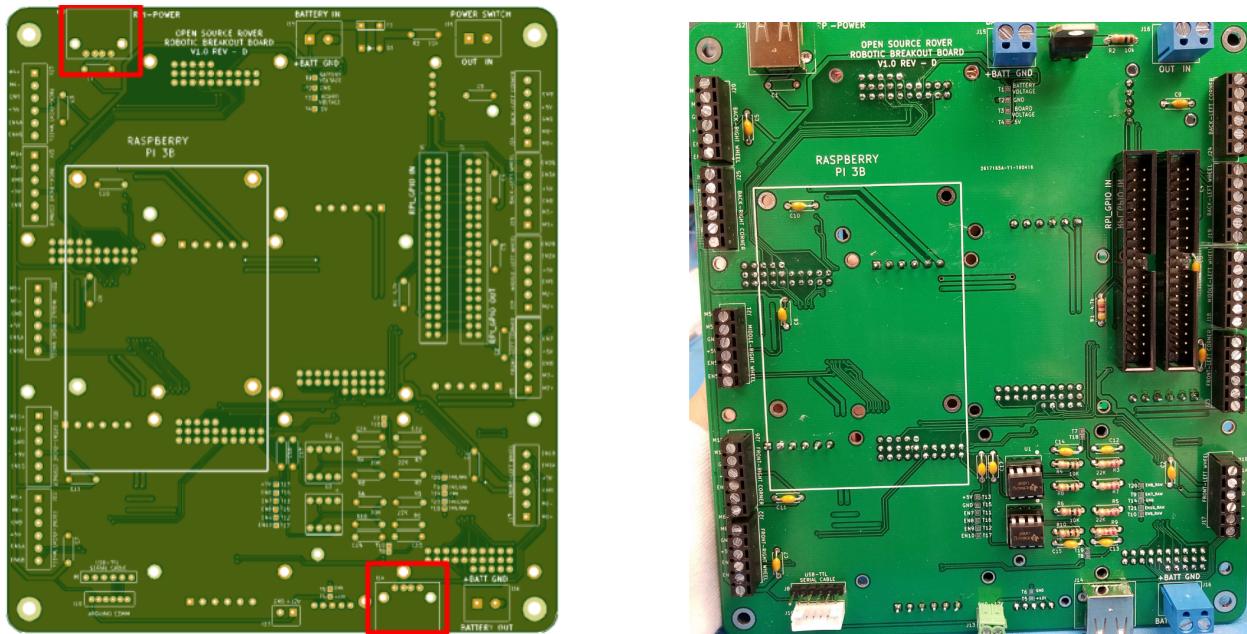


Figure 10: Assembly Step 9

This concludes soldering of the Control Board PCB!