Omni Robot Platform

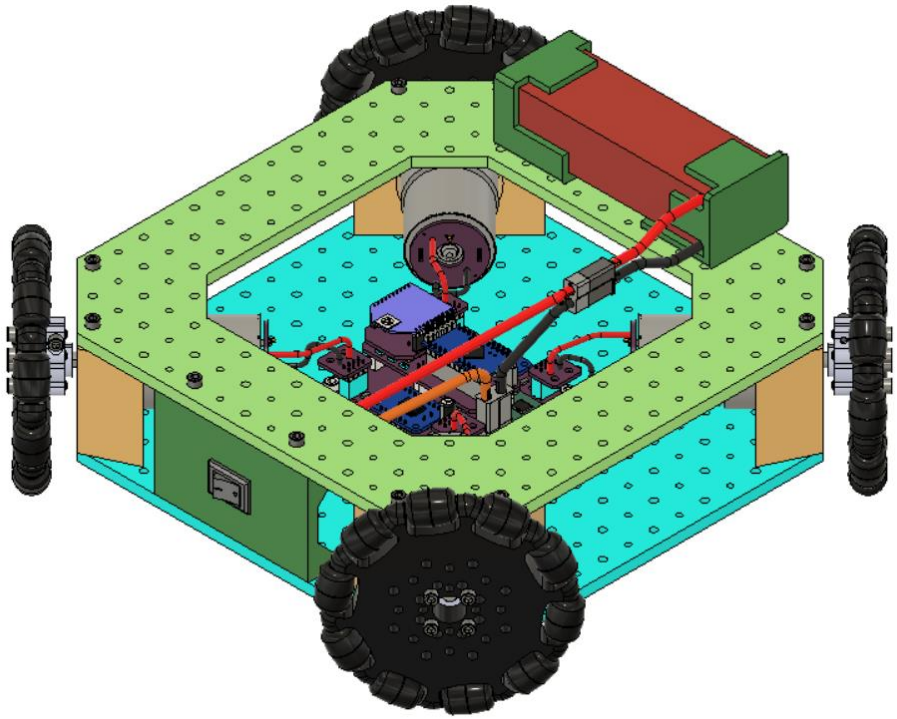
Richard Firth 11/25/17

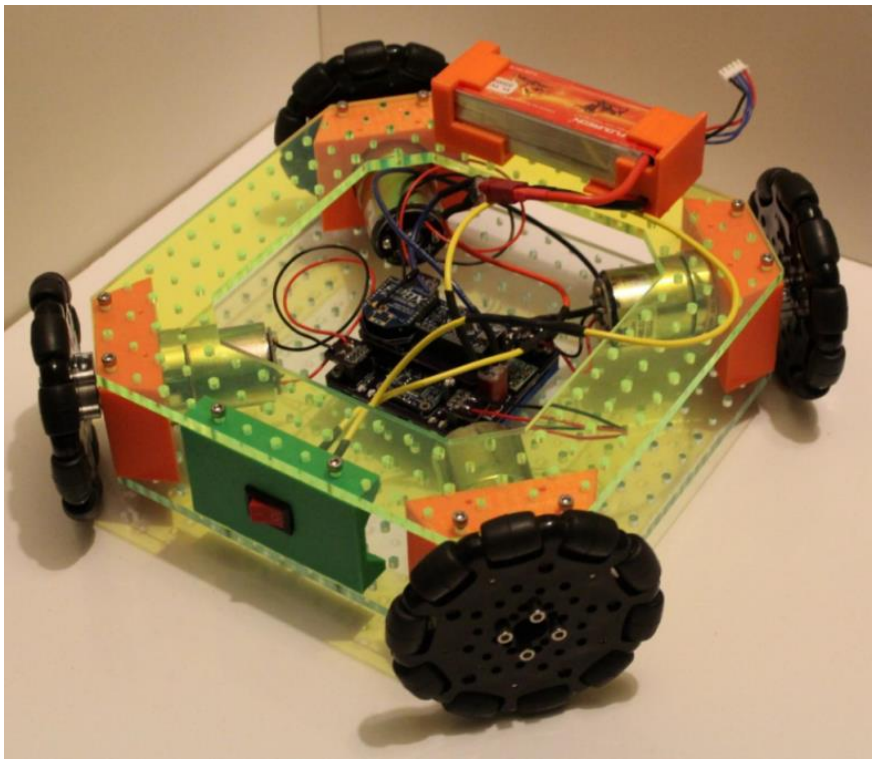
I saw these cool omnidirectional robots, so I decided to make one of my own (The ones for sale were out of stock). I figured I may as well document it and release it for others to make.

This isn't a robot since it is controlled by a remote, but it should be easy enough to add sensors.

Everything is released like an open source thing. So people may do whatever they want with these.

Contact me at richardfirthucsb@gmail.com if you decide to make one of these. I'd be interested to know what people do with it.





Goal / Contents

- Provide high level instructions on how to construct the robot platform
- List the parts used in constructing the robot platform
- Go over the design/engineering of the thing, so that people can understand how it was designed & constructed

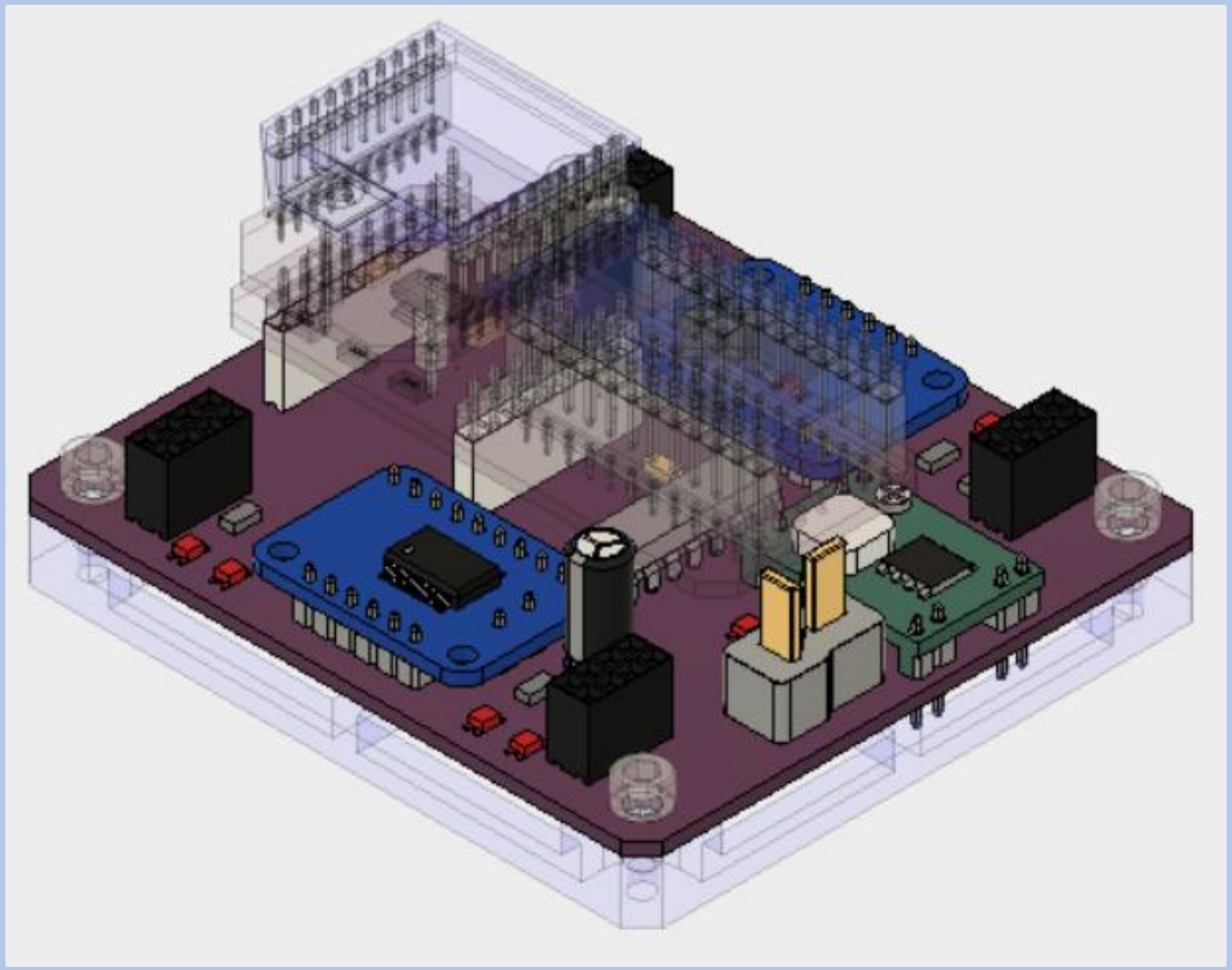
Resources:

Github: https://github.com/richardFirth/OmniRobotPlatformSKIRB_RevA
CAD Files: https://grabcad.com/library/omni-robot-platform-skirb_reva-1

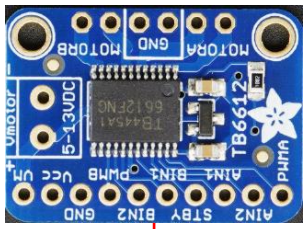
Prerequisites:

- Electronics/soldering
- Arduino Programming

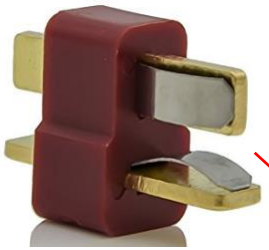
Motor control board

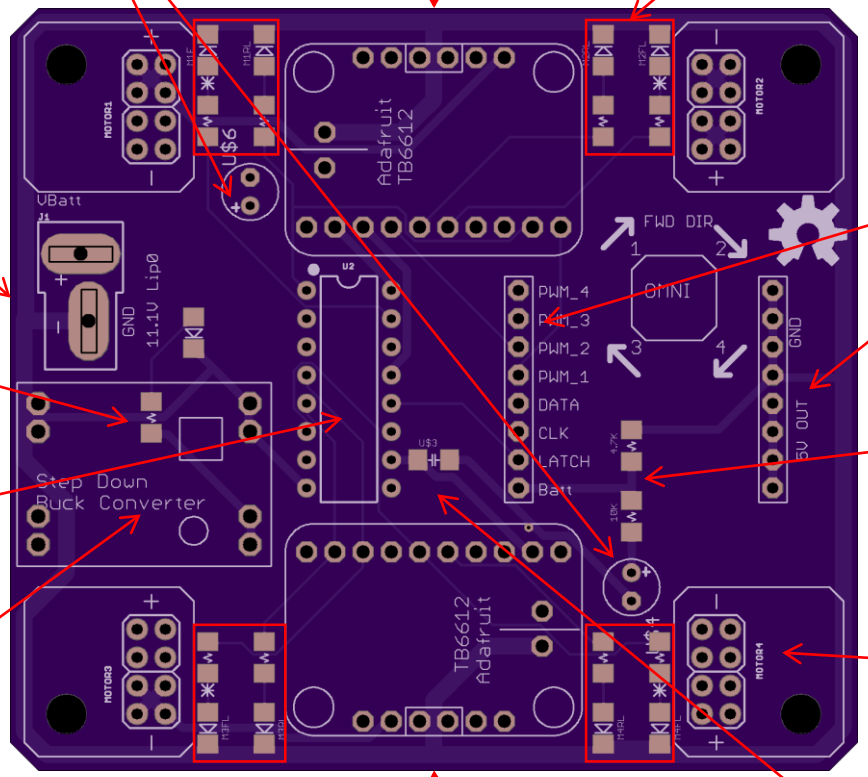


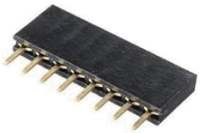
OmniMotor_MotorOnly Assembly



SMD LEDS Optional
Use resistor 330 (bright) to 3.3K (less bright)
The LEDs with * should be a different color to those without.



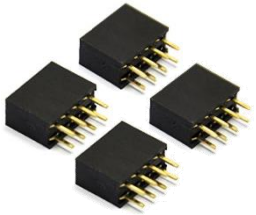




R2 (3.3K)

R3 (4.7K)
R4 (10K)

x4

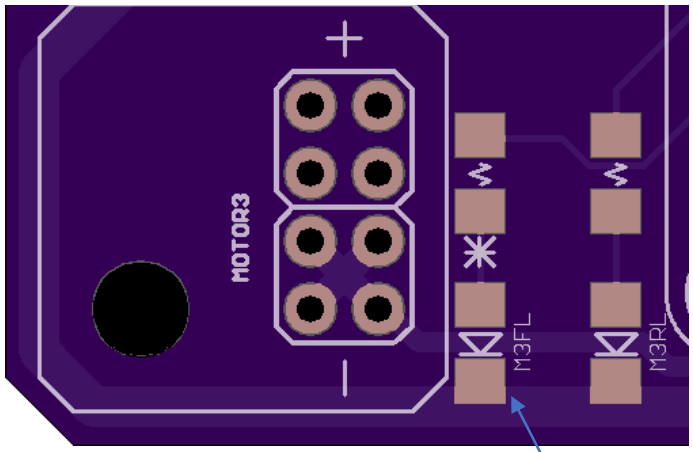


Adjust to 5V Output prior to connecting!

(use male headers to attach)

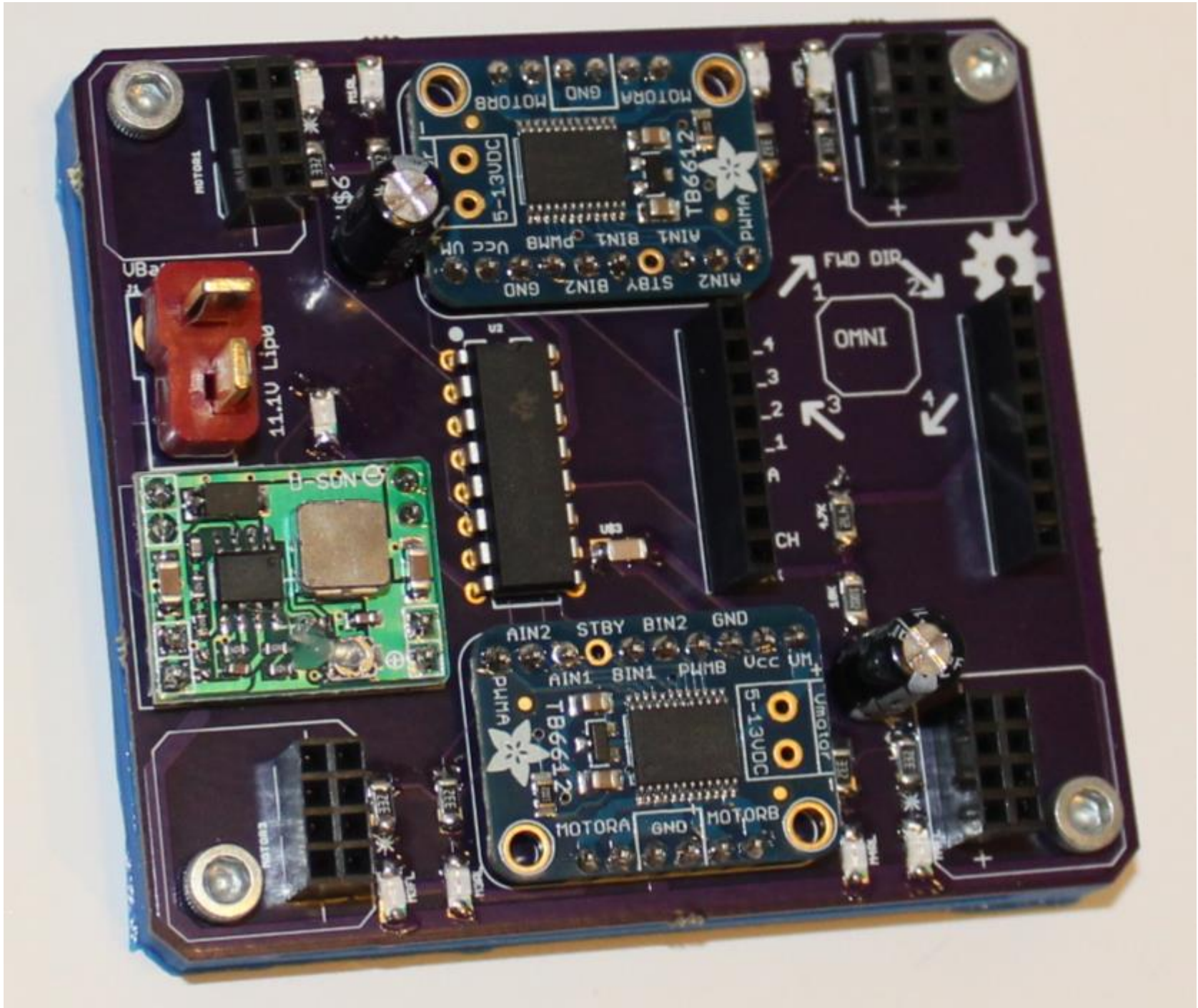
OmniRobotPlatform_SKIRB_MotorControl-> https://oshpark.com/shared_projects/BiVYTwTP

OmniMotor_MotorOnly Assembly



If you add the SMD LEDS, make the ones with the * all the same color, and the other ones a different color. These indicate ‘forwards’ and ‘backwards’
Use 3.3K resisitors for the SMD LEDS.

OmniMotor_MotorOnly Assembly



OmniMotor_MotorOnly BOM

Part #	Part	Pic	Source
1	SN74HC595 Shift Register		https://www.amazon.com/gp/product/B011NA30RK
2	Adafruit TB6612 1.2A DC/Stepper Motor Driver Breakout Board		https://www.adafruit.com/product/2448
3	Icstation Mini DC Voltage Regulator Step Down Buck Converter Power Supply Module 4.5V-28V to 0.8V-20V 3A		https://www.amazon.com/gp/product/B06Y1ZBY8Q
4	Plug Connectors Deans Style		https://www.amazon.com/gp/product/B00S7G4A14
5	2.54mm Pitch 2X4 8 Pin Female Double Row Straight Header PCB Connector		https://www.amazon.com/gp/product/B01IHBCO2K
6	100 uF 25 V 612 Electrolytic capacitor		https://www.amazon.com/gp/product/B01M8QC1E3
7	2.54mm Single Row Female Pitch Header Socket Connector PCB 8 Pin Strip		https://www.amazon.com/gp/product/B00SUXT67M
8	AVX 0.1uF 50V SMD (Surface Mount)		https://www.amazon.com/gp/product/B0015A6Z5I

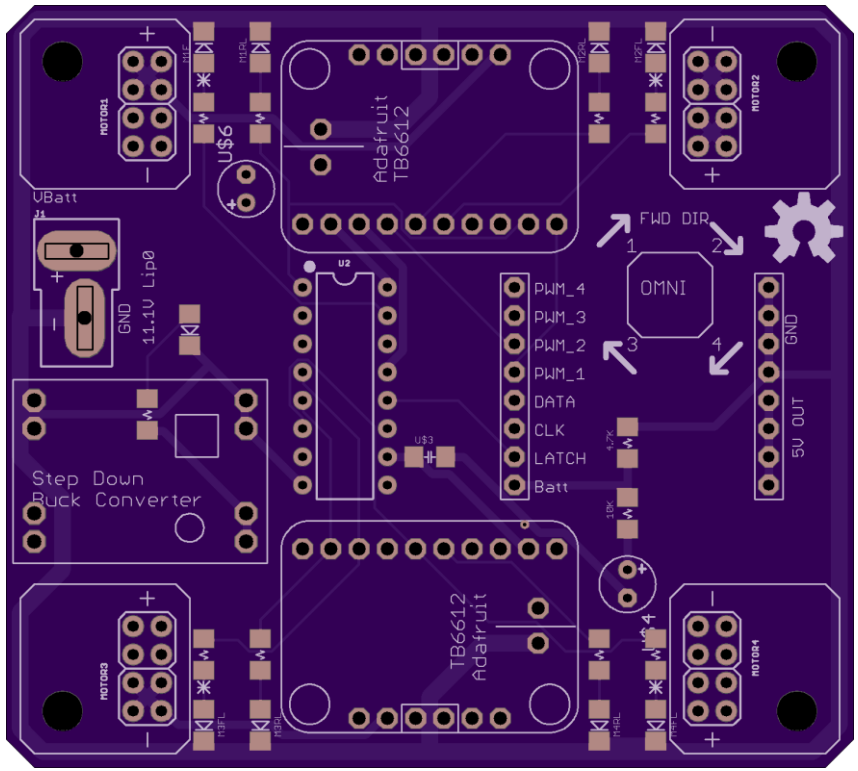
Part Num	Resistor Values (1206 SMT)	Link
R1	330 Ohm	https://www.amazon.com/gp/product/B00NQ4JZDA
R2	3.3K Ohm	https://www.amazon.com/gp/product/B007V6AQ64
R3	4.7K Ohm	https://www.amazon.com/gp/product/B01DKC5BBM
R4	10K Ohm	https://www.amazon.com/gp/product/B073RYS2BL

Printed Circuit Boards

OmniRobotPlatform_SKIRB_MotorControl-> https://oshpark.com/shared_projects/BiVYTwTP
OmniRobotPlatform_SKIRB_Xbee -> https://oshpark.com/shared_projects/E1SlzLHo
MotorClip -> https://oshpark.com/shared_projects/modA4HzY (need 4)
MotorBackplate -> https://oshpark.com/shared_projects/eEKy6Eoc (need 4, optional part)
XBeeBreakOut -> https://oshpark.com/shared_projects/hA4cGipD

Not to Scale!

OmniRobotPlatform_SKIRB_MotorControl



Design Notes - Electrical

- The motor portion was separated from the control portion, since I figured I would be adding sensors and redoing the control portion later
- Shift register used to control the motor drivers, which lets me use 3 pins to control 8 inputs.
- I used the 2X4 female headers at little clips for the motors so it's easy to attach and detach them.
- SMD lights are there because I just learned to do SMD stuff and wanted to put them everywhere and see stuff.