Skitter Robot for Arduino Mega

Assembly Guide
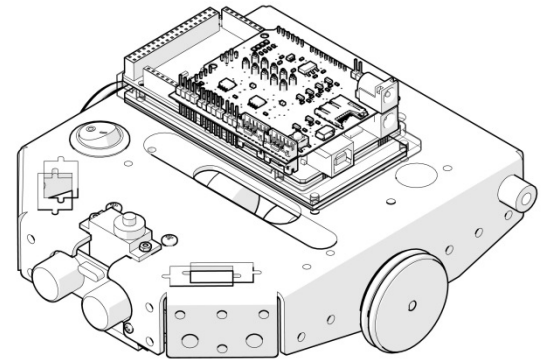


TOOLS	
am-1287	5.5mm Nut Driver
am-4416	#2 Phillips Screwdriver
	Needle-nose Pliers (Optional)

| PART #	DESCRIPTION	QTY
am-4344a or b	Skitter Chassis Frame	1
ip-5121	Skitter Circuit Board	1
am-5288	Arduino Mega	1
am-4353	Ball Caster	1
am-4342	Sensor, Ultrasonic HC-SR04	1
am-4352	Cable, Ultrasonic	1
am-4343	Servo, SG90	1
am-4347	12V Li-Ion Battery, 3000mAh	1
am-4513	Gearmotor, 12v w/ encoder	2
ip-3797_switch	On/Off Switch	1
am-4354b	Wheel	2
am-4340	O-Ring	4
am-1188_1	Cable Tie, 4"	4
ip-4350a_h&l	Hook and Loop Pair	1
am-5150h	**Hardware Kit**	
am-1553	Screw, Pan Head M2-0.4 x 6mm	13
am-1554	Nut, M2-0.4	3
am-1556	Screw, Pan Head M3-0.5 x 6mm	9
am-1559	Screw, Flat Head M3-0.5 x 10mm	2
am-1023	Nut, Nylock M3-0.5	2
am-1558	Hex Standoff, M3-0.5	2
am-4856	**Line Follower Kit**	
am-4857	Sensor, Line Following	1
am-4730	Line Follower Sensor Bracket	1
am-4818	Cable, Line Follower	1
am-1677	Screw, Pan Head M3-0.5 x 16mm	2
am-1432	Line Follower Screw Spacer	2
am-1553	Screw, Pan Head M2-0.4 x 6mm	2
am-1554	Nut, M2-0.4	2

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1. Install caster using two Flat Head M3-0.5 x 10mm Screws (am-1559) and two M3 x 0.5 Nylock Nuts (am-1023). The flat head of the screw should sit inside the bent flange. The screw and nut can be tightened using the access holes in the frame.

am-1023 M3 x 0.5 Nylock Nut

am-1559 FHCS M3 x 10mm
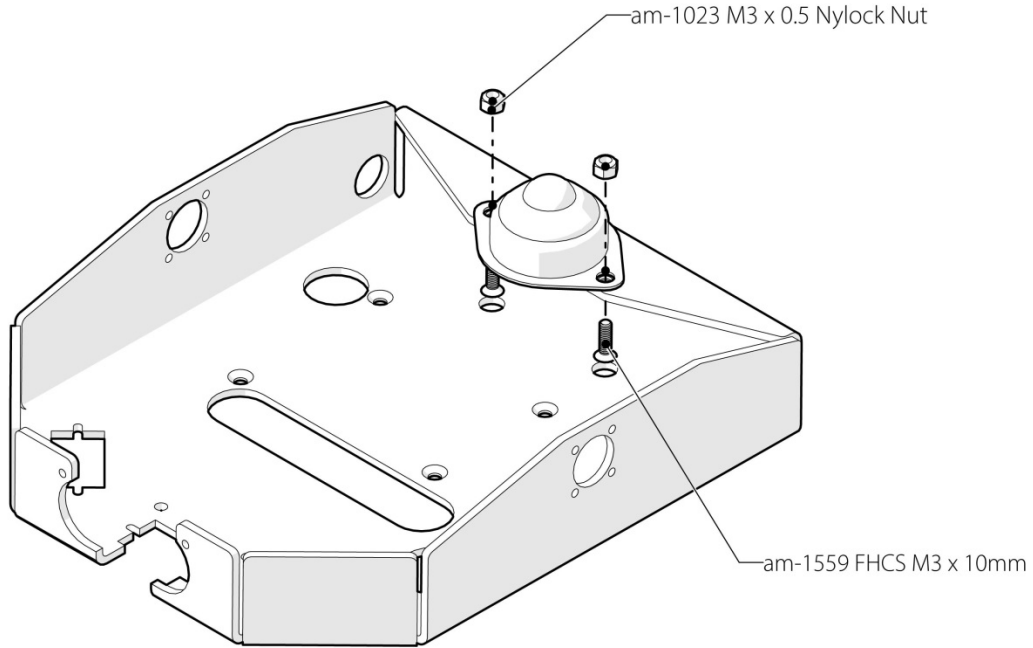
2. Locate the Battery Cable included with the Battery Pack. This cable has a female end and two male ends. The female end will be fed through a hole in the chassis for charging. One male end will go to the battery pack and the other will go to the circuit board.

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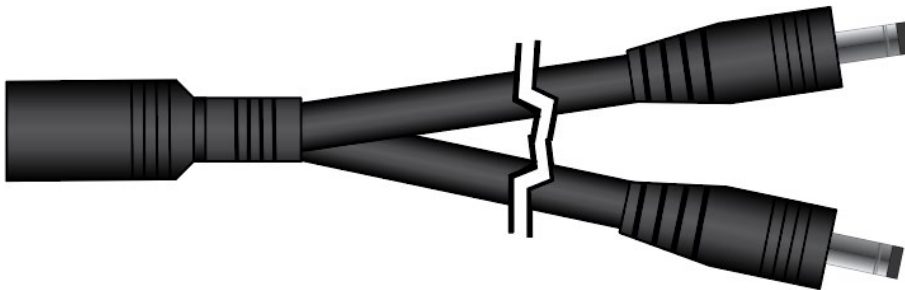
3. Wrap one end of the Battery Cable into a small loop and secure using one to four cable ties (am-1188_1). In order to fit in the space between the Battery Pack and the Frame Wall, the two cable ends will need to overlap for a total length of ~2".,The smaller the loop, the easier it will fit in the chassis frame. The other male end will go to the connector on the Circuit Board and should measure approximately 6" long.
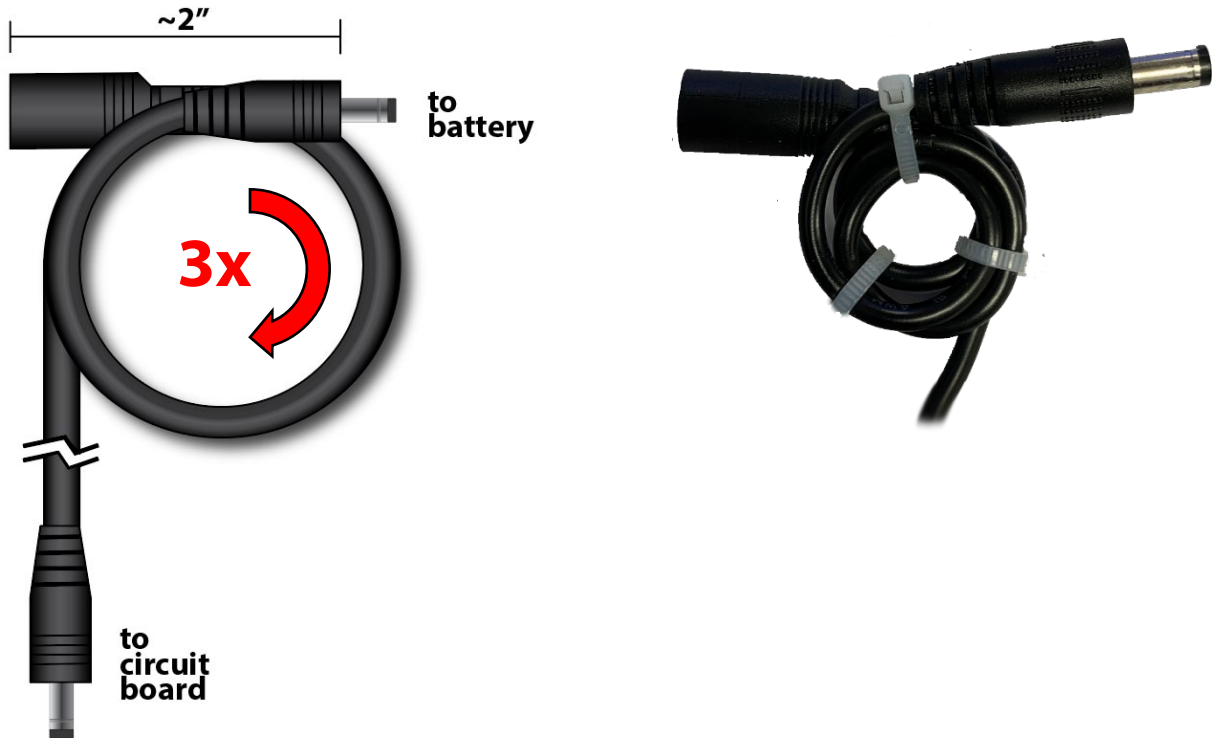

4. Plug the shorter male end of the Battery Cable to the Battery and slide the Battery into the rear right corner of the chassis. The lights on the battery should face up and the switch should be located on the left.

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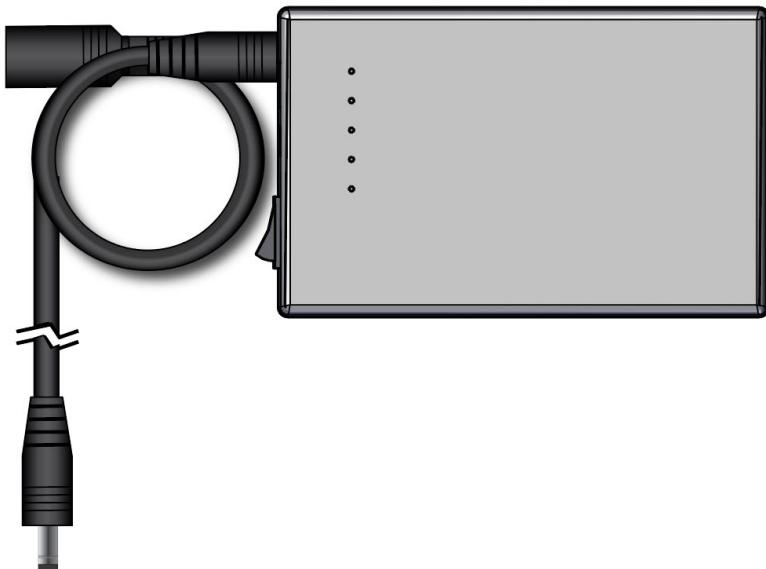
5. The battery pack sits underneath the chassis flange with the lights facing outward. To install, Insert female end of the Battery Cable into left rear hole while sliding the battery into place. The female end of the battery cable should protrude approximately ½" The female end of the cable is a tight fit held in by friction, you may need to wiggle the cable back and forth to get it inserted into the hole.

~1/2"
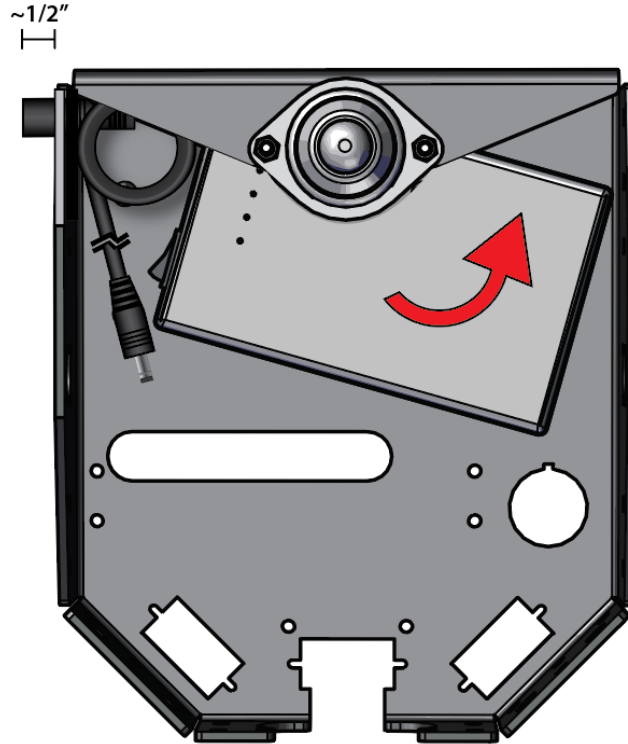
6. Snap in the On/Off Switch (ip-3797_switch) into the mounting hole in the frame. Ensure the locating key on the switch is aligned with the notch in the frame.

Key

am-4344b

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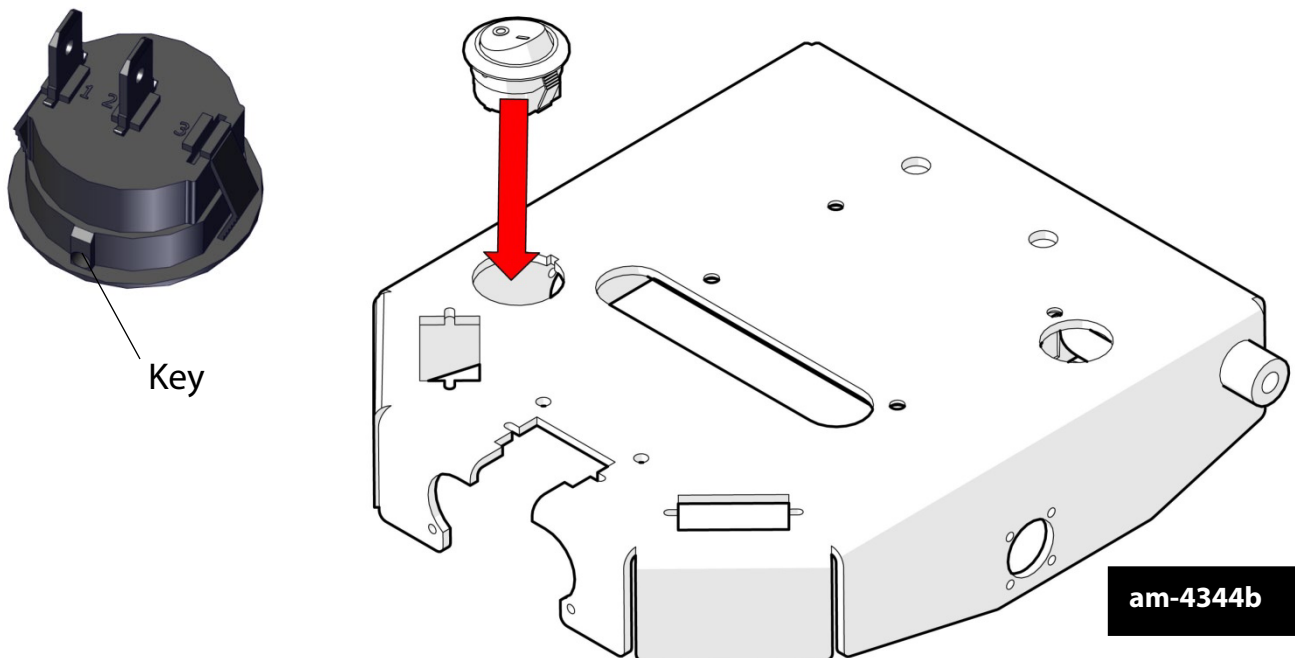
7. Slide the crimped connectors on the cable from Circuit Board onto the tabs on the on/off switch. The red or black color does not matter and can go to either tab. Needle-nose pliers may be used to gently press the connectors onto the tabs.
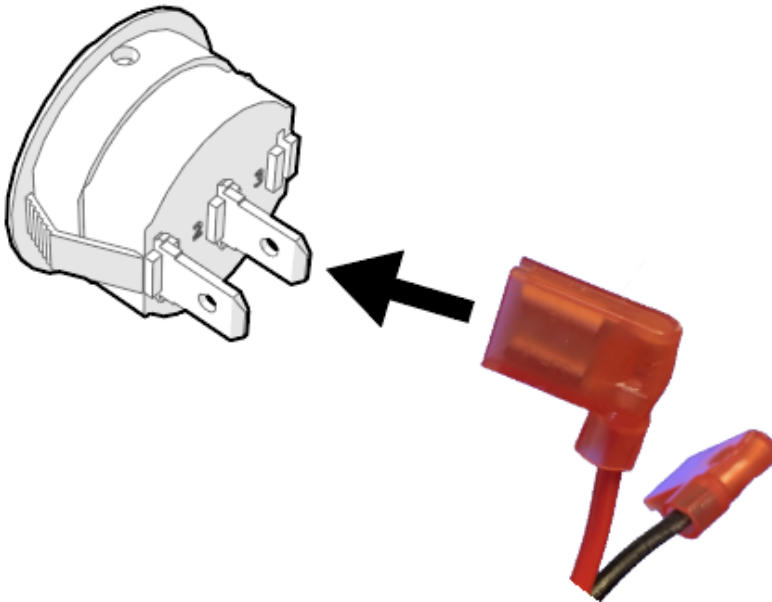
8. Locate the Ultrasonic Sensor (am-4342) and plug in the 4-pin cable (am-4352). The pinout is labeled on the board.

Board Label	Wire Color
VCC	Red
Trig	Orange
Echo	Yellow
Gnd	Green
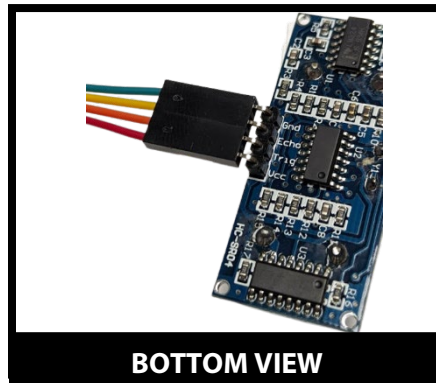
BOTTOM VIEW

TOP VIEW

Carefully bend the pins so that the connector sits perpendicular to the board and the pins stick straight out.
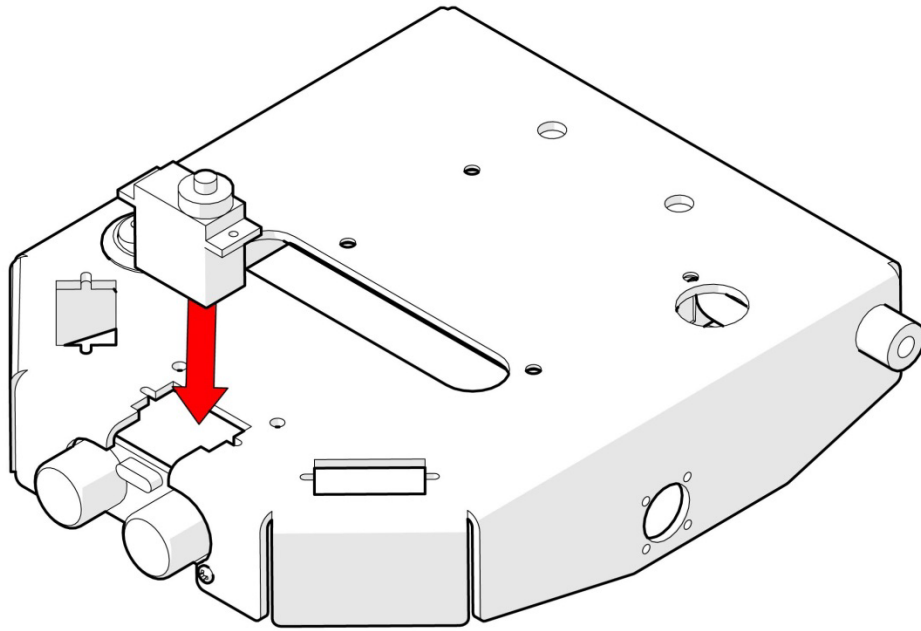
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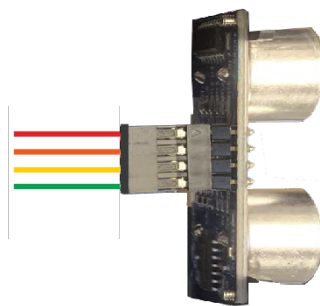
9. Insert the Ultrasonic Sensor into the slot in the front of the robot. The pins should be towards the bottom of the robot.
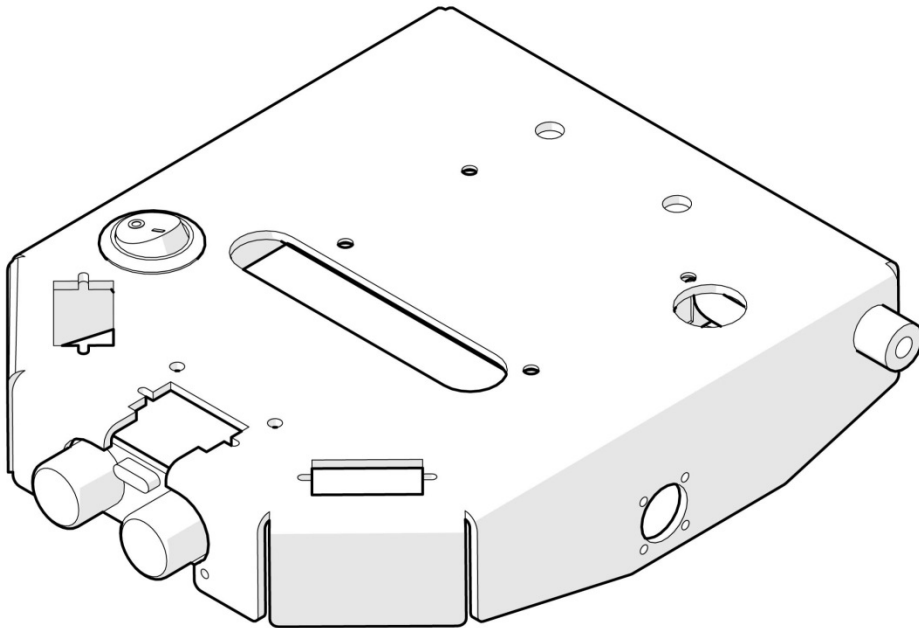

10. Install ultrasonic sensor with two M2 x 6mm Screws (am-1553). **No nuts are used, these screws thread into the circuit board.**


am-1553 Pan Phillips M2 x 6mm Long

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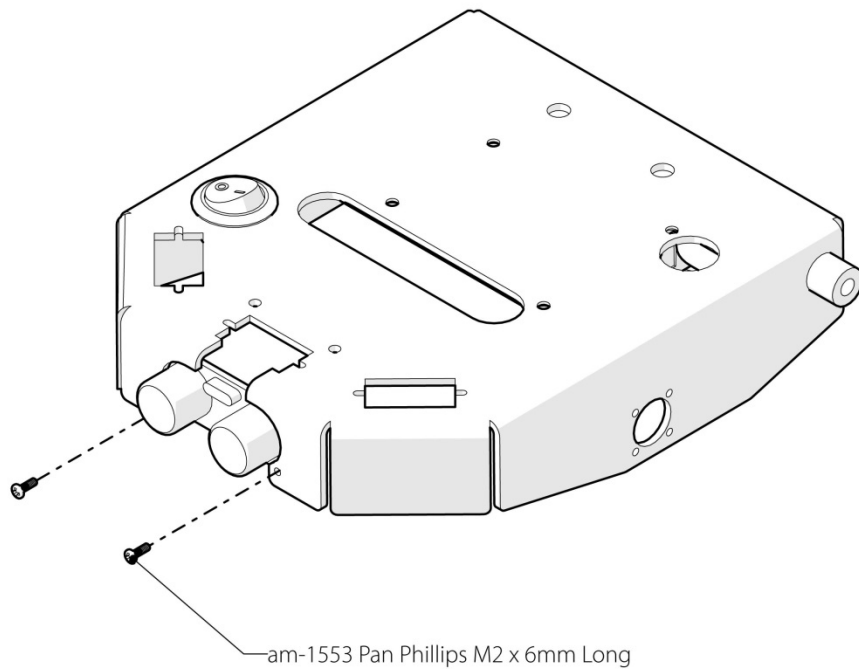
11. Insert the Servo (am-4343) into the center slot on the frame as shown.

12. Attach the Servo using one M2 x 6mm Screw (am-1553) and M2 Nut (am-1554). These screws and nuts can be tightened by hand. Two of the three mounting slots will remain unused. Additional slots are available for mounting additional Servos.

am-1554 M2 Nut

am-1553 Pan Phillips M2 x 6mm Long

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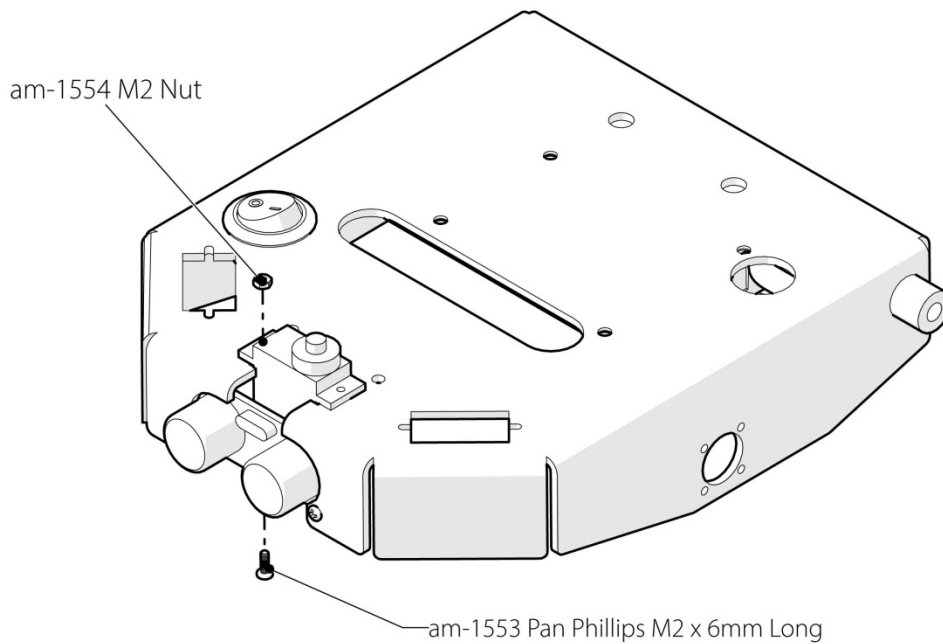
13. Mount Standoffs (am-1558) to underside with two M3 x 6mm Pan Head Screws (am-1556) in the holes adjacent to the servo as shown.

am-1556 M3 x 6mm PHPS

am-1558 28mm x M3 standoff
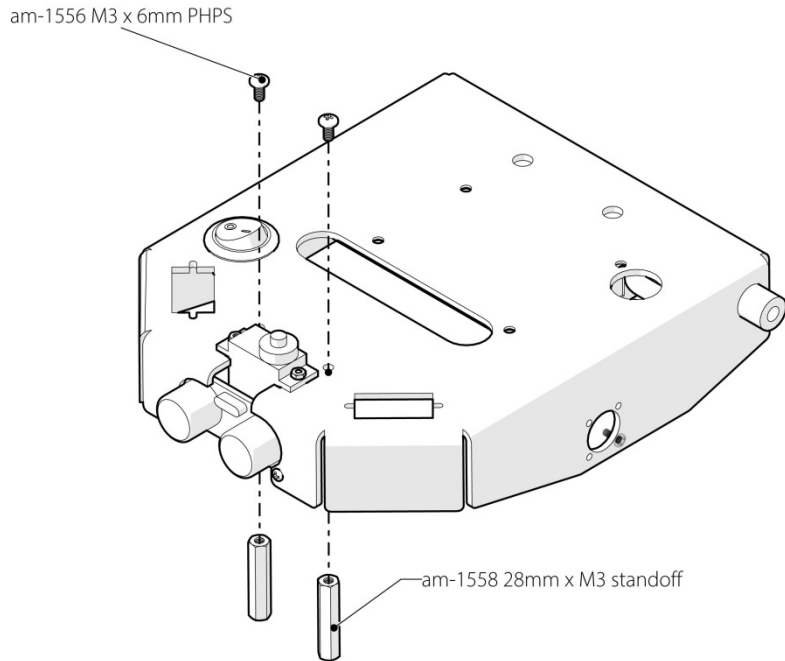
14. Attach the Line Follower Sensor (am-4857) to the Line Follower Sensor Bracket using M2 x 6mm Screws (am-1553) and M2 Nuts (am-1554).

M2 Nut

am-1553 Pan Phillips M2 x 6mm Long

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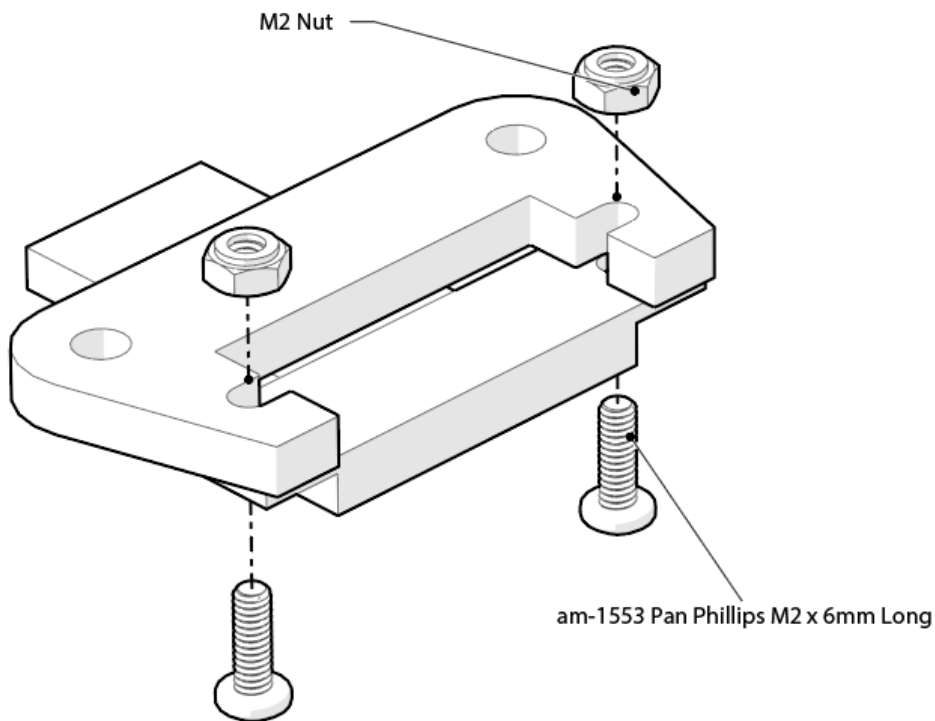
15. Plug the 5-pin cable (am-4818) into the Line Follower Sensor Assembly. The pin-out label is located on the bottom board of the board. Use the red/black pair for 5V and GND.
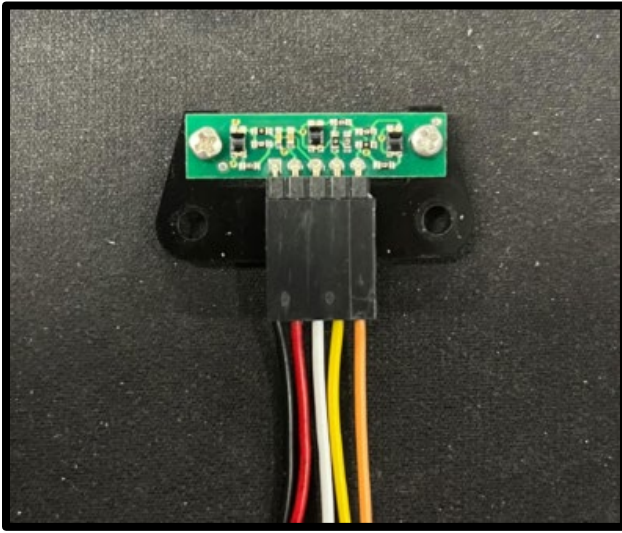
| Board Label	Wire Color
GND	**Black**
5V	**Red**
1	**White**
2	**Yellow**
3	**Orange**

BOTTOM VIEW
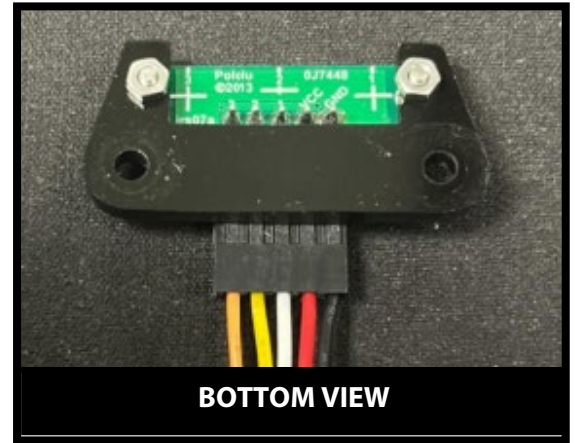
16. Flip the frame over and add the Line Follower Screw Spacer (am-1432) to each standoff. These will be secured in the next step.

am-1432 0.141 ID 0.375 OD 0.375 Long Aluminum Spacer

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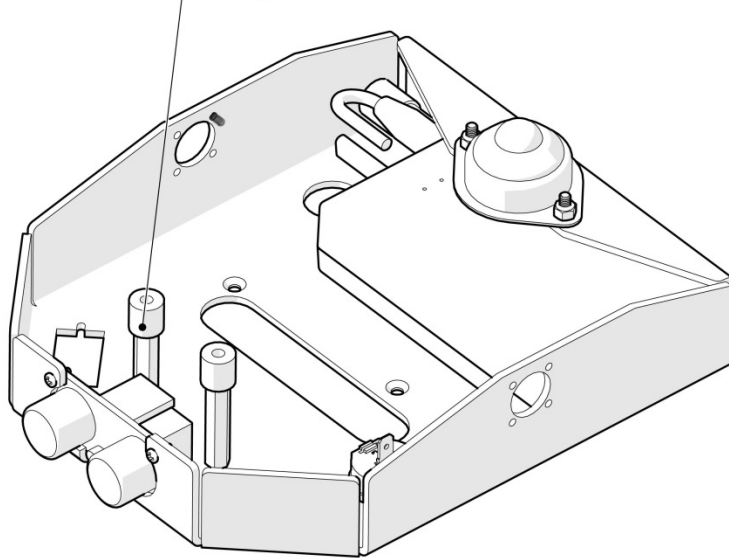
17. Secure the line follower sensor to the standoffs, through the spacer, with two M3 x 16mm Pan Head Screws (am-1677). The sensors on the circuit board should be facing outwards and away from the frame.

am-1677 Pan Phillips M3 x 16mm
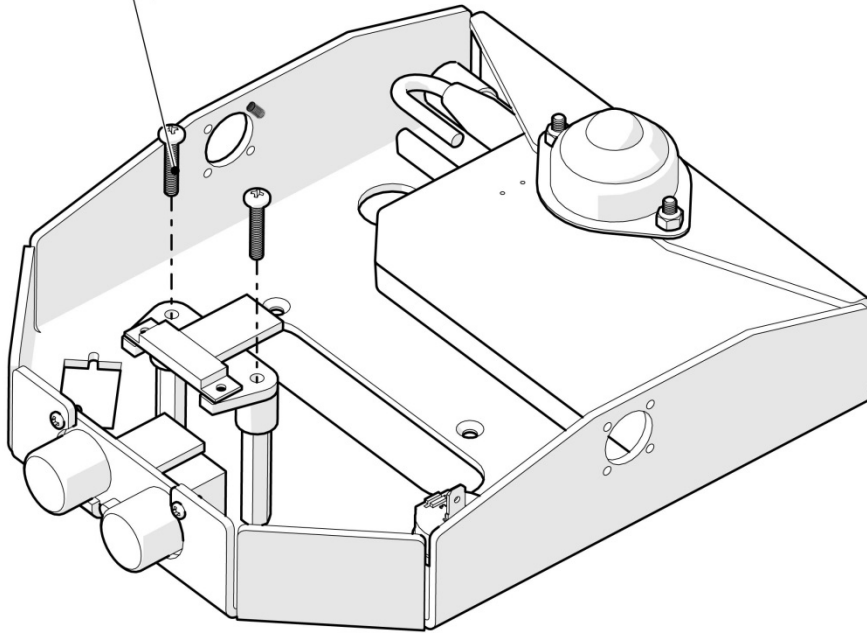
18. Align the Gearmotor (am-4513) with the hole in the side of the frame. Note: To ensure the wires are cleanly routed, rotate the Gearmotor to align with mounting holes so that the wires route under the motor but still allow for a small amount of slack for the connection to the Circuit Board.
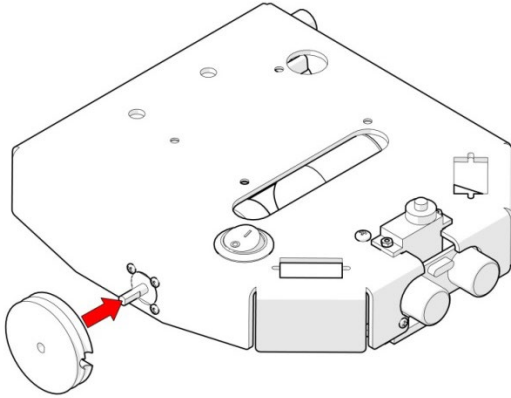
12/19/2023

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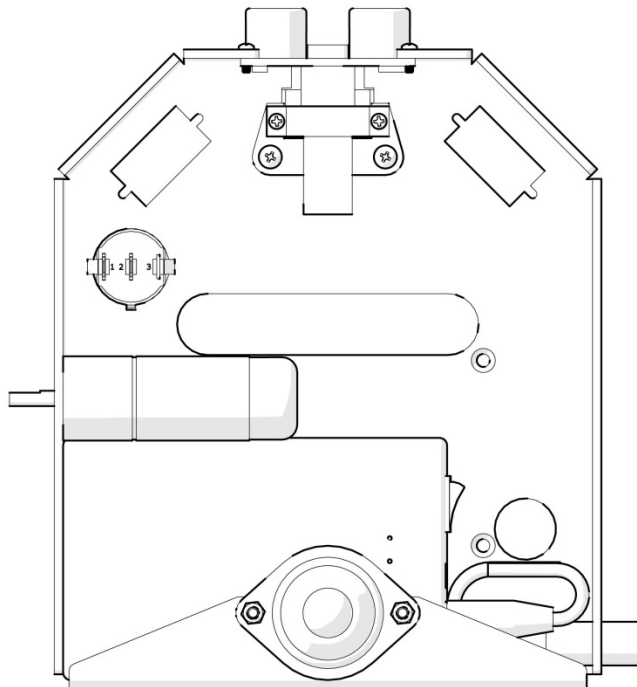
19. Install the motors using four M2 x 6mm Pan Head Screws (am-1553).
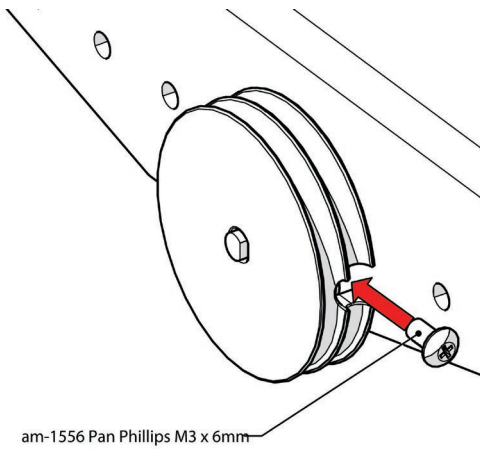

am-1553 Pan Phillips M2 x 6mm Long
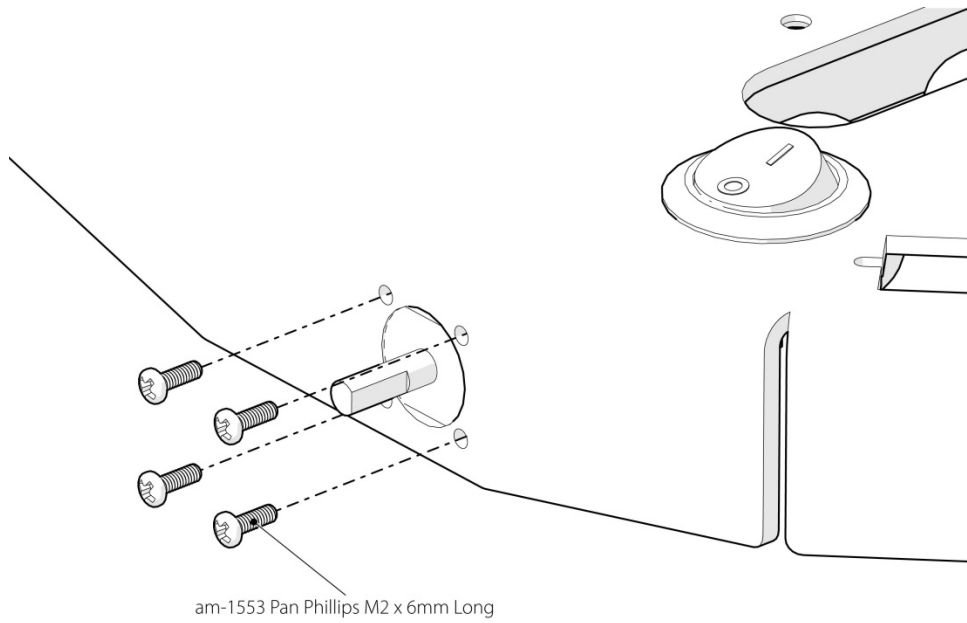
20. Repeat steps for the motor on the opposite side.

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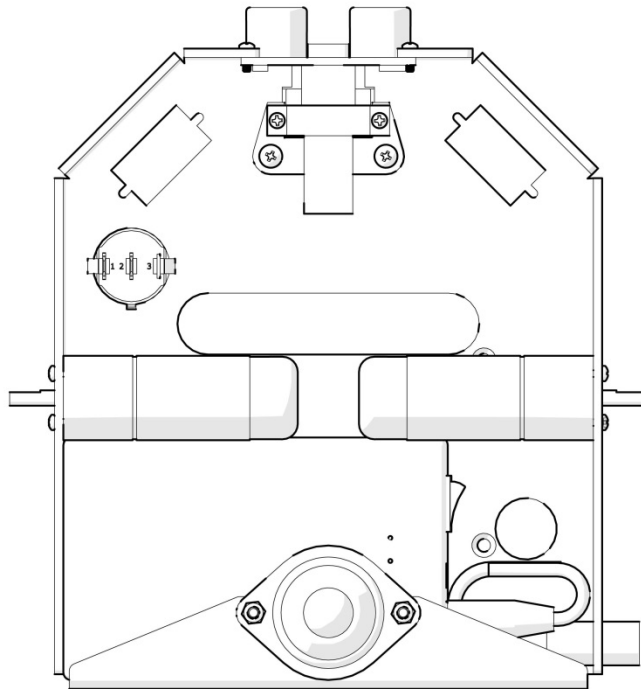
21. Press one Wheel onto each motor shaft. Ensure the D-shaped profile of the shaft aligns with the D-shaped profile of the wheel bore.
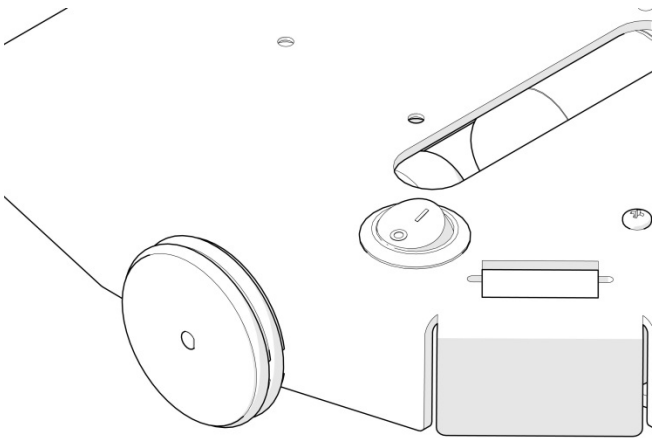

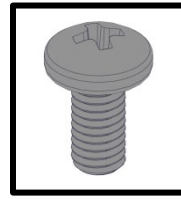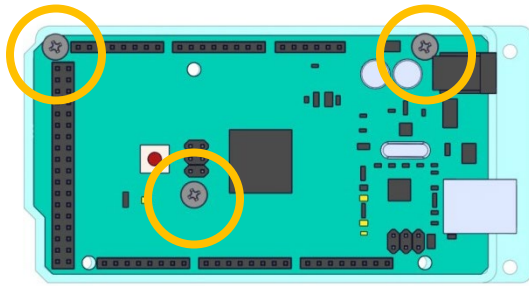22. Add one M3 x 6mm Pan Head Screw (am-1556) to each wheel to secure axially on the shaft.

am-1556 Pan Phillips M3 x 6mm
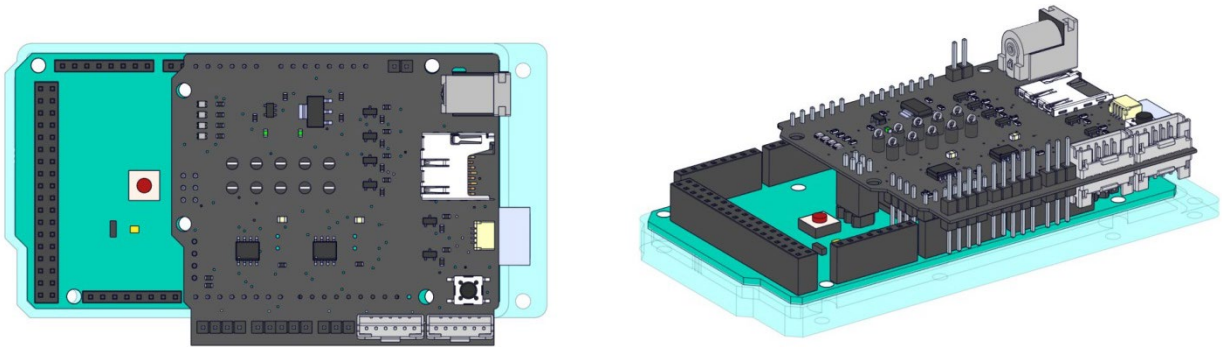
Note: Be careful not to over tighten!

23. Add two O-Rings to each Wheel.

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24. Attach the Arduino Mega to the included mounting case using three M3 x 6mm Pan Head Screw (am-1556) in the locations shown.


25. Insert the pins from the Skitter Circuit Board into the Arduino Mega as shown.

26. Attach the Arduino and Circuit Board to the top of the Chassis Frame using the included hook and loop. The pins for the motors and sensors should be close to the slot in the Chassis Frame.

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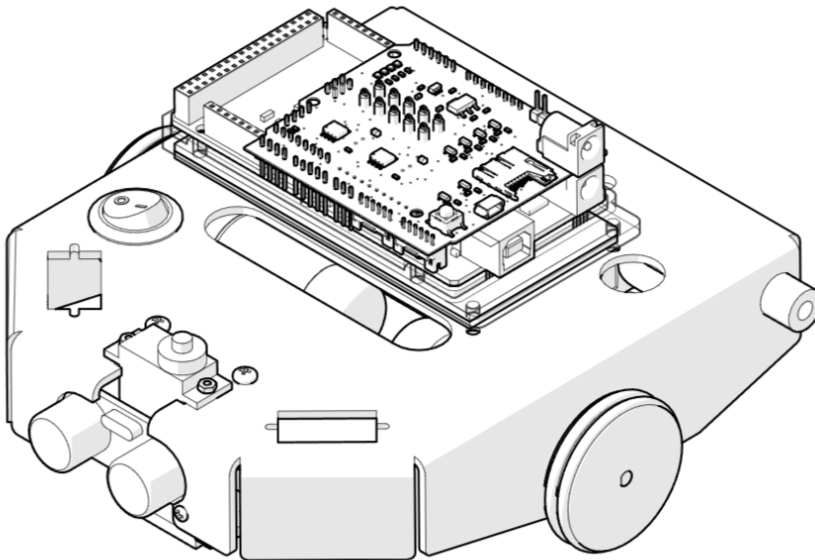
27. Feed the motor cables neatly through the slot in and plug into the Circuit Board as shown.
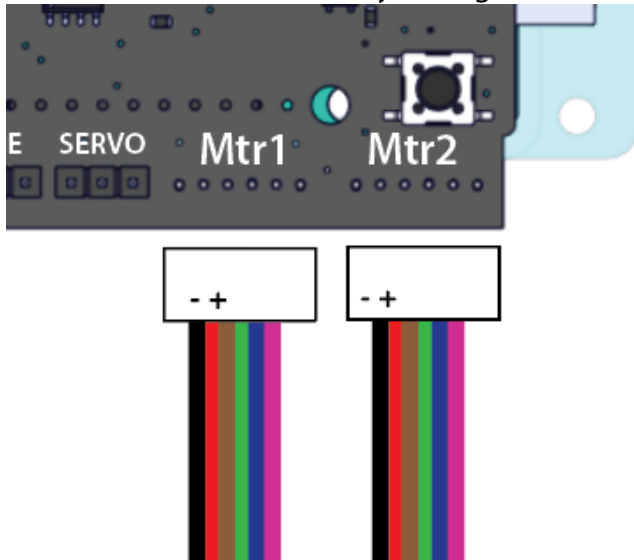
28. Plug in the Servo, Line Follower Sensor, and Ultrasonic Sensor into the connectors on the Circuit Board.
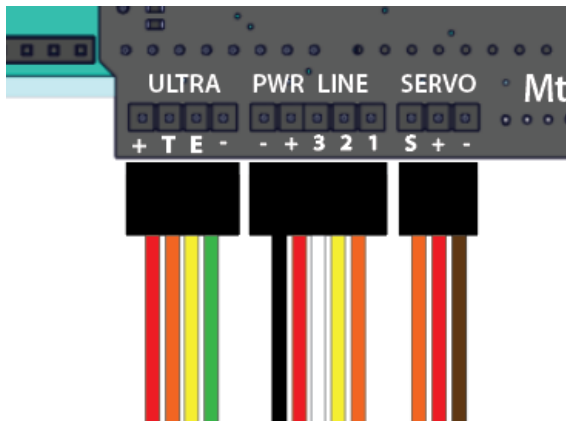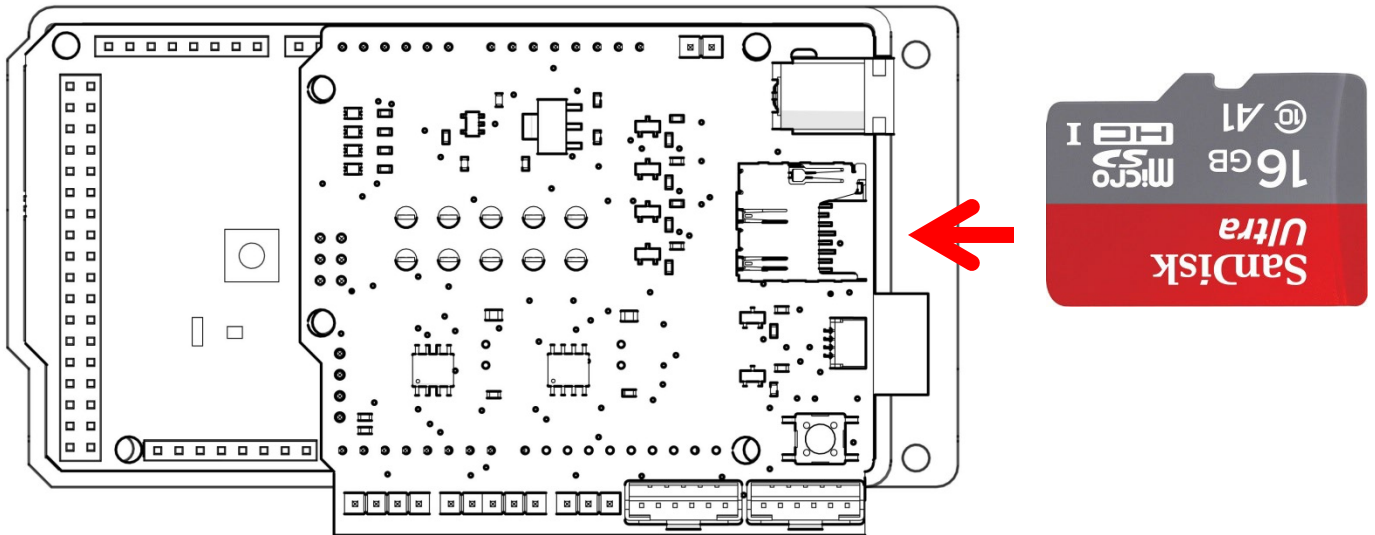
29. Pull the male barrel jack from the long extension from step 2 through the slot and plug into the power connector on the Circuit Board. This will pass through power to the other electronics.

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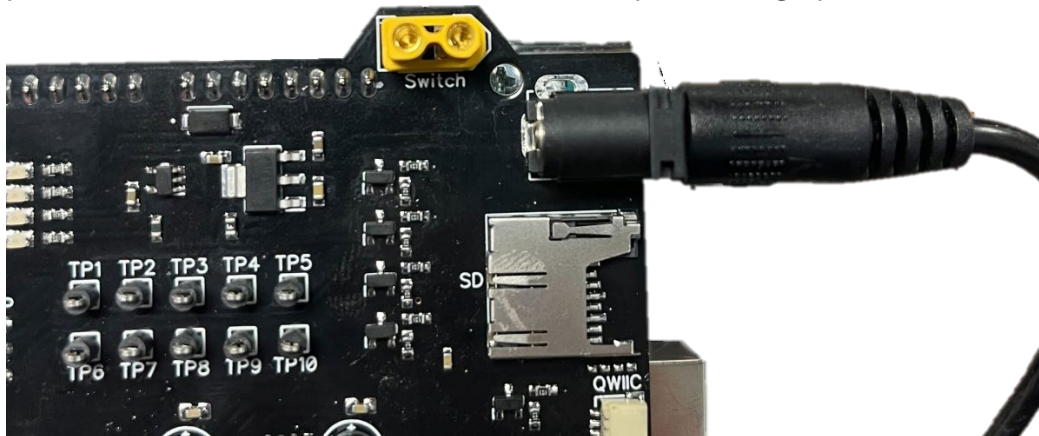
30. Plug the yellow XT30 connector through the slot and plug into the yellow connector on the Circuit Board.
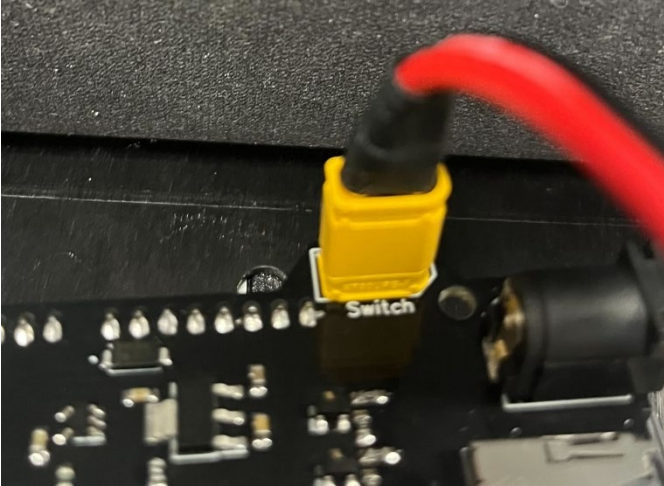
31. Insert SD card into the slot on the Circuit Board.

Your Skitter is Complete!

Note about charging:

- Charge before use.
- Only use provided charger.
- Ensure robot is turned off completely.

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