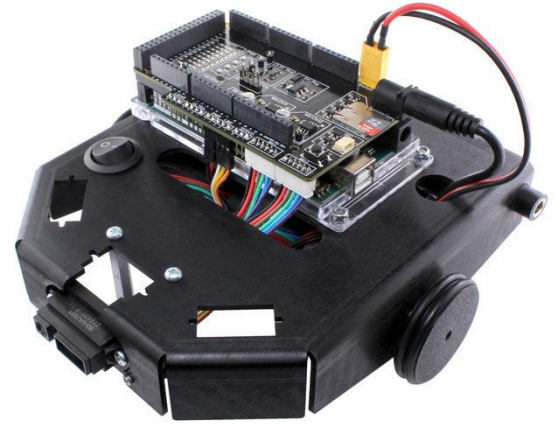


Skitter Robot for Arduino Mega

am-5150a Assembly Guide

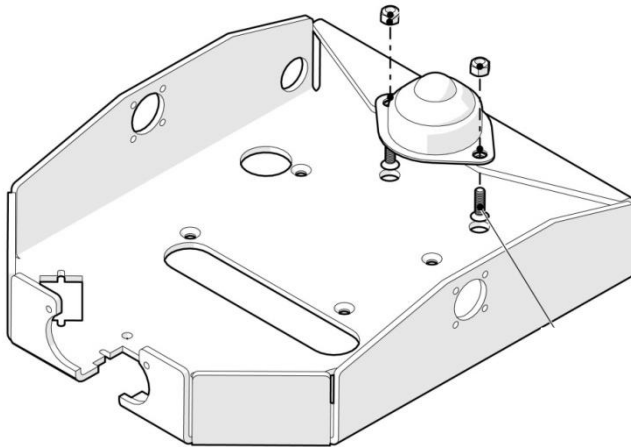


TOOLS

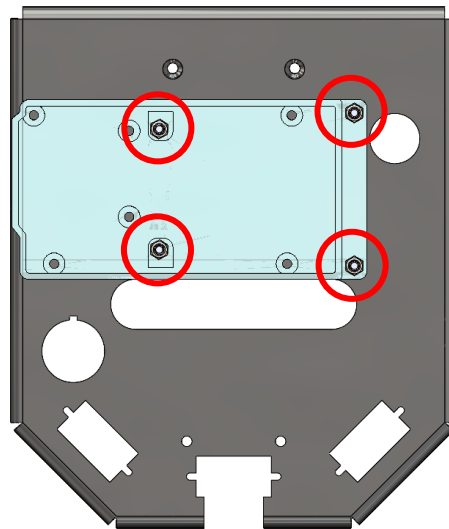
am-4486a	5mm/5.5mm Wrench
am-4416	Reversible #2 Phillips Screwdriver
	Needle-nose Pliers (Optional)

PART #	DESCRIPTION	QTY
am-4344b	Skitter Chassis Frame	1
am-5121a	Skitter Circuit Board	1
am-5288	Arduino Mega & Case	1
am-4353	Ball Caster	1
am-5480	Distance Sensor	1
am-5478	Distance Sensor Bracket	1
am-5479	Cable for Distance Sensor	1
am-4347	12V Li-Ion Battery, 3000mAh	1
am-4513	Gearmotor, 12v w/ encoder	2
am-3797_switch	On/Off Switch	1
am-5287	Switch Cable Assembly	1
am-4354b	Wheel	2
am-4340	O-Ring	4
am-1589_black	Cable Tie, 4"	4
am-4730	Line Follower Bracket	1
am-4818a	Cable for Line Follower	1
am-4857	Line Follower Sensor	1
am-5121a_spacer	Pin Spacer	1
am-4867	USB-A to USB B Cable	1
am-5292	MicroSD to USB Reader	1
am-5186	SanDisk 16GB Memory Card	1
am-5150ah	Hardware Kit	
am-1553	Screw, Pan Head M2 x 6mm	12
am-1554	Nut, M2	2
am-1556	Screw, Pan Head M3 x 6mm	11
am-1023	Nut, Nylock M3	6
am-1729	Hex Standoff, M3 x 37mm	2
am-1741	Screw, Flat Head M3 x 8mm	6

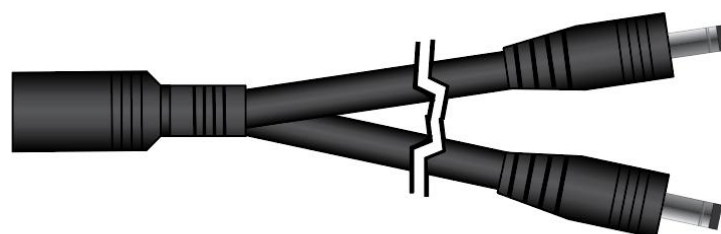
1. Install caster using two Flat Head M3 x 8mm Screws (am-1741) and two M3 Nylock Nuts (am-1023) using the reversible screwdriver. You may have to use pliers to change the screwdriver from a flat head to a phillips head. The flat head of the screw should sit inside the bent flange. The screw and nut can be tightened using the access holes in the frame.



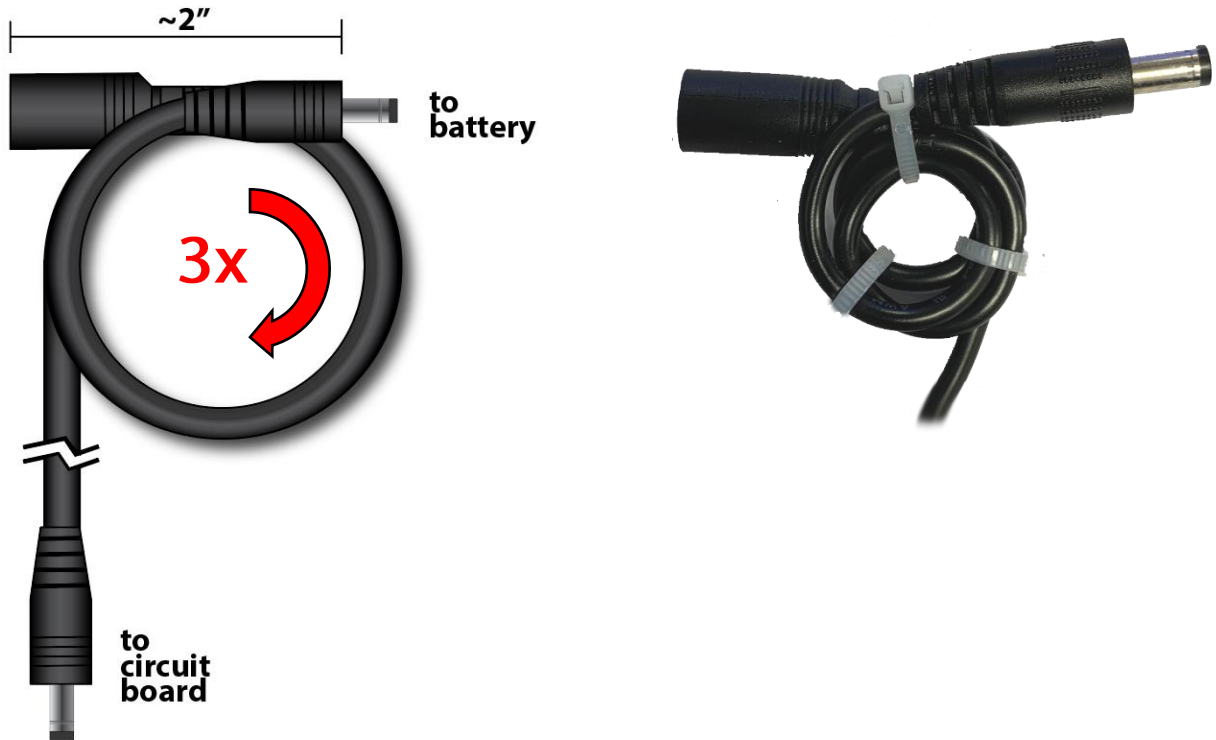
2. Attach the Arduino Mega mounting case (included with the Arduino) to the Skitter using four M3 x 8mm Flat Head Screws (am-1741) and four M3 Nylock nuts (am-1023) in the locations seen below.



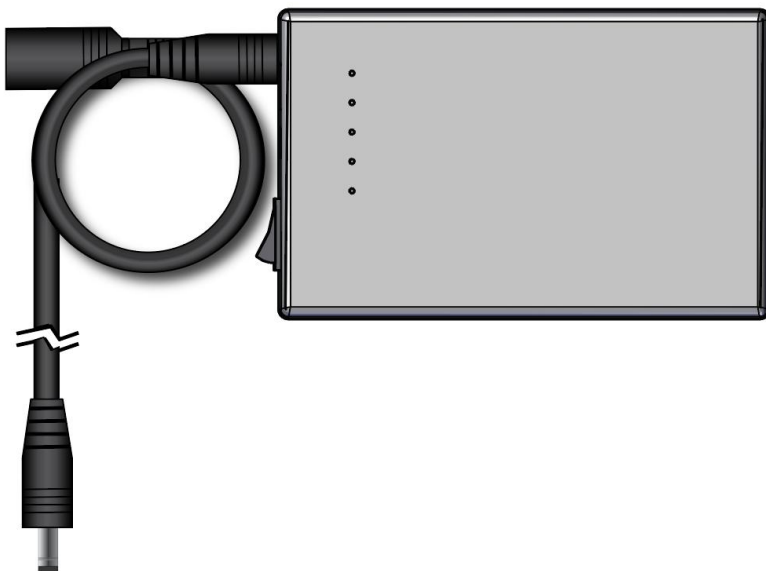
3. Locate the Battery Cable included with the Battery Pack. This cable has a female end and two male ends. The female end will be fed through a hole in the chassis for charging. One male end will go to the battery pack and the other will go to the circuit board.



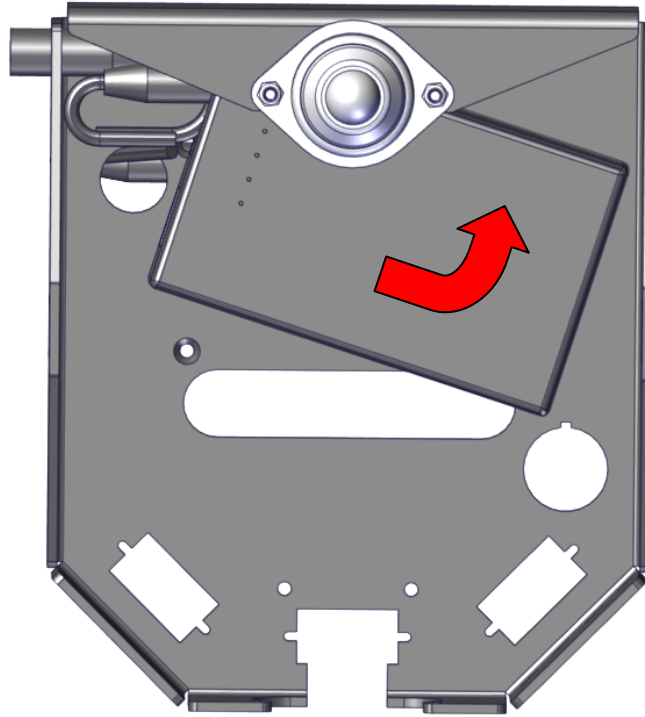
4. Wrap one end of the Battery Cable into a small loop and secure using one to four cable ties (am-1589_black). In order to fit in the space between the Battery Pack and the Frame Wall, the two cable ends will need to overlap for a total length of ~2". The smaller the loop, the easier it will fit in the chassis frame. The other male end will go to the connector on the Circuit Board and should measure approximately 6" long.



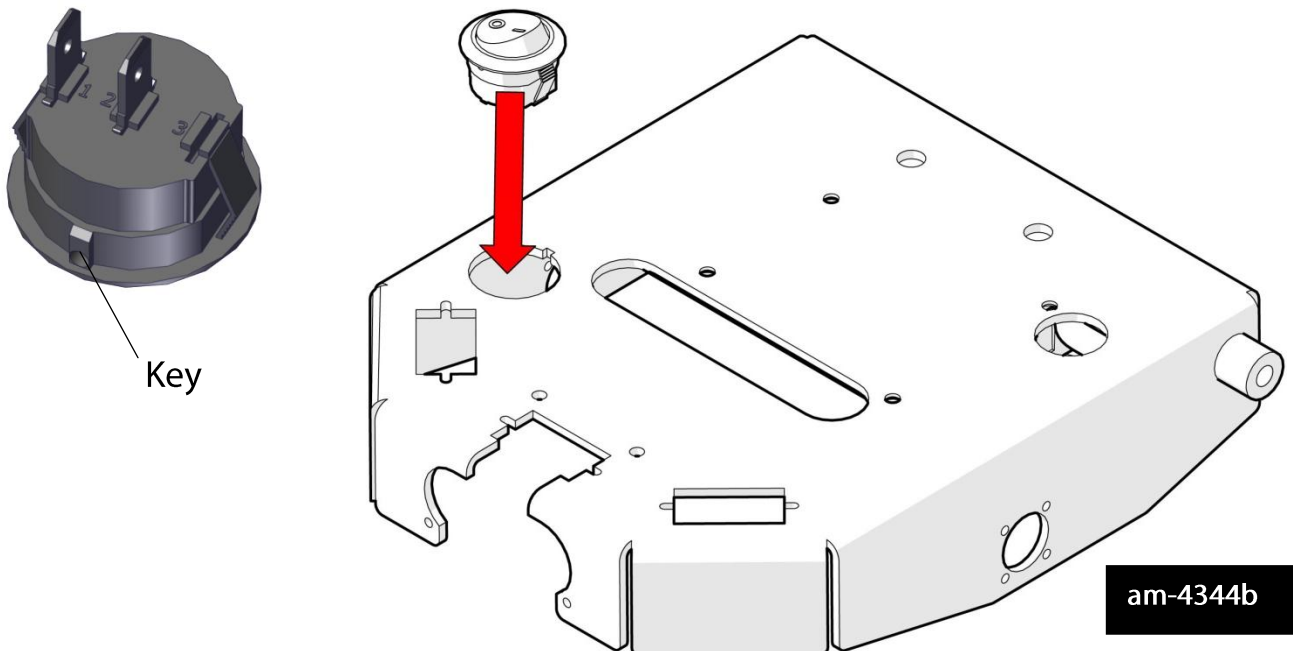
5. Plug the shorter male end of the Battery Cable to the Battery and slide the Battery into the rear right corner of the chassis. The lights on the battery should face out and the switch should be located on the left.



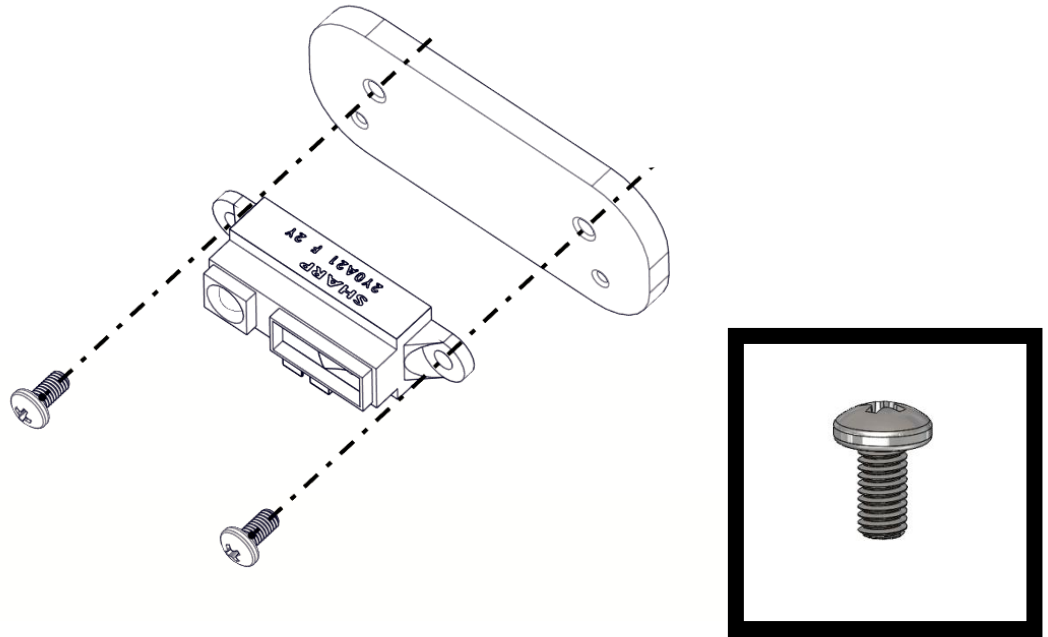
- The battery pack sits underneath the chassis flange with the lights facing outward. To install, Insert female end of the Battery Cable into left rear hole while sliding the battery into place. The female end of the battery cable should protrude approximately $\frac{1}{2}$ " The female end of the cable 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.



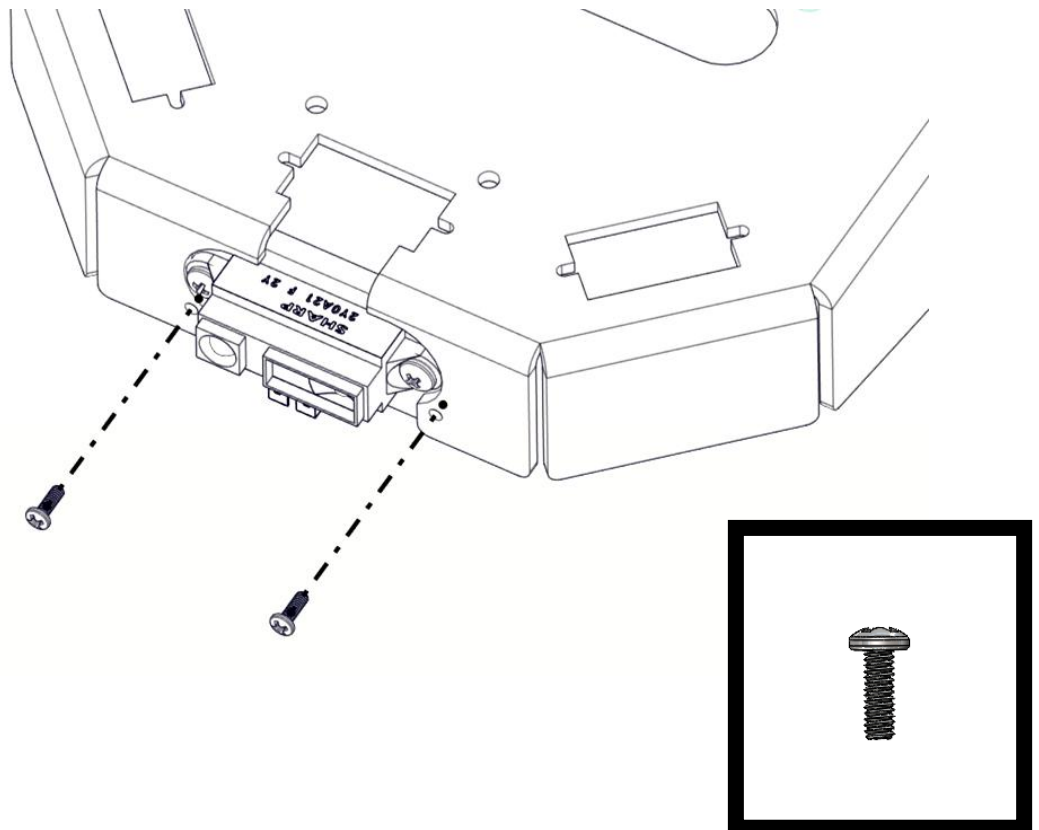
7. Snap in the On/Off Switch (am-3797_switch) into the mounting hole in the frame. Ensure the locating key on the switch is aligned with the notch in the frame.



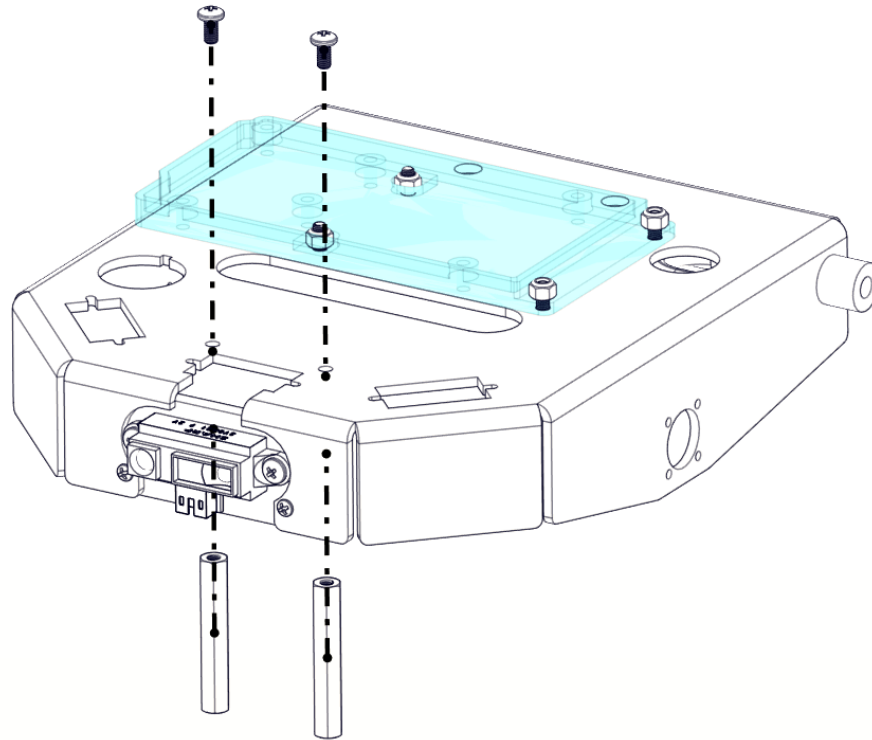
8. Install distance sensor with two M2 x 6mm screws (am-1553). No nuts are used, these screws thread into the plastic.



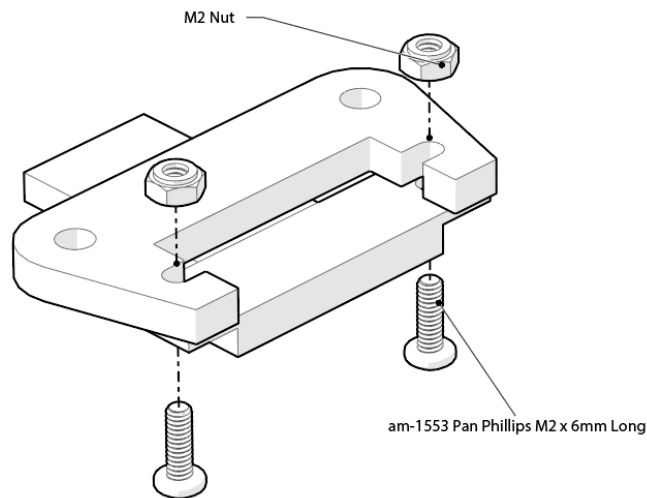
9. Insert the distance sensor plate into the slot in the front of the robot using two M3 x 6mm screws (am-1556). No nuts are used, these screws thread into the plastic.



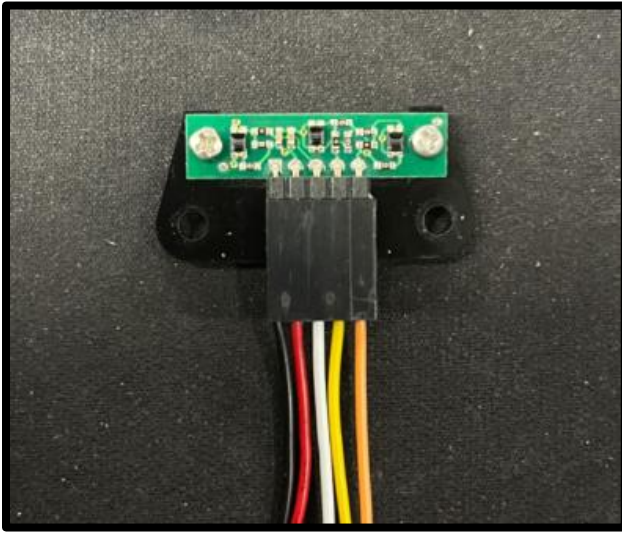
10. Mount Standoffs (am-1729) to underside with two M3 x 6mm Pan Head Screws (am-1556) in the holes as shown.



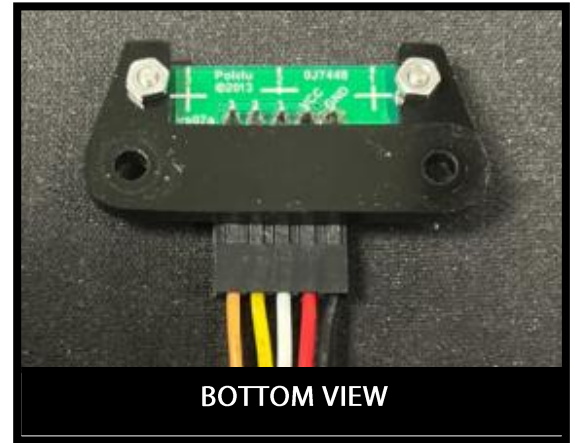
11. Attach the Line Follower Sensor (am-4857) to the Line Follower Sensor Bracket using M2 x 6mm Screws (am-1553) and M2 Nuts (am-1554).



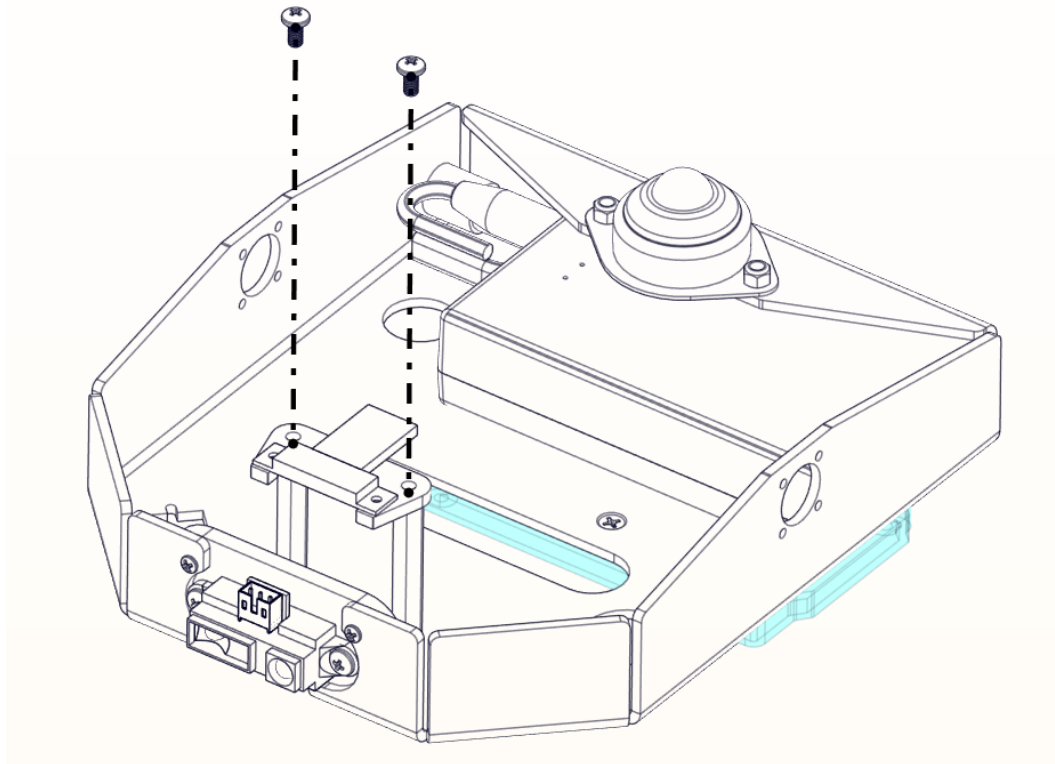
12. Plug the 5-pin cable (am-4818a) into the Line Follower Sensor Assembly. The pin-out label is located on the bottom of the board.



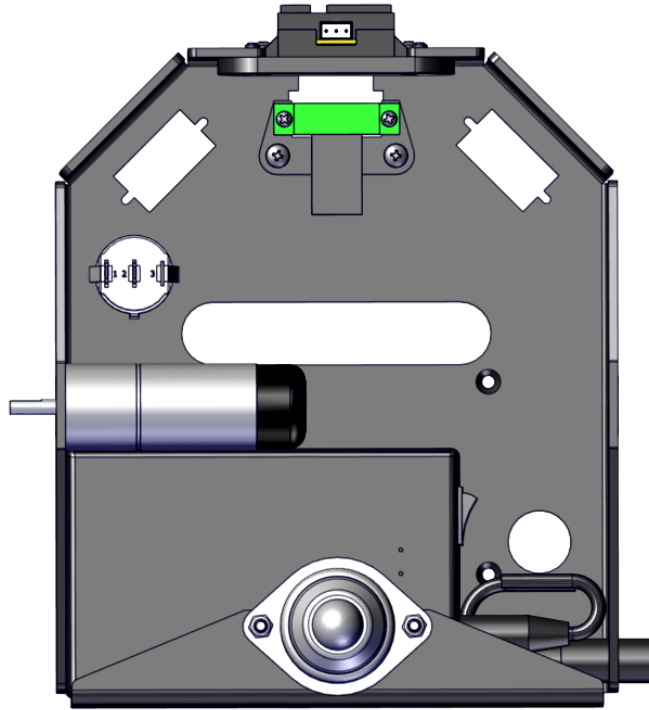
Board Label	Wire Color
GND	Black
5V	Red
1	White
2	Yellow
3	Orange



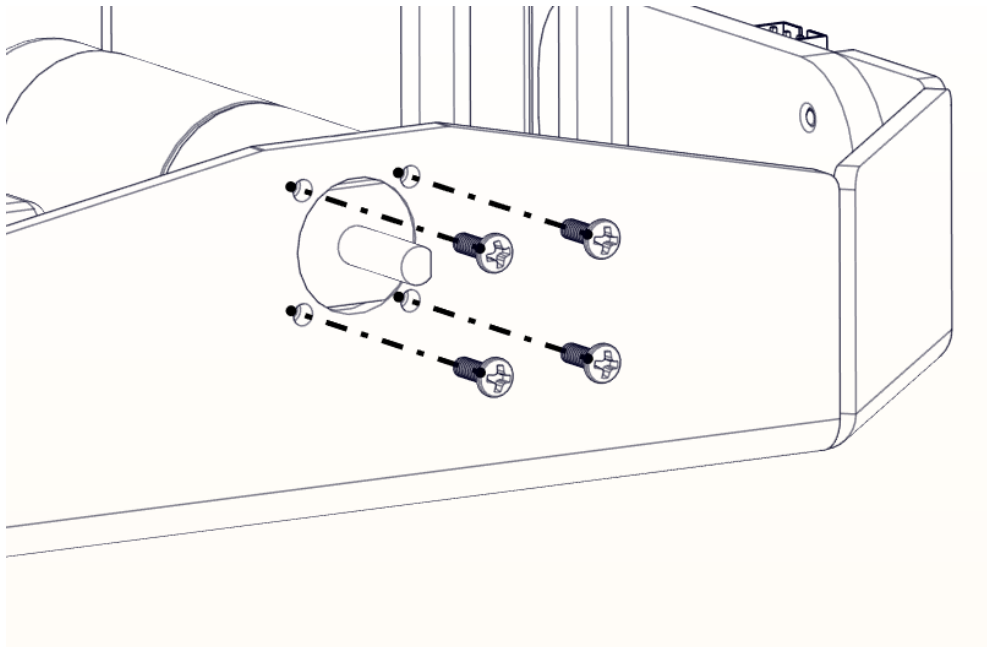
13. Secure the line follower sensor to the standoffs with two M3 x 6mm Pan Head Screws (am-1556). The sensors on the circuit board should be facing outwards and away from the frame.



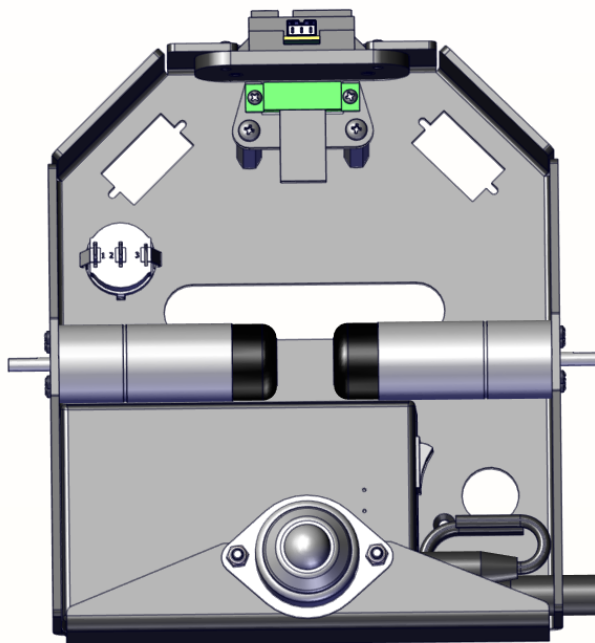
14. Align the Gearmotor (am-4513) with the hole in the side of the frame. Note: To ensure the wires are cleanly routed, rotate the Gearmotor to align with mounting holes so that the wires route under the motor but still allow for a small amount of slack for the connection to the Circuit Board.



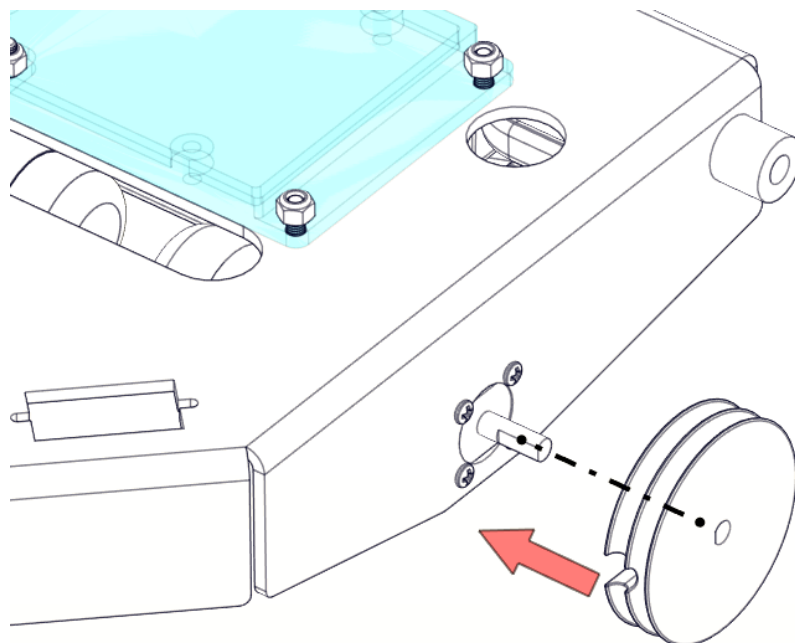
15. Install the motors using four M2 x 6mm Pan Head Screws (am-1553).



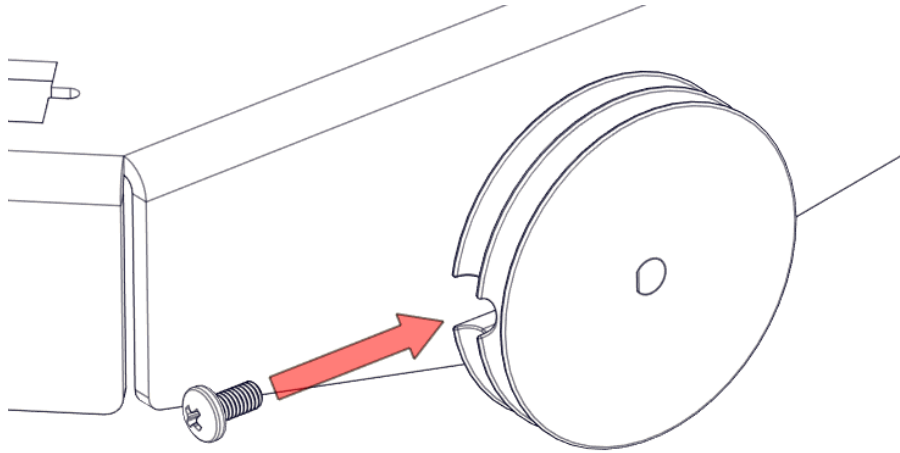
16. Repeat steps for the motor on the opposite side.



17. Press one Wheel (am-4354b) onto each motor shaft. Ensure the D-shaped profile of the shaft aligns with the D-shaped profile of the wheel bore.

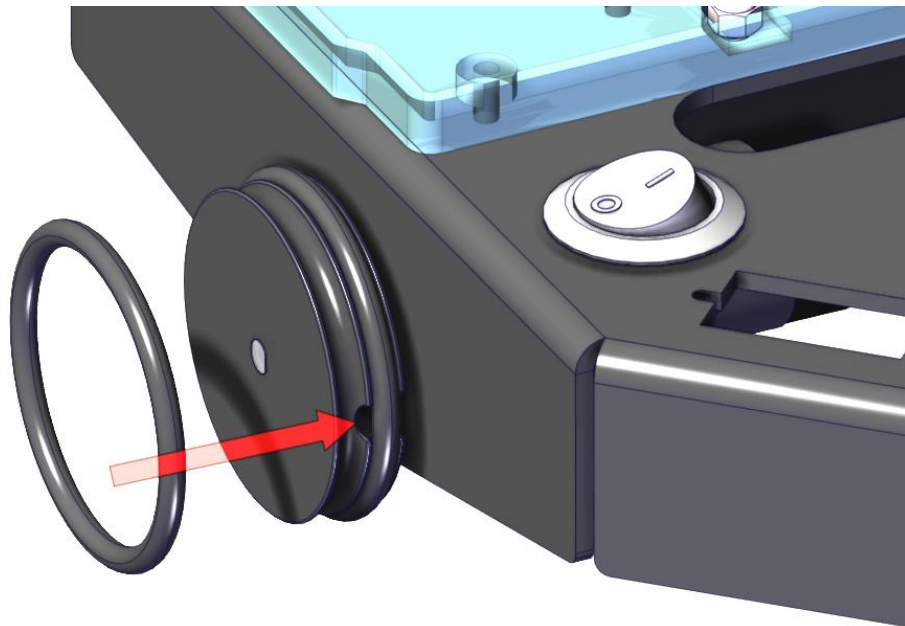


18. Add one M3 x 6mm Pan Head Screw (am-1556) to each wheel to secure axially on the shaft.

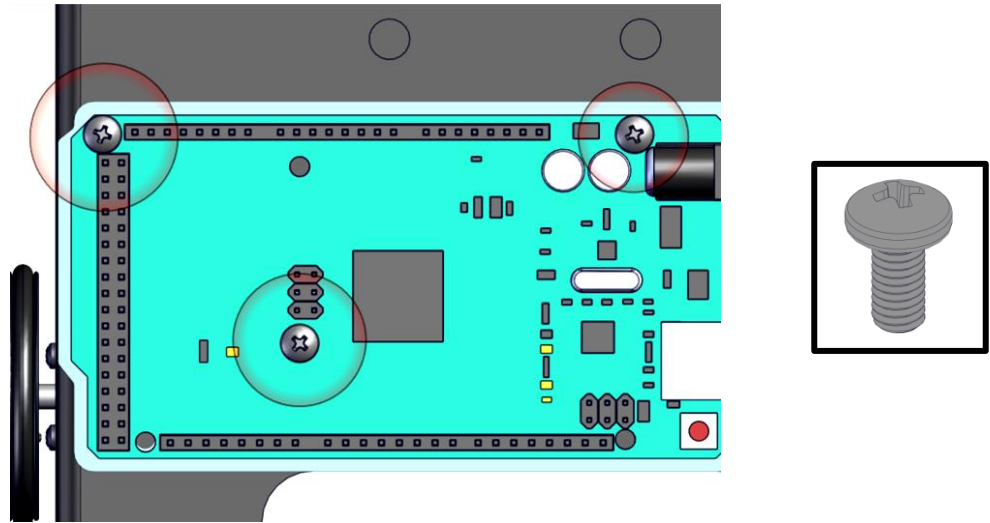


Note: Be careful not to over tighten!

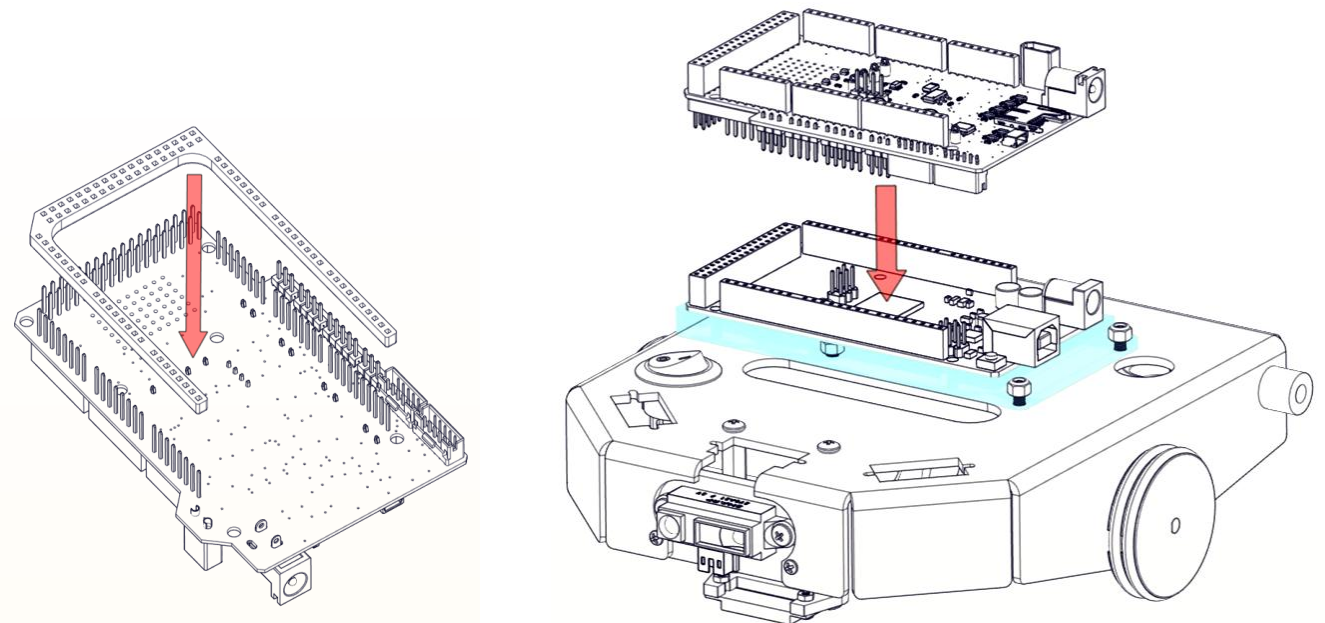
19. Add two O-Rings (am-4340) to each Wheel.



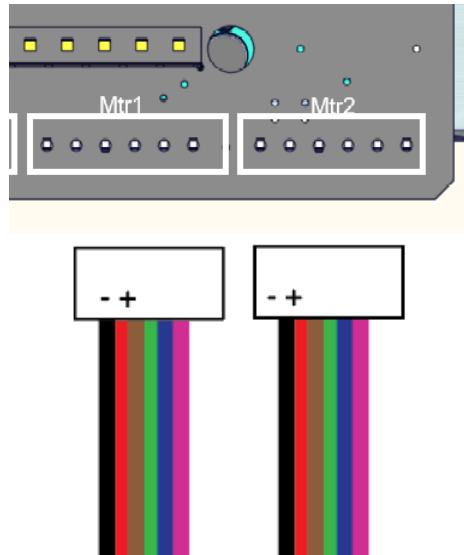
20. Attach the Arduino Mega (am-5288) to the mounting case using three M3 x 6mm Pan Head Screw (am-1556) in the locations shown.



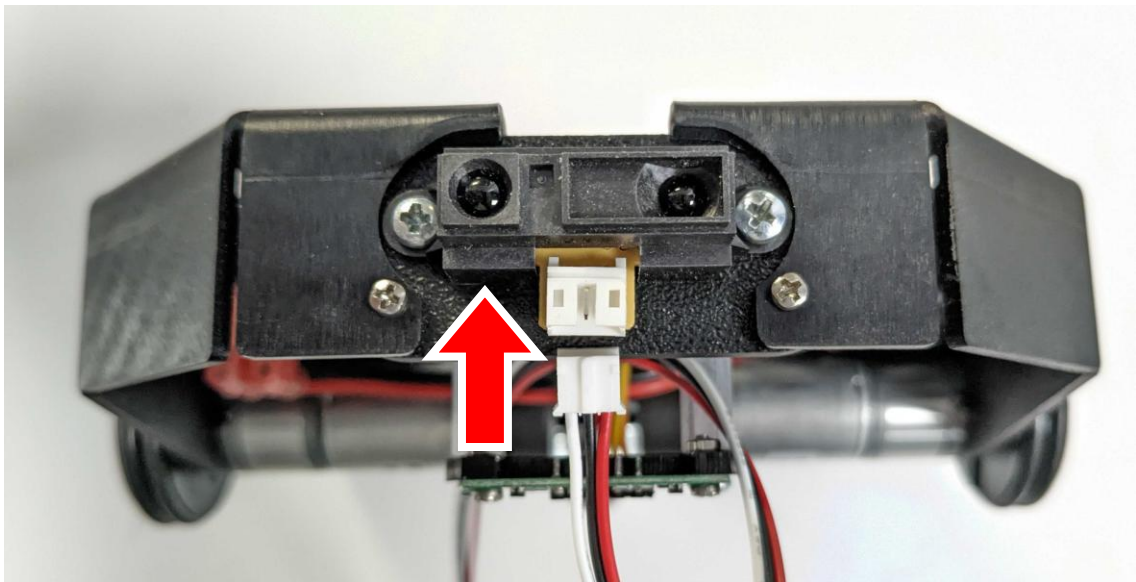
21. Push the pin spacer (am-5121a_spacer) onto the exposed pins on the bottom of the Skitter Circuit Board (am-5121a). Insert the pins from the Skitter Circuit Board into the Arduino Mega as shown.



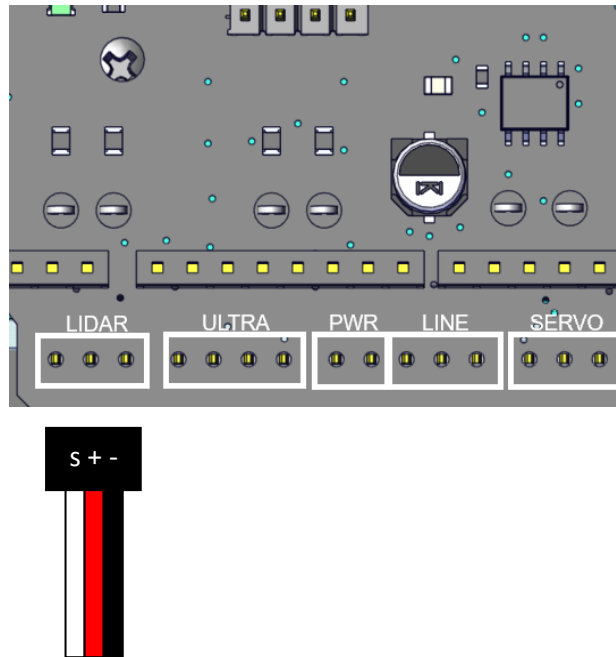
22. Feed the motor cables neatly through the slot in and plug into the Circuit Board as shown.



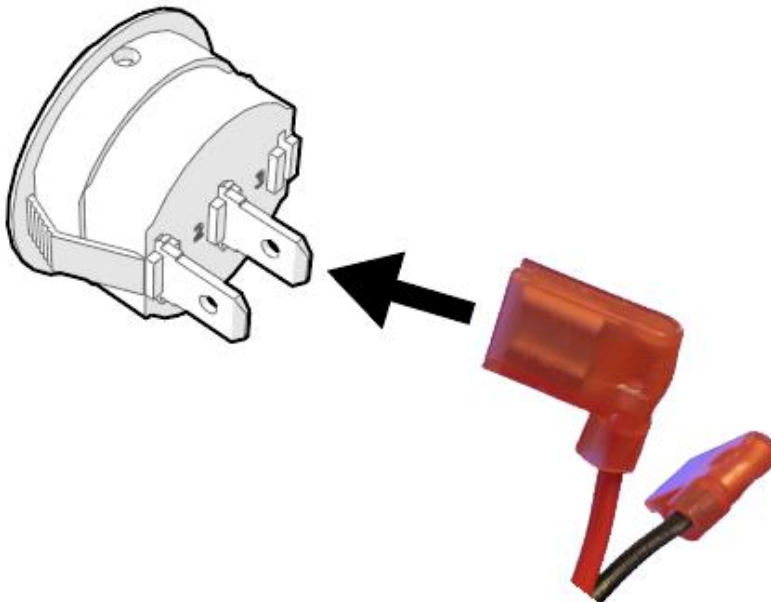
23. Clip in the distance sensor cable (am-5479) into the plug on the distance sensor. Make sure that the wires go through the standoffs for the line follower.



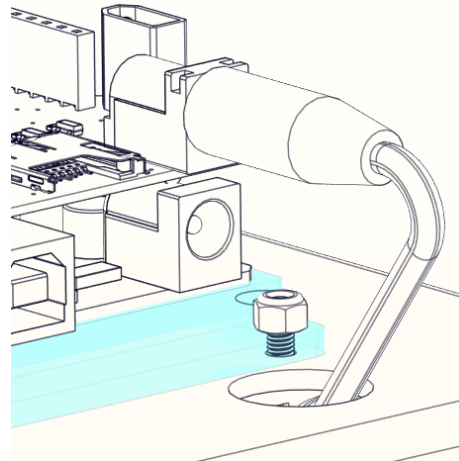
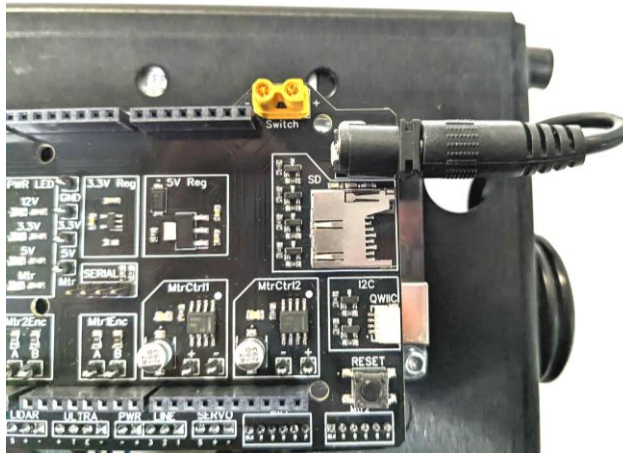
24. Plug in the distance sensor cable (am-5479) into the LIDAR connectors on the Circuit Board.



25. Slide the crimped connectors (am-5287) 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.

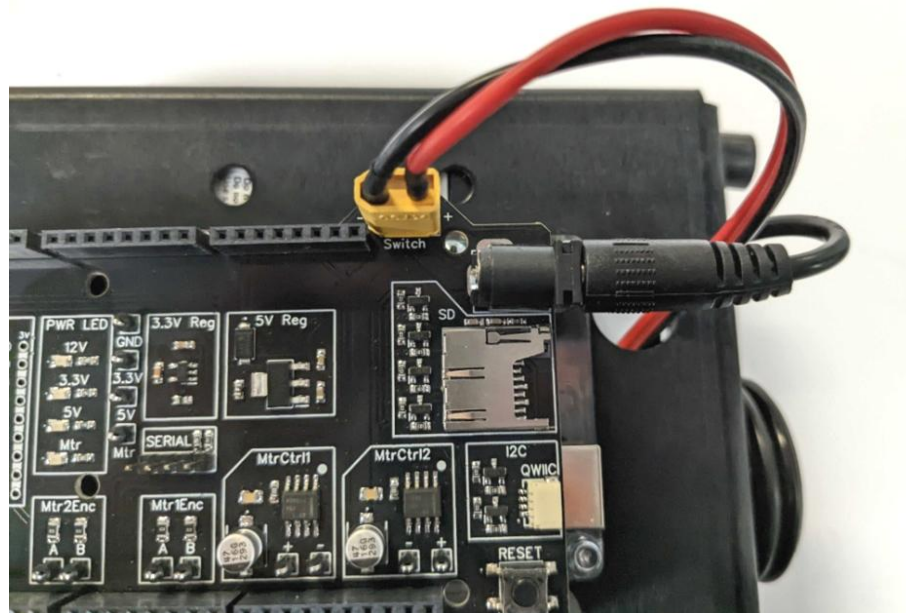


26. Pull the male barrel jack from the long extension from step 3 through the hole and plug into the power connector on the top Skitter Circuit Board. This will pass through power to the other electronics.



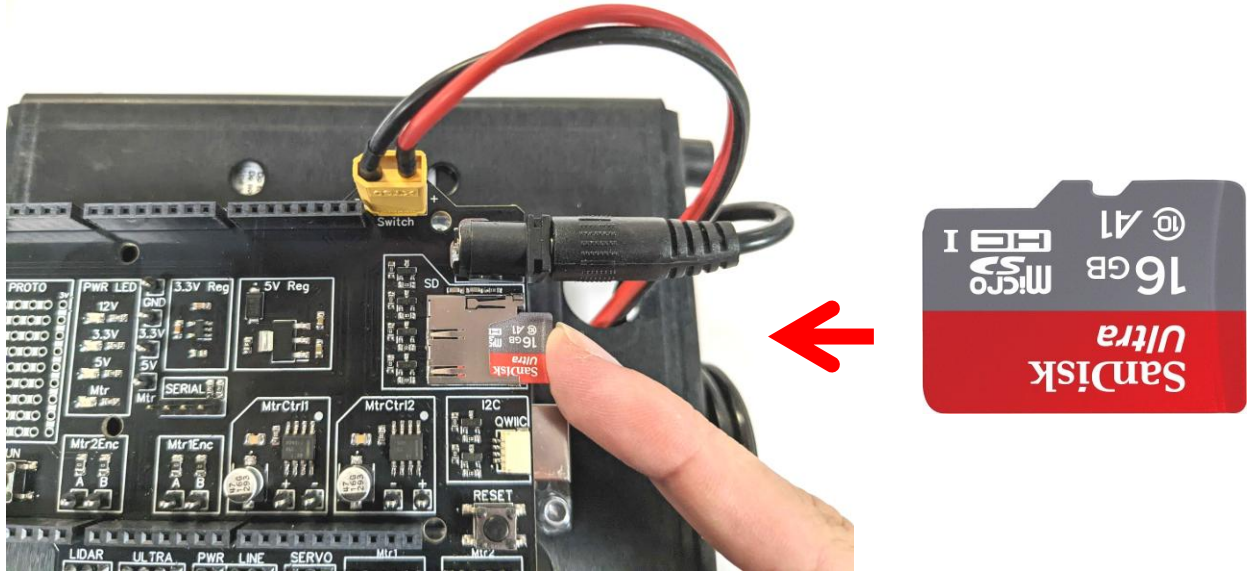
Note: Be sure to plug into the top Skitter Board and *not* the Arduino.

27. Pull the yellow XT30 connector through the hole and plug into the yellow connector on the Skitter Circuit Board.



● **Stop! Wait for further directions from your instructors** ●
before inserting the SD Card.

28. When instructed, press the SD card into the slot on the Circuit Board.



Your Skitter is Complete!

Note about charging:

- Charge before use.
- Only use provided charger.
- Ensure the battery switch is turned off when not in use.

Features, specs, and example code can be found on the AndyMark website at
www.andymark.com/skitter