

Assembling The Car

Objectives:

1. The student will be able to locate the parts needed to assemble the car.
2. The student will be able to use the correct names of the parts in the kit.
3. The student will be able to complete a circuit.
4. The student will be able to assemble the car by following directions and the car will successfully move.

Time:

1.5 hours

Introduction:

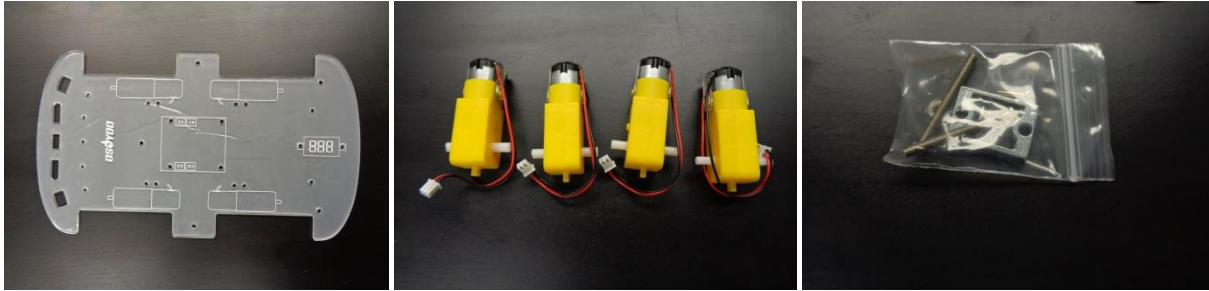
Assembling the car is the first step in this project. In the future we will add sensors to the assembled car that will allow us to control the car.

Assembling The Car

Part 1. Installing the Motors

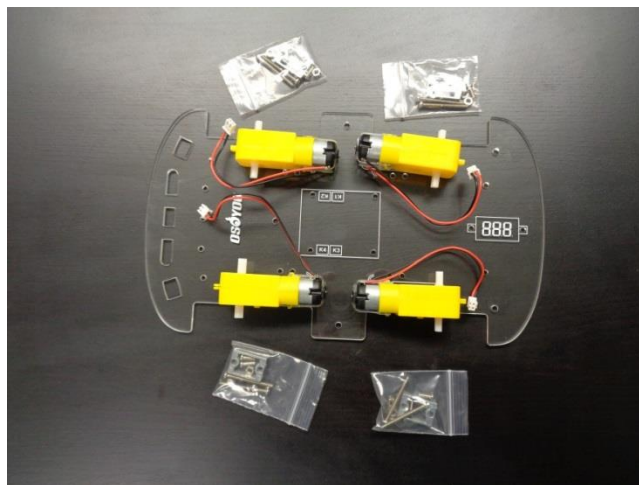
Step 1.

Locate the lower chassis (curved on both ends), the four yellow motors, four metal motor holders, and screwdriver. Remove plastic cap from motors. Peel the protective film off the chassis.



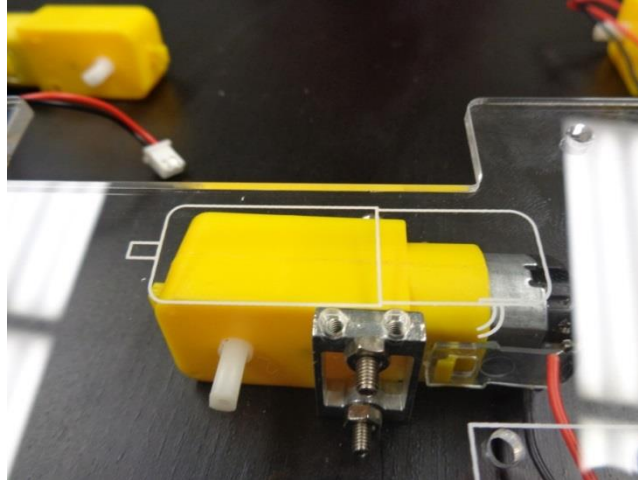
Step 2.

- A. Line one of the motors up with the image printed on the lower chassis, paying attention to the wire direction and hub.

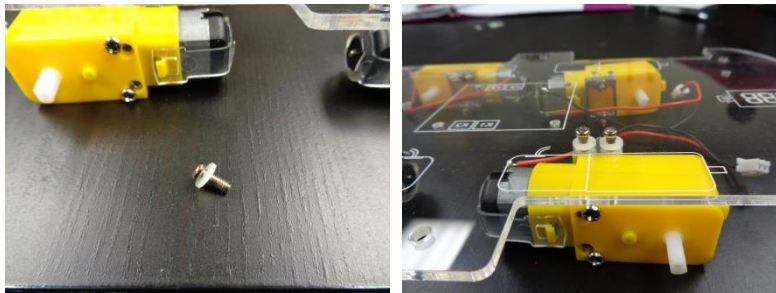


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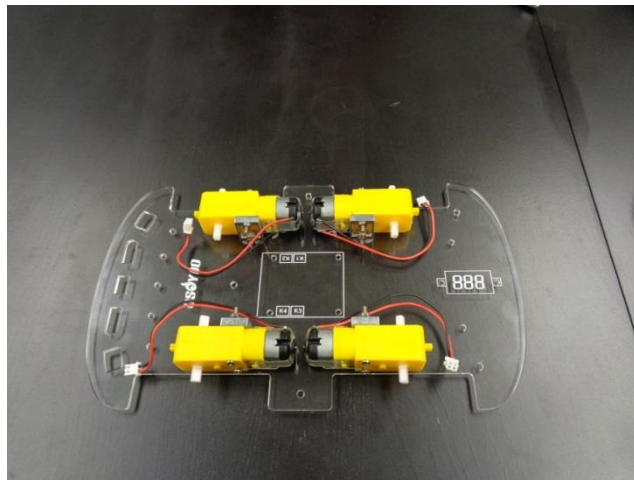
- B. Attach a motor holder to the motor with the long bolts and nuts from the motor holder pack. Tighten with a screwdriver.



- C. Line up the two small holes on the motor holder with the two small holes on the chassis and attach with the small M3 bolts (from the motor holder pack) and rubber rings. Tighten with screwdriver until motor is secure.



- D. Repeat for each of the other three motors.

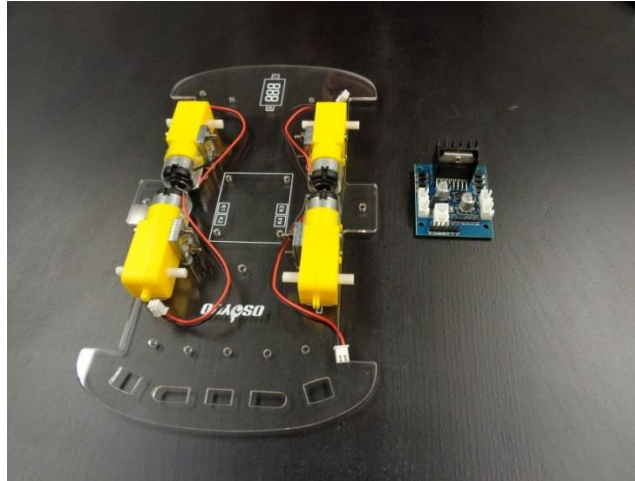


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Part 2. Attaching motor driver, voltage meter, Uno board, and power supply

Step 1.

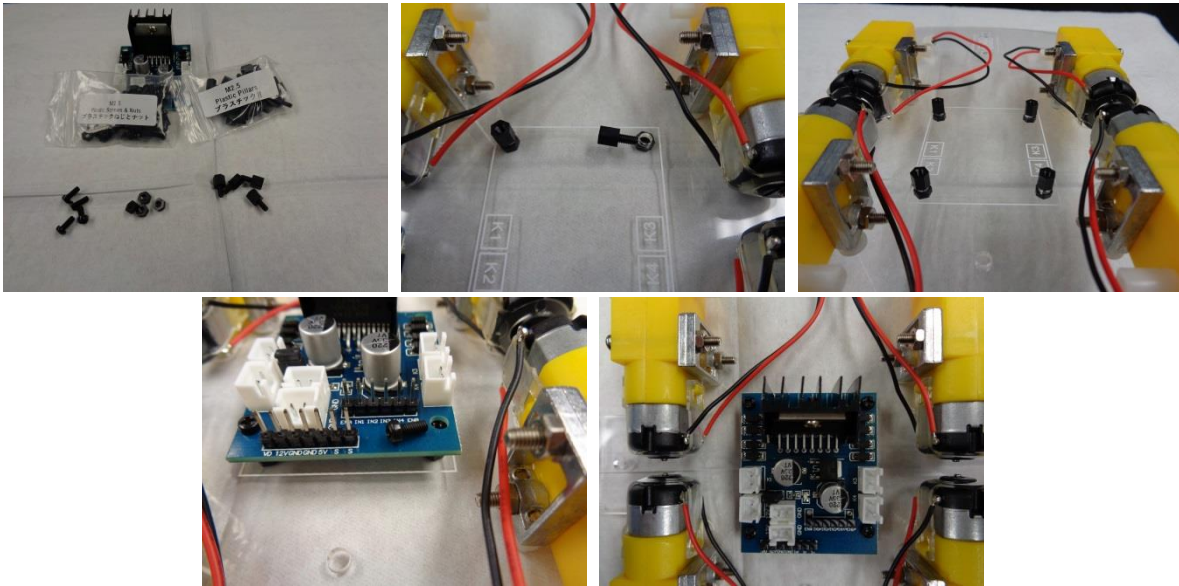
- A. Locate the Model X motor driver module (It will say Model X on the bottom).
- B. Take note of the direction of the printed logo and motor driver so that they align.



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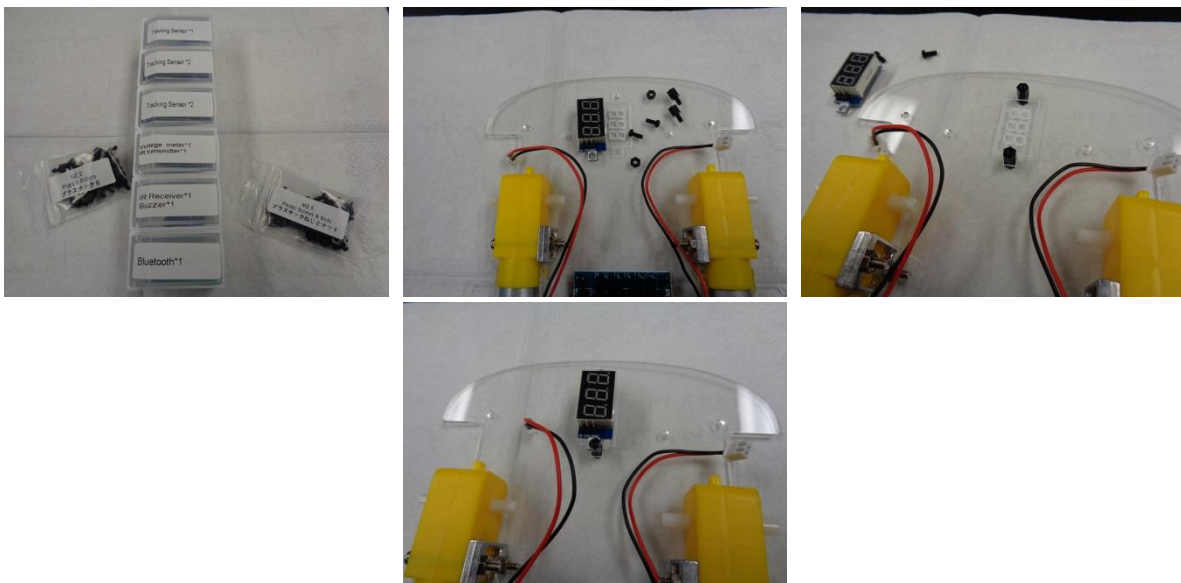
Step 2.

- A. Attach the Model X motor driver onto the lower chassis using the M2.5 plastic screws, nuts, and pillars:
 - a. Place the pillar through the lower chassis and attach a nut on the underside of the chassis.
 - b. Lay the Model X driver on top. Be sure that the tall black tower on the Model X motor driver (heat sink) is closer to the curved end of the chassis without the holes.
 - c. The holes in the corners of the Model X motor driver will align with the holes in the center of the lower chassis.
 - d. Screw through the Model X driver and into the pillar.



Step 3.

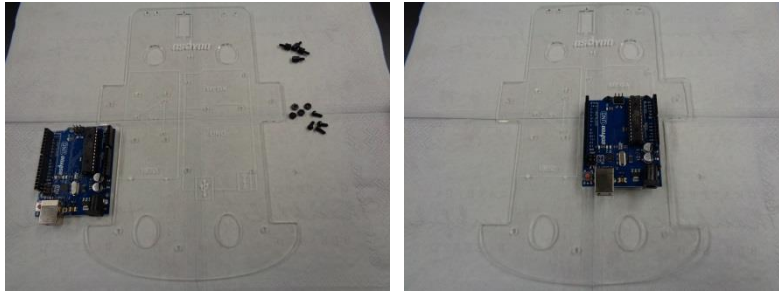
- A. Find the Voltage meter (in the parts bin).
- B. Note the voltage meter image printed on the upper chassis.
- C. Align the voltage meter to the upper chassis and attach it using M2.5 plastic pillars, screws, and nuts.



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Step 4.

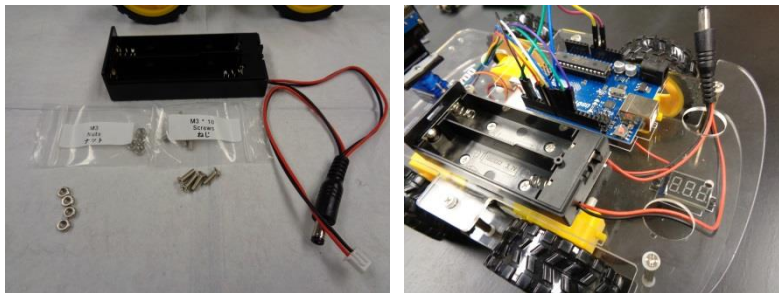
- A. Find the upper chassis and the Uno board.
- B. Align the Uno board to the image on the upper chassis.
- C. Attach the Uno board to the upper chassis with the M2.5 pillars, screws, and nuts.



Step 5.

- A. Find the 18650 battery box.
- B. Align the battery box to the upper chassis. The wires should face the curved side of the chassis.
- C. Attach the battery box to the upper chassis with four M3*10 screws and nuts.
- D. DO NOT insert the batteries into the box. You will do that later for Project 1: Infrared Remote Car.

Alternatively, you can attach the 9V battery box to the upper chassis using three M3*10 screws and nuts, but you will have limited power and function of the car.

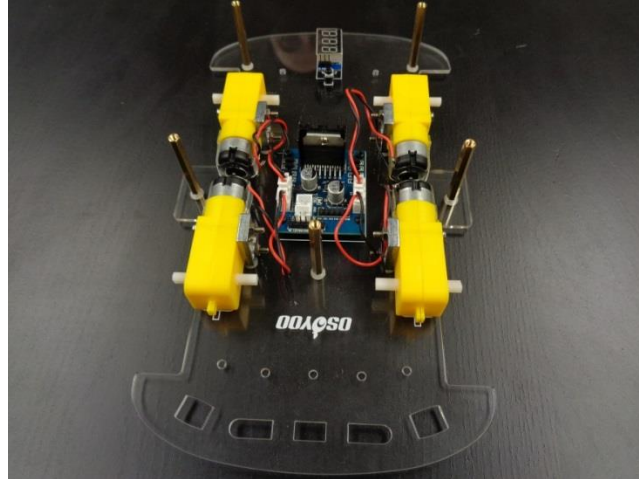


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Part 3. Wiring

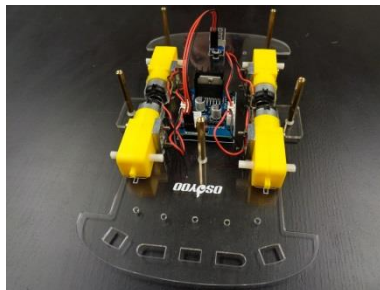
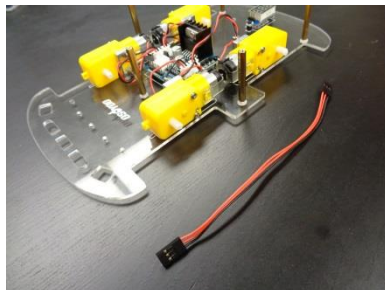
Step 1.

- a. Connect the wires from the motors to the Uno board using K1, K2, K3, and K4 sockets.



- b. Connect the voltage meter to the Model X using 3pin female to 3 pin female from the wire bundle based on the chart below:

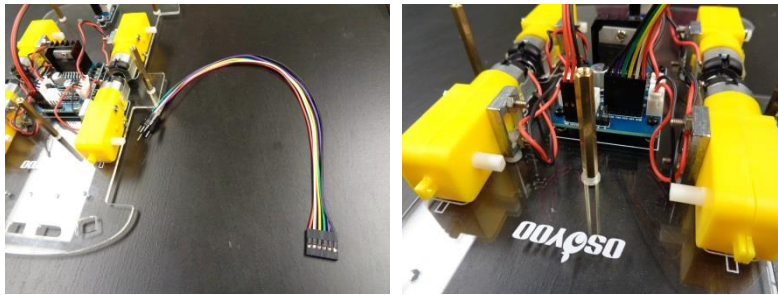
Model X	Wire Color	Voltage Meter
GND	Black	GND
12V	Red	VCC
V0	Red	VT



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- c. Connect the Model X to the Uno Board using 6pin female to 6 pin male wires based on the chart below. Be sure to feed the wires through the hole on the top chassis before connecting.

Model X	Wire Color	Uno Board
ENA	Black	D9
In1	Purple	D12
In2	Green	D11
In3	Yellow	D7
In4	White	D8
ENB	Red	D6



- d. Connect the Uno board, battery box, and motor driver by plugging the power supply from the battery box in to the Uno board and connecting the wires to the 12V slot on the Model X driver. Be sure to feed the wires down through the hole on the top chassis before connecting.

Part 4. Attach upper and lower chassis.

Step 1.

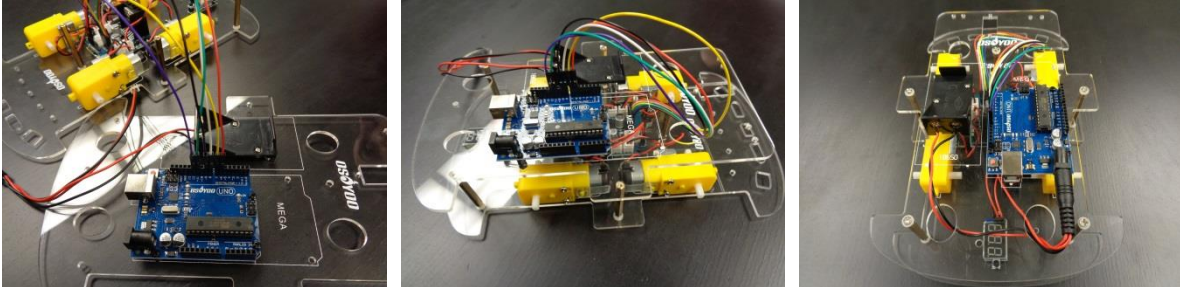
- Attach copper pillars to lower chassis with M3*10 screws and rubber rings
- The screws and rubber rings should be underneath the chassis and the copper pillar on top of the chassis.



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Step 2.

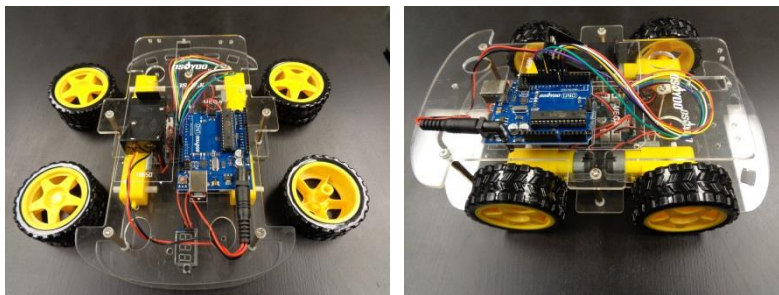
- A. Attach upper chassis to copper pillars with M3*10 screws and rubber rings.
- B. The rubber rings and screw should be on top of the chassis.



Part 5. Install wheels

Step 1.

- A. Line up each wheel and press onto the white plastic axle found on each yellow motor assembly on the lower chassis.



Do not insert the batteries into the box yet.