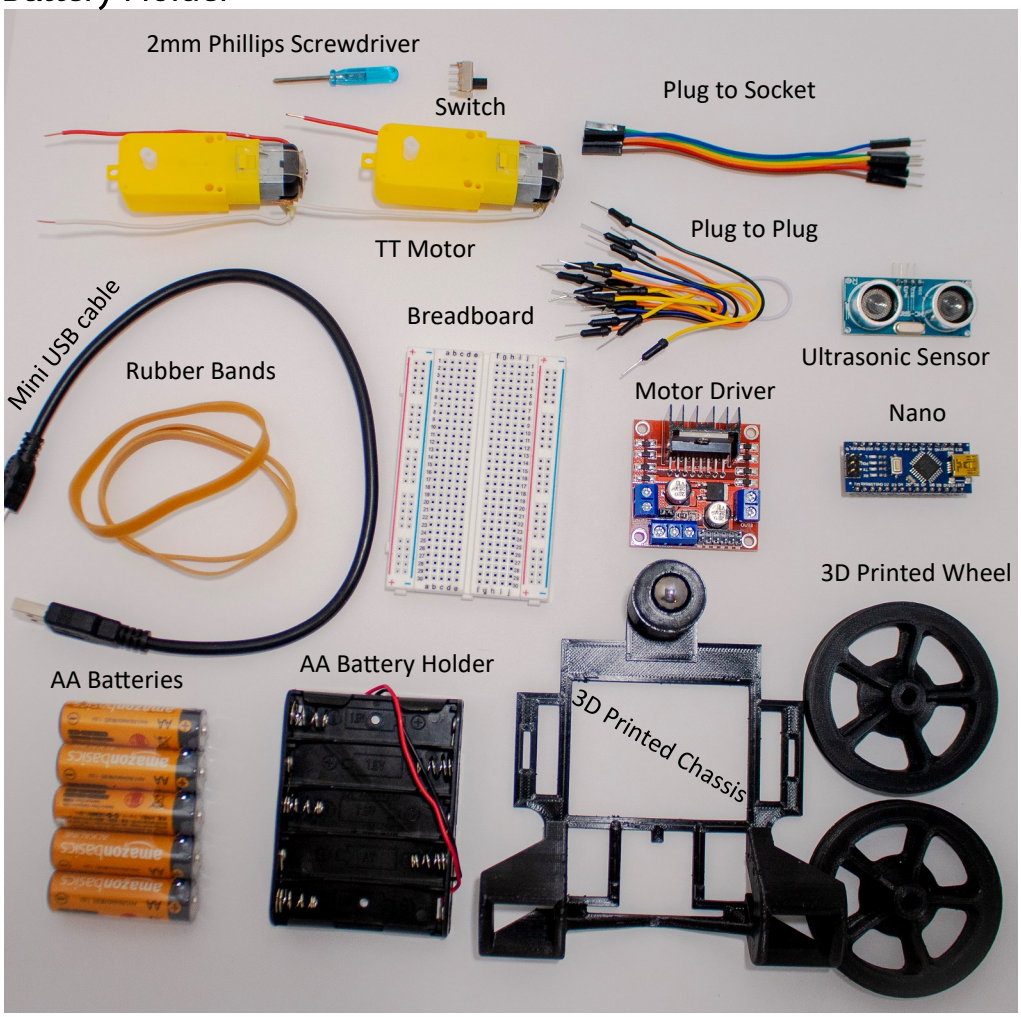
Destination Automation Assembly

Created: 22 June 2020 by Tyler Gleydura for Destination SPACE

Revised: 5 June 2021 by Tyler Gleydura for Destination SPACE

Materials:

- Arduino Nano Microcontroller
- Motor Driver
- Ultrasonic Sensor
- Switch
- 2X DC Motors
- Breadboard
- 5 Slot AA Battery Holder
- 9X Plug to Plug Wires
- 6X Plug to Socket Wires
- 3D Printed Chassis
- 2X 3D Printed Wheels
- 2mm Screwdriver
- 3x Rubber Bands
- 5X AA Batteries



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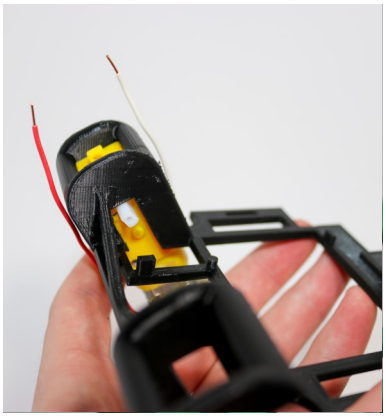

Figure 1: bump facing inward

Step 1 Materials: 3D Printed Chassis, Wheels & Tires, 2X TT Motors

- Slide the motors into the chassis so that the side with the bump are facing inwards and the top of the motor is touching the inside of the rounded frame (figure 1).
- Connect the axel hole on the wheel with the white motor shaft by lining up the flat sides and pushing firmly.

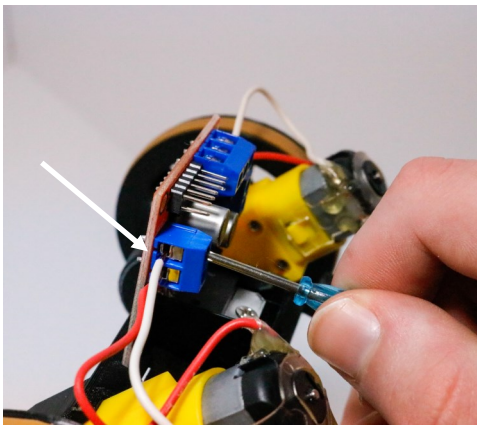

Figure 2: Ground wire is on top

Step 2 Materials: Motor Driver, 2mm screwdriver

- Slide the side of the motor driver with the heat sink (large black rectangular prism) into the flat side of the chassis so that it sticks up in the opposite direction of the wheels.
- Push the wire ends into the blue wire clamps closest to each motor so that the white ground wire is on top and the red positive is on the bottom. Use the screwdriver to tighten the clamps, you may have to loosen before inserting wires (figure 2).

Step 3 Materials: Breadboard, Nano, Ultrasonic Sensor, Switch

- Connect the Arduino Nano to the breadboard by firmly pressing it in all the way in so that pin D13 on the Nano is in hole c1 on the breadboard and pin D12 is in g1.
- Insert the Ultrasonic Sensor into breadboard so that the GND pin is in hole j16, and VCC pin is in hole j19.
- The switch goes into the fallowing holes: d26 through d30. Direction doesn't matter.

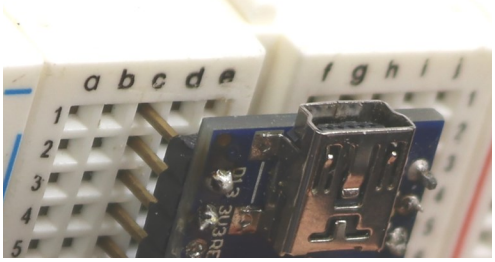

Figure 3: Arduino Nano alignment

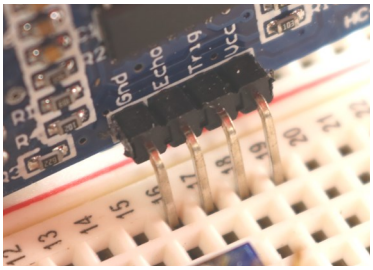

Figure 4: Ultrasonic Sensor alignment

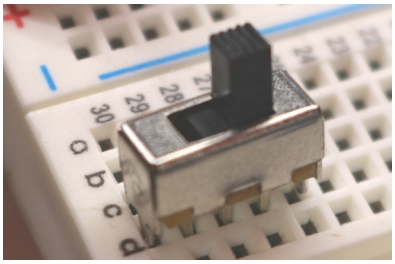

Figure 5: Switch Alignment

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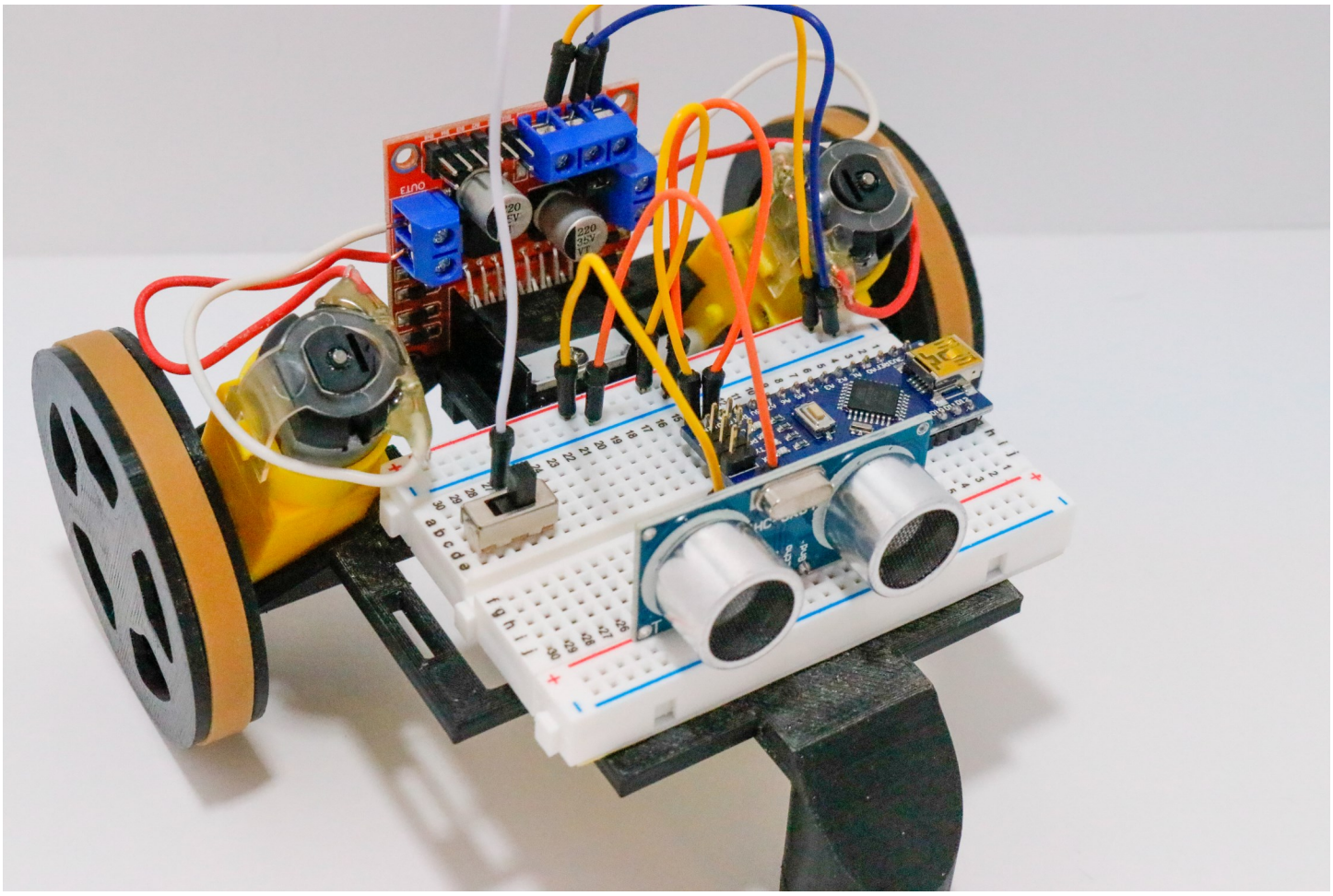
Step 4 Materials: 7 plug to plug wires (Color doesn't matter) , 2mm screwdriver

1. Power to Arduino: Use a plug to plug jumper wire to connect b15 on the breadboard to anywhere in the positive rail , This will be the positive 5v power to the Nano. Another plug to plug wire is used to connect b14 on the breadboard to anywhere one the negative rail. This is the ground connection for the Nano.
2. Power to Ultrasonic: Using two plug to plug wires connect i19 on the breadboard to anywhere on the positive rail, and i16 on the breadboard to anywhere on the negative rail.
3. Motor driver power: Find the blue wire clamp array with 3 spots, insert a plug to plug wire into all 3 and tighten them to be snug with the screwdriver. The names of these are on the back of the motor driver and in the diagram on the last page. Connect the 5V wire to any hole in the positive rail. The GND wire gets inserted into any hole in the negative rail. Connect the 12V wire into hole b27 in the breadboard (power supply to motor driver).



Finished power wiring

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Step 5 Materials: 2 Plug to Plug Jumpers, 6 Plug to Socket Jumpers

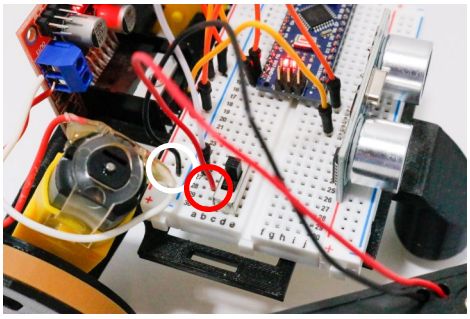
- Ultrasonic Data: Use 2 plug to plug to connect i18 on the breadboard to h10 on the breadboard, and i17 on the breadboard to h9 on the breadboard.
- Motor Driver Data: Using the plug to socket jumper wires, connect the holes on the breadboard to the pins on the motor driver

Hole on bread-board:	h8	h7	h6	h5	h4	h3
Pin on motor driver:	ENA	IN1	IN2	IN3	IN4	ENB

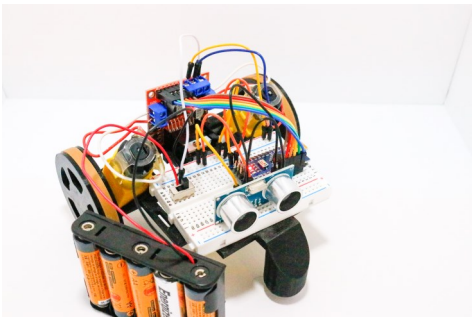
Step 6 Materials: Battery holder, 5X AA battery holders

*****When batteries are inside the battery holder, DO NOT let the red and the black wires touch contacts, this will short circuit and melt the wires*****

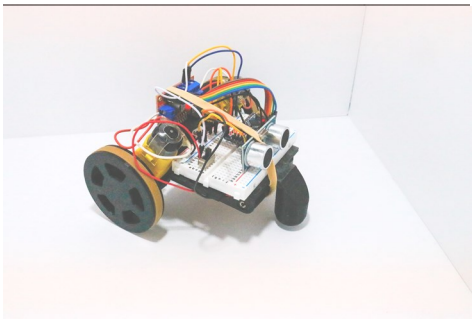
- Insert the batteries into the battery holder so that the flat negative (-) end is contacting the spring and the positive (+) end with the bump is facing away from the spring, do not remove the tape from the wire lead yet.
- Use a rubber band to hold the battery holder under the chassis while being careful not to disconnect wires
- Insert the black wire into any hole on the negative rail.
- Take the tape off of the red lead and insert it into a28 on the breadboard



Battery holder wiring



Finished wiring with loose battery holder



Finished robot with rubber band

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Schematics: