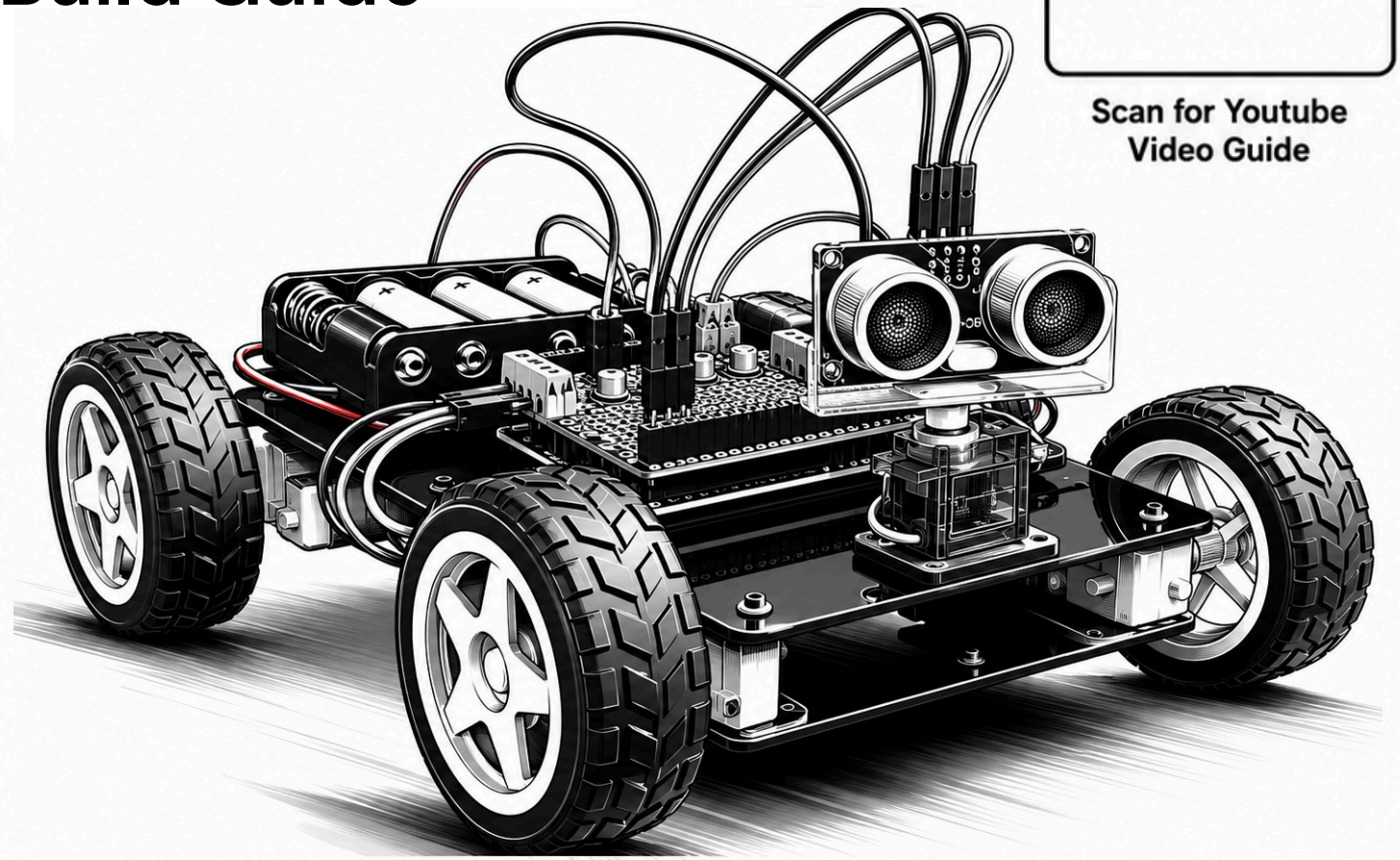
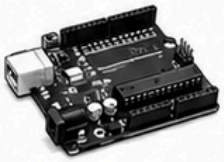
Tinkren

Rover One Build Guide

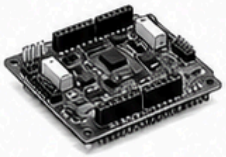
Scan for Youtube Video Guide



PARTS INCLUDED



1x Arduino Uno R3 Clone



1x TB6612 Motor Driver Shield



2x Plexiglass Chassis Pieces



1x HCSR04 Ultrasonic Sensor



1x SG90 Servo Motor



1x AA Battery Holder



4x AA Batteries



4x DC Motors & Wheels



1x Adhesive Strip Sheet



1x Flathead Screwdriver

Missing anything? tinkrenrobotics@gmail.com

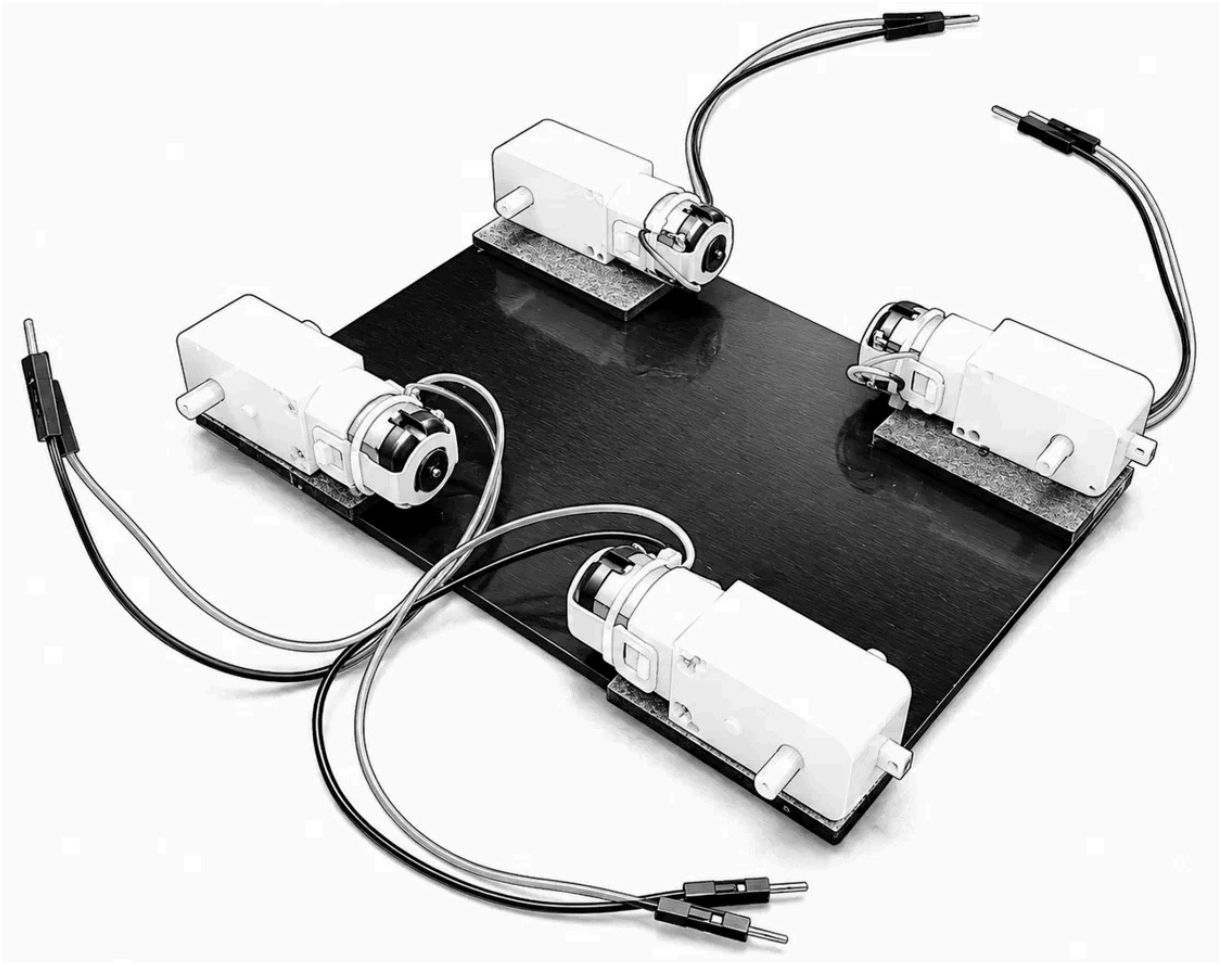
1. Chassis Assembly

Description

Begin by assembling the base of the rover. The DC motors are secured to the bottom chassis plate using adhesive strips. Do not attach wheels or the top chassis plate yet — those steps come later.

Steps

1. Lay both plexiglass chassis plates flat on your work surface.
2. Remove four adhesive strips from the sheet. Each strip can be cut in half using scissors for this phase — one half-strip per motor. Keep the remaining sheet nearby for later phases.
3. Peel one strip and apply it to the flat underside of each DC motor.
4. Press each motor firmly onto the bottom chassis plate — one at each corner, with the motor shafts pointing outward. Hold each motor for 30+ seconds.
   - *If a motor lifts at a corner, continue applying pressure for another 30 seconds before moving on.*
5. Do not place wheels onto the shafts yet. Ensure all motor wires remain freely accessible before proceeding.



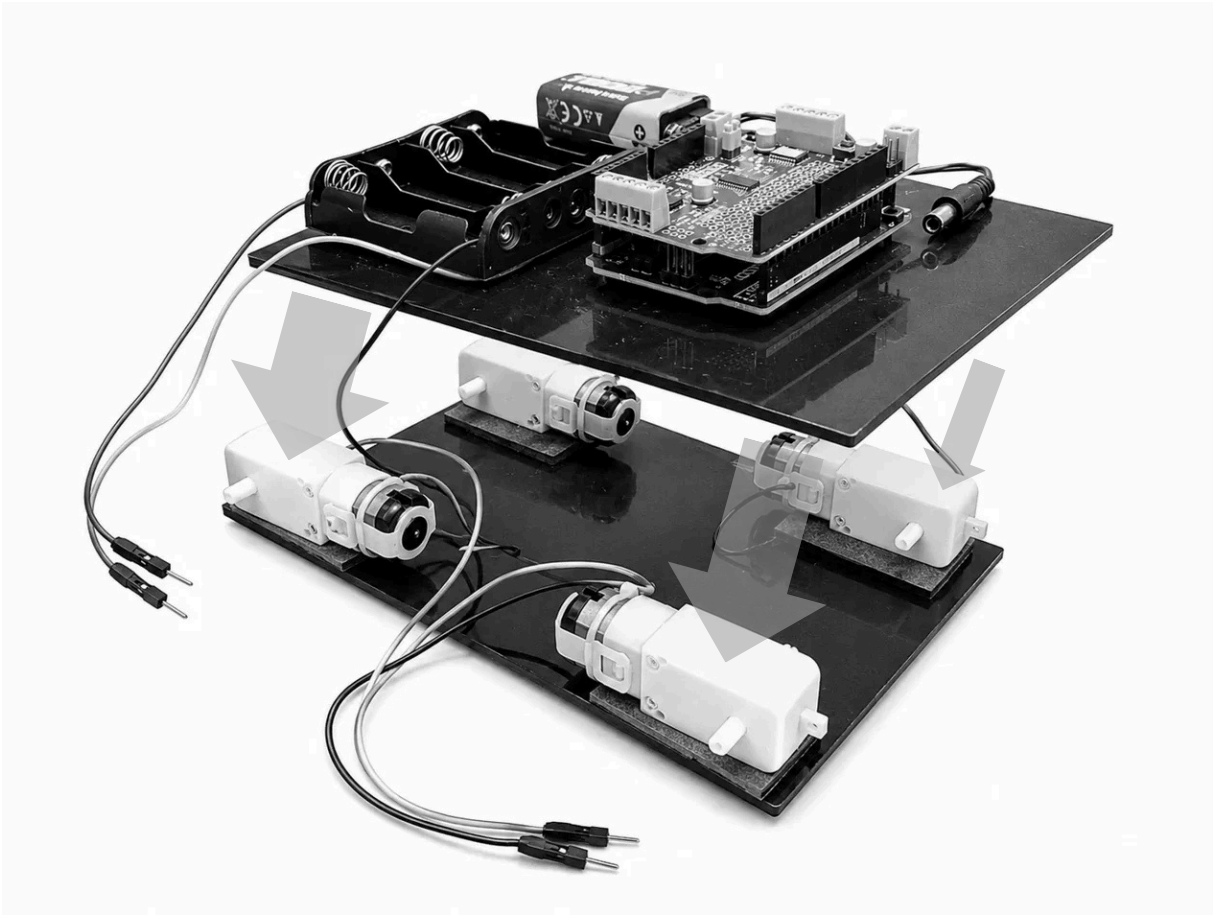
2. Electronics Mounting

Description

The Arduino, Motor Shield, battery holder, and 9V battery are all mounted onto the top chassis plate using adhesive strips. The two chassis plates are then joined using strips on the motor tops.

Steps

1. Press the Motor Shield firmly onto the Arduino pin headers. All pins must seat fully, with no visible gap between the two boards.
   - *If pins resist, check for and straighten any bent pins before applying additional pressure.*
2. Apply one full-length adhesive strip to the underside of the Arduino.
3. Press the Arduino and Shield assembly firmly onto the center of the top chassis plate, with the USB port facing the left side of the build. Hold for 10 seconds.
4. Apply one adhesive strip to the base of the 4×AA battery holder. Press it onto the top chassis plate, positioned behind the Arduino, centered between the rear motor positions. Do not insert batteries yet.
5. Apply one adhesive strip to the 9V battery. Place it on the chassis plate alongside the battery holder.
6. Apply four adhesive strips to the top faces of each motor on the bottom chassis plate. Carefully align and press the top chassis plate down onto the bottom plate, sandwiching both assemblies together. Hold for 30+ seconds.



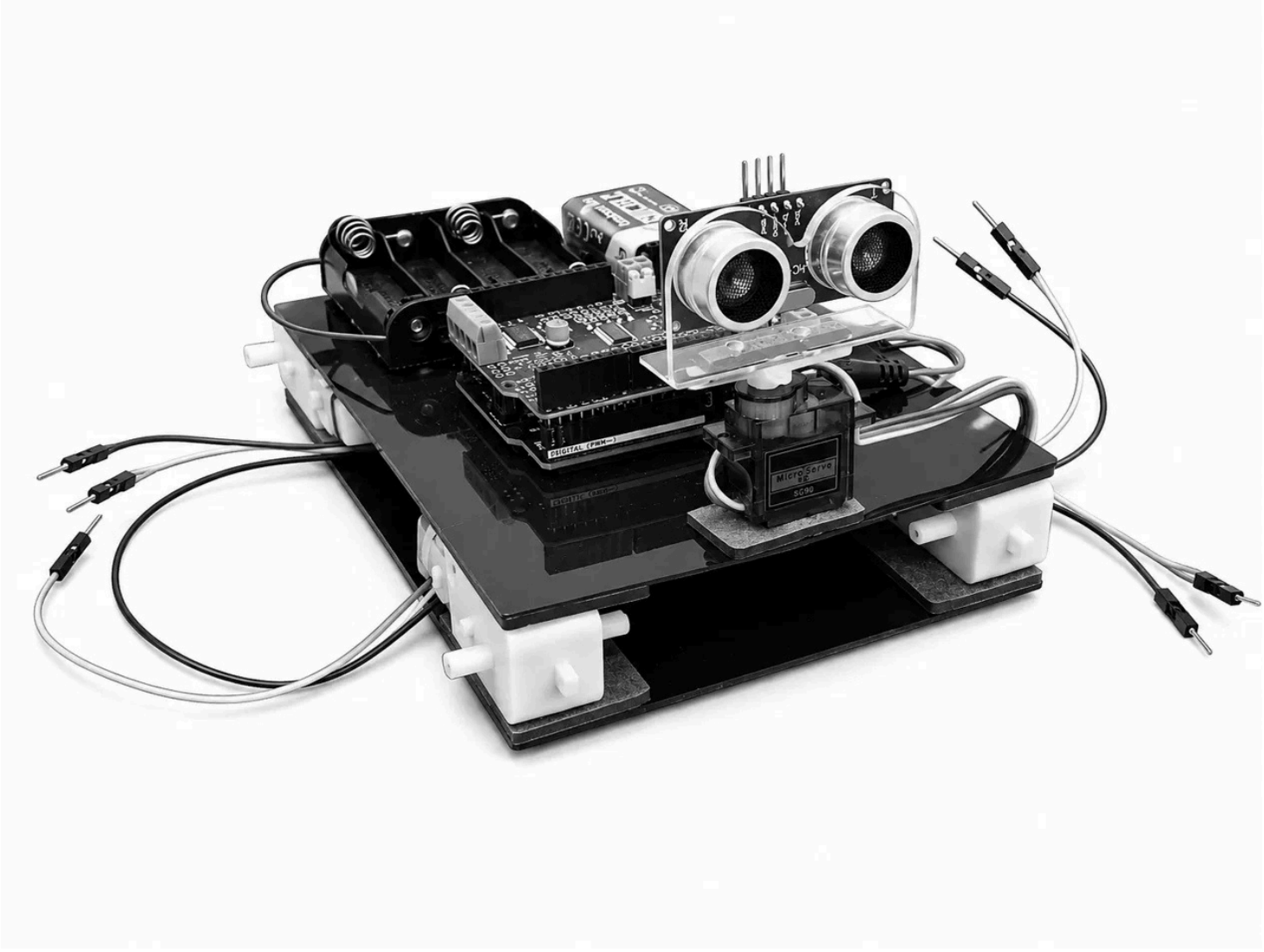
3. Sensor & Servo Mounting

Description

The SG90 servo is mounted at the front of the rover. The HC-SR04 ultrasonic sensor attaches to the servo horn via a bracket, allowing it to sweep left and right to scan for obstacles. Both are secured with adhesive strips.

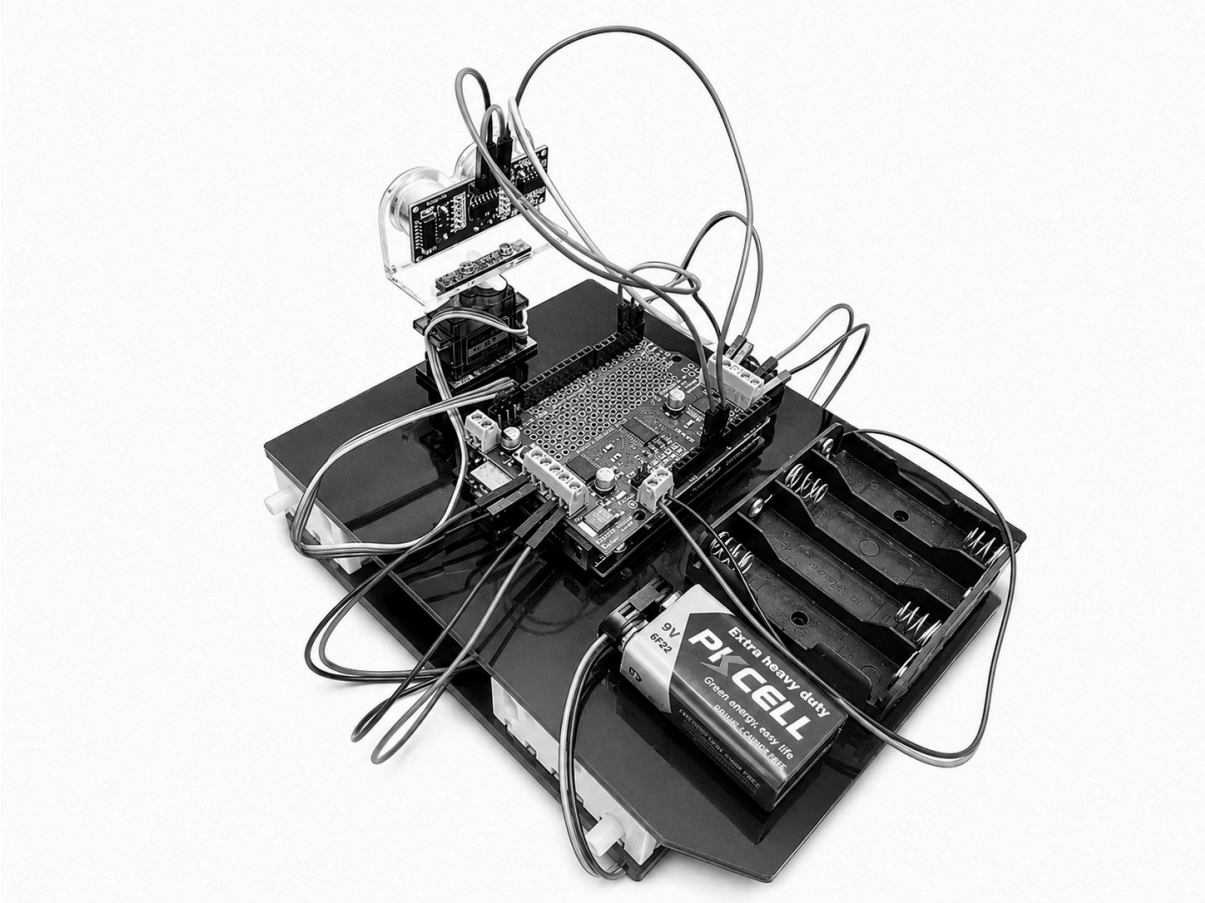
Steps

1. Press the servo horn firmly onto the SG90 servo shaft.
2. Cut half of one adhesive strip and apply it to the base of the SG90 servo. Attach the servo centered at the front of the top chassis plate.
3. Cut a small strip and apply it to the underside of the HC-SR04 sensor bracket. Attach the bracket to the servo horn.
4. Insert the HC-SR04 ultrasonic sensor into the bracket with the sensor pins facing upward. If the sensor is loose, apply a small adhesive cutout to fasten it securely.



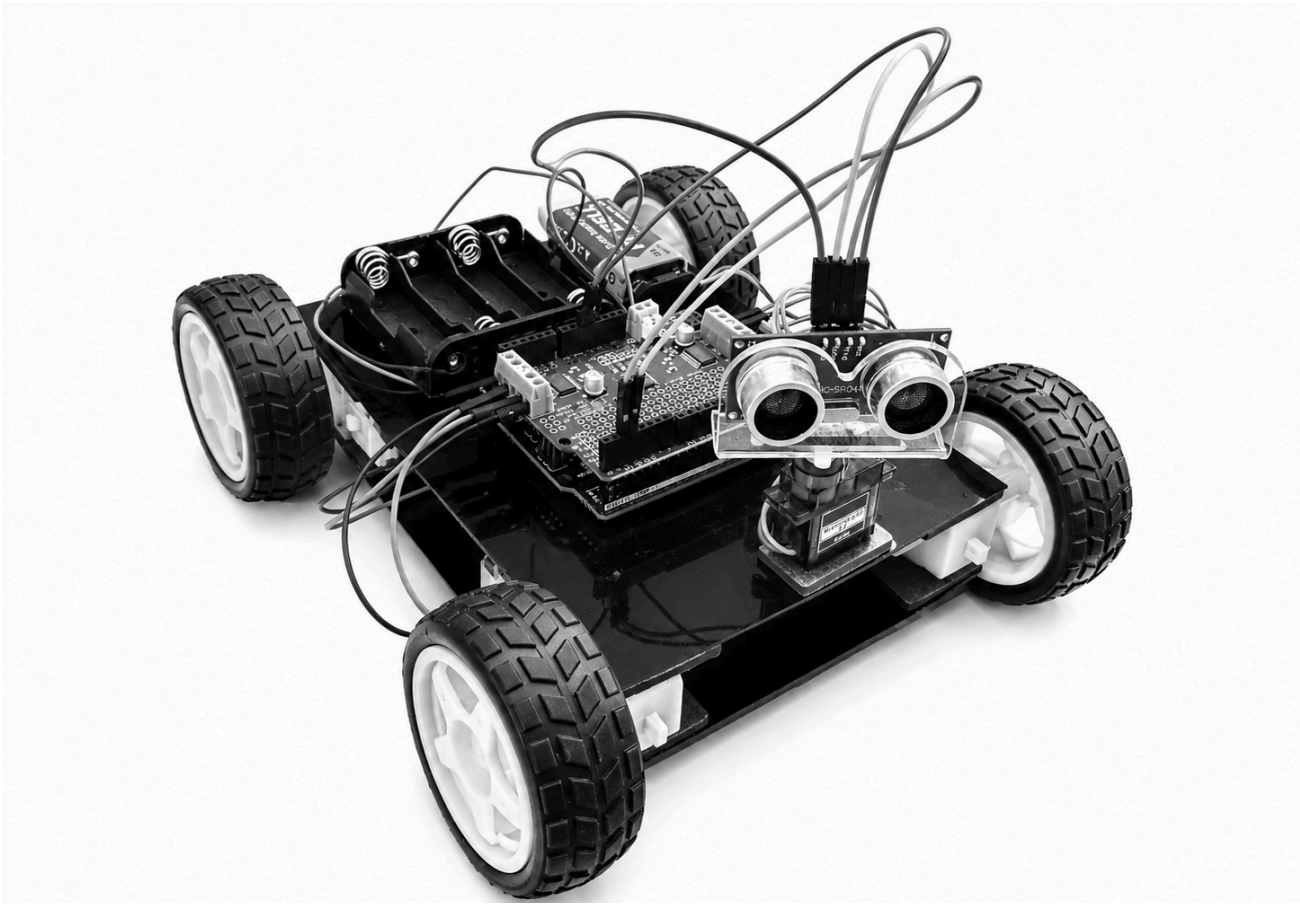
4. Wiring

Description	Connect the sensor, servo, and motors to the Motor Shield. Two separate power sources are used: the 4×AA holder powers the motors through the shield, and the 9V battery powers the Arduino directly. Do not connect power or attach wheels until after the code upload.
Sensor & servo	1. Using four male-to-female jumper wires, connect the HC-SR04 sensor to the Arduino as follows: GND → GND, Echo → Pin 3, Trig → Pin 2, VCC → 5V. 2. Connect the servo wire bundle to the outermost servo pins on the shield. With the rover facing forward, the yellow signal wire should be on the right.
Motor wiring	1. Unscrew all metal screw terminals on the Motor Shield to open them. 2. Right side of the shield — insert and fasten as follows: Slot 1: rear-right motor black wire. Slot 2: rear-right motor red wire. Slot 4: front-right motor red wire. Slot 5: front-right motor black wire. 3. Left side of the shield — insert and fasten as follows: Slot 1: front-left motor red wire. Slot 2: front-left motor black wire. Slot 4: rear-left motor black wire. Slot 5: rear-left motor red wire.
Power	1. Insert the red wire (+) from the 4×AA battery holder into the shield's left battery terminal (labeled Vin). Insert the black wire into the right terminal (GND). 2. Remove the yellow jumper pin from the Motor Shield. This is required because the Arduino and motors are using separate power sources.
Important	Do not insert AA batteries, connect the 9V, or attach wheels yet. These steps are completed after the code has been uploaded successfully.



5. Code Upload

Requirements	A computer with internet access and the included USB cable. Do not connect any batteries during this phase.
Install the IDE	1. Download and install the Arduino IDE from arduino.cc/en/software. 2. Open the IDE. Navigate to Sketch → Include Library → Manage Libraries. 3. Search for and install the **Adafruit Motor Shield V2 Library**. Also install its required dependency, the **Adafruit PWM Servo Driver Library**.
Upload the sketch	1. Visit tinkren.com/pages/instructions to download the Rover One sketch. Open the downloaded .ino file in the Arduino IDE. 2. Connect the Arduino to your computer using the included USB cable. 3. In the IDE, go to Tools → Board and select Arduino Uno. Then go to Tools → Port and select the port that appeared when you plugged in the Arduino. ■ *Mac: the port will appear as /dev/cu.usbmodem... Windows: it will appear as COM3 or similar.* 4. Click the Upload button (→). Wait until "Done uploading" appears in the status bar at the bottom of the IDE. ■ *If the upload fails, verify the correct port is selected and that the USB cable is fully inserted on both ends.* 5. Once upload is complete, disconnect the USB cable.
Motor direction test	During upload, observe each motor shaft. If any shaft did not rotate forward, swap that motor's red and black wires at the shield terminal to correct its direction.
Power up	Connect the 9V battery to the Arduino's barrel jack. Insert 4 AA batteries into the battery holder. Attach all four wheels onto the motor shafts. The rover is now ready for its first run.



6. Troubleshooting & Challenges

Q1. Rover doesn't move after power-on.

Check that the battery wires are correctly seated in the Vin and GND terminals. Confirm the Arduino power LED is on. Try re-seating the Motor Shield onto the Arduino pin headers.

Q2. One or more wheels spin in the wrong direction.

Swap the red and black wires for that motor at the shield terminal.

Q3. Rover moves but does not detect obstacles.

Confirm that Trig is connected to Pin 2 and Echo to Pin 3. Check all sensor connections are secure. Test by holding your hand approximately 4 inches in front of the sensor.

Q4. Servo does not sweep.

Verify the signal wire is connected to Pin 10. Check the 5V and GND connections. Try re-uploading the sketch.

Q5. Code upload fails with an avrdude error.

Verify the correct port is selected under Tools → Port. Try a different USB port or cable. Ensure all batteries are disconnected during upload.

Challenges

1. The rover can only sense obstacles at the height of its ultrasonic sensor, such as walls and chair legs. Can you adjust the sensor's mounting angle to detect lower obstacles?
2. The rover uses predetermined movement speeds. Can you modify the sketch to make it move faster or slower?
3. The Arduino has built-in, programmable LEDs. Can you program the rover's light to blink when it detects an obstacle?

Need help? tinkrenrobotics@gmail.com

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