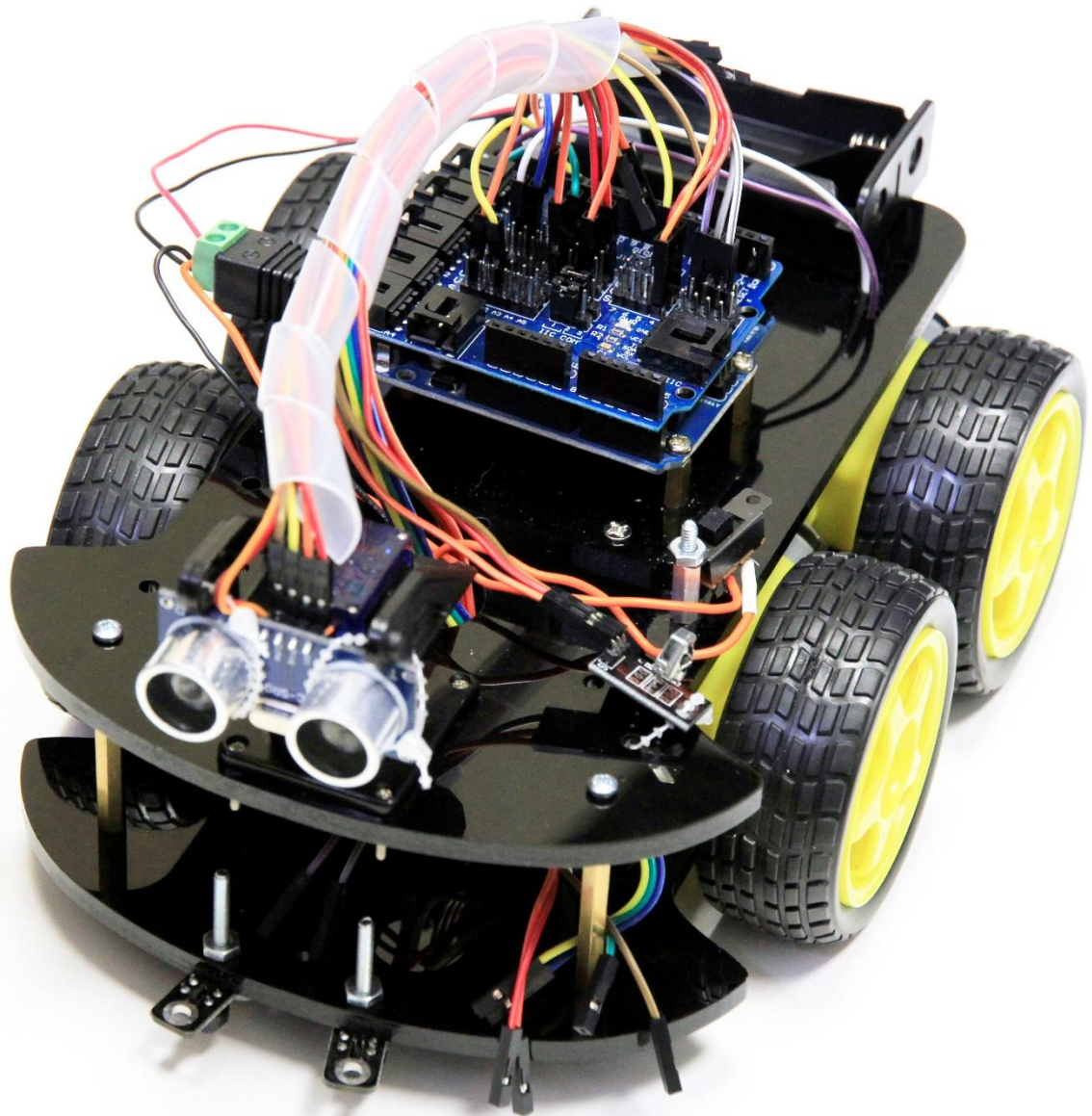


ARDUINO 4WD Smart Robot Car Kit

Level: Intermediate

GK-KIT-004



geekÜs

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PARTS LIST

Please make sure that the following pieces are included in your kit

Component	Quantity	Remarks
Arduino Sensor Shield v4.0	1	Align pins using needle nose plier, if needed
L298N Dual H-Bridge Motor Driver	1	All four DC Motors will be connected here
Arduino Uno Board	1	DO NOT plug in USB and DC at the same time
Servo Mounting Brackets	4	Required for servo fastening
Servo Beams	3	Required for servo mounting
Servo Motor (SG90)	1	HC-SR04 will be mounted on this component
Arduino USB Cable	1	Allows programming of Arduino board
HC-SR04 Sensor	1	Ultrasonic Ranging Detector
DC Motors	4	
2.51" Rubber Wheels	4	High Grip Rubber Tires
Acrylic Robot Chassis	2	Covered with Adhesive Protection
DC 1.5V Battery Holder	1	Connected to switch
Motor Blocks	4	Used to connect DC Motors to the Chassis
Stranded 24 AWG Wire Sets	2	Used to connect switch and other components
ON-ON Switch	1	Kill Switch
Female DC Power Adapter	1	Connected to Arduino
Jumper Wire Set	1	Used to connect components to Arduino Shield
Nylon Spiral Wrap	1	
Breadboard	1	Can be used for other projects
Wireless Remote Controller	1	
IR Receiver Module	1	Used with the Remote Controller
Infrared Line Sensors	3	Used for the line following function

Recommended Tools

Needle Nose Plier



TOL-08793

Flush Wire Cutter



MS54V

Wire Stripper



HT-1041

Heat Shrink (Optional)



PRT-09353

Soldering Iron (Optional)



TOL-09507

Brass Sponge (Optional)



TOL-08964

Screwdriver (+)



800-002

Hammer



900-179

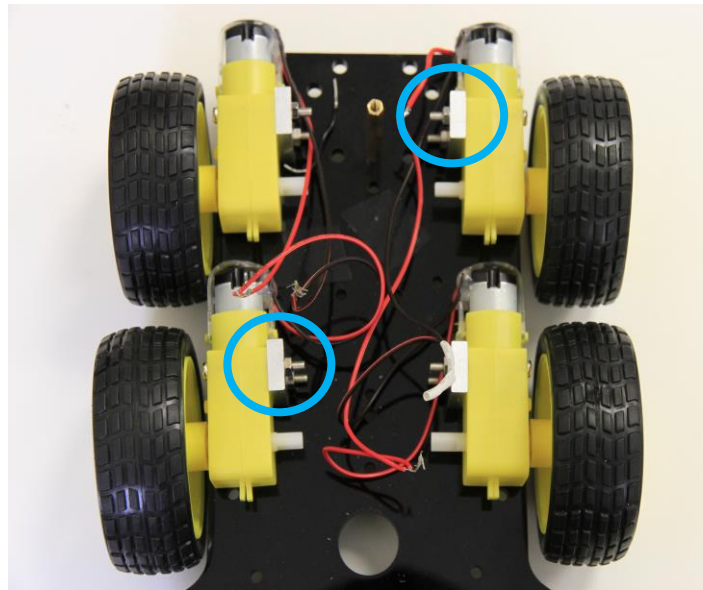
Drill



PT-1080A

Installation of Components (DC Motors)

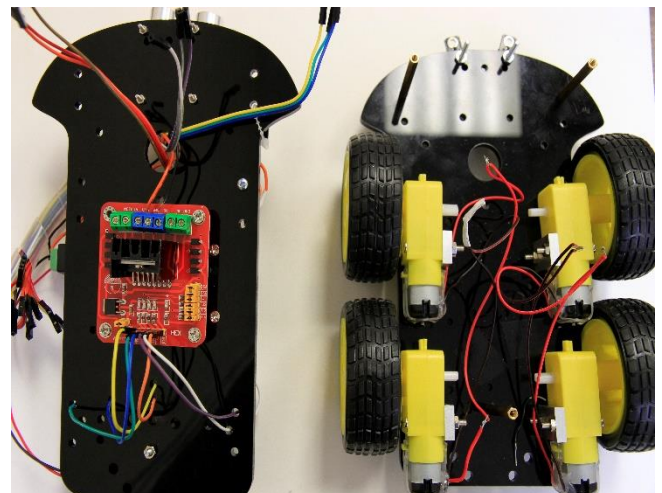
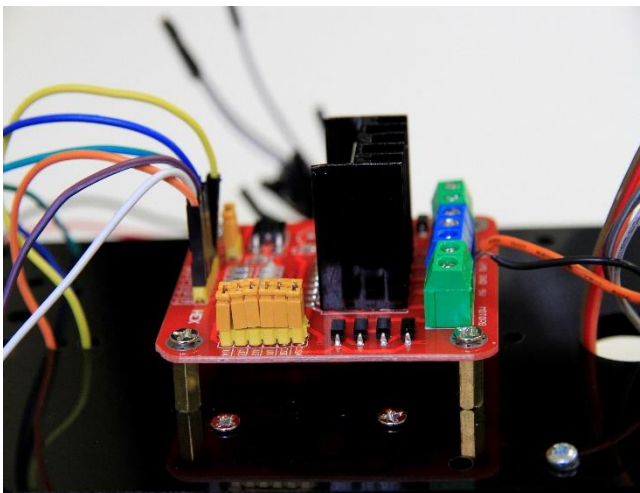
1. Remove the adhesive protection from the robot chassis plates (both sides of each plate). Use one of them as the bottom plate and the other, as the top plate.
2. First, use a motor block per each DC motor in order to install the latter on the bottom plate of the robot chassis (Blue oval shapes in figure below).
3. Use the long screws and two nuts in order to fasten the DC motors in between the blocks and on the chassis. If done correctly, each motor should be mounted just like that which is shown in the figures below.



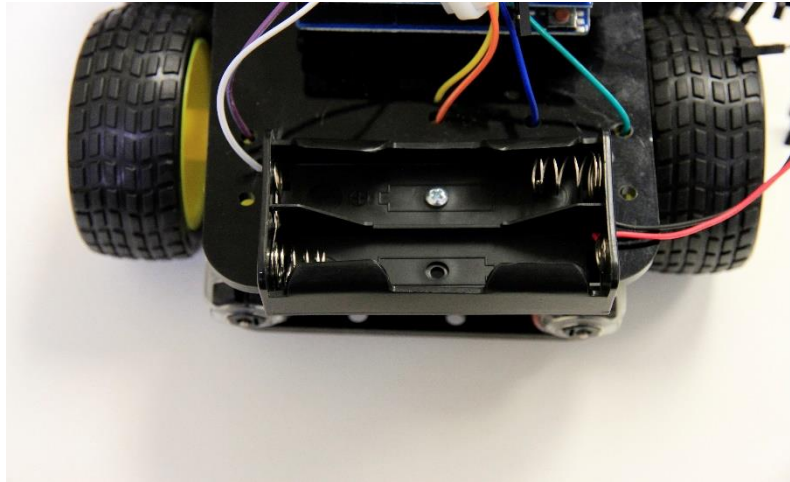
4. Repeat the same steps for the other DC motors.
5. Install the ON/ON switch anywhere near the circular hole on the top plate in order to ensure efficient wiring of the components.

Installation of Components (Motor Driver and Battery Holder)

6. Install the L298N Motor Driver on the back of the top chassis plate using standoffs and screws for fastening. Drill additional holes if you would like your motor driver to remain firmly fixed on the plate (not required however).

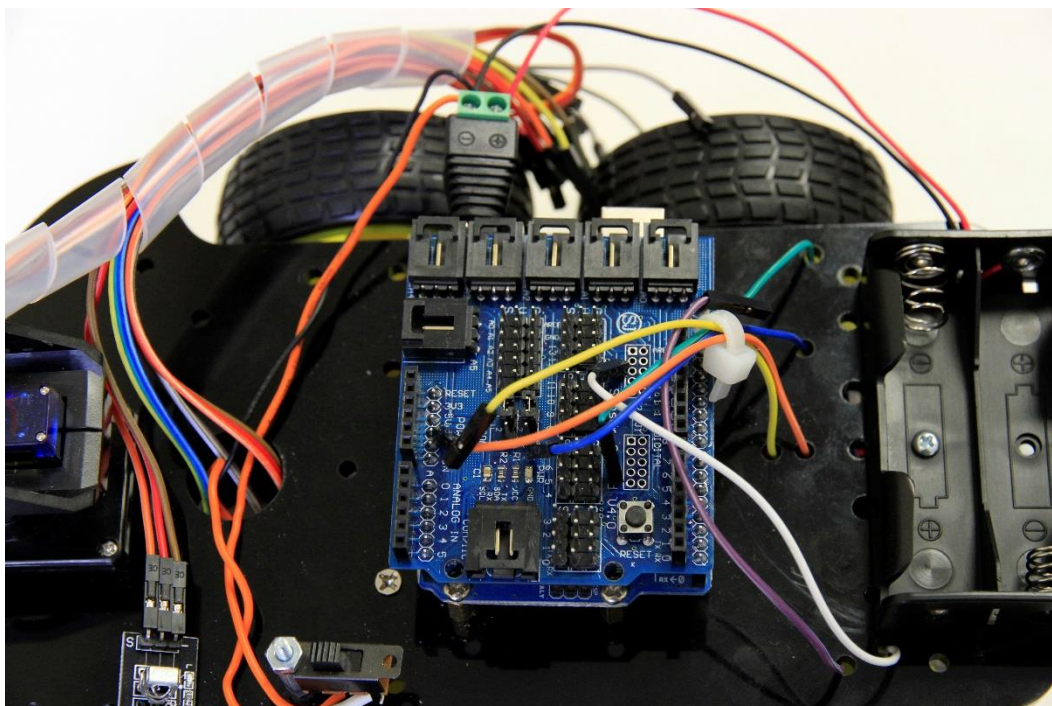


7. The battery holder can be installed on the opposite side of the circular hole on the top plate (You can use either battery holder). Use screws and nuts to keep the battery holder fixed on the plate. Please refer to the figure below in order to see the proper mounting spot for the battery holder.



Installation of Components (Arduino Uno Board)

8. In order to install the Arduino Uno board, use the spacers and the screws provided in the kit and mount the board on the top plate next to the battery holder. Refer to the figure below to see the installation spot (**Please note that only one side of the Arduino can be screwed on the chassis plate in this specific position. You can either drill additional holes on the plate or use the other spacers provided to keep the other sides of the Arduino board at the same level – This can be seen on the figure below on the right).**

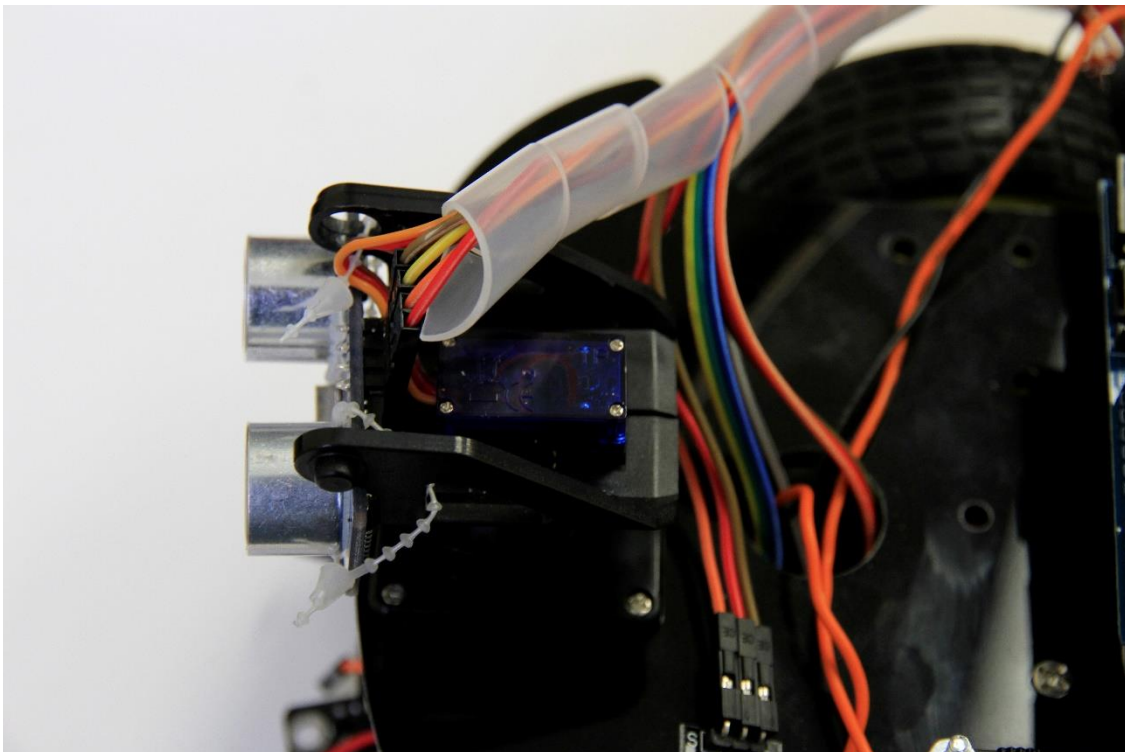


Installation of Components (Servo Motor and HC-SR04)

9. Next up, we are going to work on preparing the servo mounting brackets and the servo beams. Using a flush wire cutter or any other cutting tool, cut the cross-shaped white beam into that which is shown in the figure below and install it inside the servo holder using the two small screws **(Please note that you will have to use a hammer and your screwdriver to create new holes on the servo holder in order to screw your beam inside of it)**.

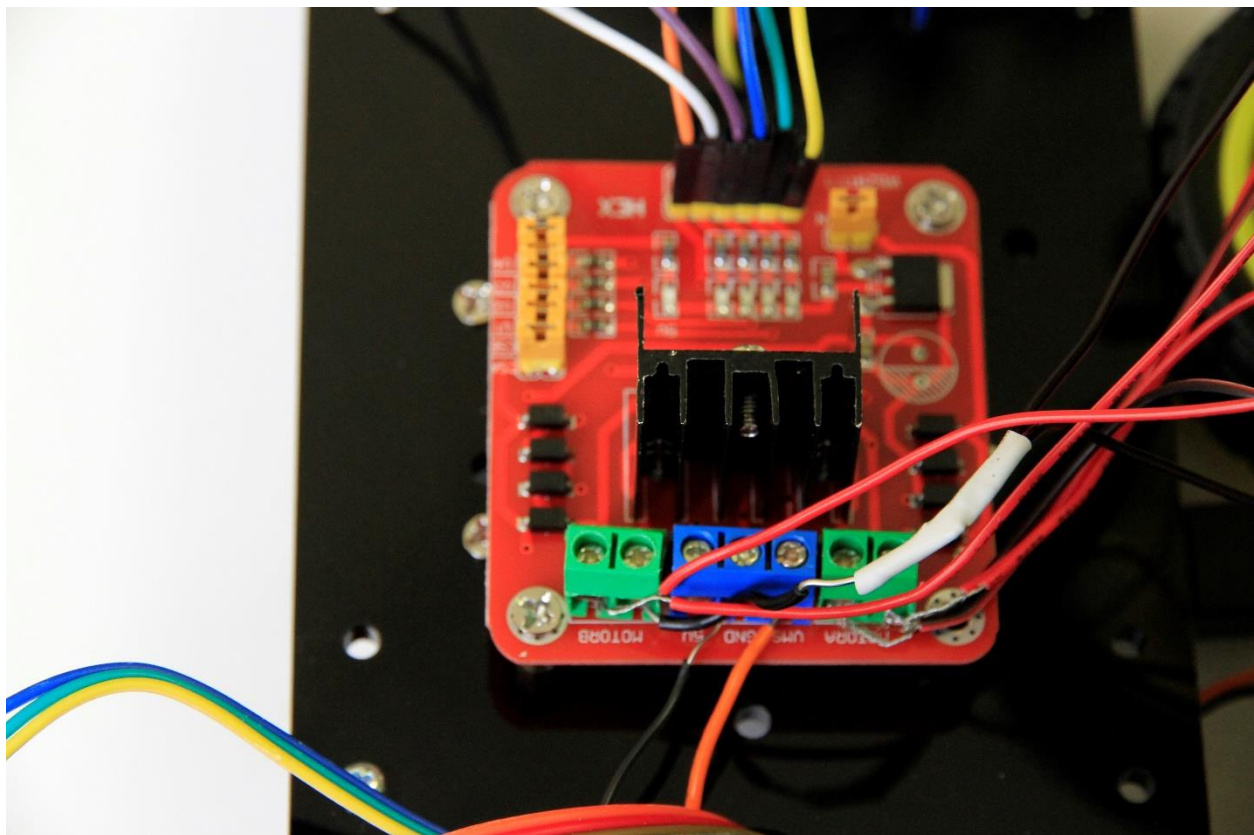


10. Afterwards, use the two servo mounting brackets provided and fasten the servo in between them and then, use the longer screws provided in the servo screw bag to connect the mounting brackets together tightly. Place the servo motor on the white beam inside the holder prepared in the previous step and use one of the screws found in the bag with the beams to connect the beam (from the whole in its middle) to the servo in order to make sure the servo motor stays straight. You can then mount the HC-SR04 sensor on the servo mounting brackets and install the servo holder on the back of the chassis plate using four screws and four nuts as shown in the figures below **(Please note that the HC-SR04 sensor should be tilted a bit upwards in order to prevent it from reading the ground as an object in the software)**.

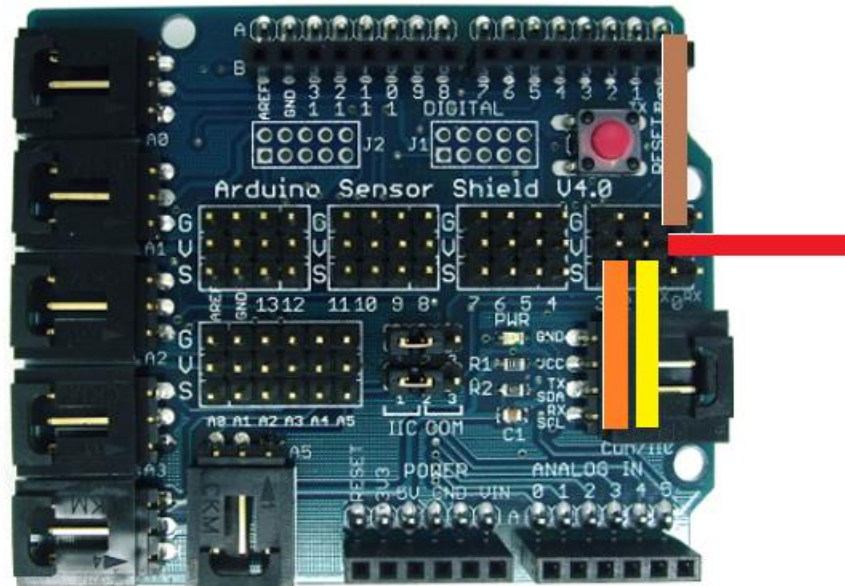


Wiring of Components

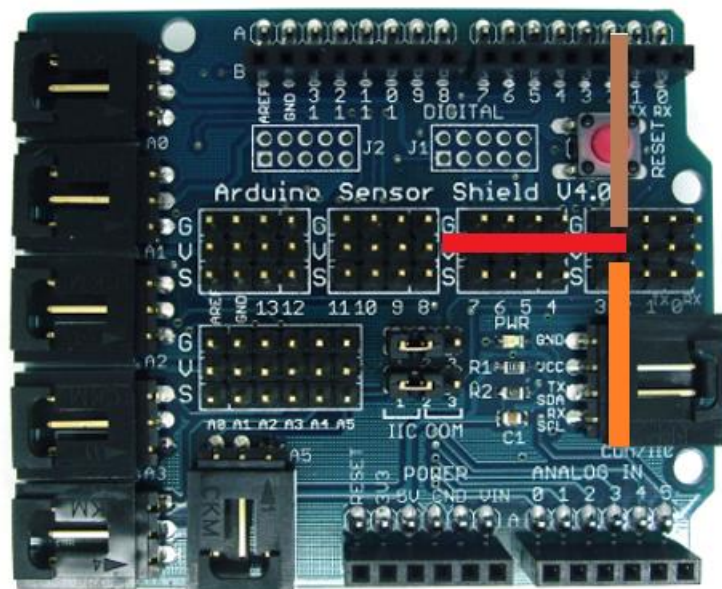
11. Next up, we are going to connect everything together using the wire jumpers and the AWG wires provided. First, connect the battery holder's power wire (red) to positive sign of the adapter's terminal block and its ground wire (black) to the negative sign on the power jack's terminal block provided in the kit. Then, connect another power wire (red or orange) from the positive sign of the adapter's terminal block and connect that to the middle lead of the switch which was installed earlier. Connect another power wire from the right lead of the switch to the VMS terminal block of the motor driver. Now, connect a ground wire from the GND terminal block of the motor driver to the negative sign on the power jack's terminal block. Please to the figure below to see the connection of the switch to the power jack **(Please do note that the wires can either be hooked on the leads of the ON/ON switch or they can be soldered. Also, please use the heat shrinks provided to extend the wires anywhere necessary).**
12. Afterwards, connect the DC motors to the L298N Dual H-Bridge motor driver using the power and the ground wires already attached to them. The ground wires of the left DC motors must be tied to each other and then they must be connected to one of the driver's output terminal blocks. Repeat the previous step for the power wires of the left and right DC motors and the ground wires of the right DC motors. Refer to the figure below to see the proper connection spots shown. As it can be seen, the power wires from the DC motors on the right are connected to the left terminal on the MOTORB output of the driver and vice versa for the ground wires (in white heat shrink). The power wires from the DC motors on the left are connected to the right terminal on the MOTORA output of the driver and vice versa for the ground wires of the left DC motors.



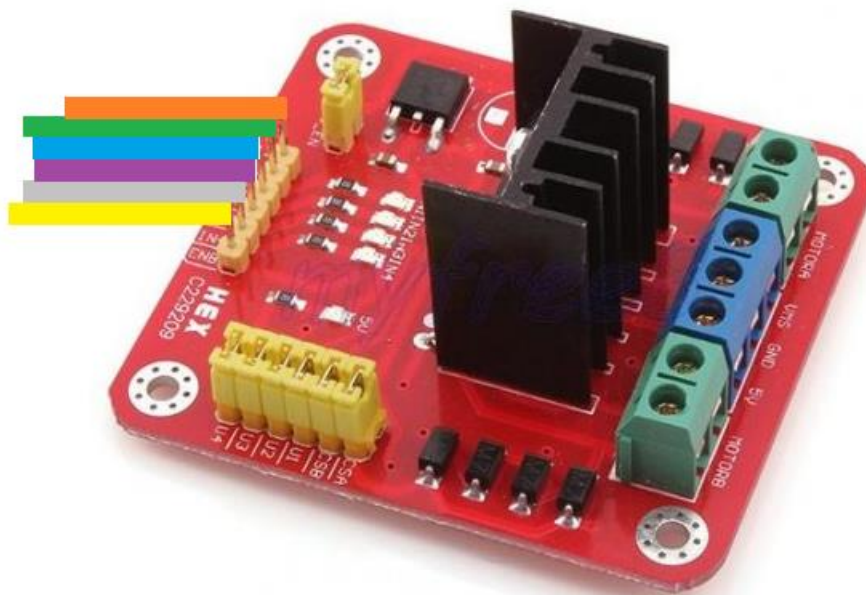
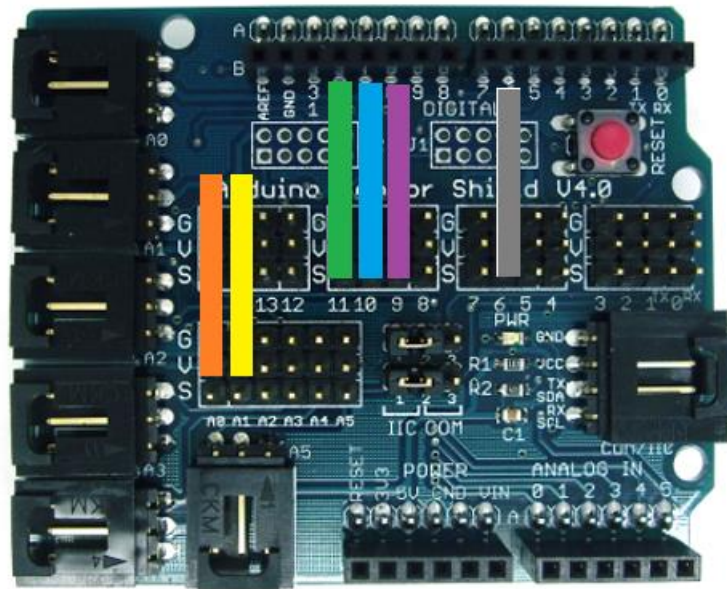
13. Now, place the Arduino Sensor Shield on top of the Arduino board. Make sure you connect the matching pins on both boards together.
14. Next up, connect the servo and the HC-SR04 pins to the correct pins on the Arduino Sensor Shield using the jumper wires provided in the kit. Please refer to the figure below to see which pins to connect. Connect the orange wire to the Trig pin, the yellow wire to the Echo pin, the Red wire to the VCC pin and the brown wire to the GND pin on HC-SR04.



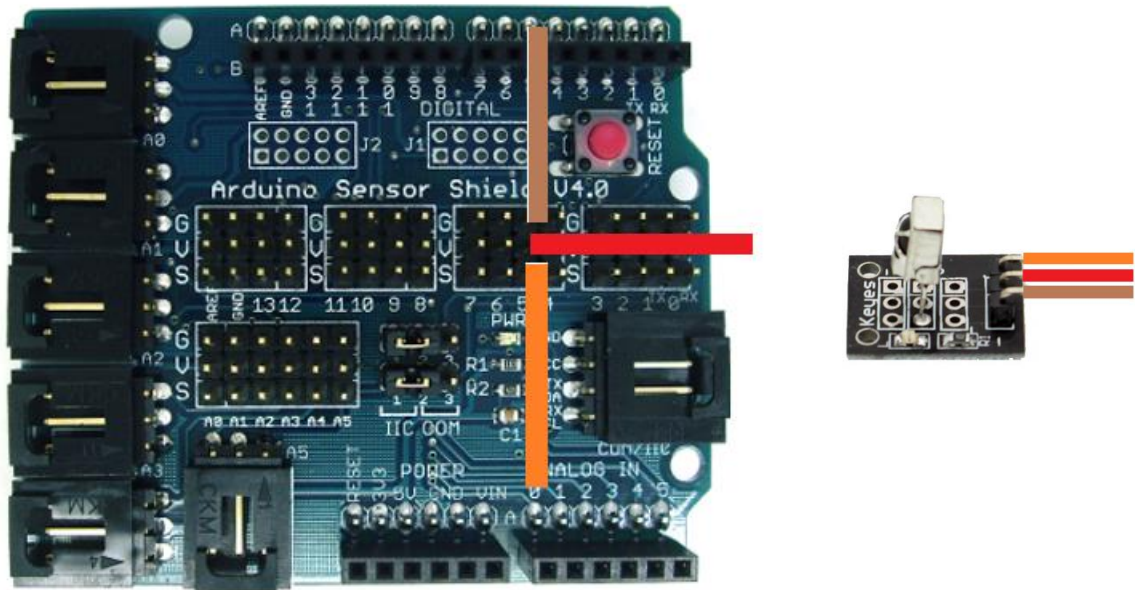
15. Now, connect the three jumper wires of the servo to the correct pins on the Arduino Sensor Shield. Please refer to the figure below to see which pins to connect.



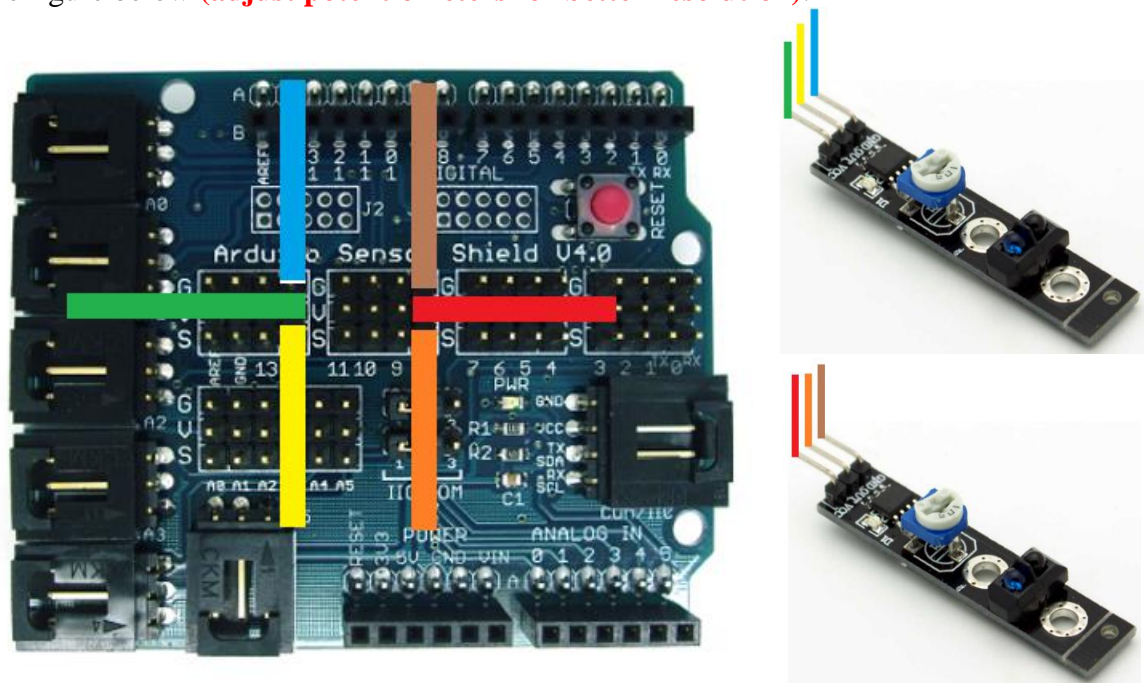
16. The motor driver's pins have to also be connected to the Arduino Sensor Shield pins. Please refer to the two figures below to see how to connect the jumper wires correctly to the sensor shield and to the motor driver.



17. Connect the infrared receiver's pins to the Arduino Shield's pins. Please refer to the figure on the next page to see the proper connection (**Remote Control**: #2 = Forward, #5 = Break, #8 = Reverse, #4 = Left and #6 = Right).



18. Finally, connect the pins of the IR sensors to the Arduino Sensor shield's pins as shown in the figure below (**adjust potentiometers for better resolution**).



19. Finally, put the batteries in the battery holder and connect the Female DC Adapter to the Arduino. You can use the pre-written code for the robot which can be found on www.abra-electronics.com. You can also calibrate your motors and sensor using the codes provided on the same website. Make sure that your line sensors are connected to the Arduino Shield pins according to that which is stated in the code.