# OFFICE J-BOT KIT | JAMECO PART NO. 2140285
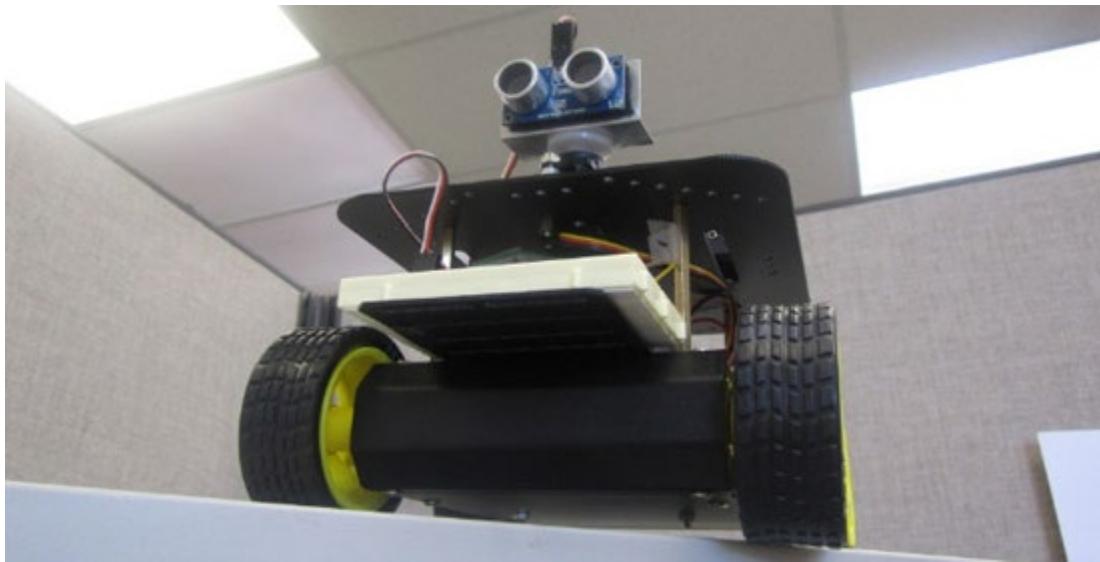
Experience Level: Intermediate (requires soldering).
Time Required: 6 hours+ depending on experience.

Required tools and parts:

- **Arduino UNO (Not Included in Kit)**
- 11 AA batteries (5 for the motors and 6 for the Arduino, servo motor and sensor)
- Philips screwdriver
- Long nose Pliers
- Soldering iron and wire
- Hand drill
- Helping hands
- Small piece of Velcro
- Scissors

Complete instructions, images, links and videos are available at:
https://www.jameco.com/jameco/workshop/JamecoBuilds/jbotrobot.html

Step 1 - Building the 4-wheel Drive Platform
Before building the brains, we'll need to build the basic platform.

First, open the box called "DFRobot mobile platform" - it's the black box with part number ROB0003 on it. Then dig to the very bottom and find the instructions, make sure that you have got all the pieces. This will take quite some time to assemble so you may want to break up this build into phases whereas this 'Step 1' would be phase one.

Tips:

- You should be able to find on YouTube [some good videos](#) to you through the process of putting together the same 4-wheel drive platform.

- After soldering the wires to the motors, I suggest adding a drop of hot glue onto each copper clip so that the clips do not rip off - they are very fragile.

- It's a good idea to label all the motor wires so you can identify them later. Label the wires from the two front motors "FL" and "FR" for front-left and front-right, as well as the back motor wires as "BR" and "BL" for back-right and back-left.

Step 2 - Wiring and Mounting Arduino to Platform

To mount the Arduino to the platform, put the standoffs on the plate as shown, you may need to drill holes to mount to your preference liking:
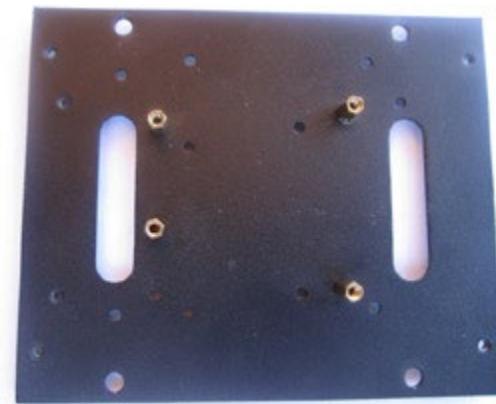
If screws come in contact with the headers on the Arduino, insulate the screws with some tape or other means. Once you have the Arduino mounted, pull all the wires up from beneath the platform. There should be six wires, four for the motors and one positive battery wire from the switch and one negative wire from the battery pack. These two battery wires will be connected to the motor shield on the two terminal screw mount that say 'positive' and 'negative'.

Step 3: Solder the Motor Shield Headers to the Board

The Adafruit motor control shield to control the motors on the platform needs some initial assembly. First, find the strip of headers that comes with the shield. You will need to break the header up into pieces so that it fits the motor shield as follows: 1 each 6-position, 2 each 8-position and 1 each 10-position. Solder these into place. **IMPORTANT: Be sure you choose the correct row (the outer row) to solder the pin headers into so that they match the Arduino. In the parts bag that you find the DC power plug and the sensor wire, there are three female Arduino headers, you may want to solder those onto the top of your motor shield board.**

You can decide not to use the headers, but instead use jumper wires to the board. In this build, we will be using pins A0, one grd (ground), and one +5V pin from the Arduino board, the shorter header.

Take both sets of wires from the left side motors (front left and back left) and test them with an AA battery to make sure they are wired correctly. Both of the wheels should spin in the same direction. We are wiring the motors in series. Perform the same check with the right side.

After making sure that the motors are wired correctly, wire the left side motors wire to the terminal labeled M1 on the motor shield board. Put the right side to terminal M2.
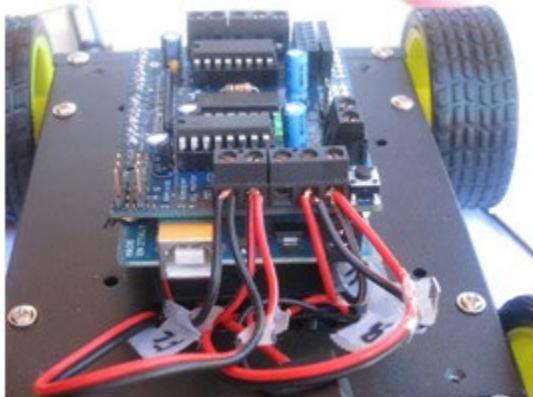
*Photo may vary from the shield being used*.

If not done already, connect the lower battery pack wires to the motor shield with the two screws

marked (+) (-). Screw on the tall standoffs that you will need attach the top plate where the upper battery will ride. The included 6AA battery holder will provide power to the Arduino Uno. The supplied plug is center positive, you will need to solder the red wire to the center pin.
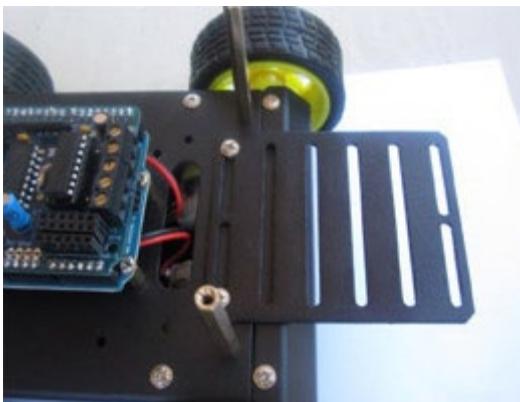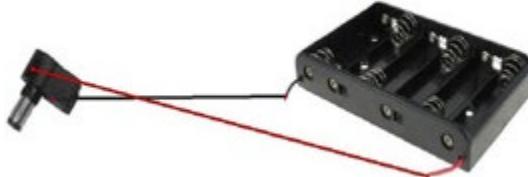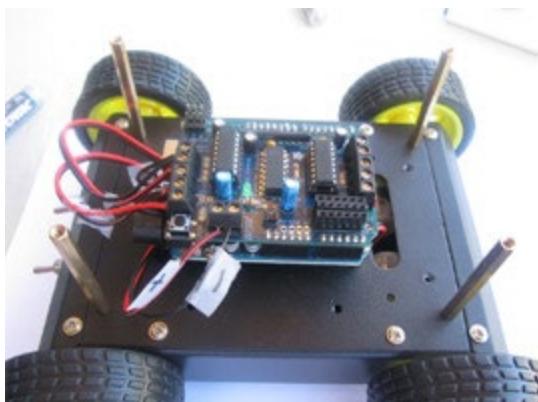
Step 4 - Adding the Breadboard
 For this build, we put the breadboard in the front for easy access. Install the plate as shown. The breadboard comes with double-sided tape. We leave the first row of the plate open in case we want to add other sensors later on.

Next, slip the servo wire through the top plate and connect it to header named 'Servo1' on the motor shield.
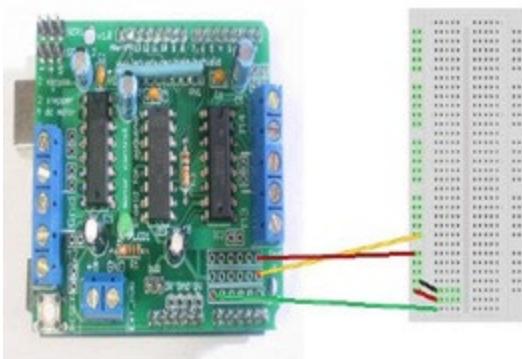
Connect a jumper wire from your breadboard to pin A0 like shown below (green).

Connect another jumper wire to ground (yellow) and another one to 5 volt (red). On the breadboard, connect the power (red wire) to the first row, the ground (yellow wire) to the second row and the signal wire to the first column.

Put the header into one end of the extension wire, and put it on the board as shown below. The white wire is the signal, the red wire is power and black wire is the ground.

Step 5 - Adding the PING Sensor

We will use the aluminum piece that came with the breadboard to make a holder for the Ping sensor. Put the sensor on the aluminum piece and mark it with a Sharpie. You can use a pair of regular scissors to cut the aluminum piece.

Use the edge of a desk or table to fold the aluminum into a 90 degree angle. We used a small piece of Velcro to stick the sensor to the mount.
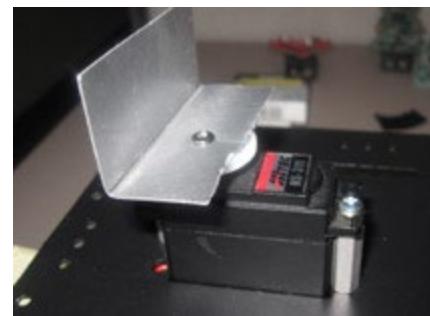
Because the aluminum is so thin, we were able to use a regular screwdriver to push in a hole in the middle of the mount. Use the circle horn from the servo motor included accessories and attached the mount to it by using the screw provided.
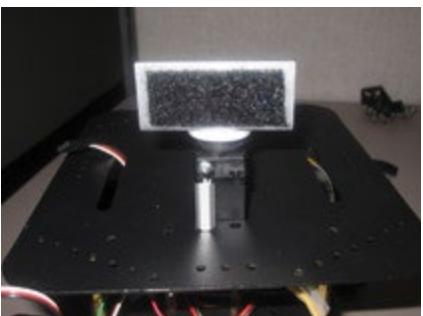
Attach the sensor to the mount using Velcro. The servo was attached to the servo hole on the top of the shield by using the standoffs, two screws and two nuts. We attached the 6AA battery holder to the top plate with Velcro in case we want access to top plate again.
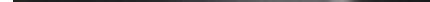
Step 6 - Now Time to Program!

Arduino software can be downloaded at: www.arduino.cc. First you will need to download the Arduino software. Next download the Arduino Stepper/Servo software library and follow the directions on how to put the library in its respective folder. Next, open the Arduino software and paste in the supplied code.

The fun with J-Bot doesn't stop here. See what Omar does next for J-Bot here

Troubleshooting

The code will not compile
1. Make sure the Adafruit motor control library is in its proper folder.
2. Check the code and make sure you copied the complete program.

The IC chip on the Adafruit shield heats up excessively
1. Check the soldering job. Make sure your soldering is correct on the motor shield.

The wheels fall off too easy
1. Apply a small amount of hot glue to the wheels.