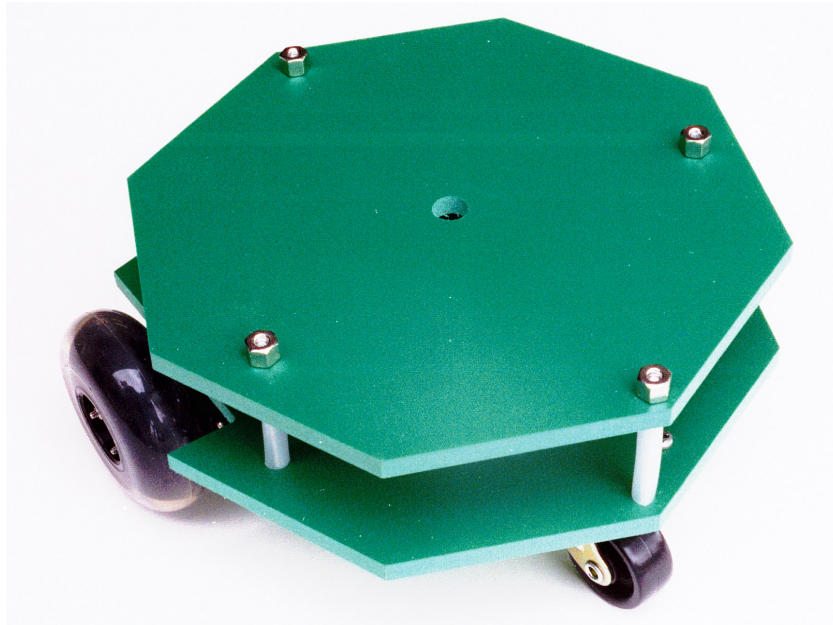


Budget Robotics Octabot Assembly Instructions



The Budget Robotics Octabot kit is a low-cost 7" diameter servo-driven robot base, ready for expansion. Assembly is simple, and takes less than 15 minutes.

The Octabot comes with two "decks" for mounting the servo motors, batteries, sensors, microcontroller, and other components. Additional decks can be added if desired. We recommend no more than three decks total, to reduce the possibility of the robot tipping over.

The Octabot uses the popular "differential steering" motor arrangement, where the robot is propelled by two motors and wheels on opposite sides of the base. A caster, placed at the rear of the Octabot, provides balance. With this arrangement, the Octabot is able to move forward and back, turn left and right, and spin about the axis of the wheels.

The two drive motors are standard R/C airplane servos. Normally, such servos are limited to 180° rotation only, but the motors included with the Octabot have been modified to permit continuous rotation. As with all R/C servos, the Octabot motors must be driven using the appropriate control circuit. This control circuit is not included with the basic Octabot kit.

If you need a control circuit, the OOPic R, from Savage Innovations, (<http://www.oopic.com/>) is a good all-purpose solution. The board has connections for attaching up to 16 R/C servos.

The Octabot kit contains the following parts:

Quantity	Description
1	7" diameter base (bottom deck). The base has "wheel well" cutouts for the drive wheels. The base is pre-drilled for the servo motor mounting brackets and caster.
1	7" diameter 2nd deck. The 2nd deck is attached to the base using risers. Holes in this deck match mounting holes in the base.
2	Pre-modified R/C servo motors.
2	2 1/2" diameter wheels, with hubs to attach to the servo motors.
2	Servo mounts, engineered to fit most any standard-size servo.
4	90° corner brackets, for attaching the servo mounts to the base.
16	4-40 x 1/2" machine screws and nuts.
4	Risers consisting of: 6-32 x 2" machine screws, 6-32 hex nuts, and sleeves.
1	Swivel caster.
2	Caster hardware consisting of: (2) 6-32 x 1/2" machine screws and (2) 6-32 hex nuts.

Assembly Steps

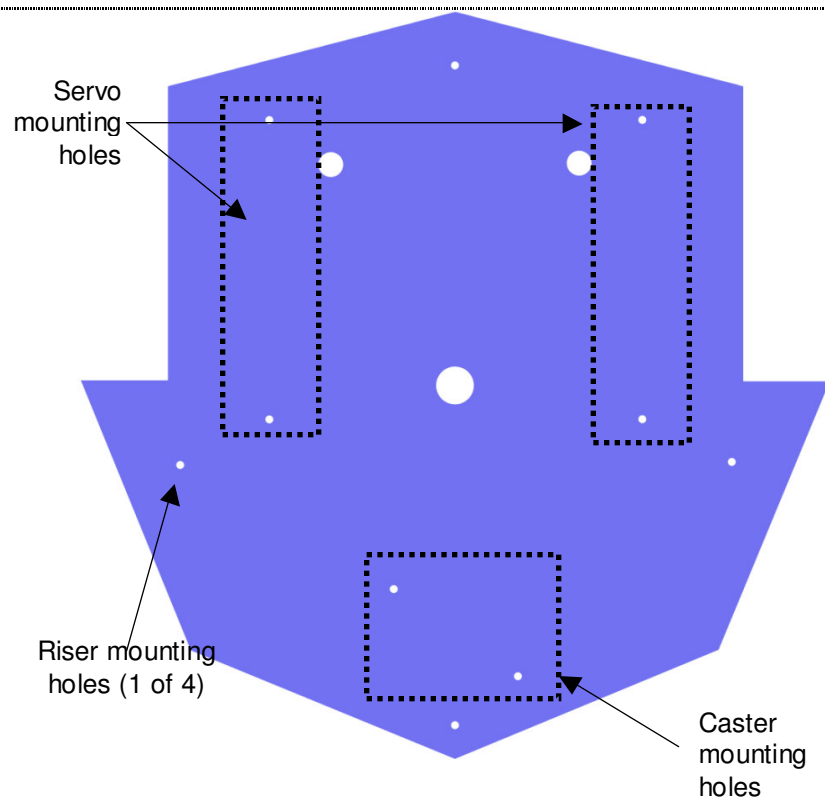
Step 0

Orient the base (bottom deck) as shown. This will be the underside of the base.

Note the servo mounting holes on the left and right side, as well as the caster mounting holes.

Four additional small holes are pre-drilled for the risers. They are located on the front and rear (the rear is considered the end with the caster), and the left and right sides.

The remaining larger holes are for feeding through wires for servos, sensors, etc.



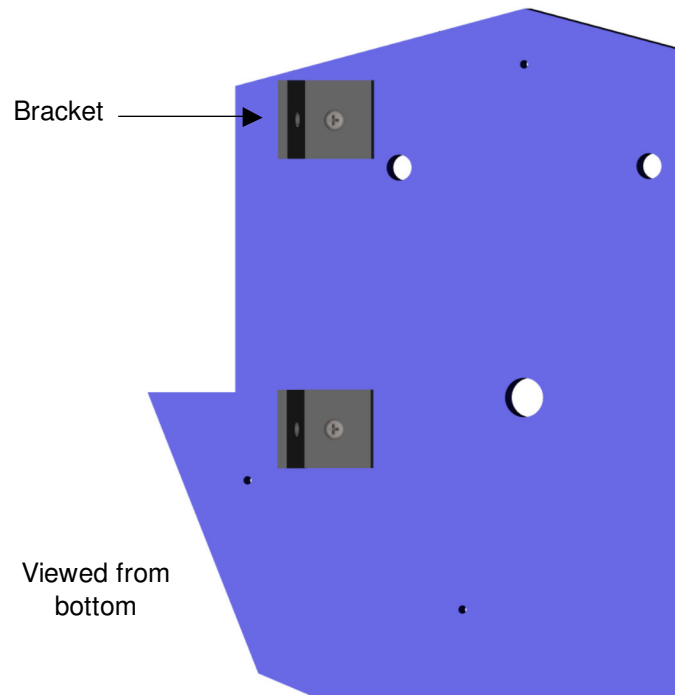
Step 1

Mount the left servo corner brackets over the servo mounting holes as shown. Use 4-40 x 1/2" screws and nuts to fasten the brackets in place.

Repeat the same for the right servo.

The screws should be pushed through from the bottom of the base. The nut is fastened on the top of the base.

Finger-tighten only at this point.



Step 2

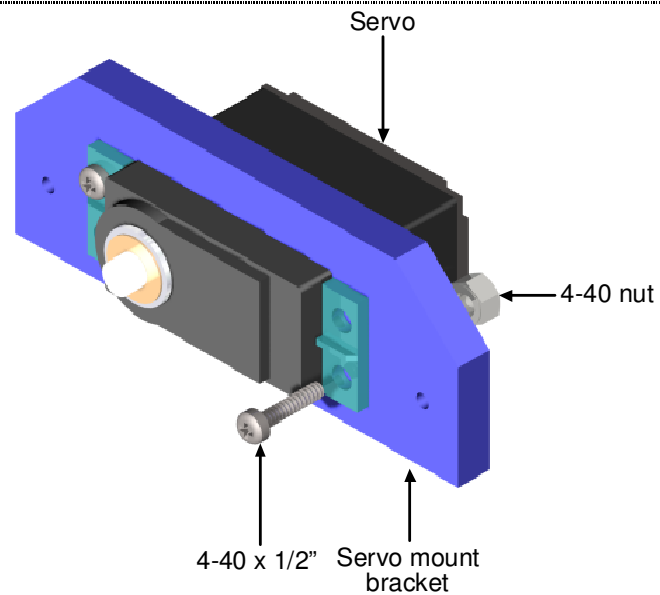
Mount one of the servos into a servo mounting bracket by sliding it back-end first through the bracket.

The fit may be tight, depending on the make and model of the servo. Do not force the servo into the bracket, or the bracket may be damaged.

If you are using alternative servos than those that come in the Octabot kit, you may need to lightly file the inside pocket of the servo mounting bracket to enlarge it to accommodate your servo. *Don't make the pocket any larger than it needs to be.*

Secure the servo to the mount with two 4-40 x 1/2" screws and hex nuts. (There is no need to use fasteners on all four corners of the servo; two screws are sufficient.)

Repeat for the opposite servo and mounting bracket. *Be sure to mount the servo in mirror-image to the one shown!* Refer to Step 8 to view how the servos are installed.



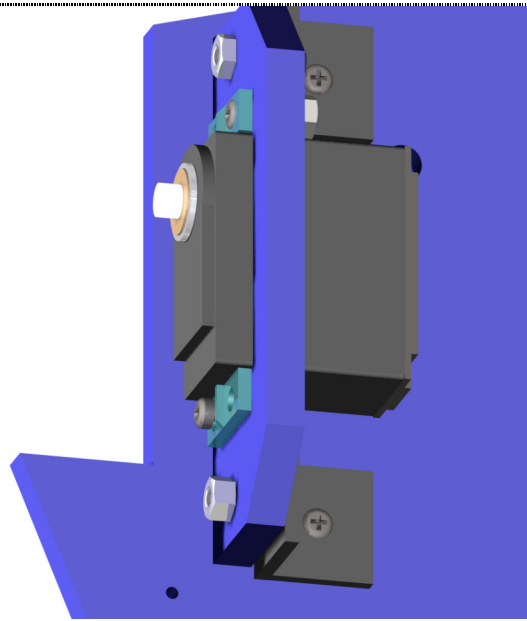
Step 3

Attach the left servo and servo mount to the base using two 4-40 x 1/2" screws and nuts. The nuts should be secured to the side of the mount facing the wheel well cutout.

Note that when properly attached, the servo shaft will be centered in the wheel well cutout.

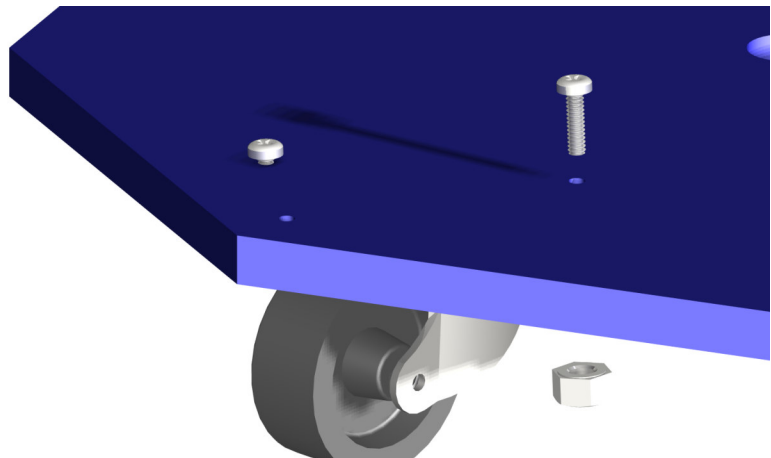
Repeat the same procedure for the right servo and servo mount.

After the servo mounts have been attached, align the mounts so they are parallel with the wheel well cutout, and tighten all screws.



Step 4

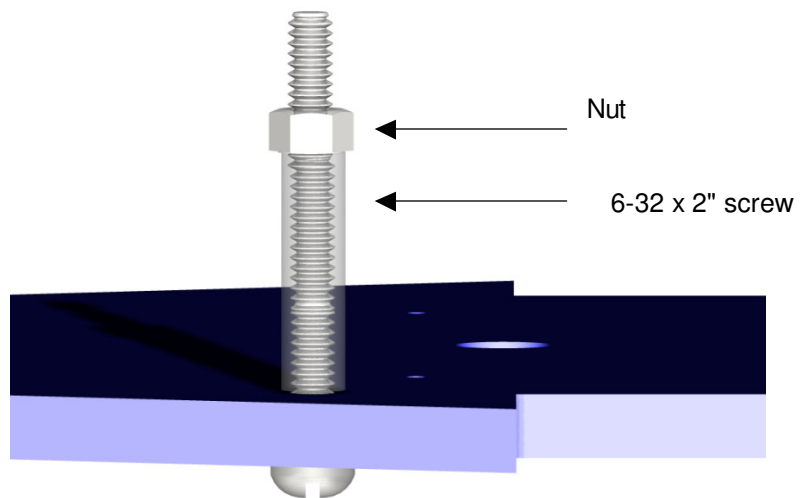
Attach the caster using two 6-32 x 1/2" machine screws and nuts.



Step 5

Assemble and install the four risers as follows:

1. Thread each of the 6-32 x 2" machine screws into the four holes designated for the risers. The screws are inserted from the bottom.
2. Slip a plastic sleeve over each of the screws.
3. For each riser, thread a 6-32 hex nut until the sleeve is *slightly* compressed.

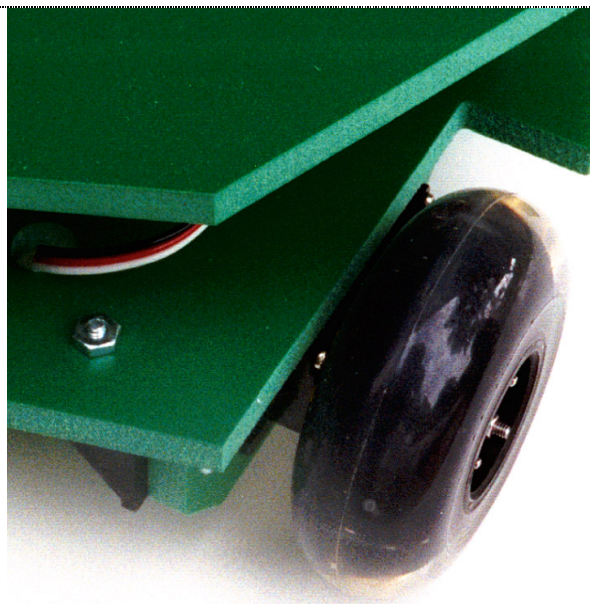


Step 6

Mount the wheel to each servo. The wheel is secured with a small self-tapping screw.

Note that the servo shaft is splined, and this spline matches the wheel hub. Be sure to press the wheel onto the shaft firmly while tightening the screw.

Do not over-tighten the wheel mounting screw, or it may break off!

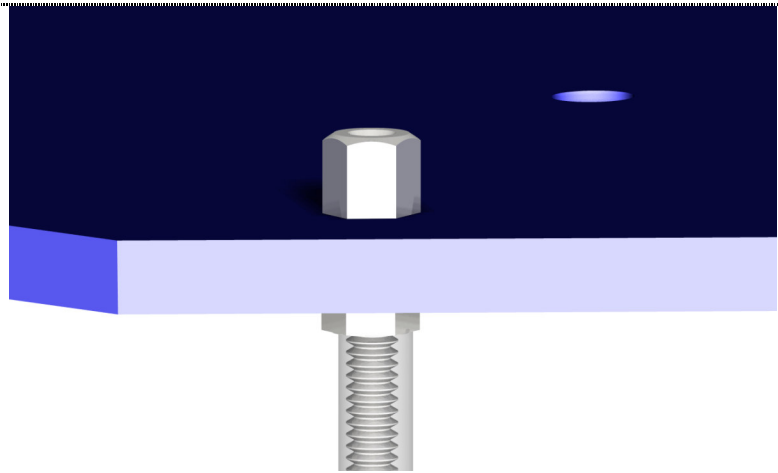


Step 7

Attach the 2nd deck by locating the matching four holes to the risers.

Secure the top deck by threading four 6-32 "high profile" hex nuts onto each riser.

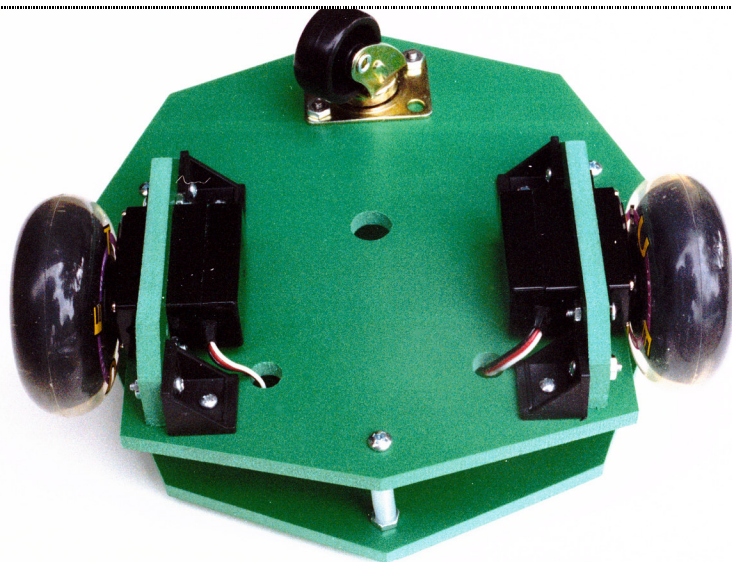
These "high profile" nuts act as couplers in case you wish to add a third deck to the Octabot.



Step 8

The based is drilled with several large holes for wire "feed through," and can be used as shown.

You may drill additional holes as needed. A standard wood bit may be used to drill holes.



Servo Centering Adjustment

The Octabot uses standard R/C model airplane servo motors that have been modified to allow for continuous rotation. This modification entails removing a "stop" on the bottom of the drive gear, and disengaging the drive gear from the feedback potentiometer inside the servo.

Before the servo was shipped to you, the potentiometer was positioned in its physical center position, but was not cemented in place. This allows you to make fine-tuning adjustments to the servo center to best suit the control circuitry you are using.

Ordinarily, software running on your servo control circuit or microcontroller is used to set the "center" of the servo. This signal is nominally a repeating pulse of 1.5 milliseconds in duration. When centered, the servo stops all motion. Applying a pulse greater than 1.5 milliseconds causes the servo to rotate in one direction; a pulse of less than 1.5 milliseconds causes the servo to rotate in the other direction. Note this pulse is repeated 20-50 times each second.

Should you wish to adjust the physical center of the servo you may do so by following these steps:

1. Remove the wheel from the servo.
2. Remove the servo from the servo mount.
3. Remove the four casing screws on the servo.
4. Place the servo upright (base down) on the table, and very carefully remove the top casing.
Apply gentle finger pressure on the output shaft to prevent the output gear from being pulled out as you remove the casing.
5. Remove the center gear, but keep the metal shaft in place.
6. Remove the output gear. (Minimize handling of the gears so that you don't accidentally "soak up" too much of the white lubricating grease into your fingers. If you think the gears have become insufficiently lubricated, you may apply a small amount of synthetic grease -- available at most electronics stores -- to replenish.)
7. Adjust the feedback potentiometer as required. If needed, you may apply a *very small* amount of Super Glue (or equivalent) to the potentiometer shaft to lock it in place.
8. When done, replace the output and center gear. Replace the top casing and four casing screws of the servo.
9. Reattach the servo to the base, and the wheel to the servo.

The Octabot is from:

Budget Robotics
PO Box 5821
Oceanside, CA 92056
<http://www.budgetrobotics.com/>
orders@budgetrobotics.com

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Octabot II Addendum

Except as noted below, the Octabot II kit contains the same parts as the original Octabot kit. Construction steps are therefore similar as well.

Quantity	Description
8	Aluminum risers, with (16) machine screws. (Replaces 6-32 hardware risers of original Octabot.)
1	Extra third deck.

1. Follow construction steps 0-4 in Octabot assembly instructions.
2. For steps 5 and 7, use (4) each aluminum risers and (8) each machine screws to secure second deck. The second deck aligns with the riser holes in the bottom deck one way only.

An optional third deck is included with the Octabot II kit. It is attached to the second deck using the four alternate holes.