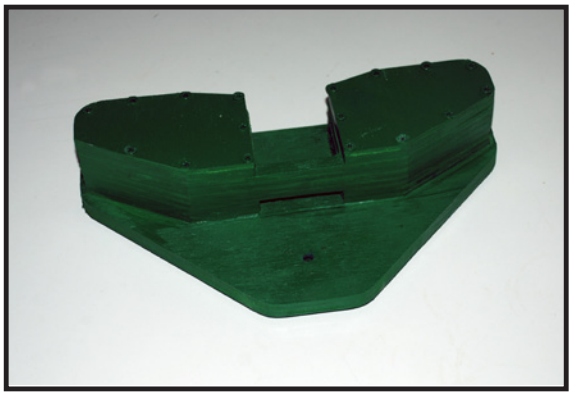
The Mind Project's Iris 1 Robotic Arm

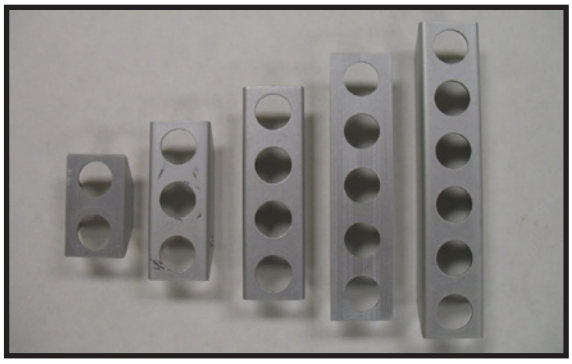
Assembly instructions
Step 1

Below you will find pictures and descriptions of each part. It may be helpful to take each piece out of the bag and place them on a table for easy access.



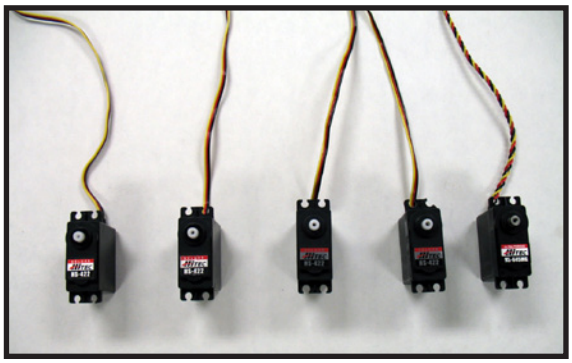
Support

1 Wooden base plate
3 #8 screws
4 #6 screws



Links

1 2-hole metal link
1 3-hole metal link
1 4-hole metal link
1 5-hole metal link
1 6-hole metal link

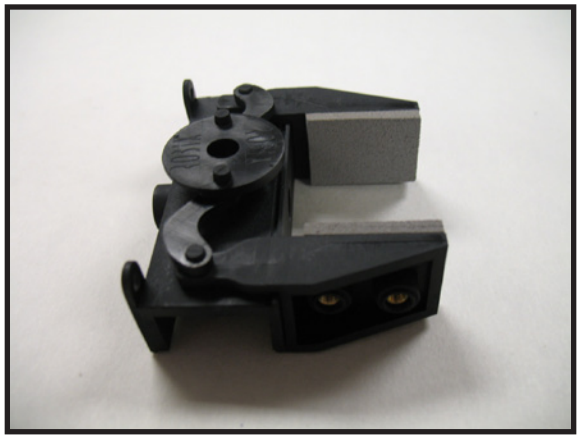


Servos

3 HiTec HS-422 servos
2 HiTec Ultra Torque Motor HS-645MG

Extensions

4 Wire extenders

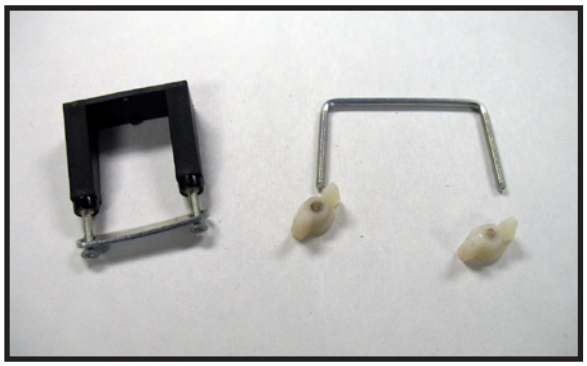


Gripper

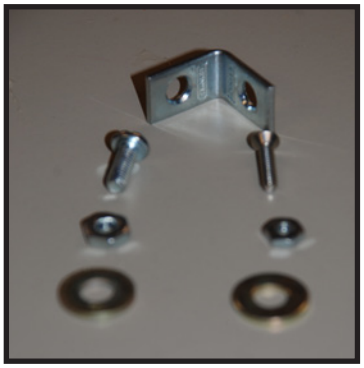
1 Robix Gripper hand

Power

1 Sceptre power cord or similar.
110vAC to 6vDC



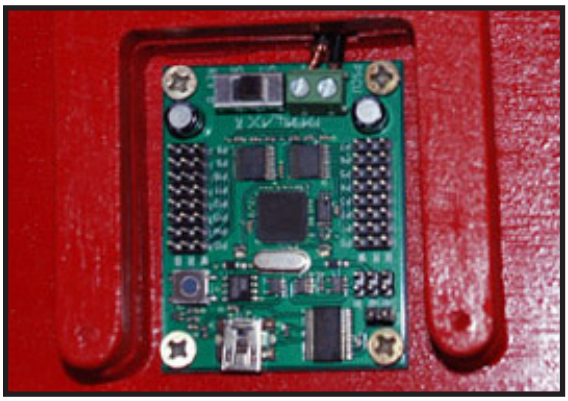
Support
1 Plastic cradle with
  2 machine screws
  1 metal connector
1 metal cradle with
  2 nylon wing nuts



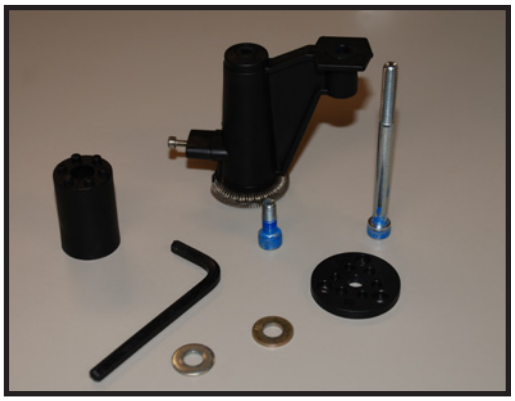
Support
1 #8-32 machine screw and nut
1 #6-32 machine screw and nut
1 3/4" corner link
2 washers

Communication
1 USB adapter A plug to Mini B plug

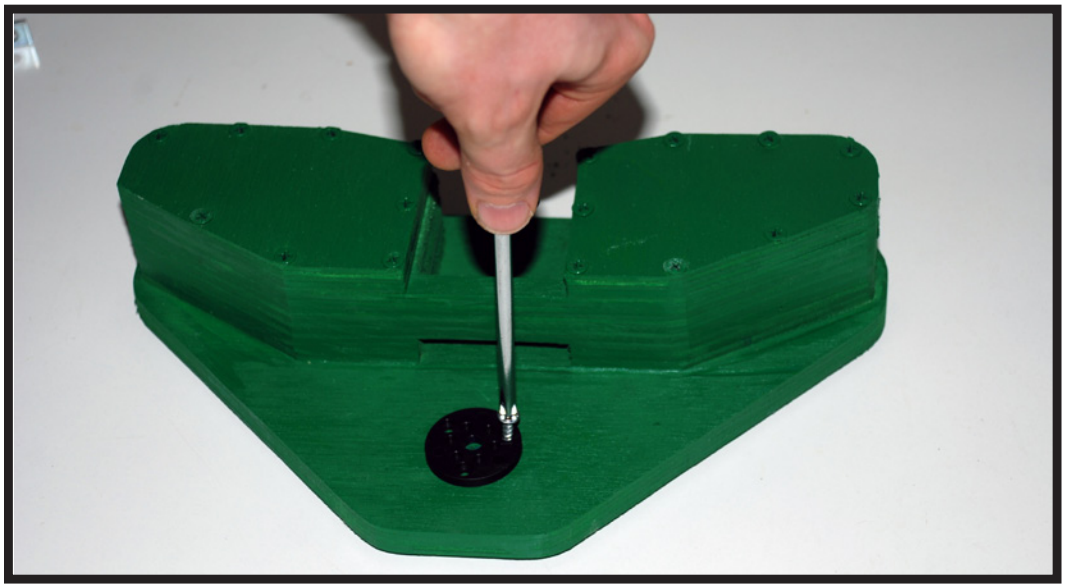
Connection
3 black plastic "Robix" servo connectors
3 Nylon washers
3 Attachment screws (on servos)



Control
1 Parallax servo motor controller

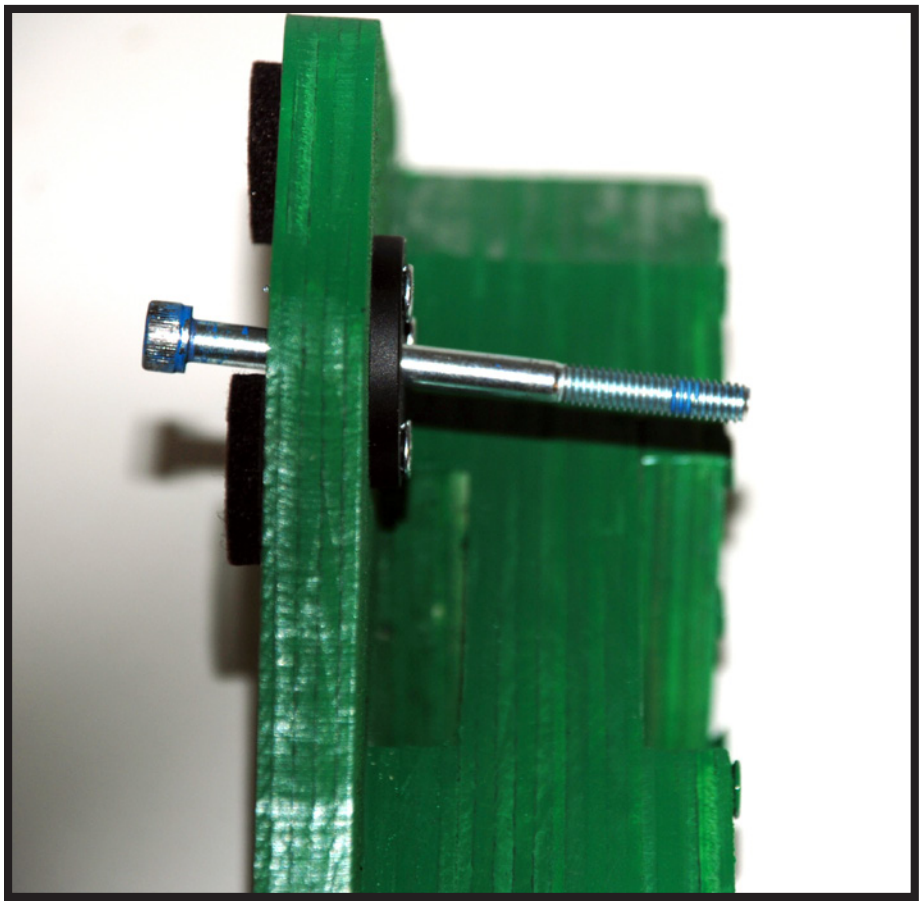


Attachment
1 plastic base kit, including 2 hex bolts, 1 short and 1 long; 2 washers, a hex wrench (not in all sets); a circular base piece, a cylindrical base piece and the top base piece.



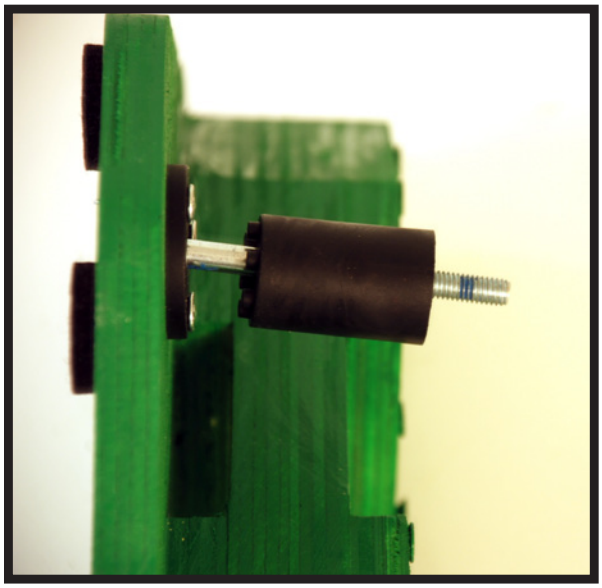
Step 1

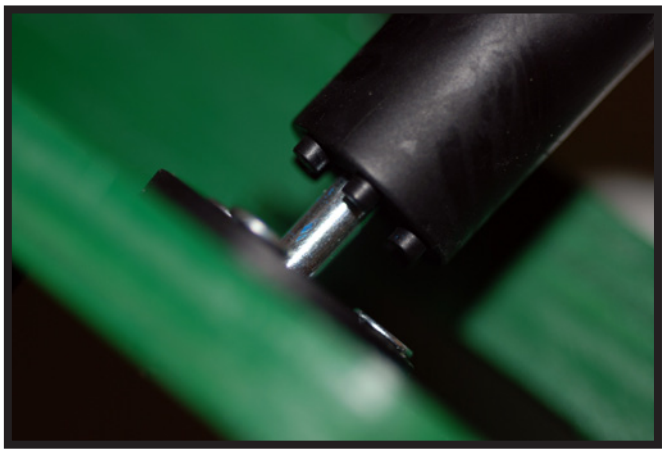
Attach circular pivot post adapter to base. Make sure the screws line up with the holes drilled in the base and the dimples on the plastic piece face up. Take care not to overtighten the screws.



Step 2

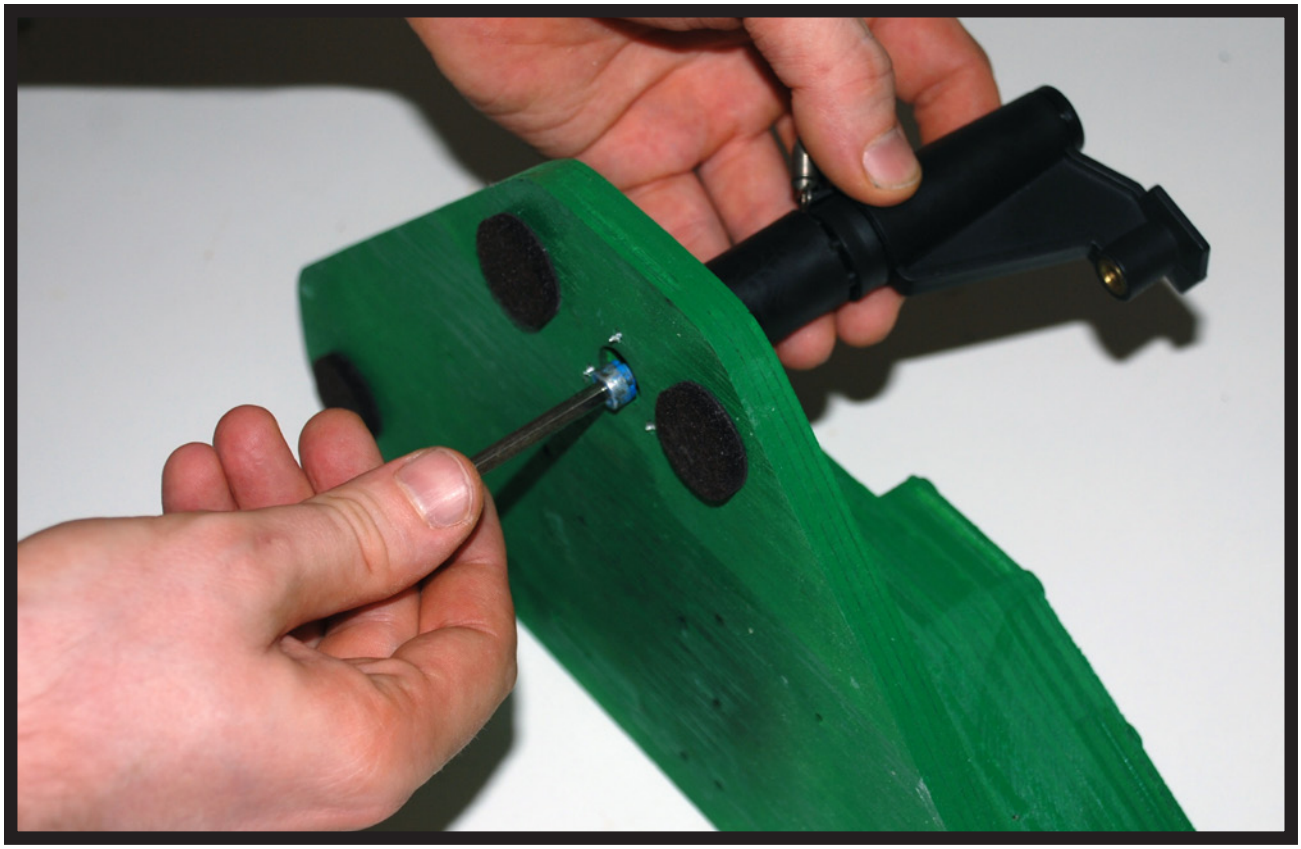
Put long hex bolt through the hole in the base from the bottom. It should stick out of the top of the circular piece you just attached.





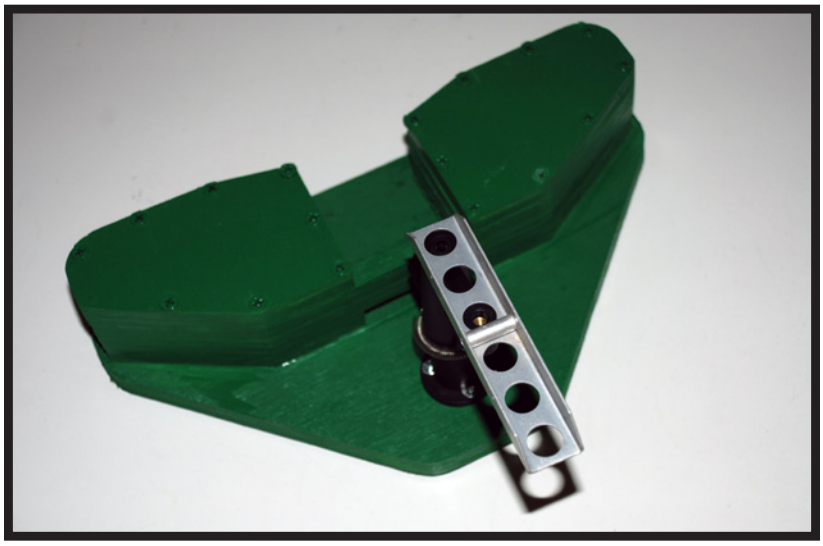
Step 3

Attach the cylindrical pivot post piece to the circular pivot post adapter. The protrusions from the cylinder should fit in the holes on the circular piece.



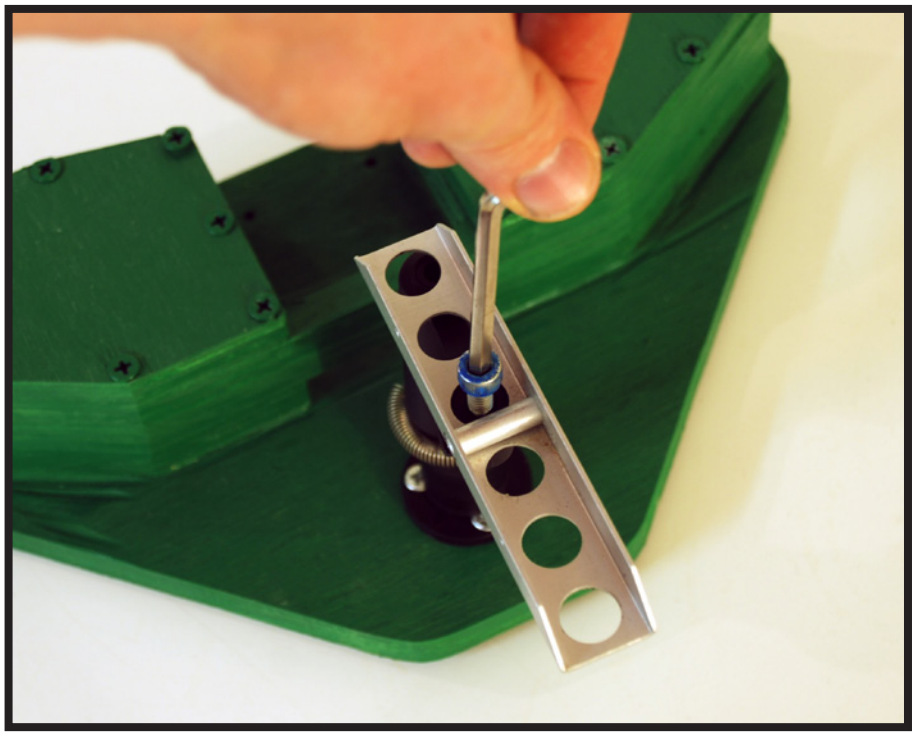
Step 4

Attach the top part of the pivot post to the rest of the assembly. Tighten everything down with a 3/16" hex wrench.



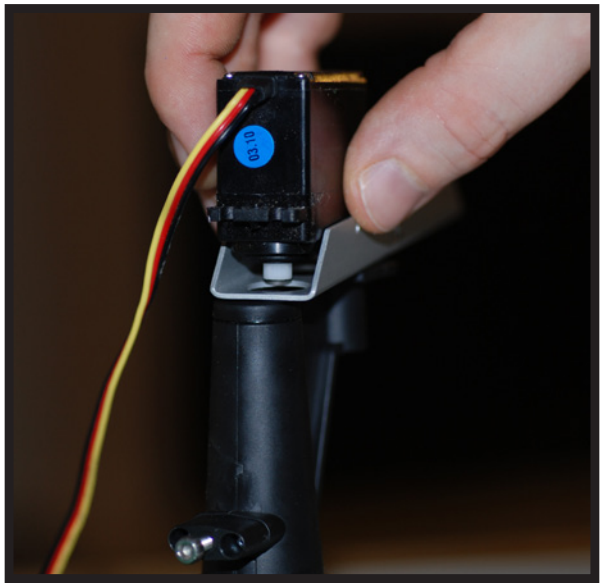
Step 5

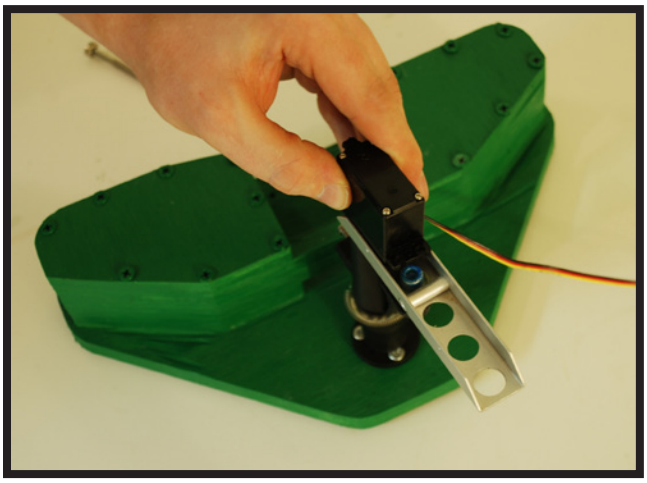
Place the 6-hole link on the top of the pivot post, open end up, as shown in the above photo.



Step 6

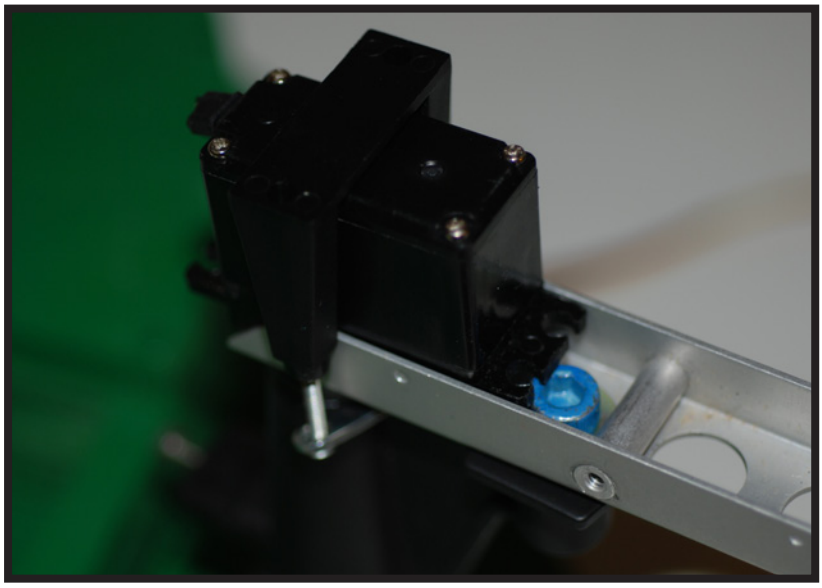
Screw the short bolt into the pivot post. Add a washer between the bolt and the metal link so it holds snugly.

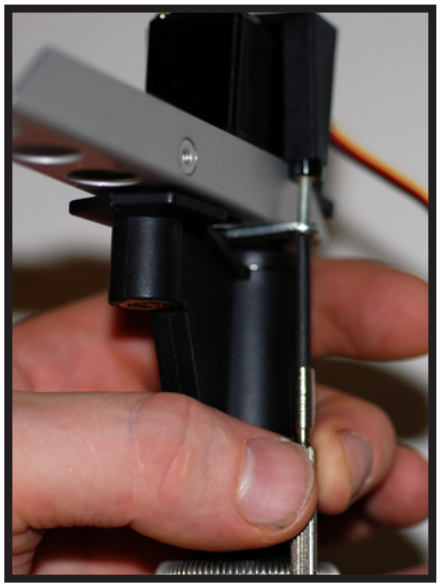




Step 7

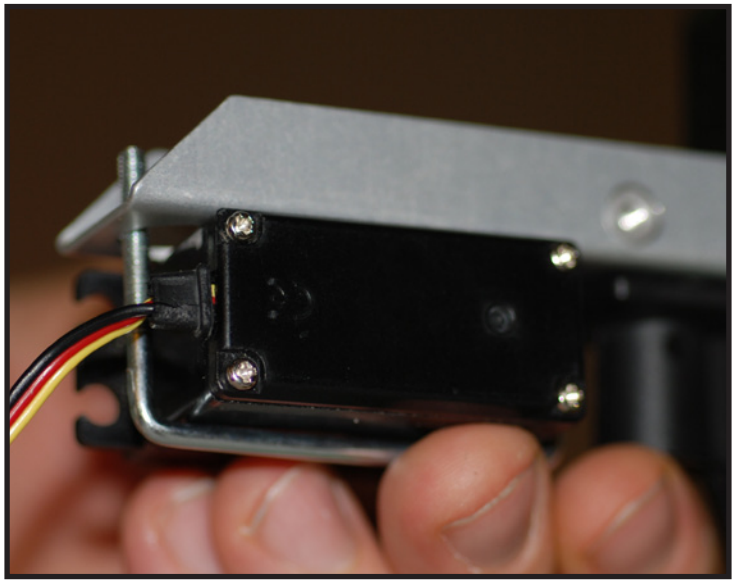
Insert the High-Torque servo, labeled HS-645MG into the back hole of the 6-hole support. The white gear drive should fit inside the hole of the plastic base piece.
Once this is inserted, swing the assembly through its full range of motion to make sure it rotates about the same distance from side to side. If it doesn't, take the servo out, reposition the arm and try again. You should hear the motor spin when you rotate the arm back and forth.

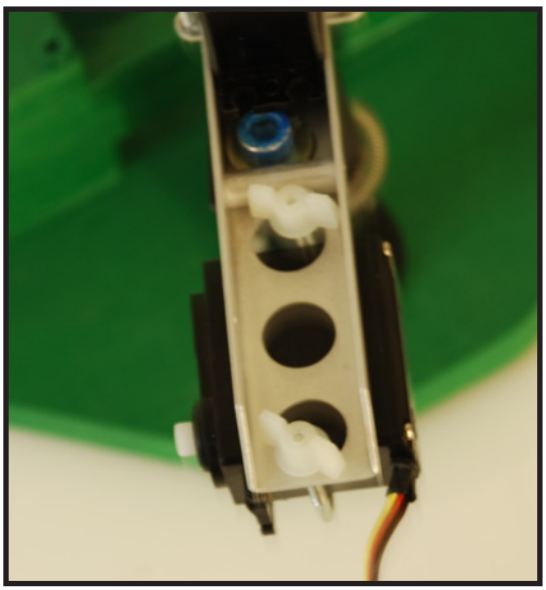




Step 8

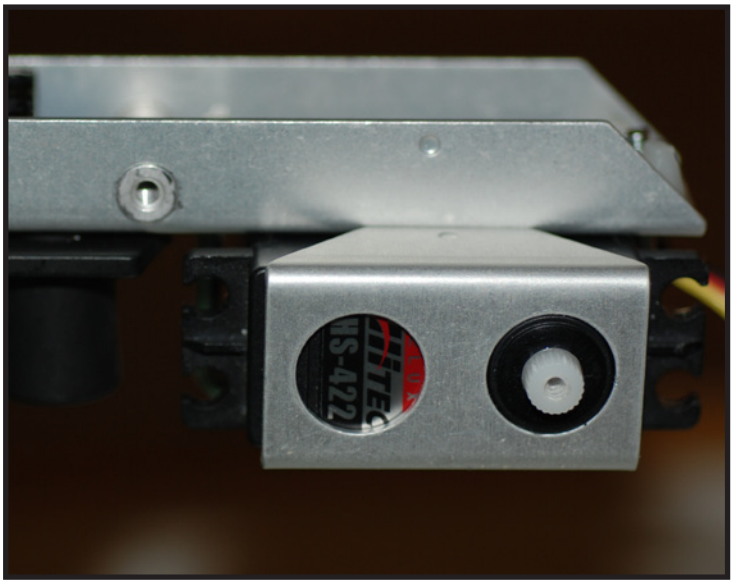
Wrap the plastic cradle around the servo, and feed the attached metal bracket underneath the metal link. Tighten the screws.





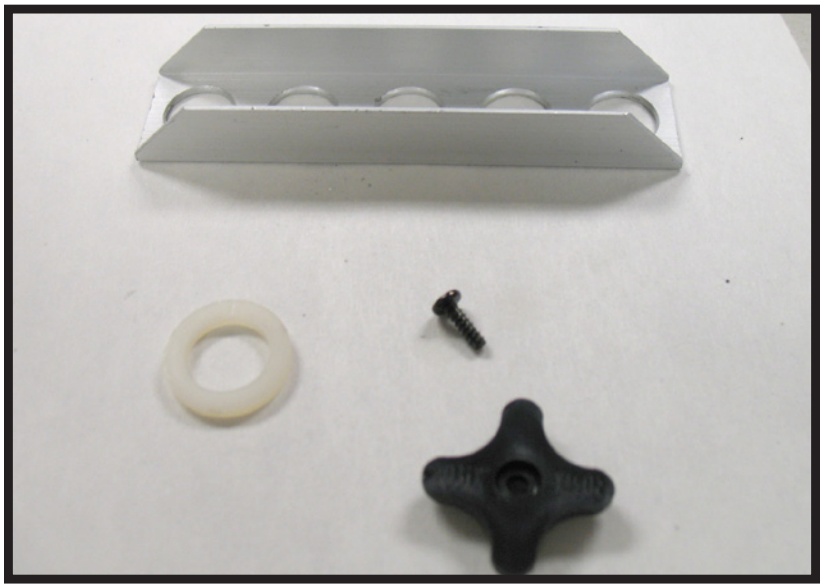
Step 9

The next piece you will attach is The second HS-645MG high-torque servo. You will need the metal cradle and the two plastic wing nuts to complete this step.
Place the servo underneath the 6-hole bracket with the white drive gear pointed to the left as seen from the front. Feed the cradle around the servo and up through the holes of the link. Attach the wing nuts and tighten everything down.



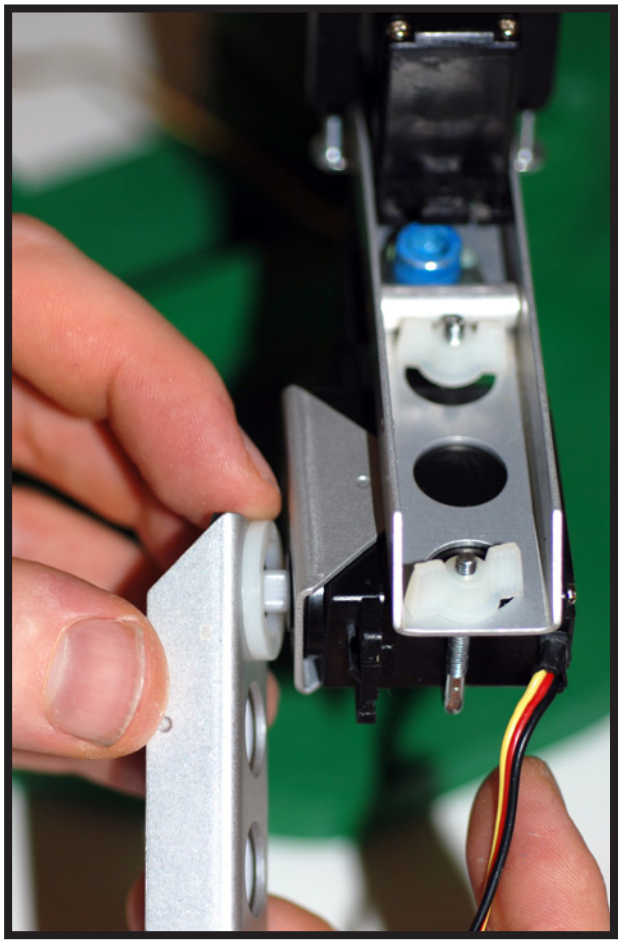
Step 10

Place the 2-hole metal link over the servo you just attached. Note: This image depicts a HS-422 servo, but you should have a HS-645MG servo installed here.



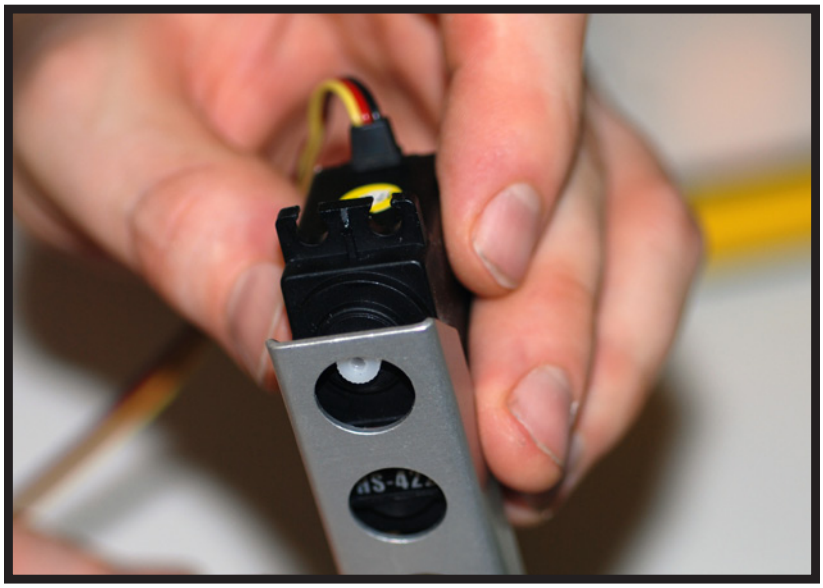
Step 11

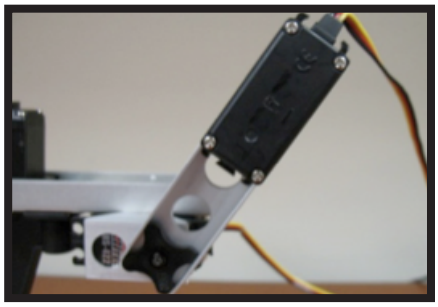
The next set of steps requires the 5-hole link, a nylon washer, a plastic servo connector and a screw (currently attached to the servo)



Step 12

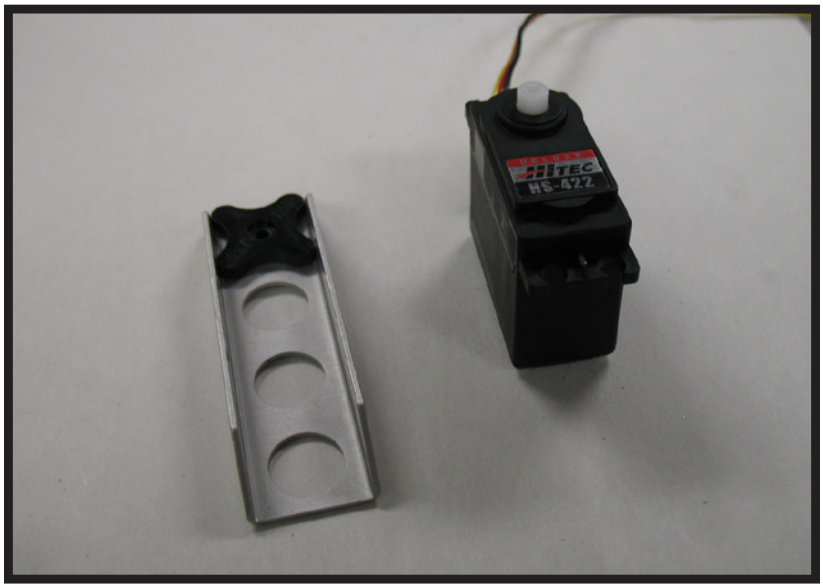
Attach the 5-hole link to the servo you just attached. Put a nylon washer between the two metal links. Tighten the screw. Again, rotate the servo to make sure it has an even motion up and down.





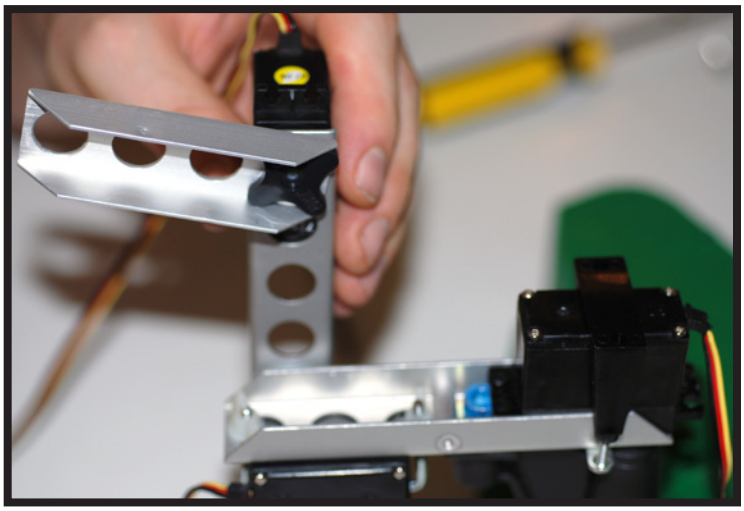
Step 13

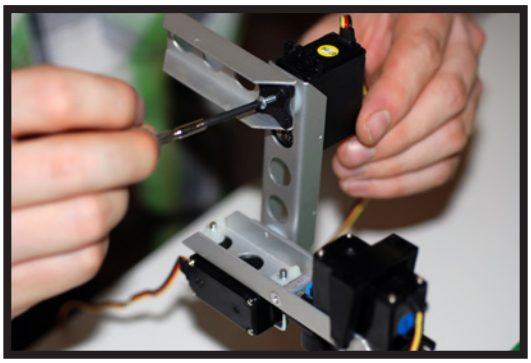
Add an HS-422 Servo to the other end of the 5-hole link.



Step 14

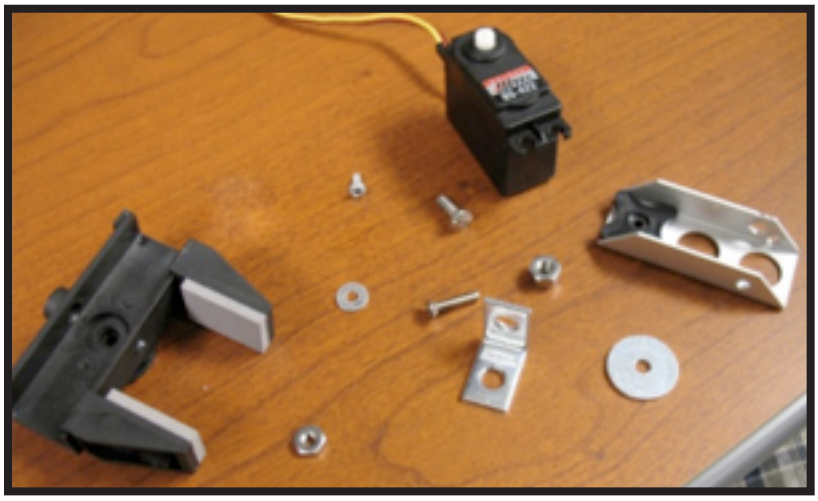
You'll need the 4-hole metal link, a servo and a plastic servo connector for the next set of steps.





Step 15

Following the same steps as before, attach the 4-hole arm link, nylon washer, servo connector and servo to the previous assembly.

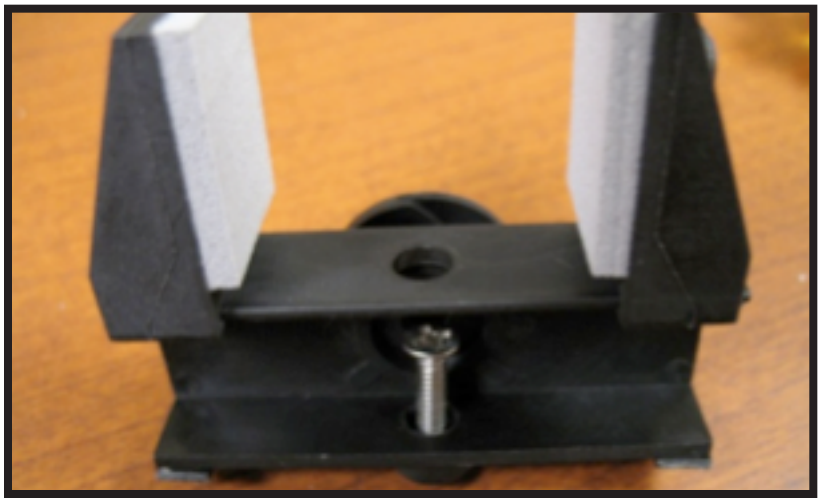


Step 16

Now gather together the gripper hand, another servo motor, the angle link, the #8 and #6 screws, nut and washer, and the 3-hole arm link with its connector and white nylon washer (not pictured).

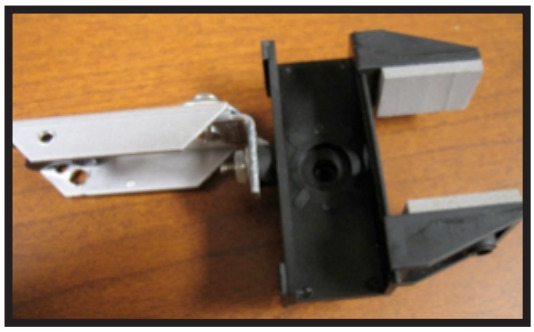
Step 17

Attach the angle link to one end of the 3-hole arm link with the #8 (the thicker one) screw, a washer and nut as shown in the photo above.



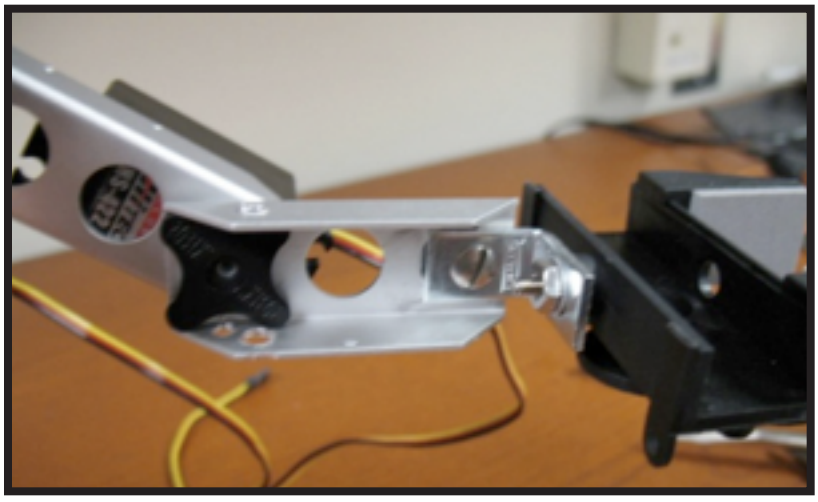
Step 18

Thread the #6 screw (the thinner one) into the gripper hand as shown above. A screwdriver will make this easier.



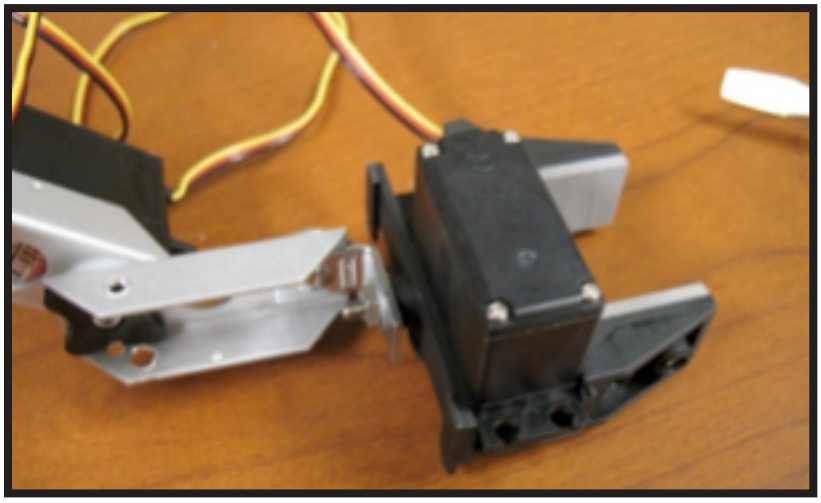
Step 19

Attach the angle gripper hand to the angle link using a small washer and a nut. Your assembly should look like the one above.



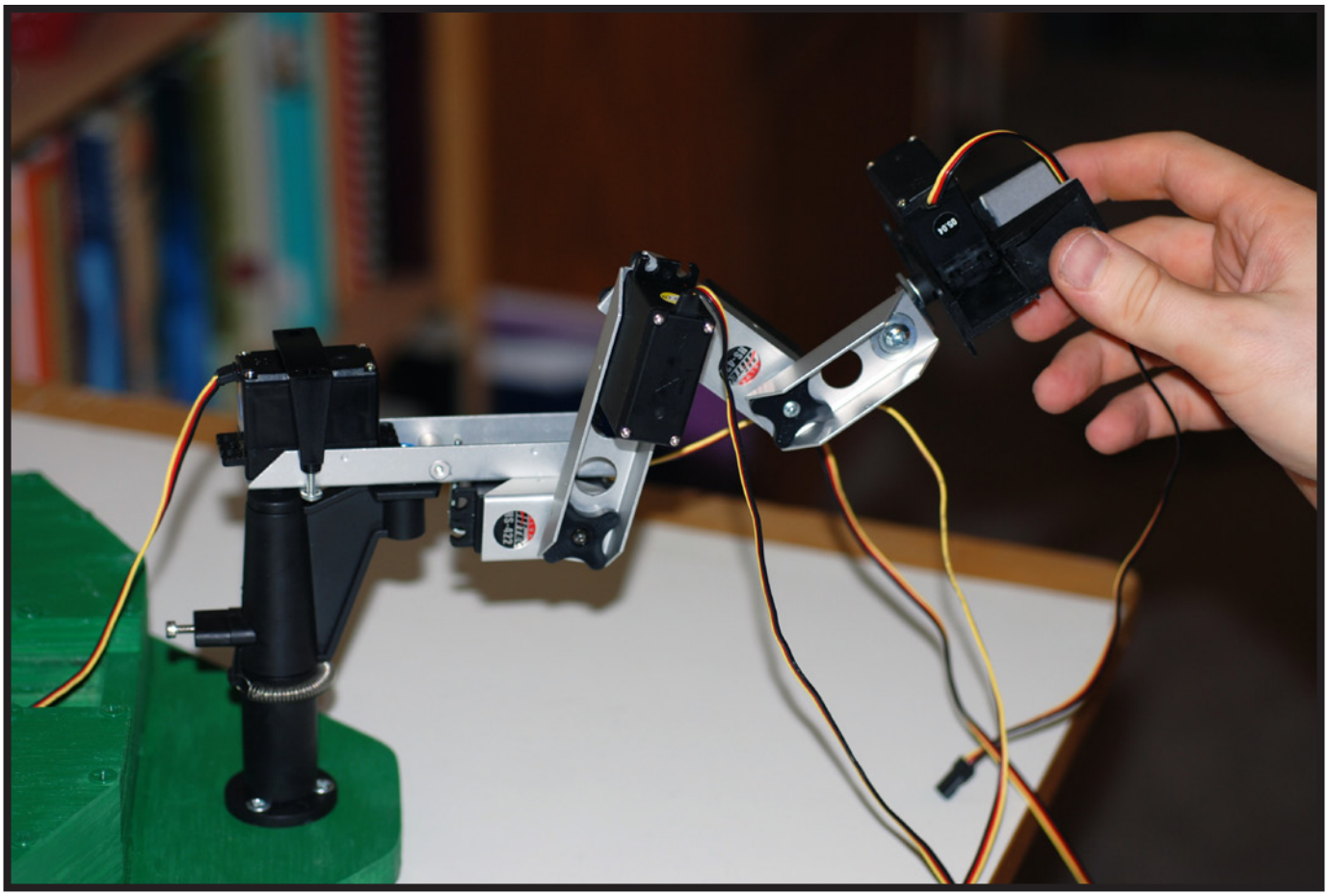
Step 20

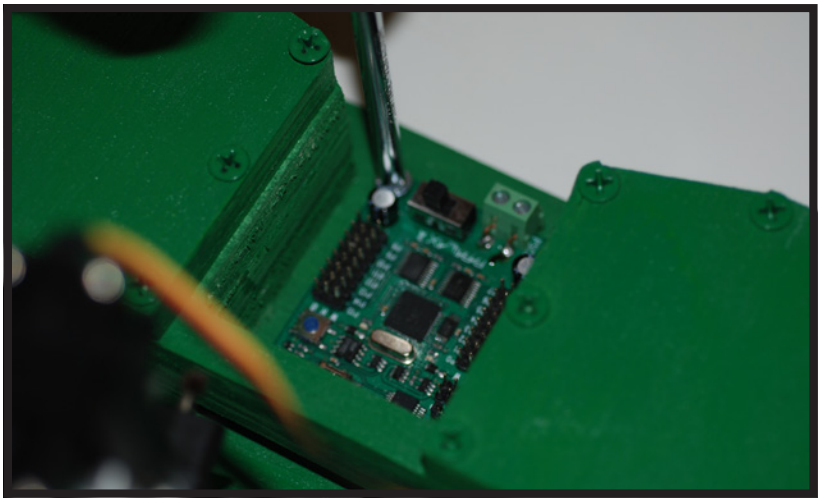
Now attach the gripper assembly to the rest of the arm as shown, using the nylon washer and servo connector.



Step 21

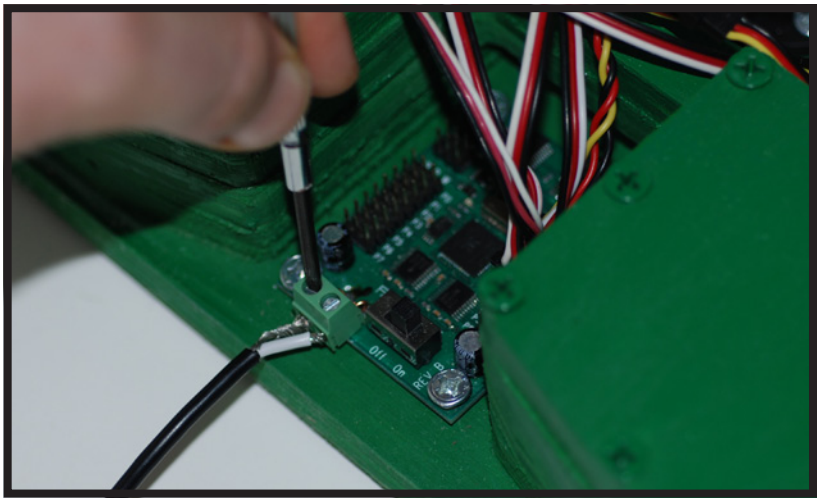
Attach the last servo motor into the gripper hand as shown. Make sure the arm opens and closes correctly.
Note: This servo sits in the gripper hand without a screw.
Congratulations! You've finished the arm!





Step 22

Tighten down the screws to fasten the parallax board to the wooden base.
Take care not to overtighten the screws.

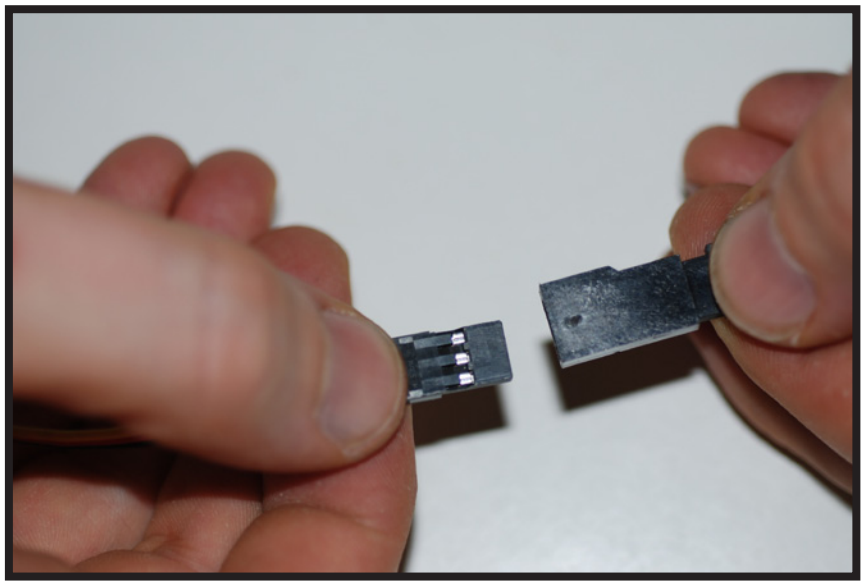


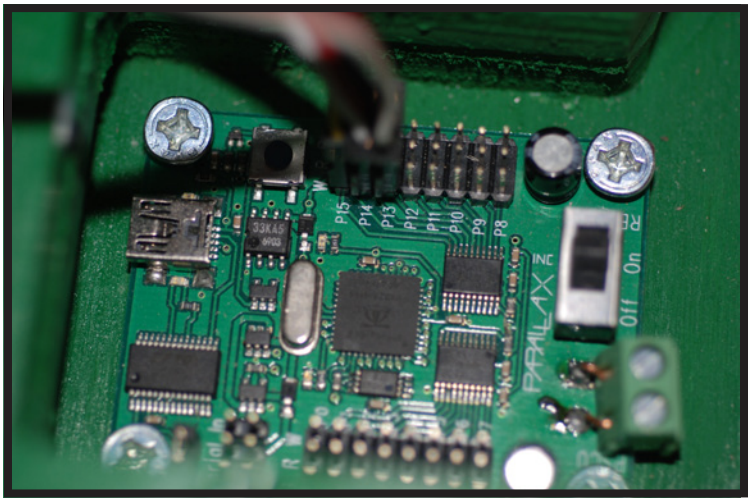
Step 23

Now we need to hook up the Parallax servo controller to the arm. Start by removing 1/4" of insulation from the clipped ends of the power supply. Feed these through the hole on the front of the board. Insert the stripped wires into the holes in the green power inputs on the circuit board. You may need to give the wires a twist to get them in the holes.
NOTE 1: Make sure no stray strands of wire are left out of the holes. These could touch the other side and cause a short in the wires.
NOTE 2: When you power up the arm for the first time, if the servos do not move when you tell them to, try switching the positions of these wires. The power supply you get may have red tape on the "+" side of the wire. Make sure this matches the "+" side of the circuit board.

Step 24

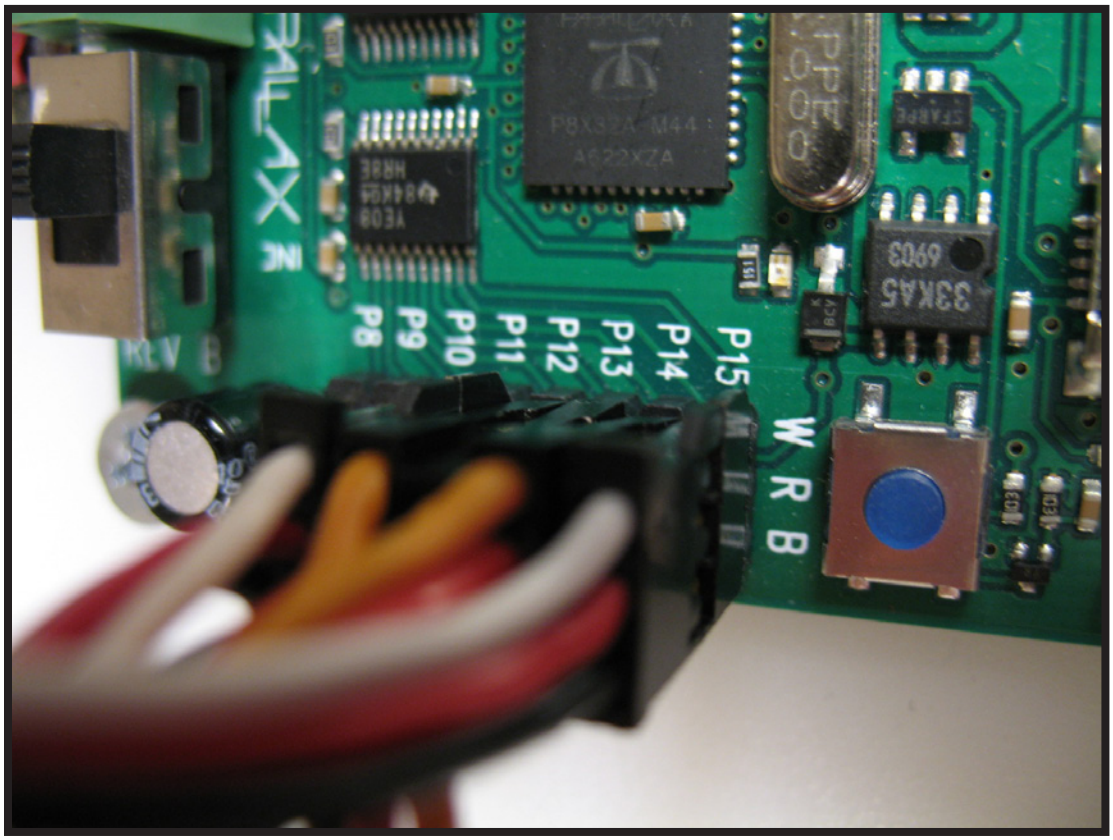
Now we'll start attaching the servos to the board. You'll need the wire extenders for the next steps. To start, remove the cable extenders from their packages and attach one to each of the servo motors except the high-torque servo motor (the first one you attached to the plastic base.) The darkest servo wire should be connected to the darkest cable extender wire on all of these extenders when you're done.





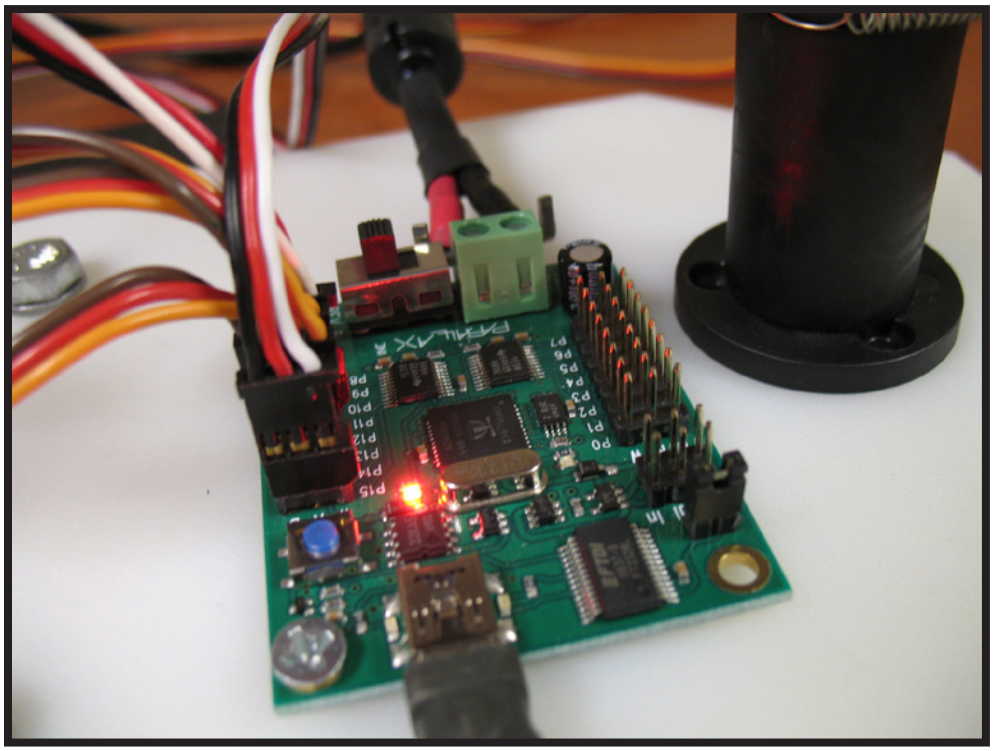
Step 25

To start, attach the high-torque servo motor's wire, the only one without a cable extender, to plug P15 on the parallax board. The darkest wire should face out.



Step 26

Continue down the line, connecting the servo between the 6-hole and 5 hole support to P14, the servo between the 5-hole and 4-hole supports to P13, The servo between the 4-hole and 3-hole connector to P12, and the servo attached to the gripper hand to P11.



Step 27

Attach the USB cable to the board and your computer, plug in the power and turn on the switch. If the red light comes on, you've done it!