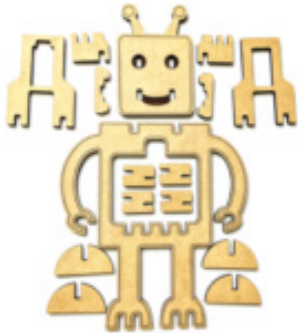


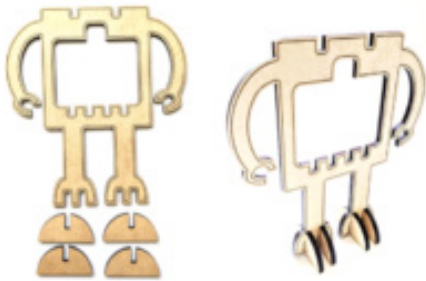
## Animated Servo Motor Robot Assembly Instructions

### Assemble the Robot Body

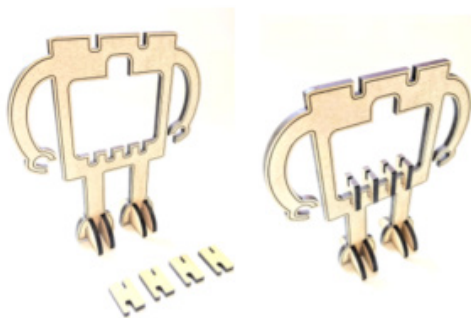
1. Remove printed pieces from the print bed and peel off any masking. The robot assembly will require all parts shown.



2. Take the robot body and attach the four semi-circular stands to its feet by inserting the slots in the stand pieces into the corresponding slots in the robot's feet. The body should now be able to stand upright on a level surface.



3. Attach the four rectangular clips which will hold the micro:bit in place. Each of the clips has a narrow and a wide slot. Insert the wider of the two slots downwards into a corresponding slot in the robot body. Each clip should be oriented so that the unused narrow slit sits behind the robot body.

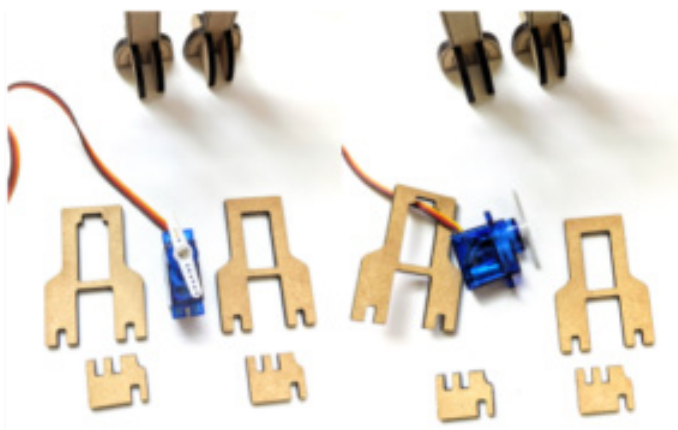


## Assemble the Robot Head

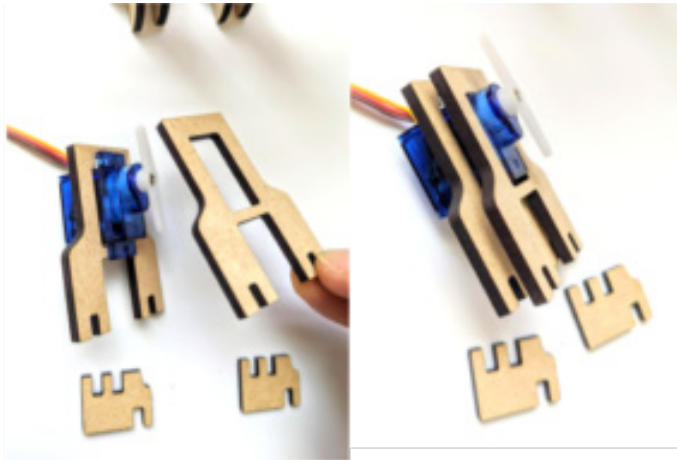
4. Take the servo motor, and attach the horn containing two straight arms which protrude out from the center. To provide symmetric motion for the robot's head, the midpoint of the servo's range of motion should occur when the servo horn is oriented perpendicular to the servo's long axis. At either end of the 180 degree range of motion, the horn should be oriented parallel to the servo's long axis. If the servo horn is not oriented correctly, unscrew it, and place it so that it looks like the images when at the endpoints and midpoints of its motion, respectively. Be sure the horn is securely affixed to the servo with the tiny screw that comes with it.



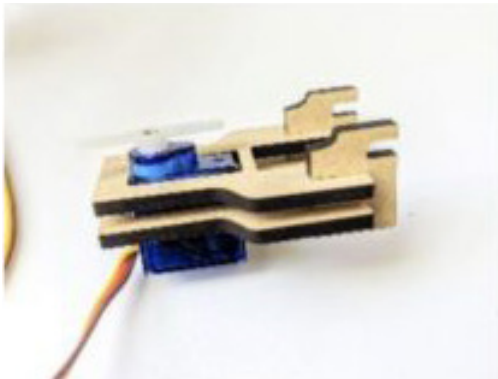
5. Take the servo motor and the parts for the head assembly. The two larger pieces sandwich the servo from either side of its flat "shelf." The back piece has a notch in the top to accommodate the wires. Slide the servo wires through the back piece and seat the servo into the rectangular hole.



- Slide the matching piece without the notch over the servo from the front side.



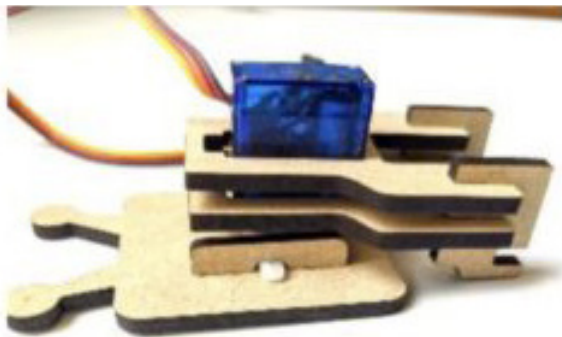
- The two small notched clips hold the larger pieces together. Insert the side of the clip with two slots into the corresponding slots on the pieces holding the servo. When seated, the remaining open notch on the clip should sit in front of the assembly, on the same side as the servo horn.



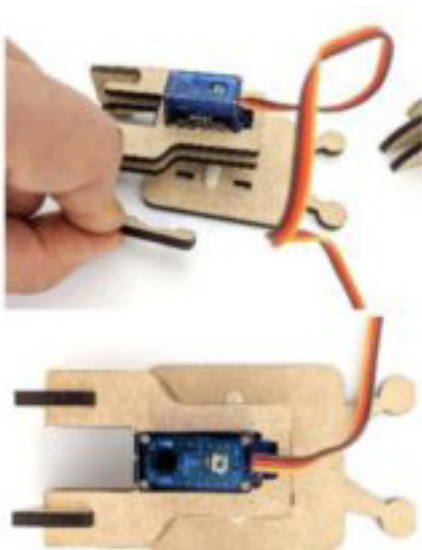
- Attach the robot's head to the servo motor assembly. Take the head, and place it face down on a flat surface. The two small clips with rounded nubs will sit over the ends of the servo horn and fit snugly into the slots in the robot's head to attach the head to the servo horn. Rotate the servo horn relative to the servo so that it sits perpendicular to the servo's long axis.



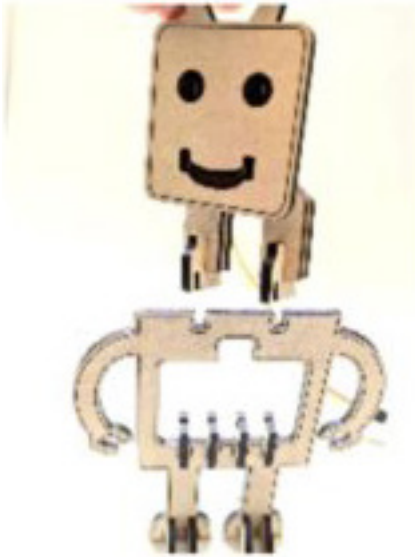
9. Place the robot head on a flat surface with its features oriented downwards. Insert one of the clips into the slots in the robot's head, pushing the clip in as far as it will go. Most of the clip sits flush with the back of the robot head leaving only a small gap to hold the servo horn. Moderate force may be required to get the clip firmly seated. With one clip seated, lift the servo assembly and turn it over so that the servo horn is facing downward. Place the assembly on top of the robot head and slide it towards the outer edge so that one end of the servo horn slips into the gap in the attached clip.



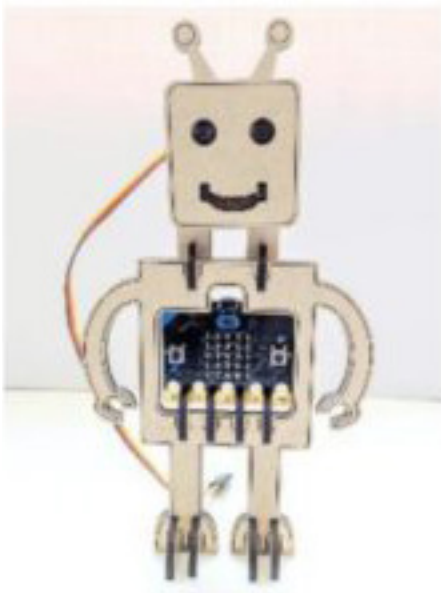
10. Attach the remaining clip to the robot head to secure the other end of the servo arm. This may be a little tricky as the remaining slots are positioned underneath the servo assembly. It may be helpful to use a butter knife or other dull, flat object to push the second clip into place. When fully inserted, the clips should sit flush on the robot head and the ends of the servo horn should fit inside the small gaps in the clip. There is a little wiggle room between the servo horn and the clips, which won't affect the robot's function. If it bothersome, apply a small amount of glue between the servo horn and the robot head to keep them securely together.



11. Now that the head assembly is complete, attach it to the body by slotting the two clips at the bottom of the head assembly into the two corresponding slots in the top edge of the robot's body as shown.



12. The micro:bit fits just behind the large rectangular hole in the robot. Attach the micro:bit by sliding it downward into the slots in the four clips along the bottom edge of the hole. The micro:bit should be aligned so that each clip holding it sits between two of the micro:bit's labeled pins, as shown.



## Assemble the Servo Motor Connector

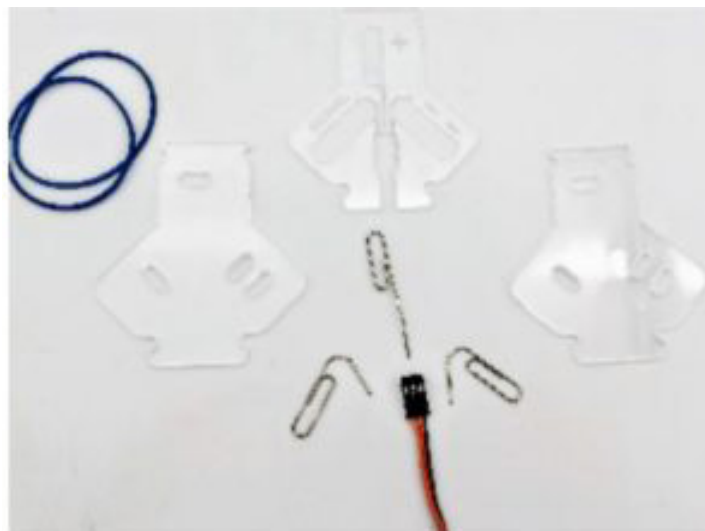
- Remove printed pieces from the print bed and peel off any masking. The robot servo motor connector will require all parts shown.



- Lay the acrylic connector pieces out on a flat surface as shown. The outer layers should have the side with two slots oriented to the right, and the middle layer should have the signal label on its left side and the two “-” (ground) labels on the right side. Orient the servo connector so that the ground lead sits on the right side. Take the three paper clips and bend them as in the picture so that their orientations match the three large oval slots in the middle layer of the acrylic.

Note: Servo motor wires come in different colors.

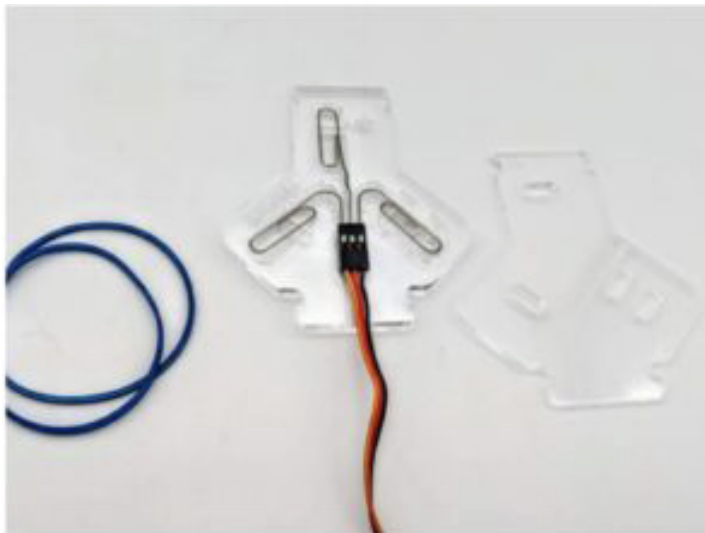
- The positive voltage lead always sits in the middle, and is usually colored red.
- The ground lead is usually black or brown, and the signal lead is sometimes yellow, blue or white.



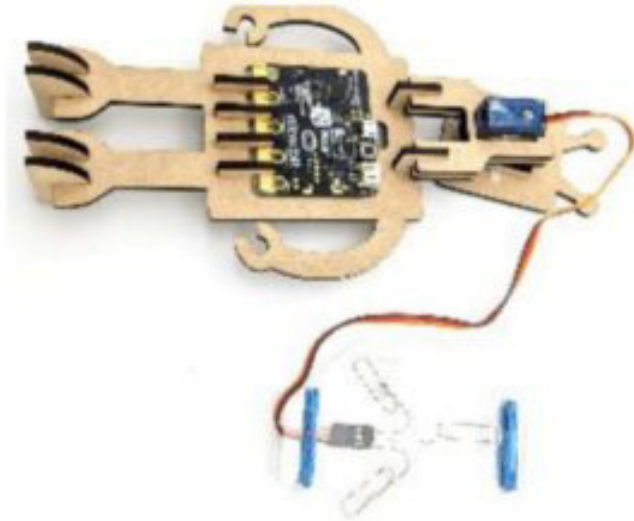
15. Gently push the straightened ends of each of the paper clips into one pin of the servo connector cable as shown.



16. Lay the middle acrylic layer on top of one one of the other two layers and slip the end of the servo connector into the matching slot. The paper clips may need to be bent a bit more or less to fit into the oval slots which hold them. It is very important that the paper clips do not touch each other when the servo is powered. The shape of the middle acrylic layer helps to keep them separated.



17. Place the last acrylic layer on top of the other two, and, while holding all three layers together, wrap the two rubber bands around the acrylic pieces to secure the connector assembly together. When tight, the rubber bands sit inside the slots at the sides of the acrylic pieces as shown.



18. Attach the servo motor to the micro:bit with alligator clips. Connect the clips to the servo motor by inserting the alligator clip ends into the holes in the acrylic and clamping them onto the accessible portion of the paper clip. On the micro:bit side, open the jaws of the alligator clip widely and clamp them over the micro:bit pins so that one jaw of the clip sits in the hole and the other side of the clip grips the bottom edge of the micro:bit. Make the following connections with the alligator clips:

- Servo Motor → micro:bit
- Positive Voltage (+) → 3V
- Ground (-) → GND
- Signal → Pin 0

