

Final Assembly

Do steps then in this order after the microcontroller board has been tested

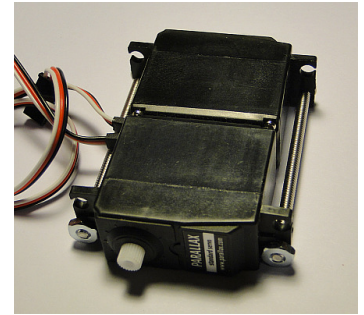
- Bolt the two servos together and mount them
- Mount the battery box (first only the cover)
- Mount the controller board
- Attach the ball and sensor mount to the *Bottom* of the platform
- Put on wheels
- Put on the IR obstacle avoidance sensor
- Attach servo and sensor leads
- Inspect Bot and move on to programming and check-out

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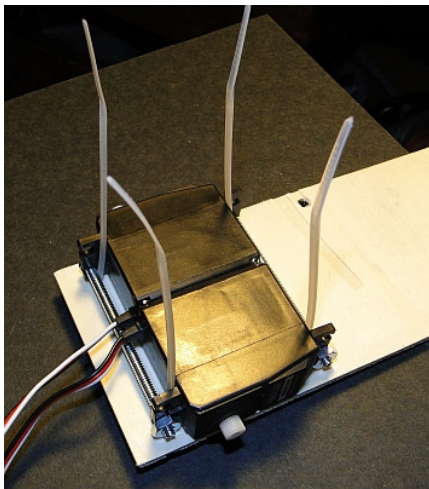
❑ Bolt the Two Servos Together

1. Place the servos back-to-back with their wires at the same end.
2. Bolt the servos together using only two bolts as shown.
3. Put only a few threads on the nuts at first. The screw lengths are close fit.
4. Alternately snug the nuts taking care not to over-tighten.

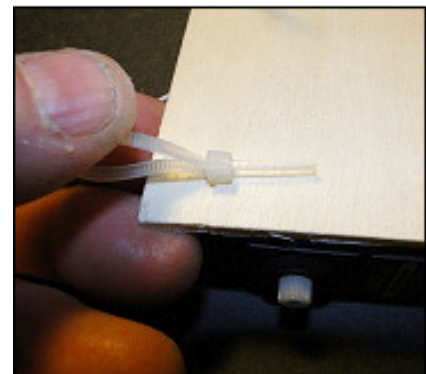
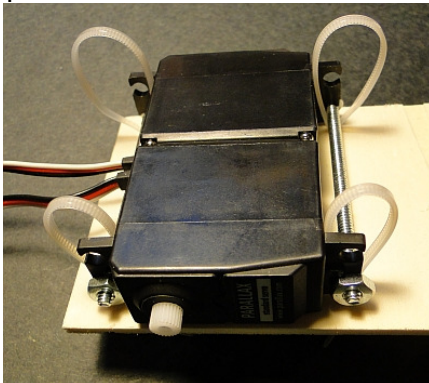


❑ Mount Servos to the Platform

1. Insert cable ties from the platform back side through the four motor mounting holes.
2. Place servos on the platform with bolt side down and leads pointing to the back edge.
3. Thread all four ties between the bolts and the servo bodies.



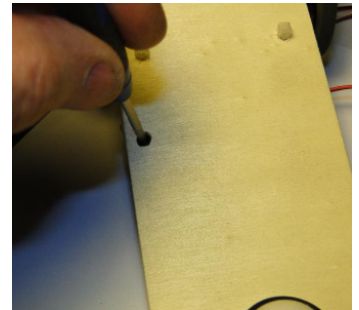
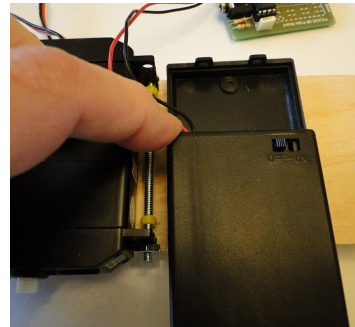
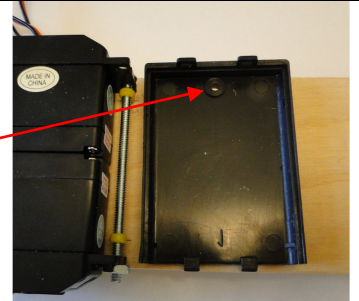
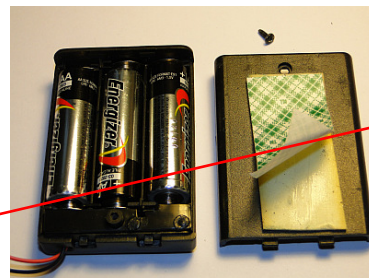
5. Orient the flat side of the tie heads away from the motors (2 towards the front, 2 to back).
6. Loop the ties over the bolts and back through the holes. It's tight.



7. Start each tie through the flat side the head
8. Keep the tie heads against the platform and pull the ties snug.
9. Pull the ties tight while keeping the heads tight against the platform.
 - This may require needle noses pliers and three hands ☺
 - Make sure the head ends are tight against the platform and the loops are tight around the bolts. *Ask for help if needed.*

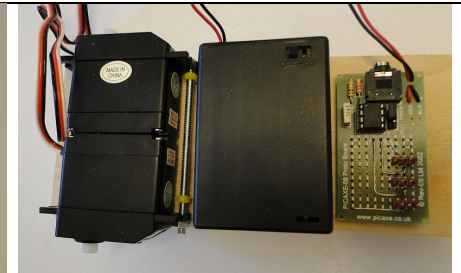
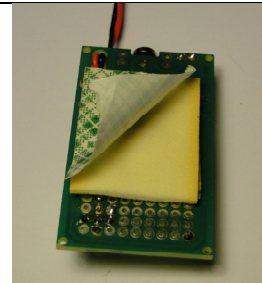
❑ Mount the Battery Box

1. Unscrew the battery box cover.
2. Put double sided adhesive foam tape on the outside of the cover. Don't cover up the screw hole.
3. Peel off the backing and align the screw hole with the hole in the platform. Sticking something like a cable tie through both holes is helpful in lining them up.
4. Press down when you have good alignment
5. Slide the battery case on to the cover.
6. Flip over the platform, drop in the screw, and snug it up to keep the lid from slipping.



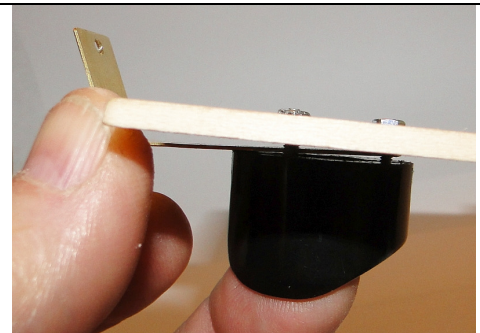
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1. Apply double sided adhesive foam tape to the back of the board. Choose an area that is the least uneven.
2. Pont the connector end as shown and mount the board between the battery box and the nose wheel screws. Push firmly.



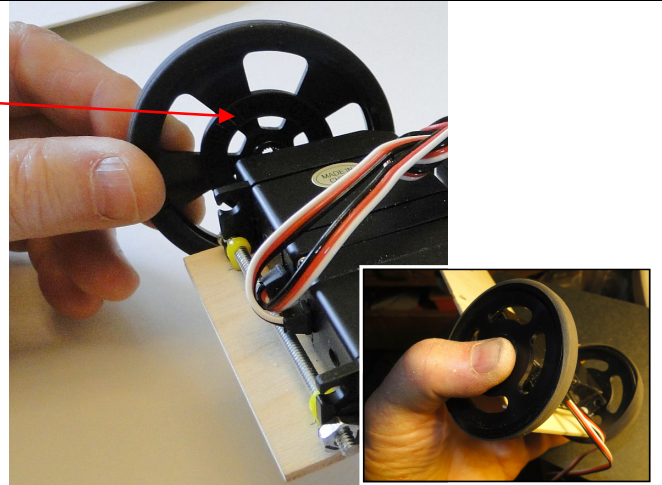
❑ Attach the Ball and Sensor Mount

1. These parts attach to the *bottom* of the platform (opposite from the servos).
2. The Sensor Mount is sandwiched between the ball mount and the platform, with its "foot" pointing up.
3. Use the shorter screws from the ball kit. Put them in from the inside of the ball base through the platform.
4. Use the center line screw to hold the sensor mount
5. Put the nuts on the screws and snug them down. firmly. The sensor mount should point straight out.
6. Place the three white plastic rollers in their ball mount slots and snap in the ball.

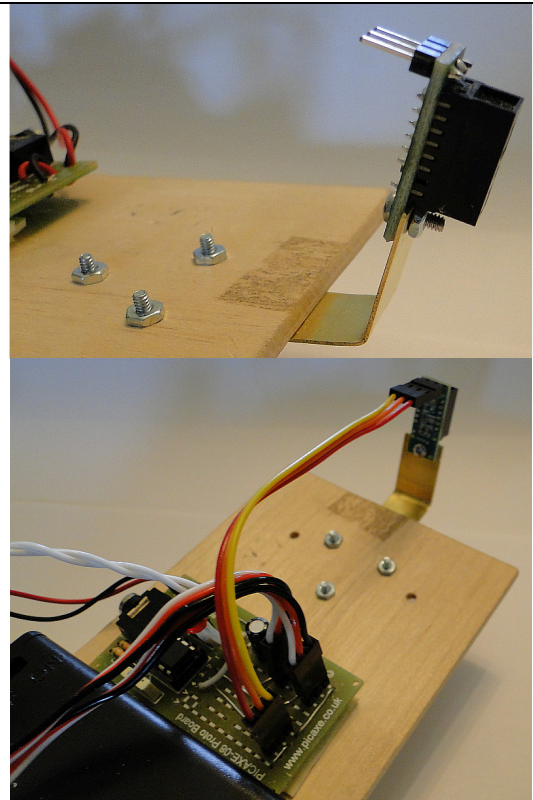


❑ Put Wheels on the Servos and Connect

1. The side of the wheel with the ribbed circle pattern will go towards the servo.
2. Rotate the hub against the servo spline using only a little pressure until you feel them mating, then push the wheel on.
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6. Do not use the header at the top side of the board. It is for the sensor cable.

**❑ Attach the IR Sensor**

1. Remove and set aside the small screw and nut attached to the sensor mount
2. Position the IR Sensor on the back of the mounting bracket with the black sensor block pointing forwards.
3. Align the mounting holes. Put the small screw through from the sensor (back) side.
4. Spin on the nut and tightly secure the sensor.
5. Plug the jumper cable into the sensor with the Yellow wire to the Left looking from the back of the board (header side).
6. Plug the jumper cable into the Picaxe board with the Red wire closest to the control board top edge.
7. The sensor mount arm may later be adjusted for detection height by gently bending the arm up or down, being careful not to pull on the sensor board.



Congratulations!

You have fully Assembled your Bot!

Now go see if it works. Remember there is a 5 second delay from when you turn on the switch until the Bot starts to move and its "heartbeat" blinks

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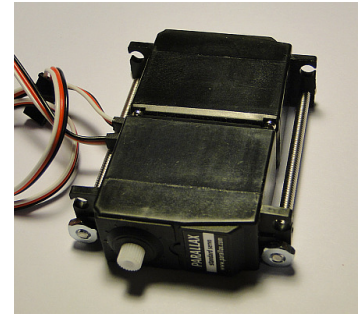
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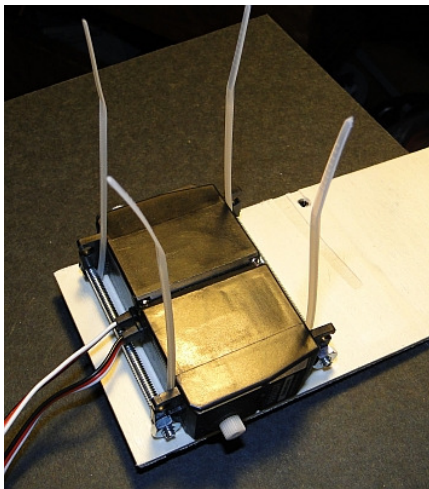
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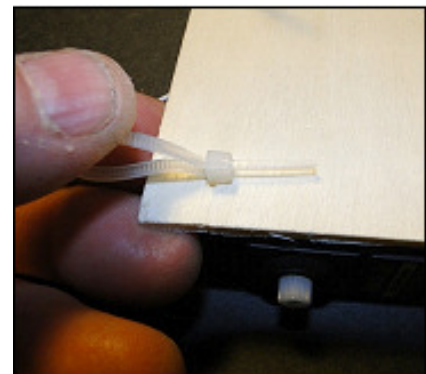
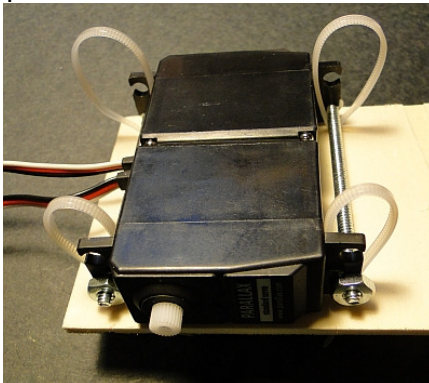


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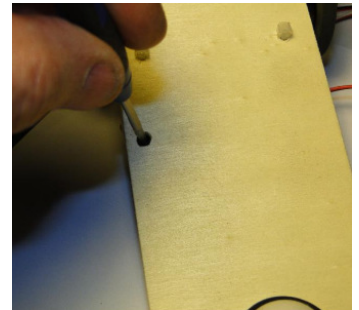
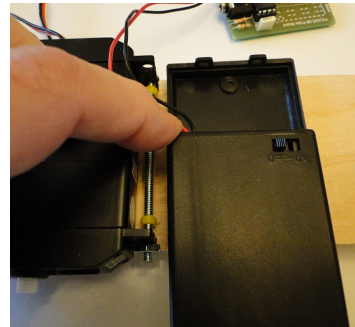
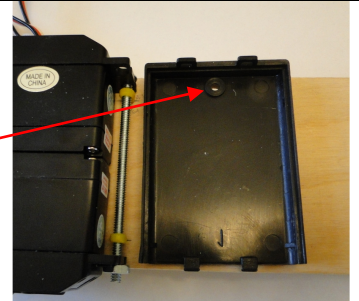
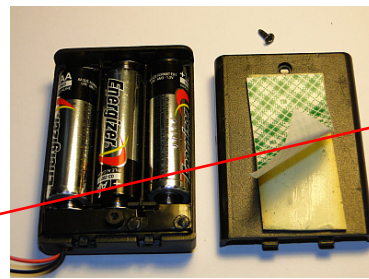
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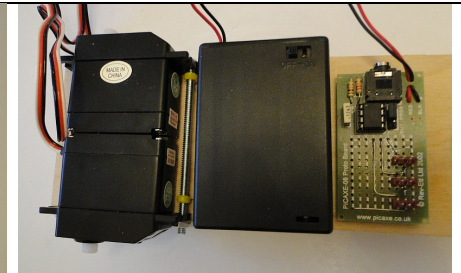
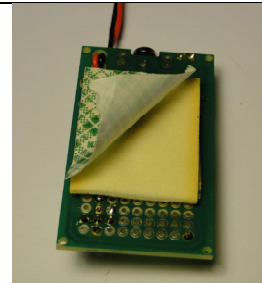
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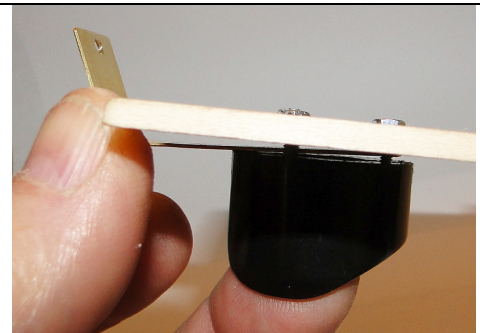
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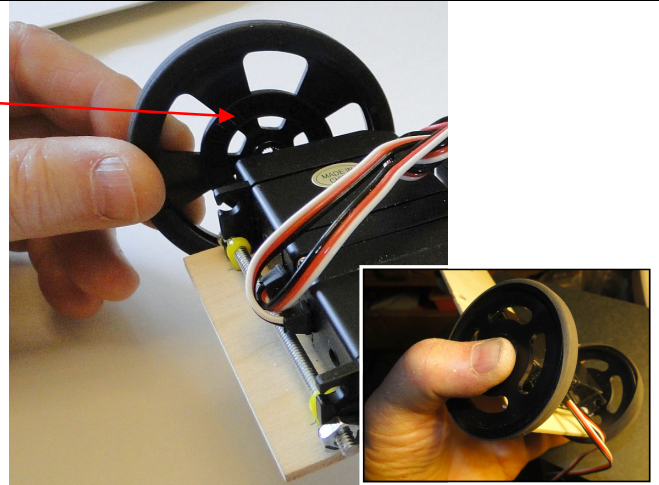
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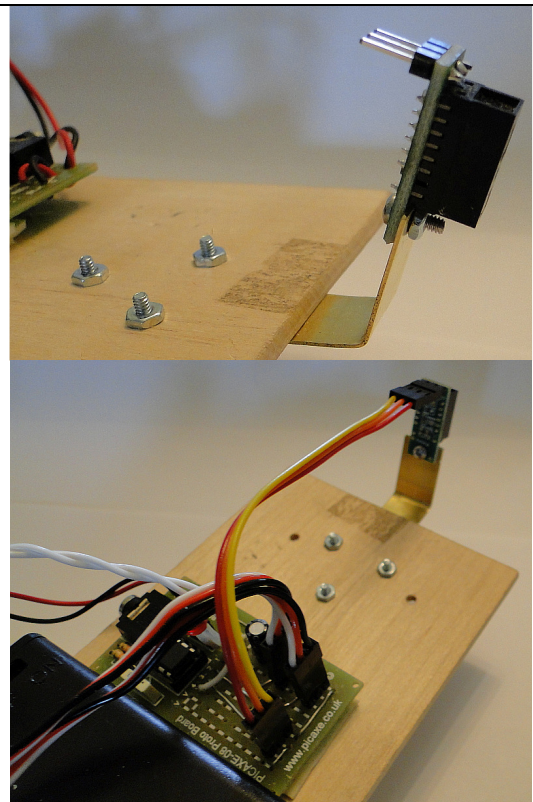


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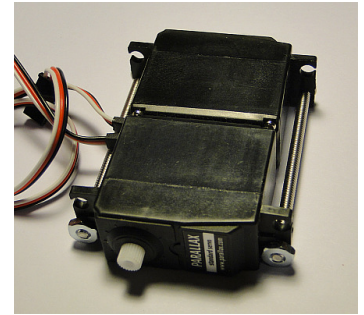
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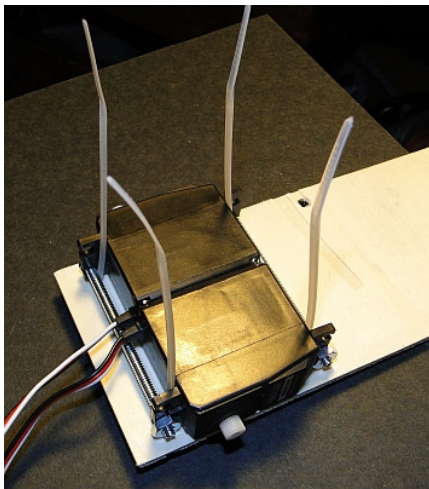
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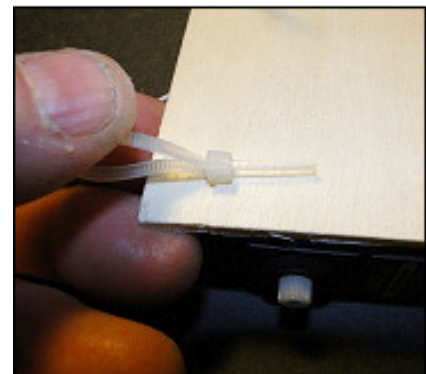
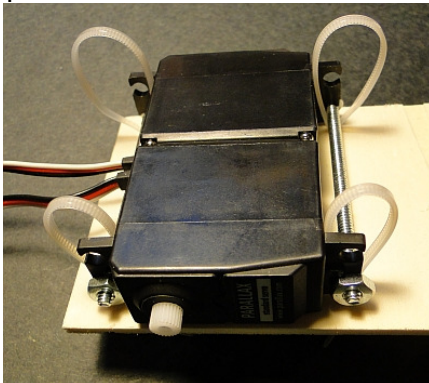


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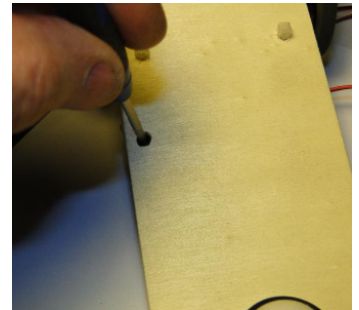
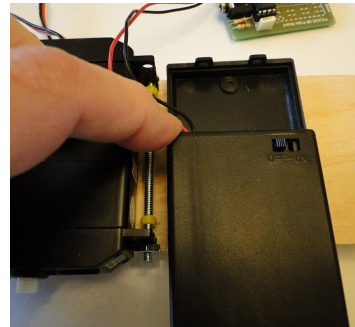
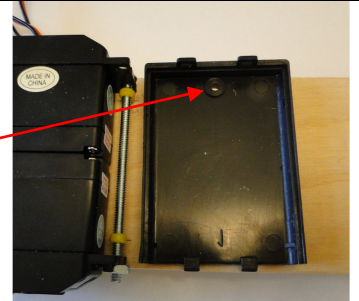
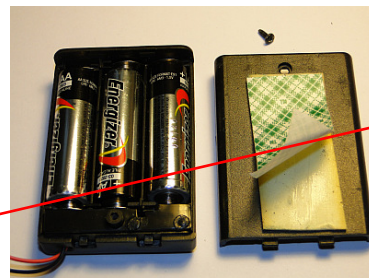
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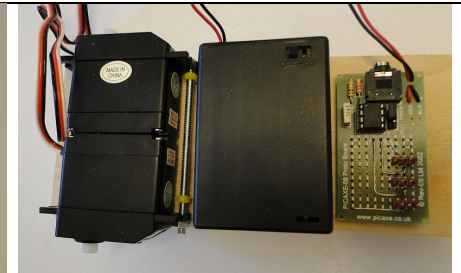
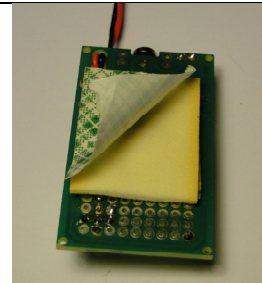
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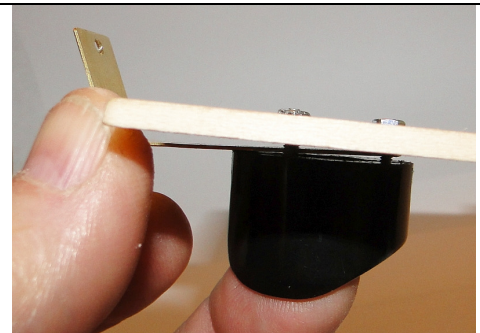
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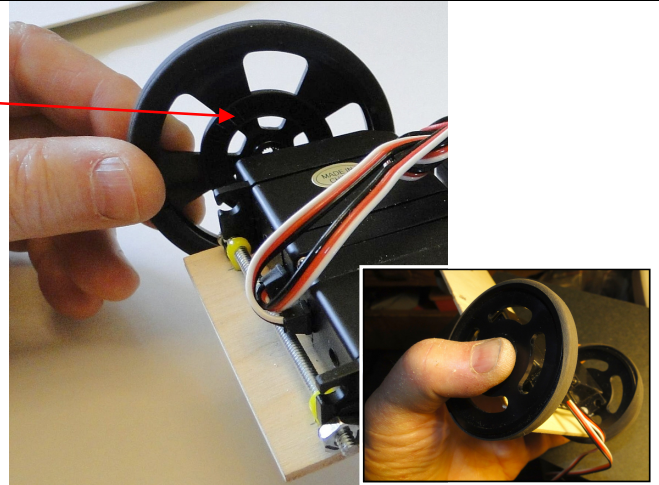
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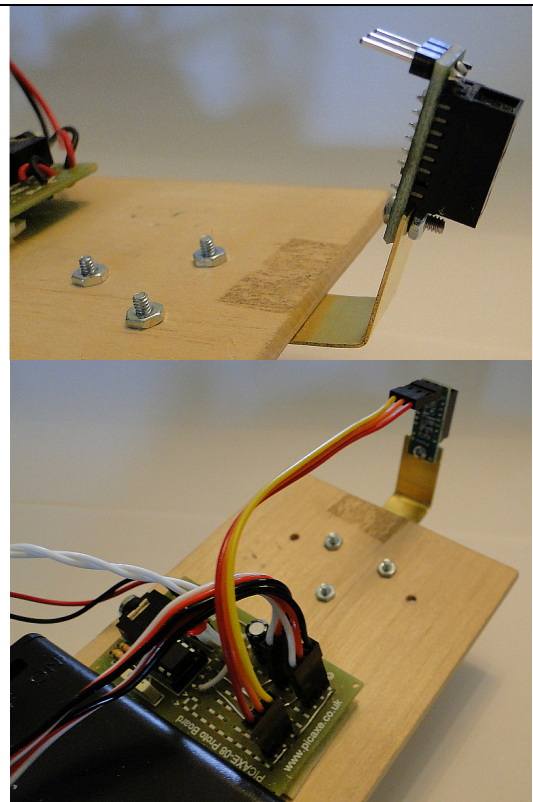


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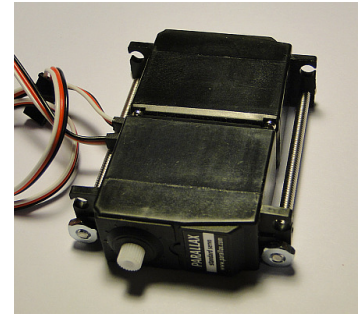
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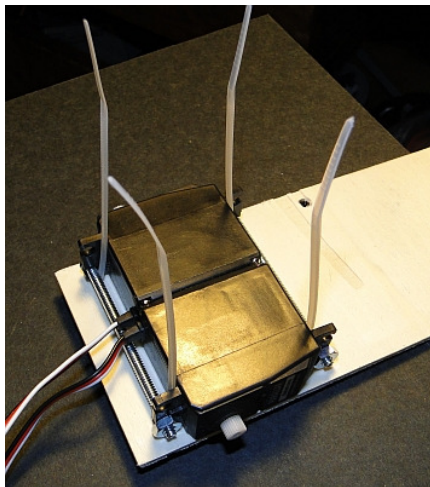
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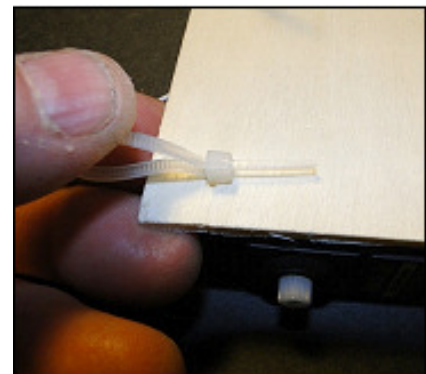
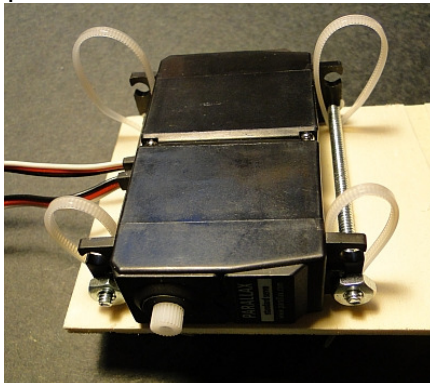


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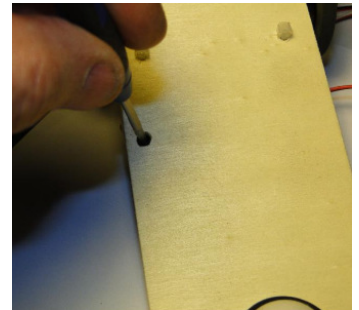
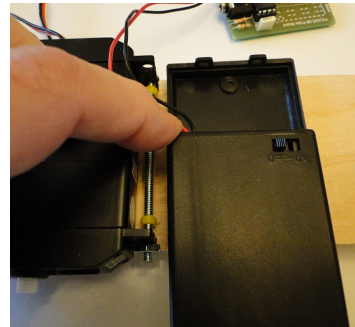
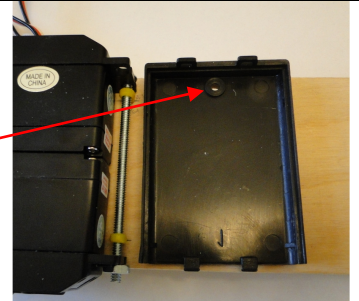
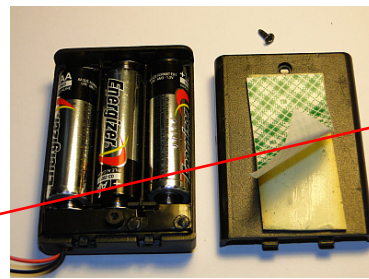
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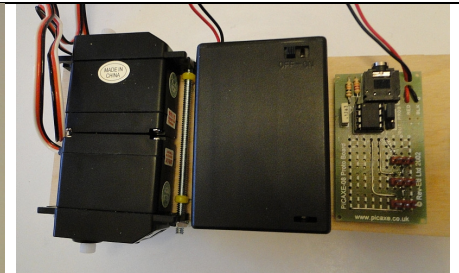
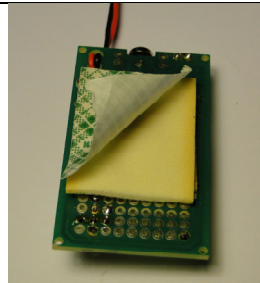
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1. Unscrew the battery box cover.
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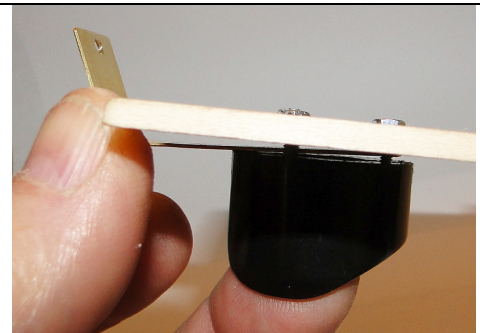
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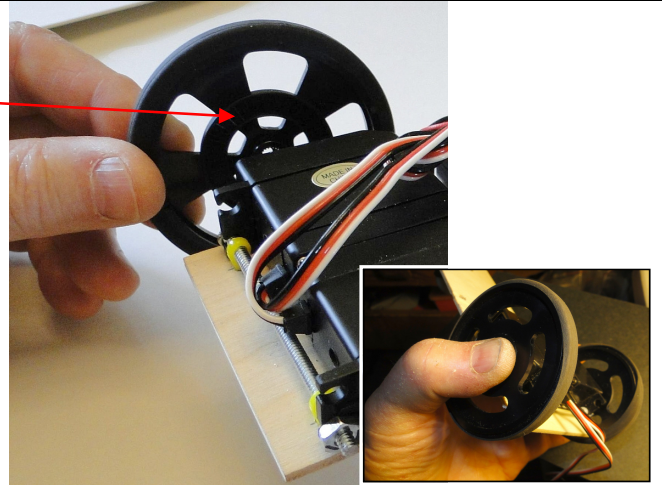
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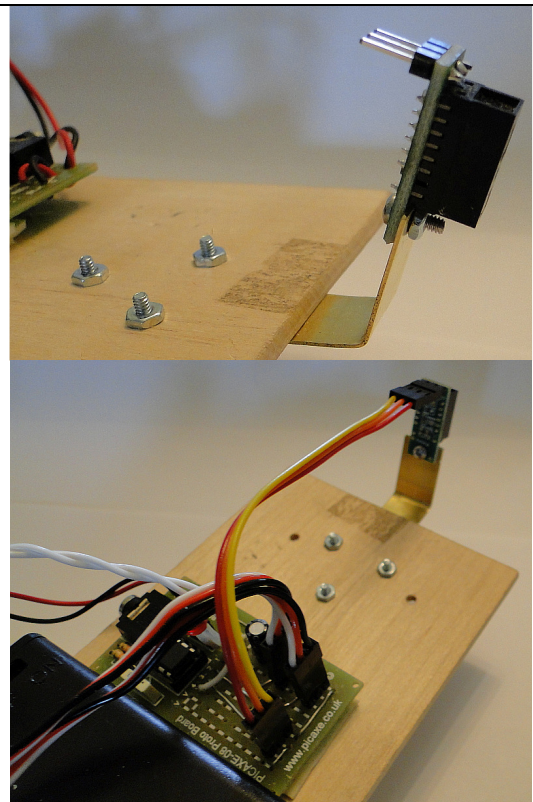


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1. Remove and set aside the small screw and nut attached to the sensor mount
2. Position the IR Sensor on the back of the mounting bracket with the black sensor block pointing forwards.
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4. Spin on the nut and tightly secure the sensor.
5. Plug the jumper cable into the sensor with the Yellow wire to the Left looking from the back of the board (header side).
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7. The sensor mount arm may later be adjusted for detection height by gently bending the arm up or down, being careful not to pull on the sensor board.



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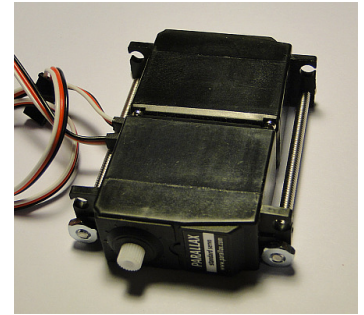
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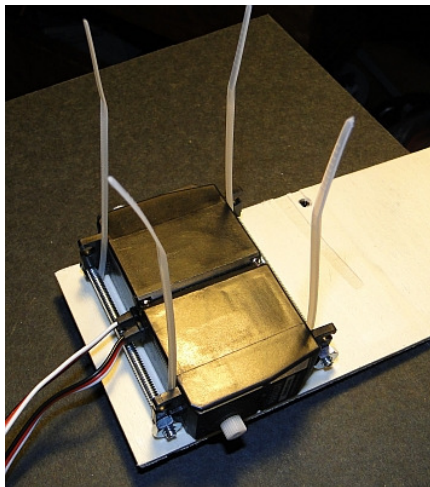
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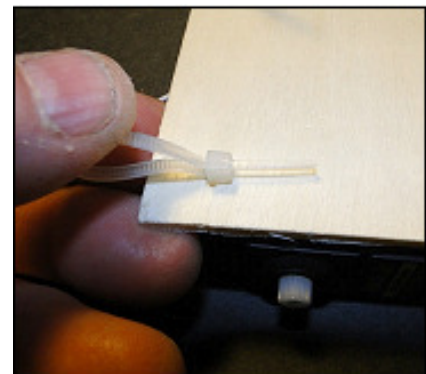
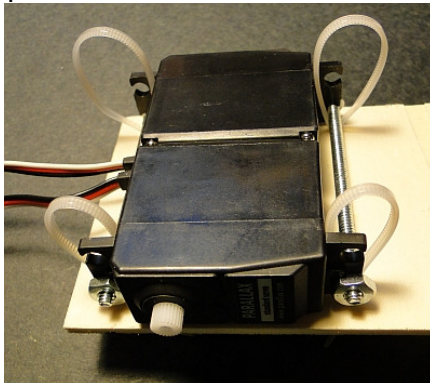


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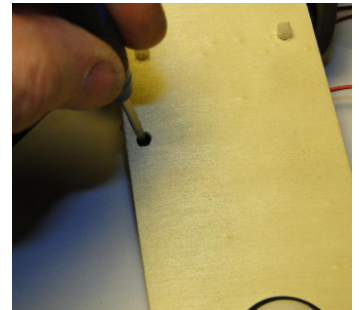
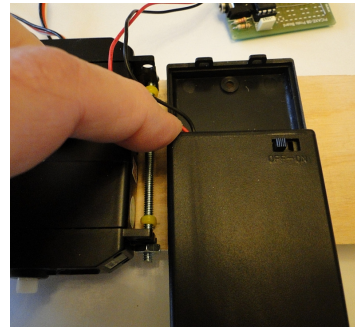
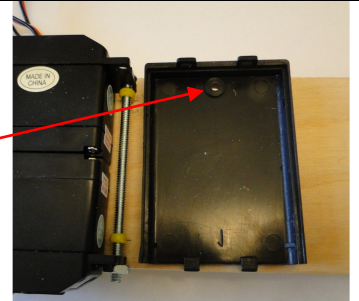
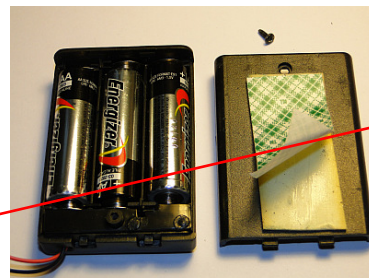
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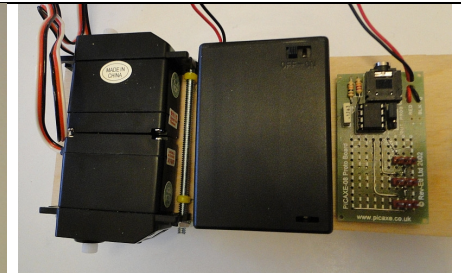
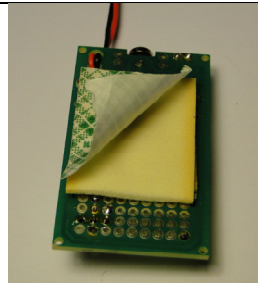
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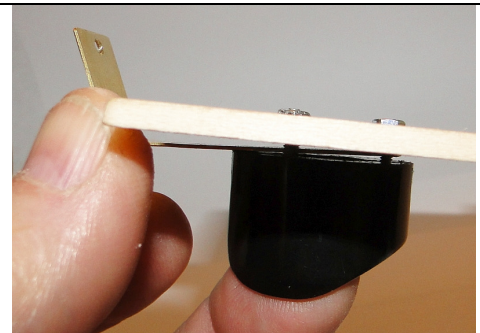
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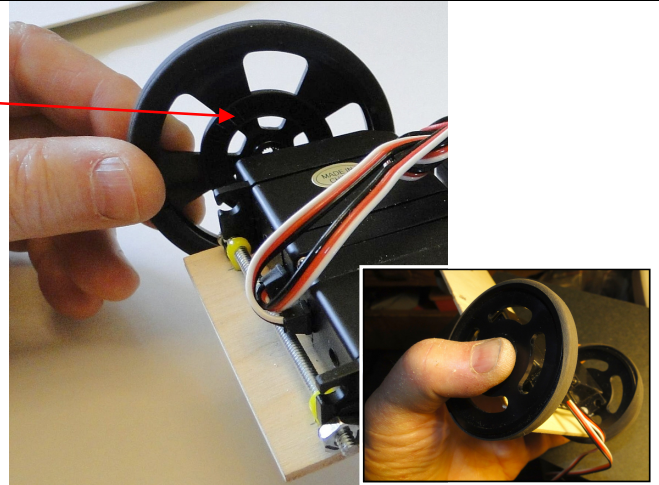
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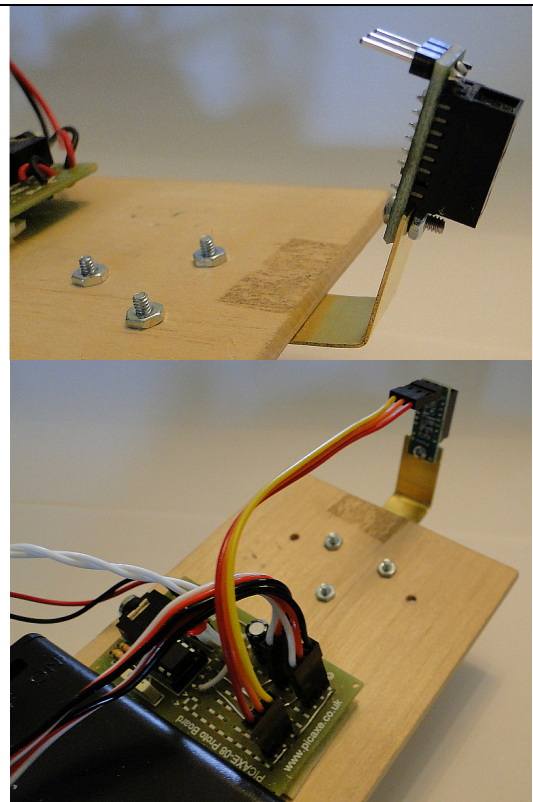


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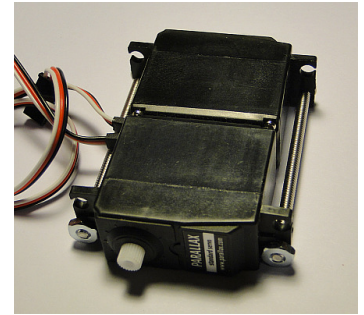
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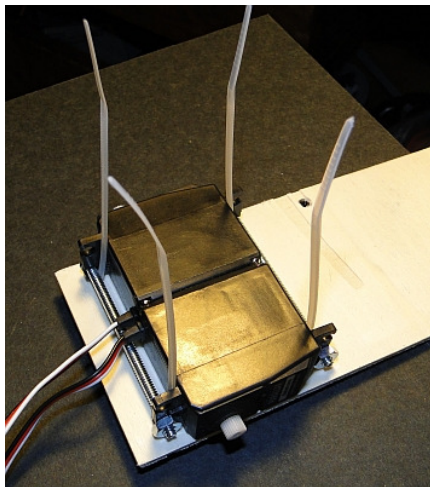
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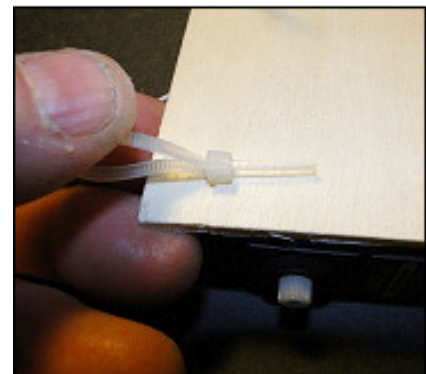
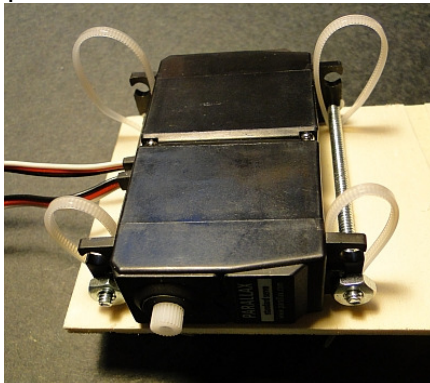


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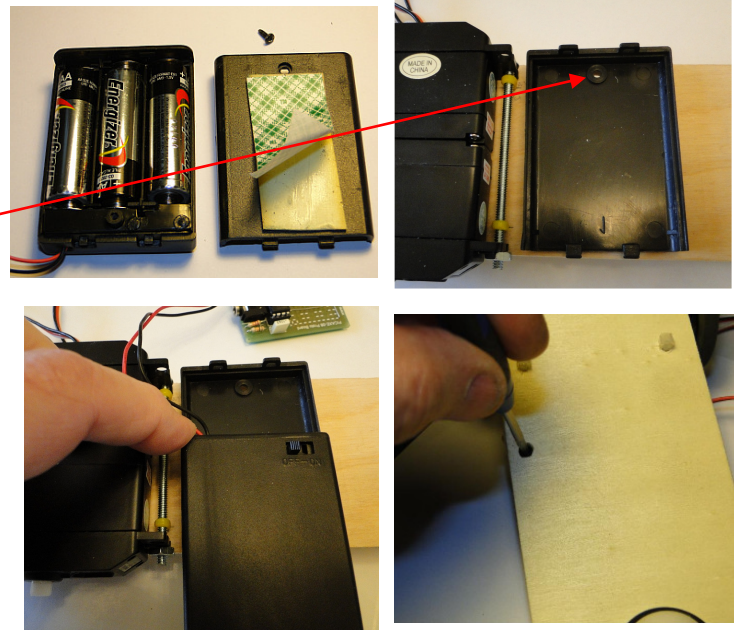
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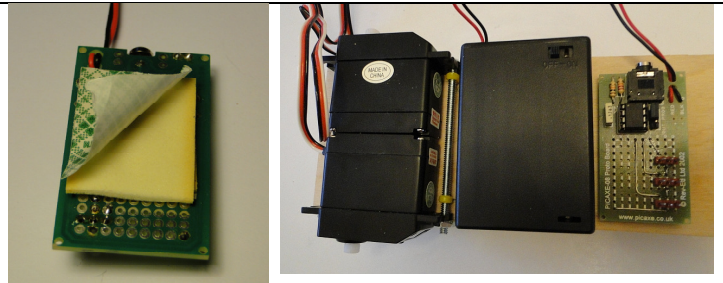
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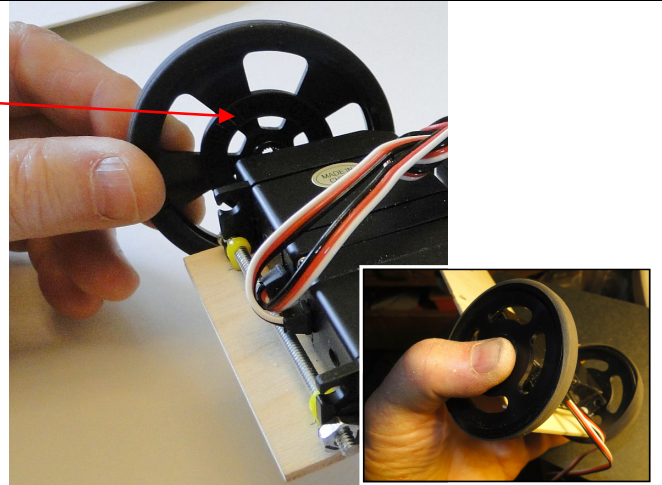
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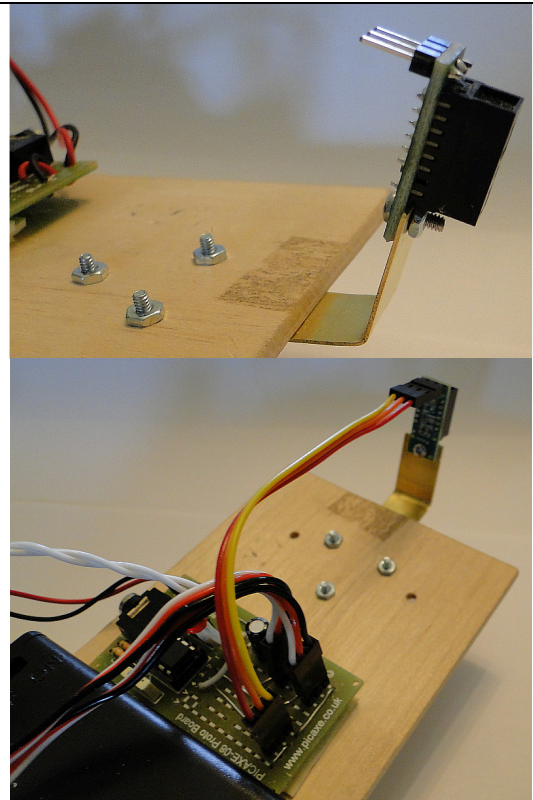


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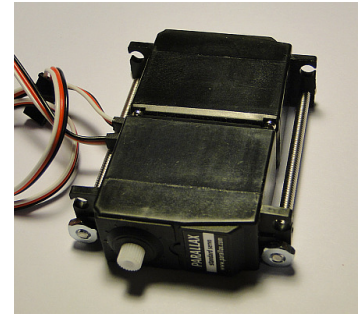
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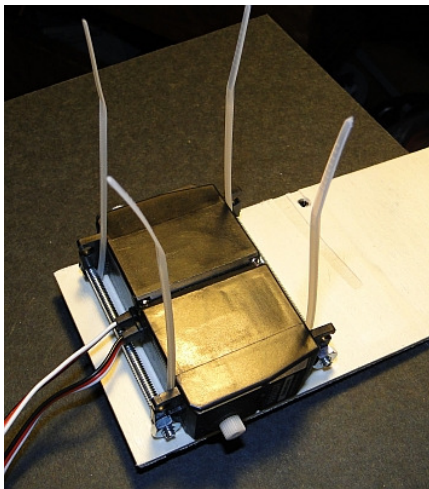
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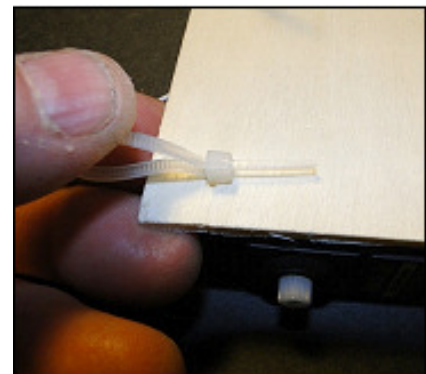
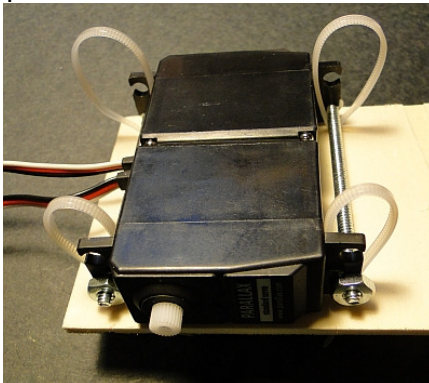


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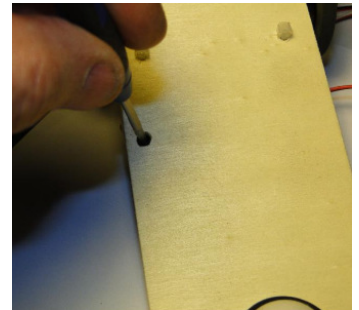
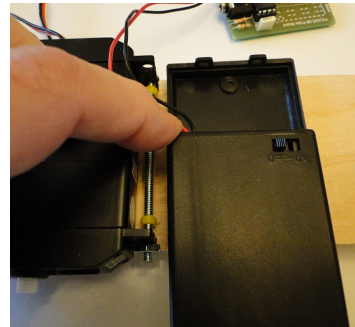
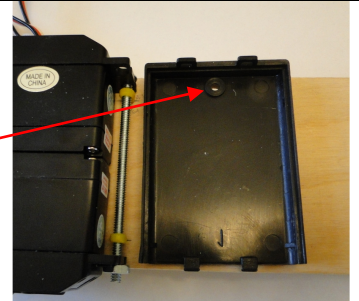
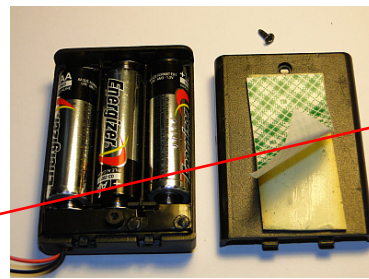
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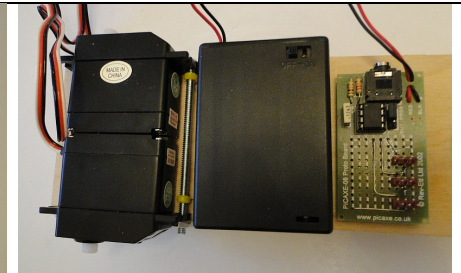
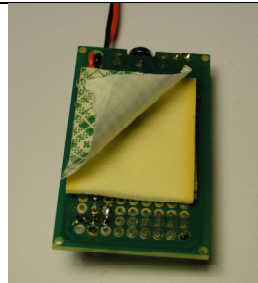
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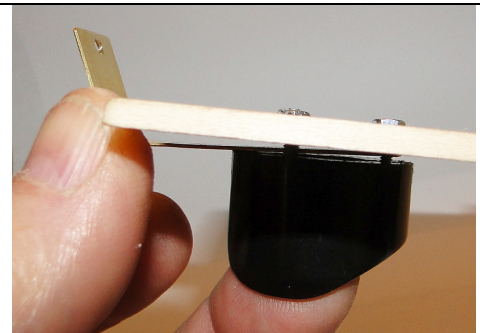
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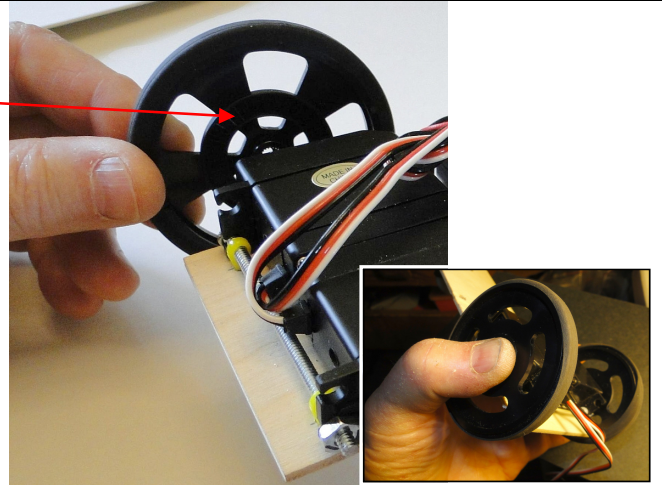
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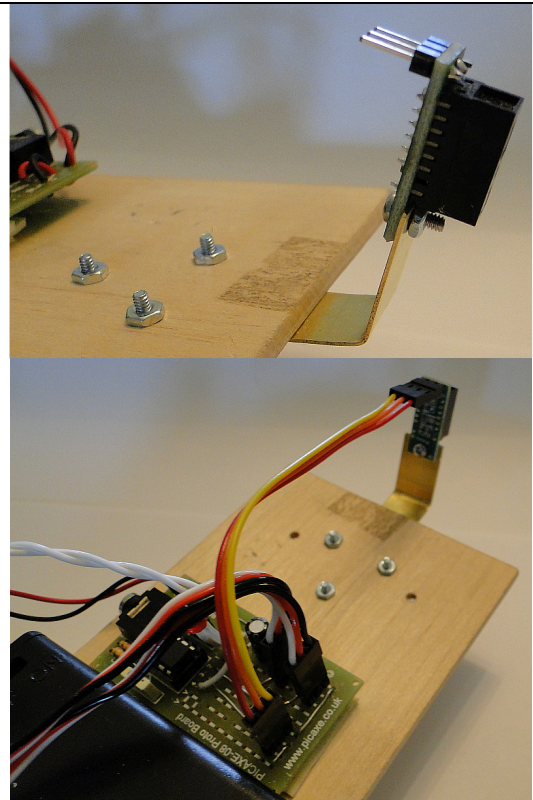


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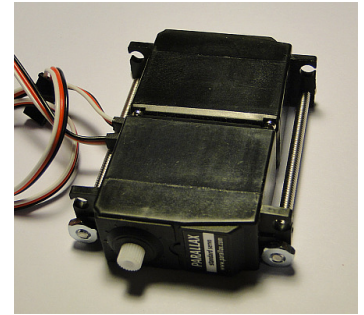
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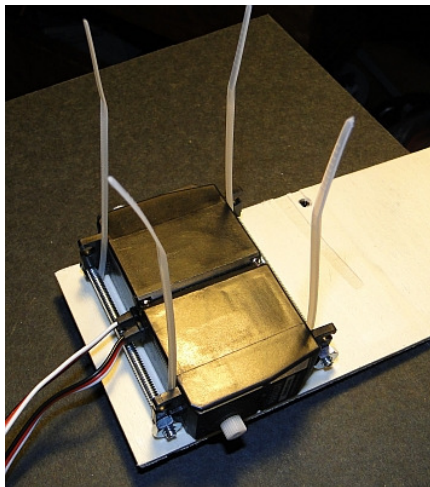
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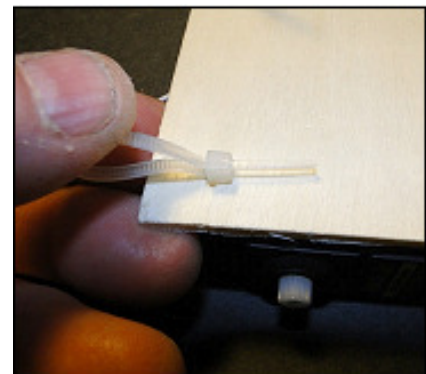
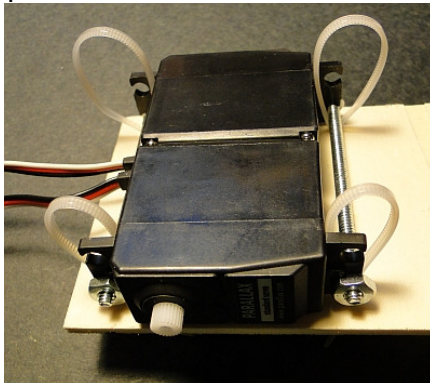


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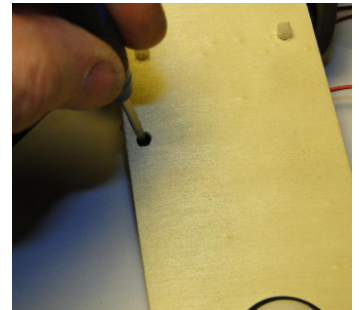
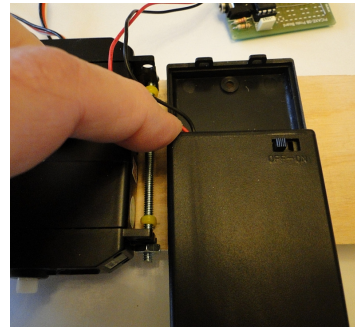
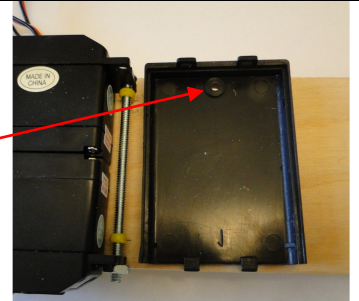
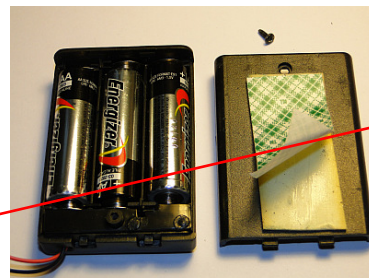
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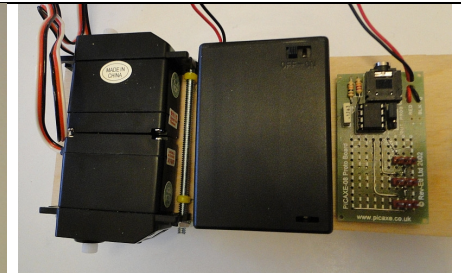
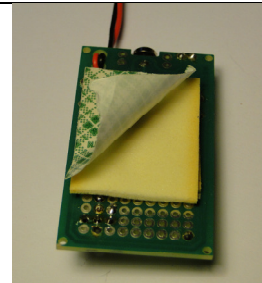
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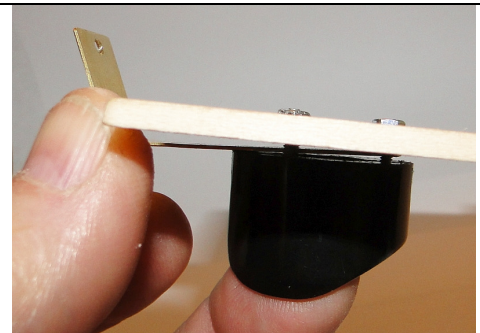
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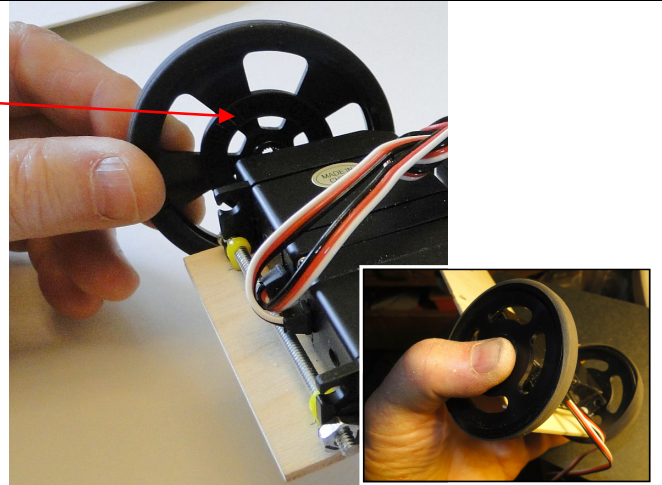
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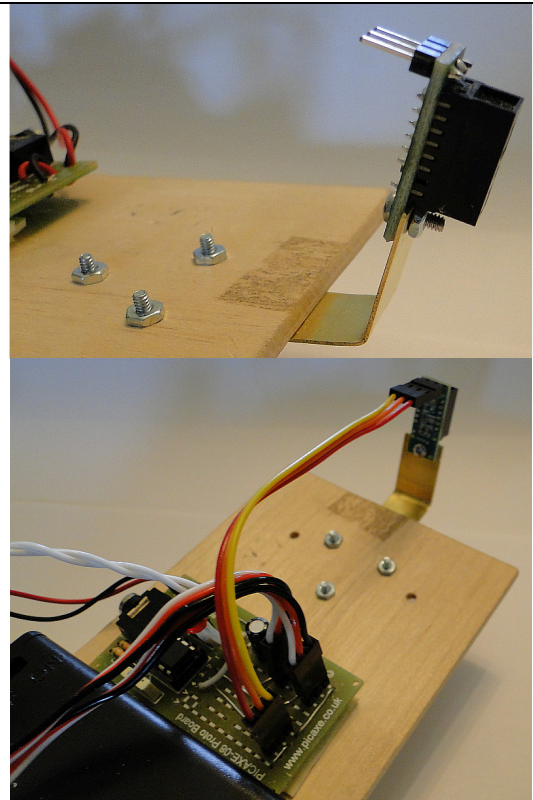


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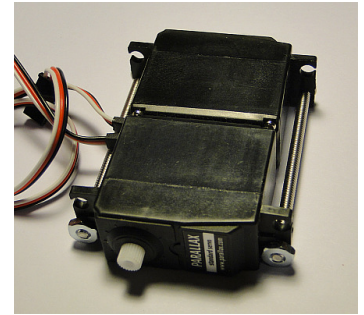
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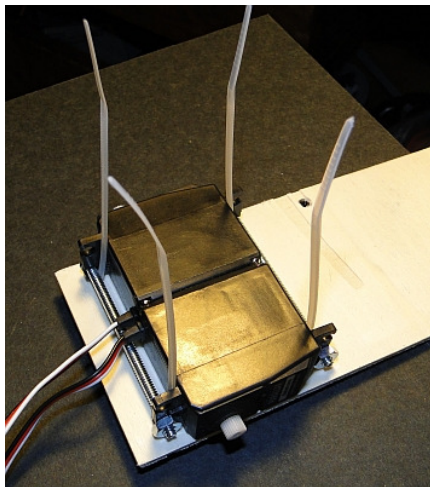
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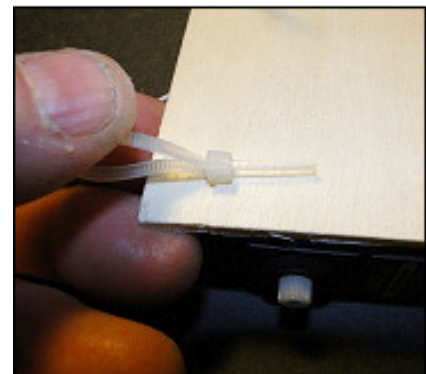
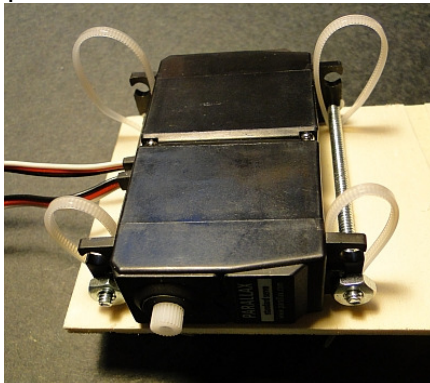


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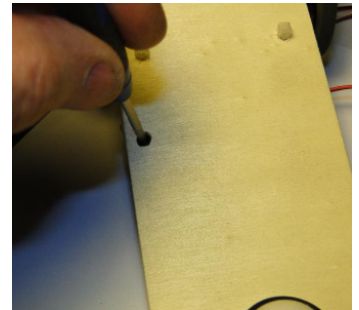
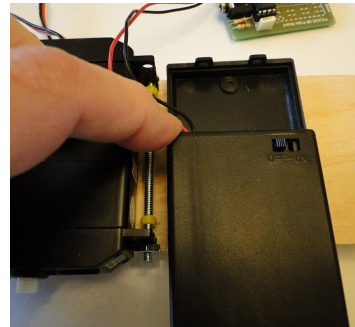
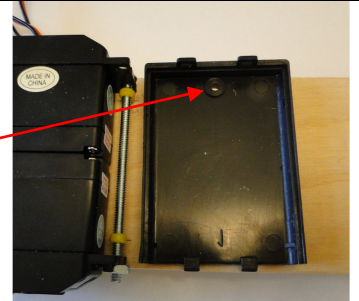
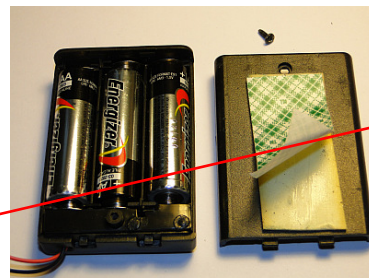
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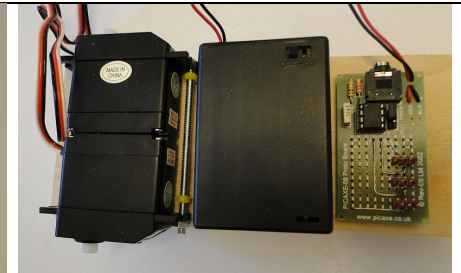
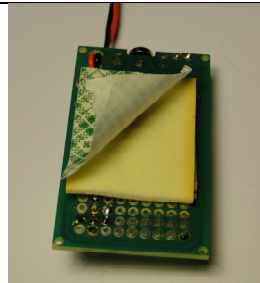
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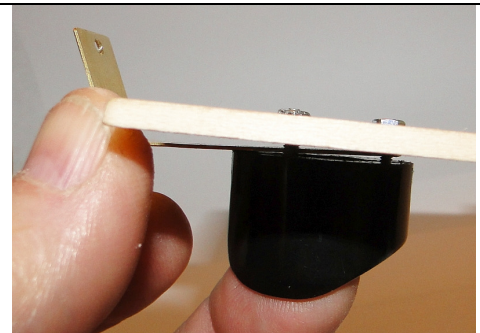
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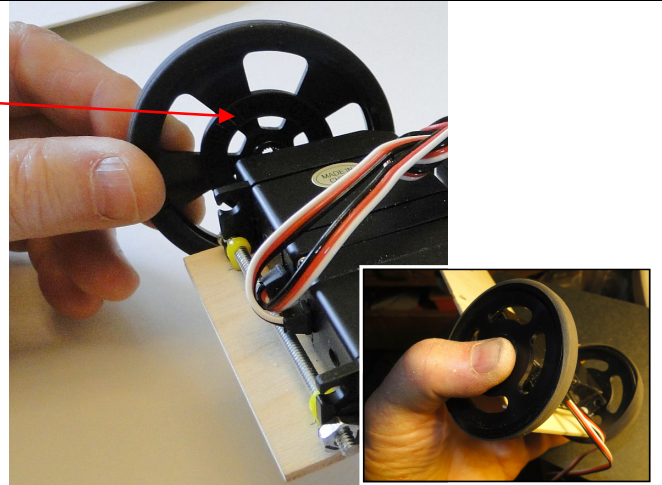
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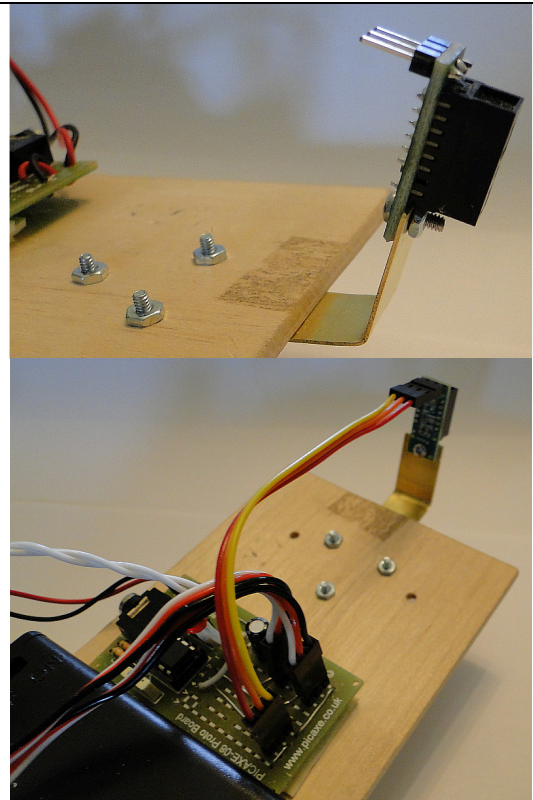


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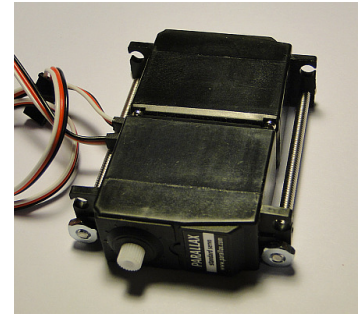
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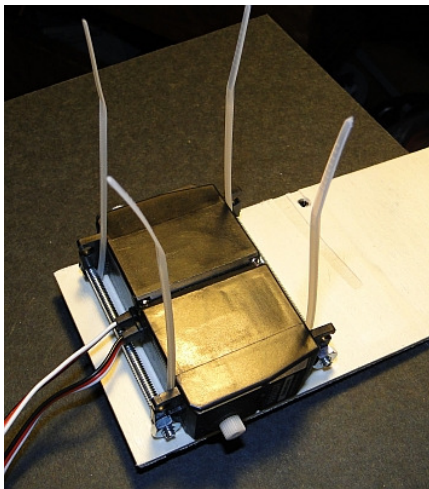
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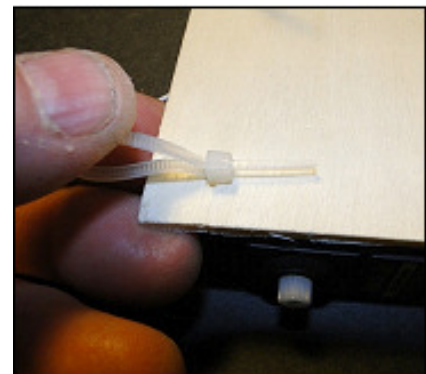
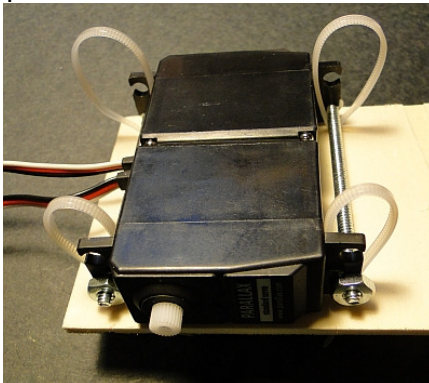


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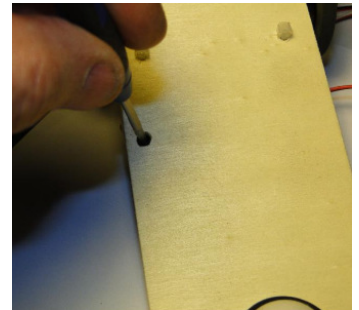
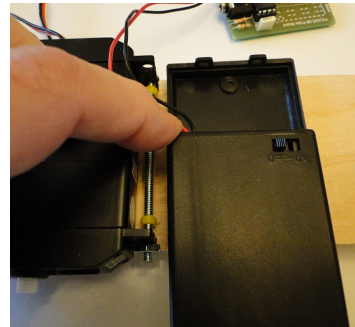
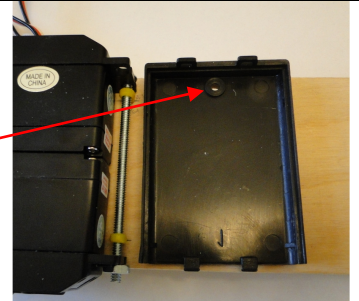
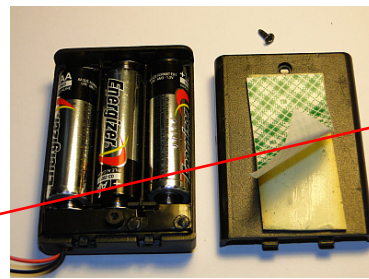
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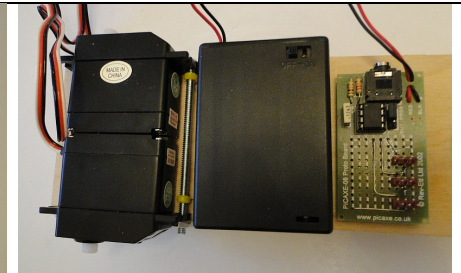
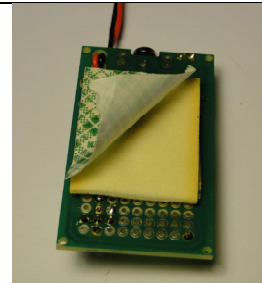
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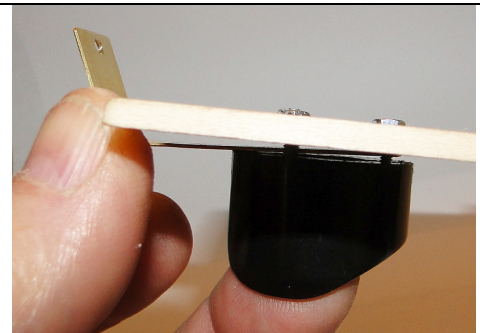
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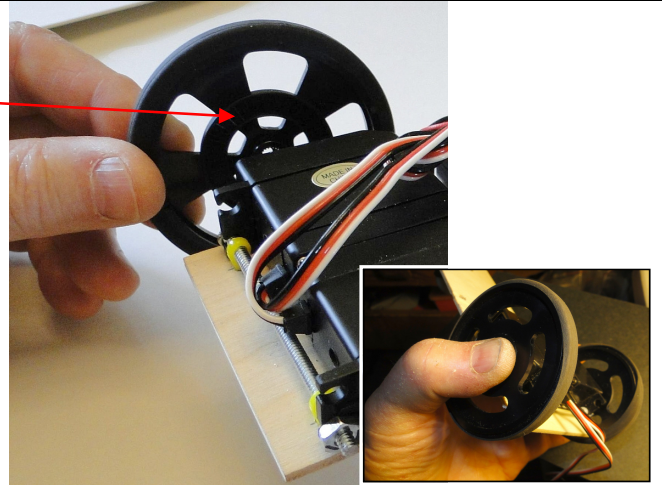
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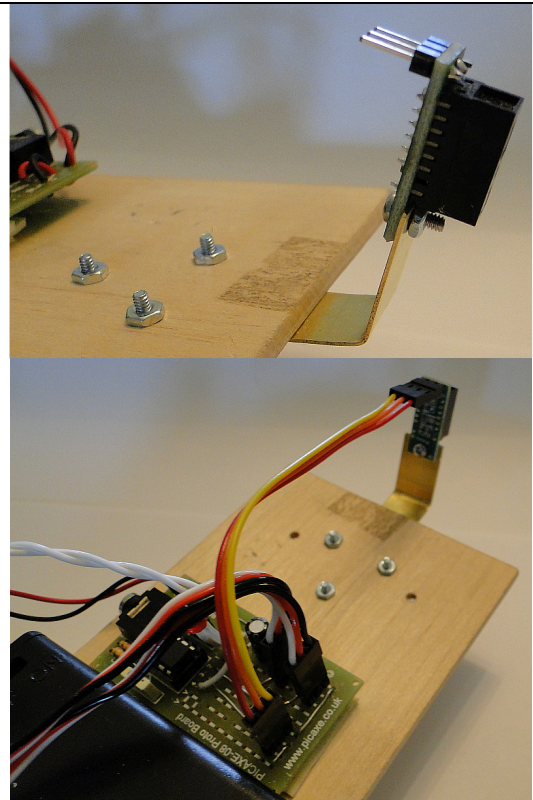


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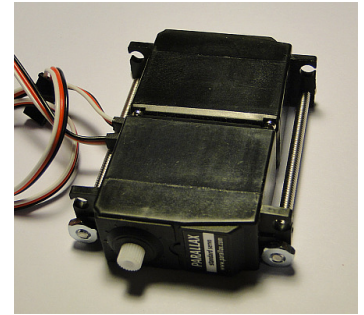
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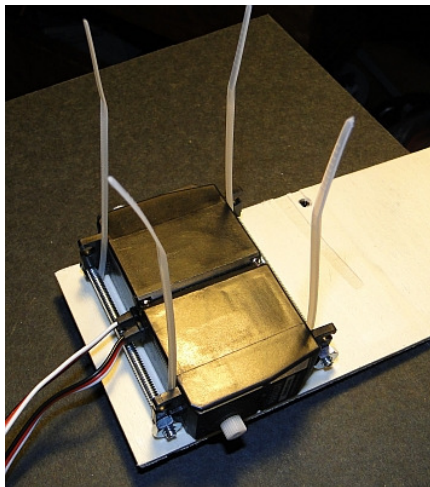
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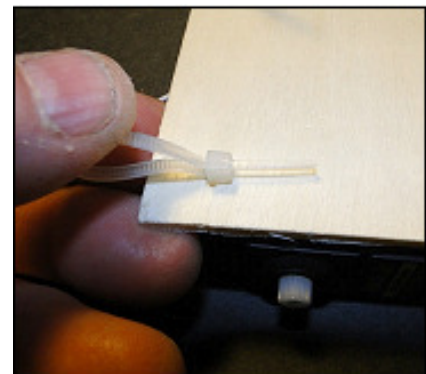
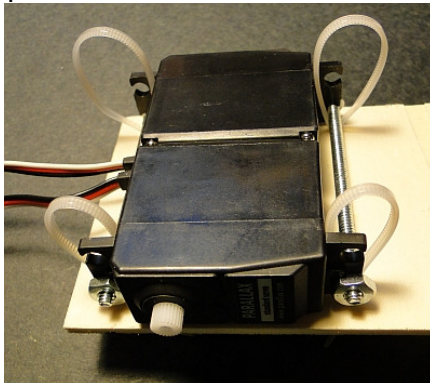


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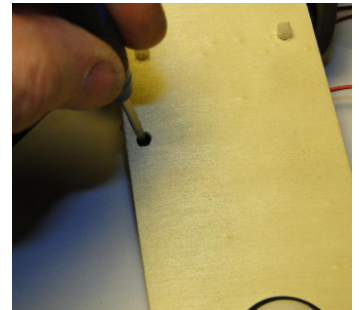
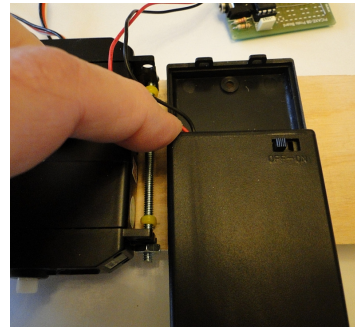
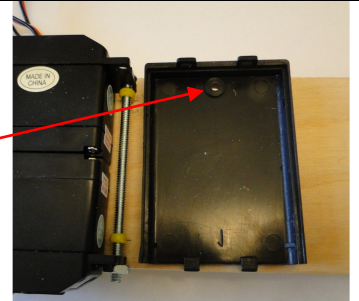
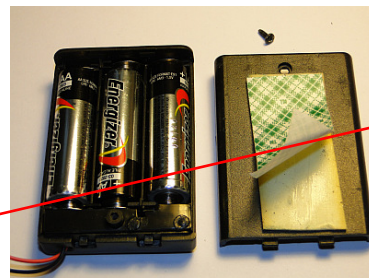
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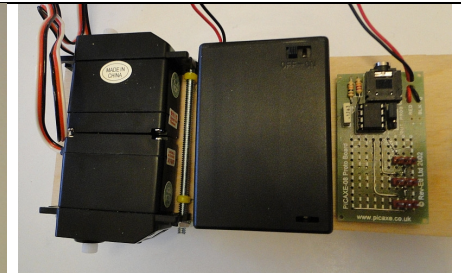
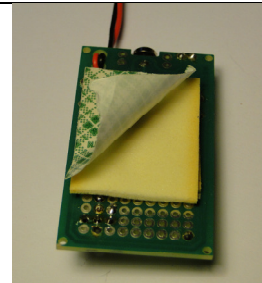
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6. Flip over the platform, drop in the screw, and snug it up to keep the lid from slipping.



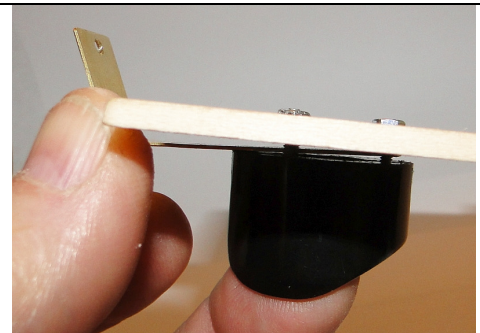
❑ Mount the Control Board

1. Apply double sided adhesive foam tape to the back of the board. Choose an area that is the least uneven.
2. Pont the connector end as shown and mount the board between the battery box and the nose wheel screws. Push firmly.



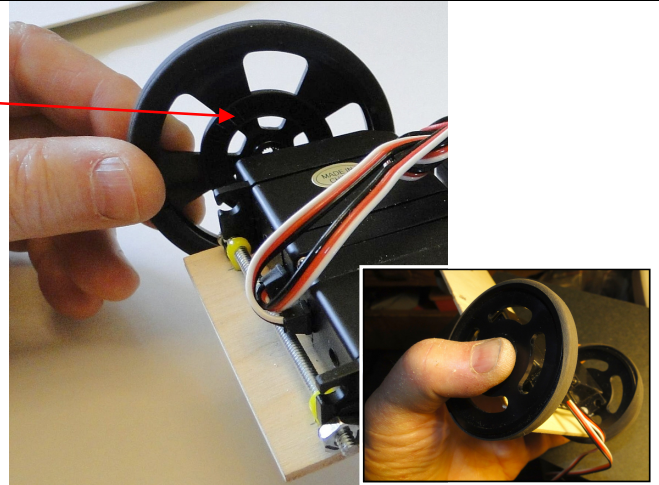
❑ Attach the Ball and Sensor Mount

1. These parts attach to the *bottom* of the platform (opposite from the servos).
2. The Sensor Mount is sandwiched between the ball mount and the platform, with its "foot" pointing up.
3. Use the shorter screws from the ball kit. Put them in from the inside of the ball base through the platform.
4. Use the center line screw to hold the sensor mount
5. Put the nuts on the screws and snug them down. firmly. The sensor mount should point straight out.
6. Place the three white plastic rollers in their ball mount slots and snap in the ball.

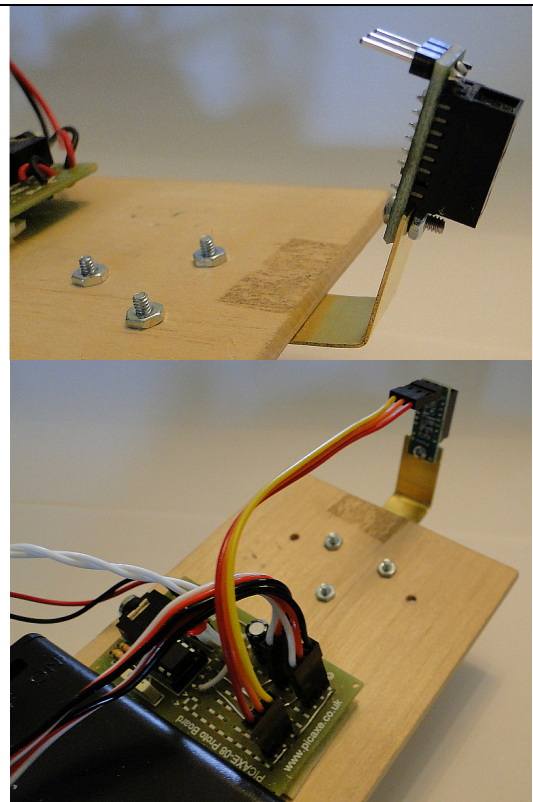


❑ Put Wheels on the Servos and Connect

1. The side of the wheel with the ribbed circle pattern will go towards the servo.
2. Rotate the hub against the servo spline using only a little pressure until you feel them mating, then push the wheel on.
3. With both wheels on, press them down the splines until they bottom out.
4. Insert and snug hub screws
5. Push the servo connectors onto the headers, black wire closest to bottom board edge.
6. Do not use the header at the top side of the board. It is for the sensor cable.

**❑ Attach the IR Sensor**

1. Remove and set aside the small screw and nut attached to the sensor mount
2. Position the IR Sensor on the back of the mounting bracket with the black sensor block pointing forwards.
3. Align the mounting holes. Put the small screw through from the sensor (back) side.
4. Spin on the nut and tightly secure the sensor.
5. Plug the jumper cable into the sensor with the Yellow wire to the Left looking from the back of the board (header side).
6. Plug the jumper cable into the Picaxe board with the Red wire closest to the control board top edge.
7. The sensor mount arm may later be adjusted for detection height by gently bending the arm up or down, being careful not to pull on the sensor board.



Congratulations!

You have fully Assembled your Bot!

Now go see if it works. Remember there is a 5 second delay from when you turn on the switch until the Bot starts to move and its "heartbeat" blinks

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Final Assembly

Do steps then in this order after the microcontroller board has been tested

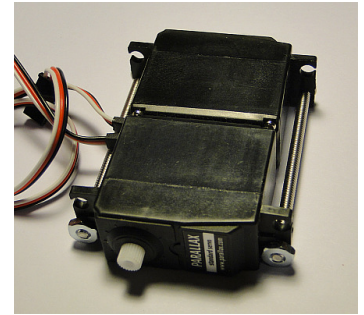
- Bolt the two servos together and mount them
- Mount the battery box (first only the cover)
- Mount the controller board
- Attach the ball and sensor mount to the *Bottom* of the platform
- Put on wheels
- Put on the IR obstacle avoidance sensor
- Attach servo and sensor leads
- Inspect Bot and move on to programming and check-out

Follow detailed instructions on the following pages for easiest assembly

- The directions are designed to help you with do it right the first time 😊
- Ask a course conductor if you have any questions or need help
- It is a good idea to check off the steps as you complete them

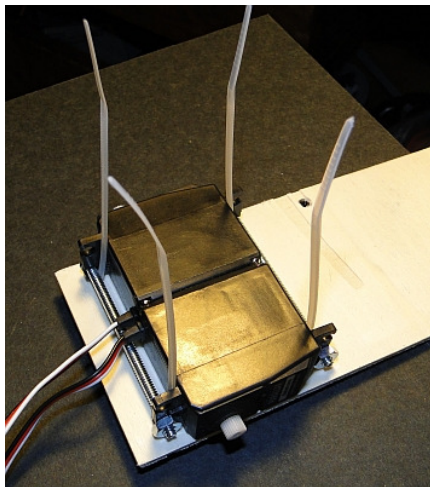
❑ Bolt the Two Servos Together

1. Place the servos back-to-back with their wires at the same end.
2. Bolt the servos together using only two bolts as shown.
3. Put only a few threads on the nuts at first. The screw lengths are close fit.
4. Alternately snug the nuts taking care not to over-tighten.

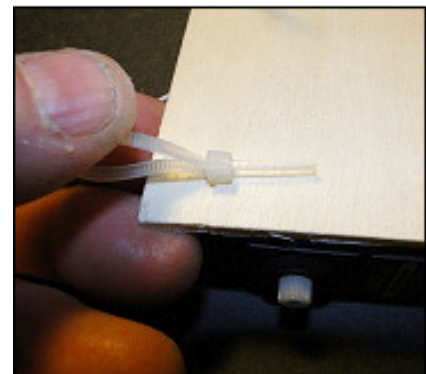
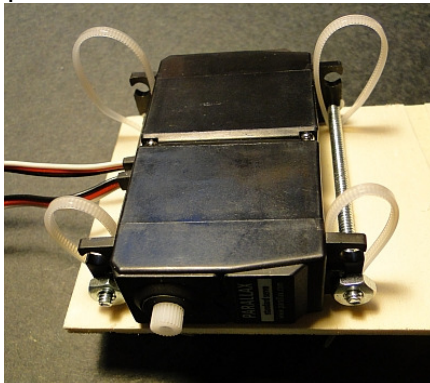


❑ Mount Servos to the Platform

1. Insert cable ties from the platform back side through the four motor mounting holes.
2. Place servos on the platform with bolt side down and leads pointing to the back edge.
3. Thread all four ties between the bolts and the servo bodies.



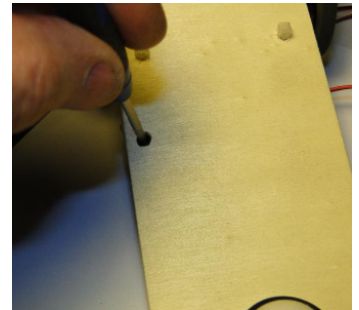
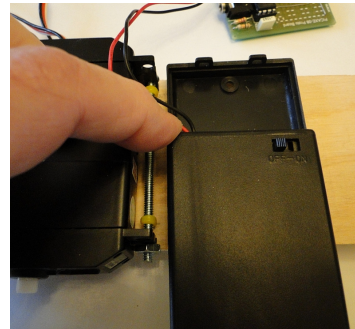
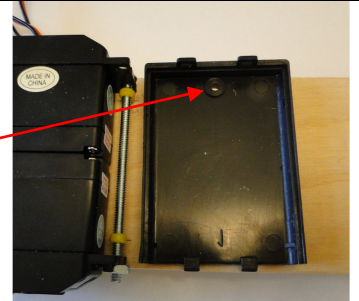
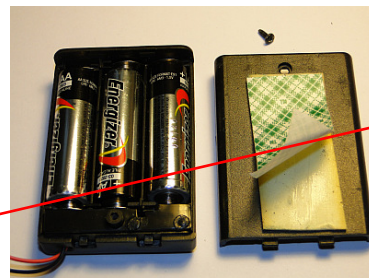
5. Orient the flat side of the tie heads away from the motors (2 towards the front, 2 to back).
6. Loop the ties over the bolts and back through the holes. It's tight.



7. Start each tie through the flat side the head
8. Keep the tie heads against the platform and pull the ties snug.
9. Pull the ties tight while keeping the heads tight against the platform.
 - This may require needle noses pliers and three hands ☺
 - Make sure the head ends are tight against the platform and the loops are tight around the bolts. *Ask for help if needed.*

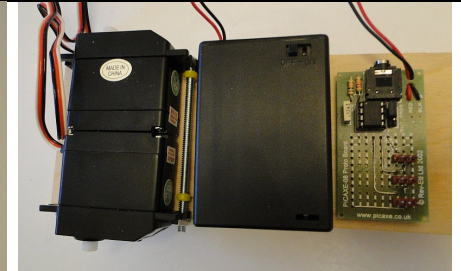
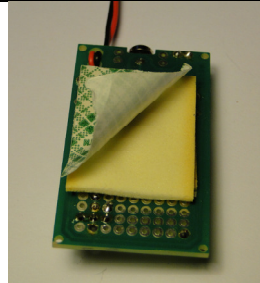
❑ Mount the Battery Box

1. Unscrew the battery box cover.
2. Put double sided adhesive foam tape on the outside of the cover. Don't cover up the screw hole.
3. Peel off the backing and align the screw hole with the hole in the platform. Sticking something like a cable tie through both holes is helpful in lining them up.
4. Press down when you have good alignment
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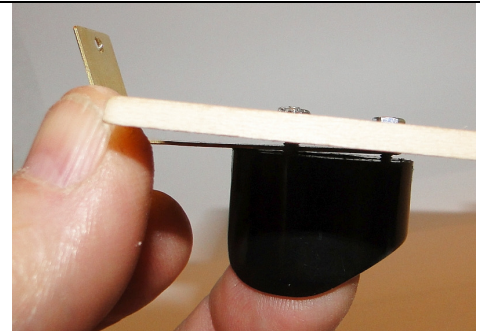
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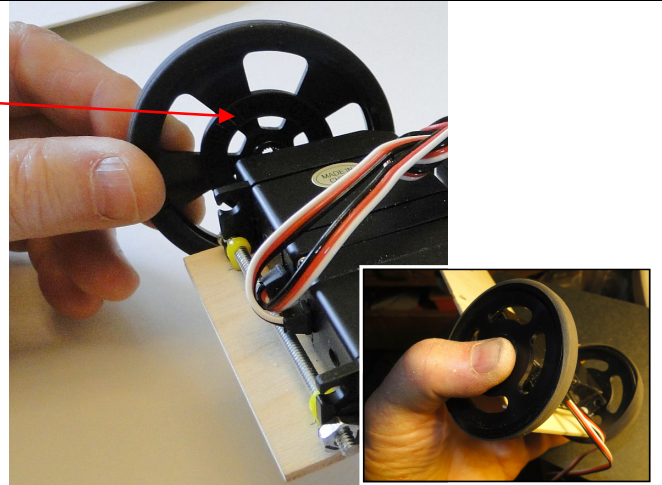
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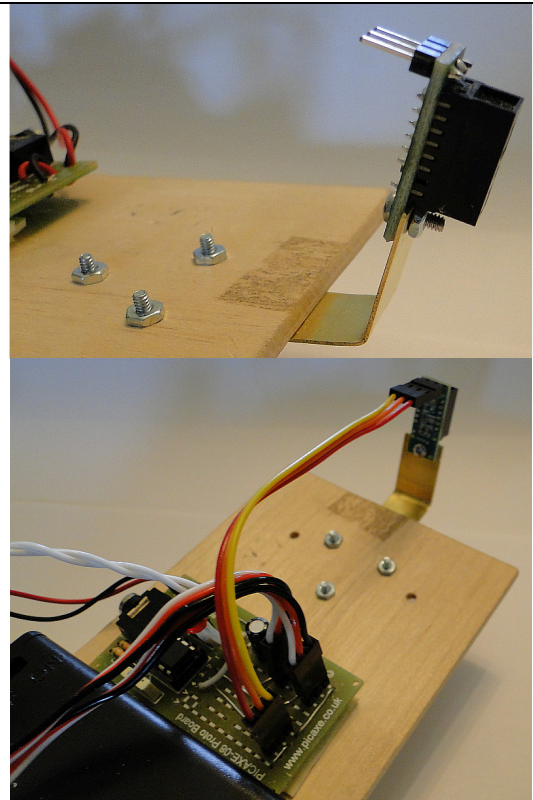


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