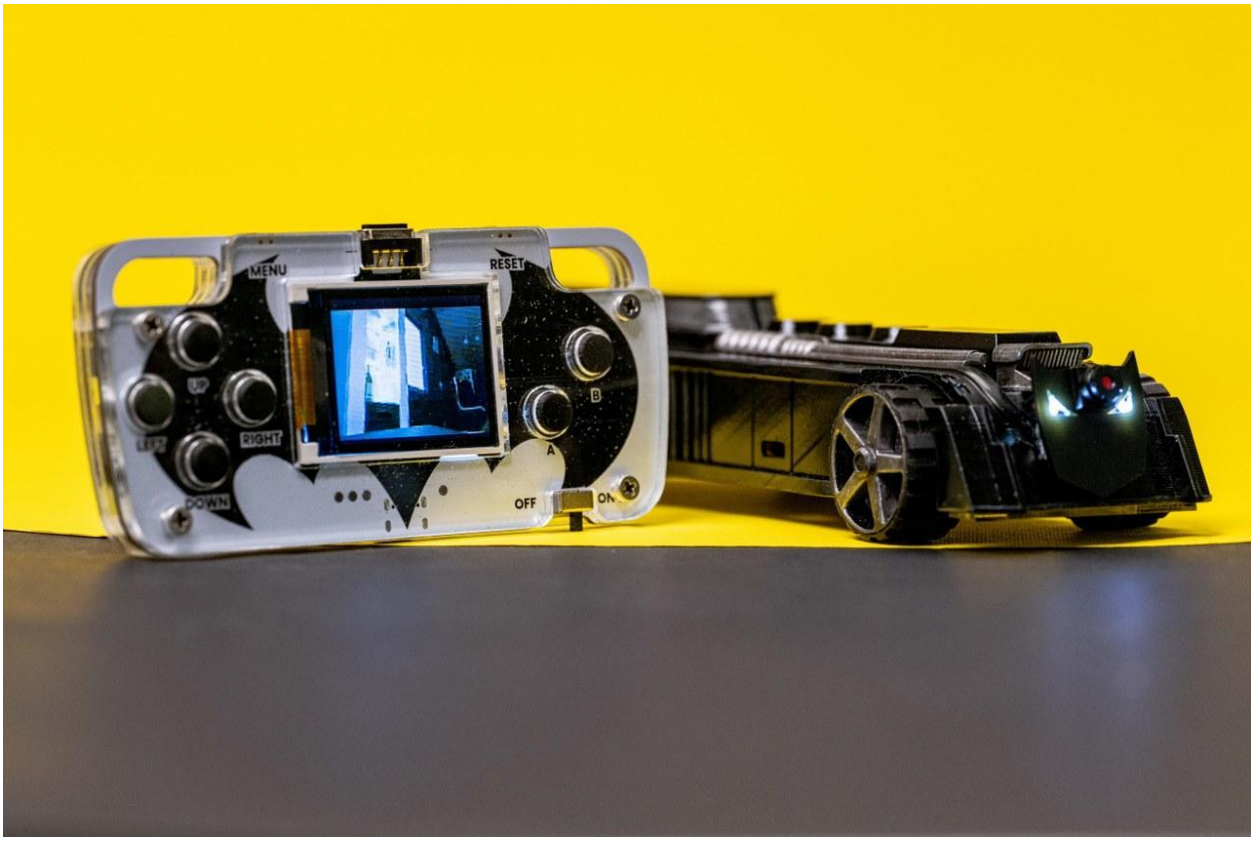
Batmobile Build Guide

The beginning

WELCOME TO CIRCUITMESS BATMOBILE BUILD GUIDE!

By following this build guide, you'll learn how to assemble your DIY autonomous robot car. With Batmobile, you'll learn about complex mechanisms, such as:

- Artificial Intelligence
- Computer Vision
- Autonomous Driving
- Machine Learning
- Electronics & Coding



AGE GROUP

Like it says on the box, Batmobile is designed for anyone who's at least 7 years old.

You should approach some of the assembly steps carefully, so make sure to have an adult jump in if you need some help with tightening the bolts later in the process. It's okay to ask for help.

Don't worry, though! We'll go through the assembly step by step and provide some useful tips along the way. We'll give you a heads-up if there's something important to keep in mind while assembling.

ASSEMBLY TIME

It should take you approximately 1 hour to fully assemble your Batmobile.

Of course, the assembly time depends on your previous knowledge and experience.

If you don't have any experience yet, don't worry! It just might take you a little longer to get into the groove and overcome the challenges in the beginning.

SKILLS

You don't need to have any specific skills before getting your hands dirty with this DIY project.

The main objective here is to have fun and learn something new.

So hold on tight, read all the instructions, and get ready to have fun!

This is a great opportunity and your first step in your big engineering career.

LEARNING WITH BATMOBILE

As previously mentioned, Batmobile will teach you a few useful things in the following few hours.

Here's what you'll learn:

- How to assemble your very own electronic device

- Microcomputers and other electronic components
- LED control
- How to control an electromotor using a microcomputer
- How autonomous cars work and how they navigate a road autonomously
- How to recognize and scan a QR code using your robot’s camera
- How to recognize different simple objects using a camera and image processing algorithms

What's in the box?

LET'S MEET ALL THE COMPONENTS THAT ARRIVED IN THE BOX!

Open your Batmobile box and check if you have all the components. Make sure to lay it all on a clean surface where you'll inspect if everything is there according to the photo and the list below.

In case something is missing, please contact us at contact@circuitmess.com. Send us a photo of everything that came in the box, and we'll get back to you as soon as possible to resolve the issue.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CREATOR'S BOOKLET
CircuitMess Batmobile™


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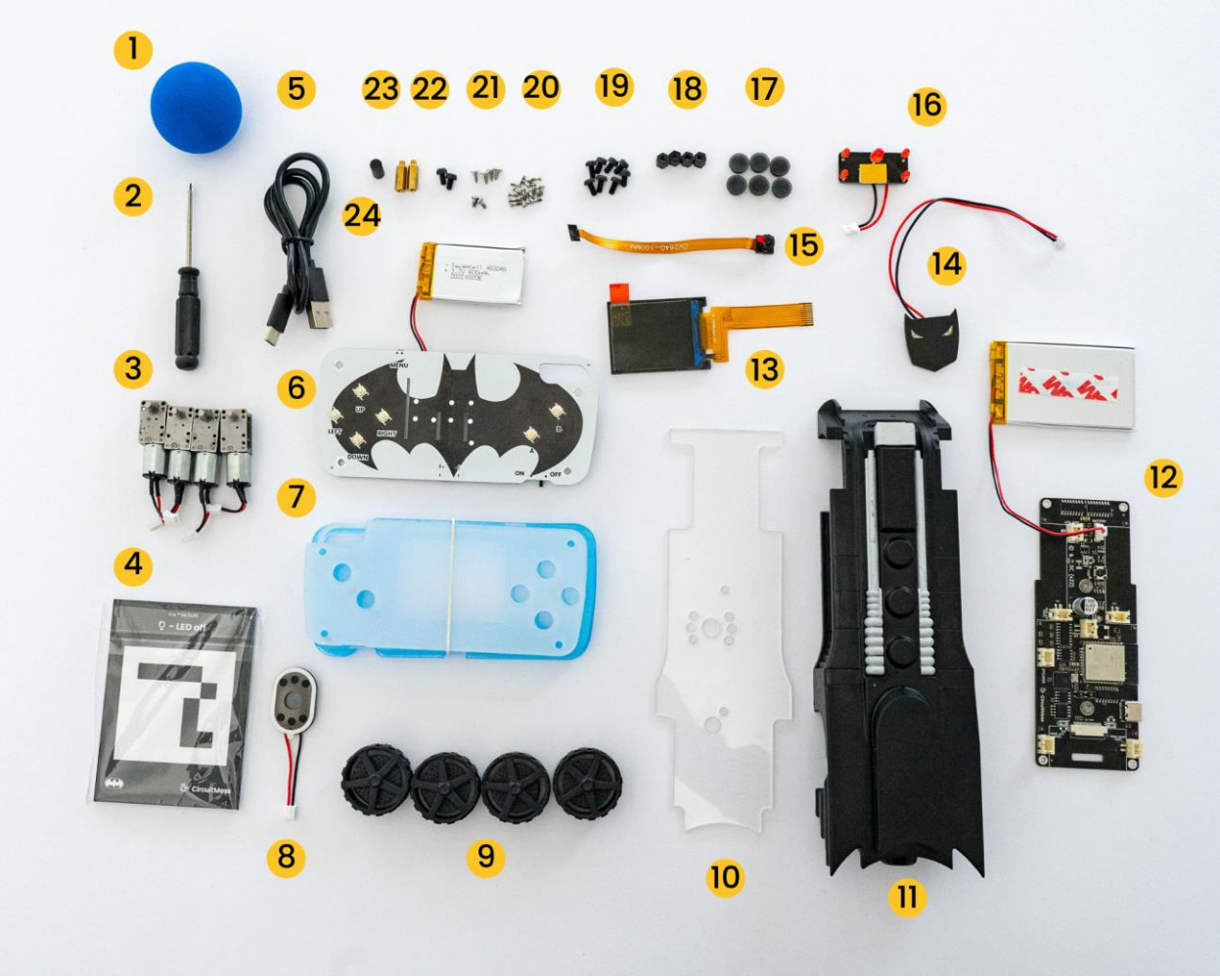


Here's the list of components:

1. Ball for tracking
2. Screwdriver
3. Four electromotors with gearboxes and wires
4. Tracking cards
5. USB-C cable for charging and programming the device
6. Batcontroller's PCB and Li-Po battery
7. Acrylic casings for Batcontroller
8. Speaker
9. Four wheels
10. Acrylic casing for Batmobile
11. Batmobile's injection molded plastic chassis
12. Batmobile's motherboard and Li-Po battery
13. LCD Display
14. Headlights board
15. Camera with a ribbon cable

16. Fire board with red LEDs
17. Six pushbuttons
18. Four spacers
19. Eight black bolts for Batcontroller
20. Small screws
21. Six bigger screws
22. Two black bolts for Batmobile
23. Two golden spacers
24. Switch cap

Assembly

Batcontroller

LET'S KICK OFF WITH THE EASIEST PART OF THE BATMOBILE KIT - THE BATCONTROLLER.

You'll use Batcontroller to drive your Batmobile around, make him dance, and do other cool things.

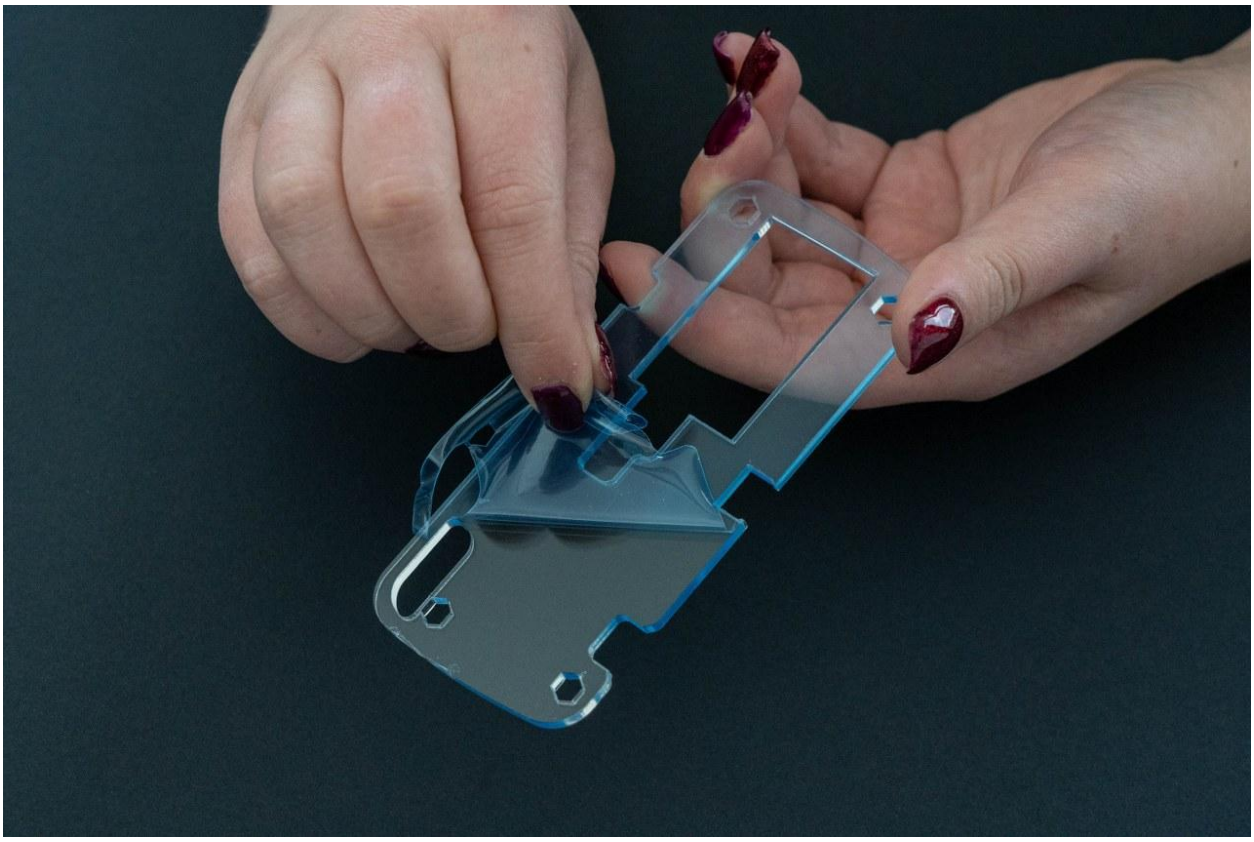
These are the parts you'll need to put Batcontroller together:

You can put the rest of the components aside; we won't be needing them yet. We'll let you know when the remaining components are required.

To begin, you need to peel off the blue and white protective layers.

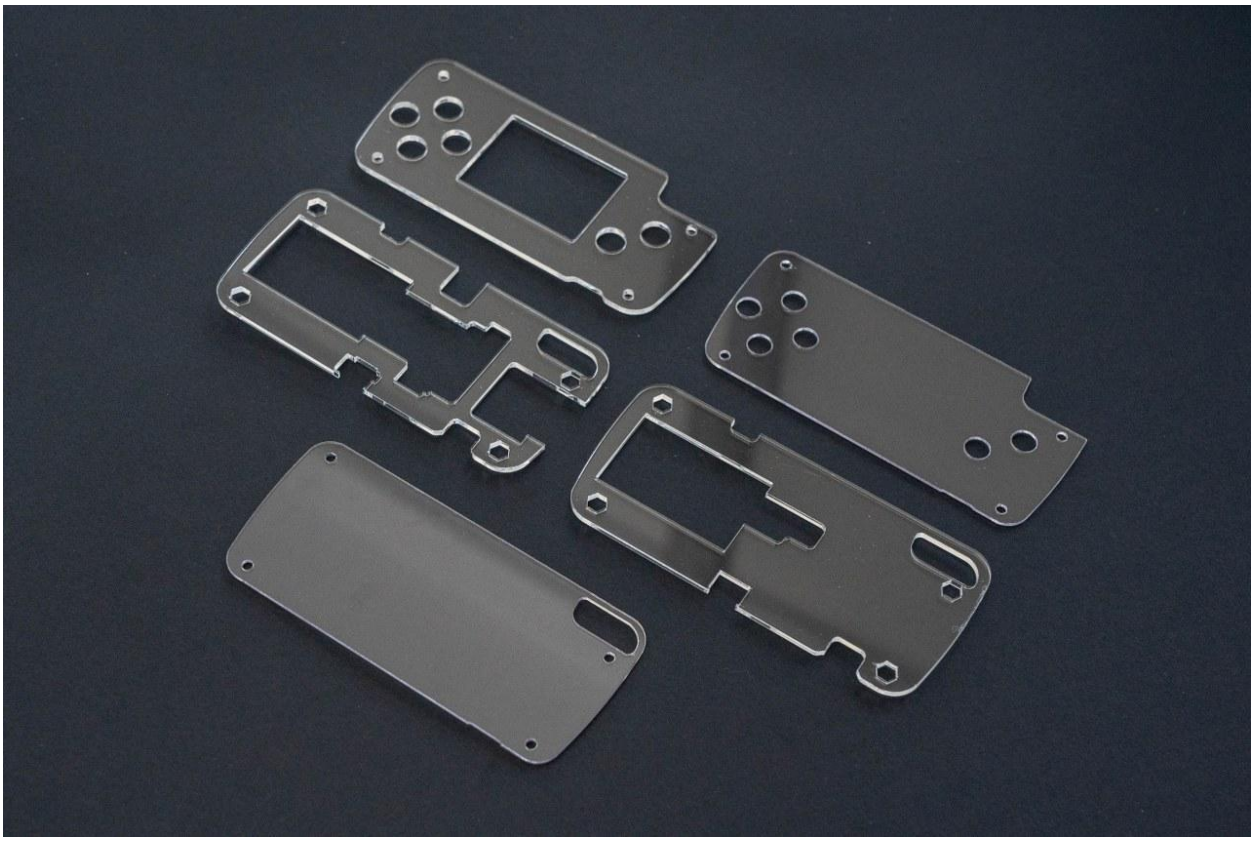
As you can see, each of the acrylic casing parts has a protective layer on both sides that needs to be peeled off. They are not yet fully transparent, but they should be once you finish this step!

Don't forget to remove the foil from the other side too!



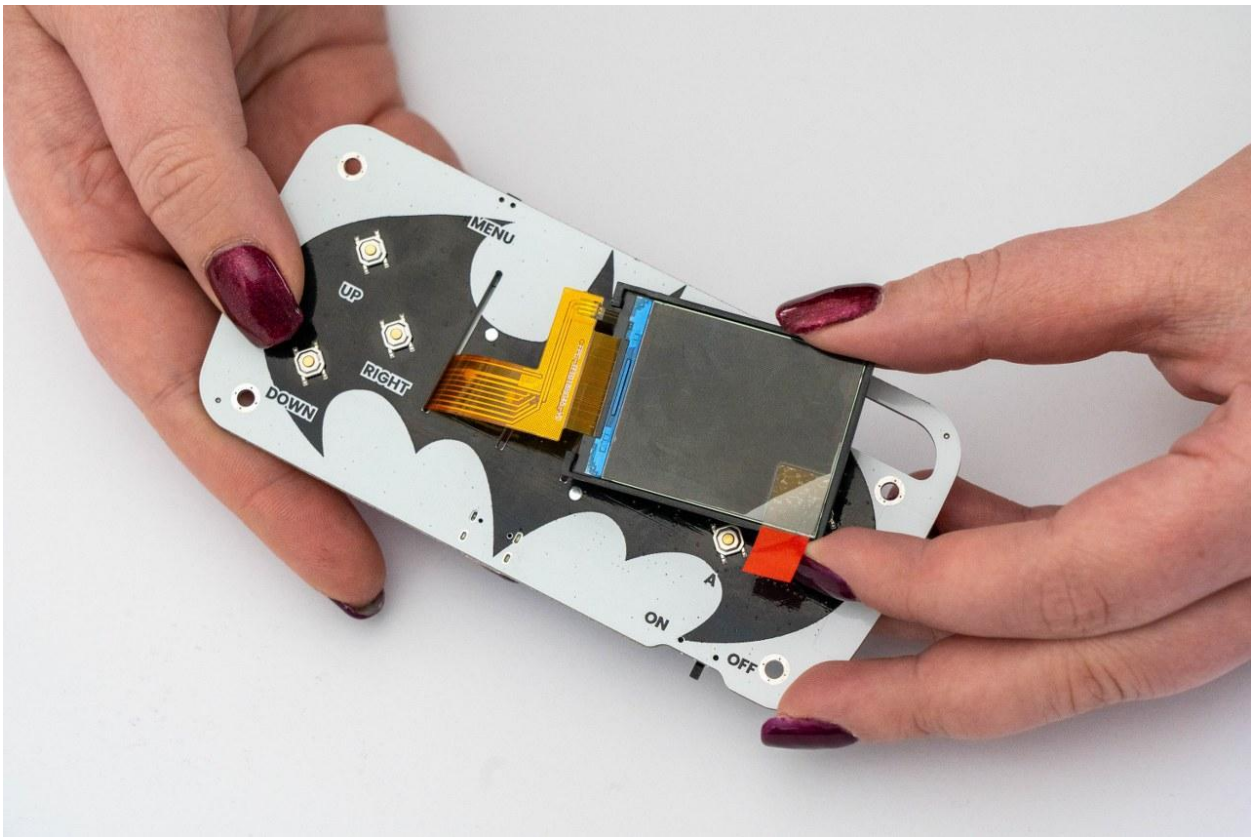
The finished product should look like this (it must be completely transparent):

You must now repeat the process for the remaining acrylic casings.



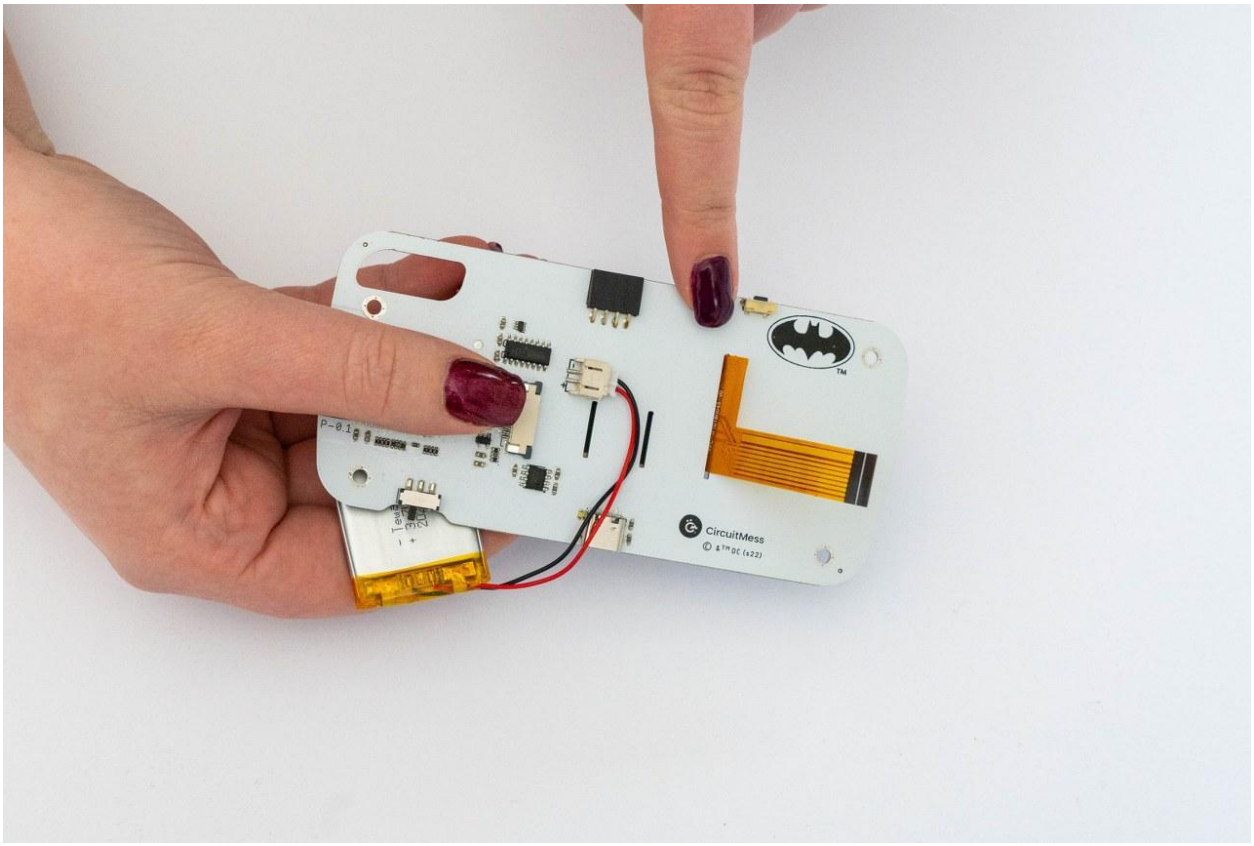
The next step will be to connect the LCD display to the Batcontroller's PCB.

Make sure the display is on the correct side and that the ribbon is pulled through the correct hole.

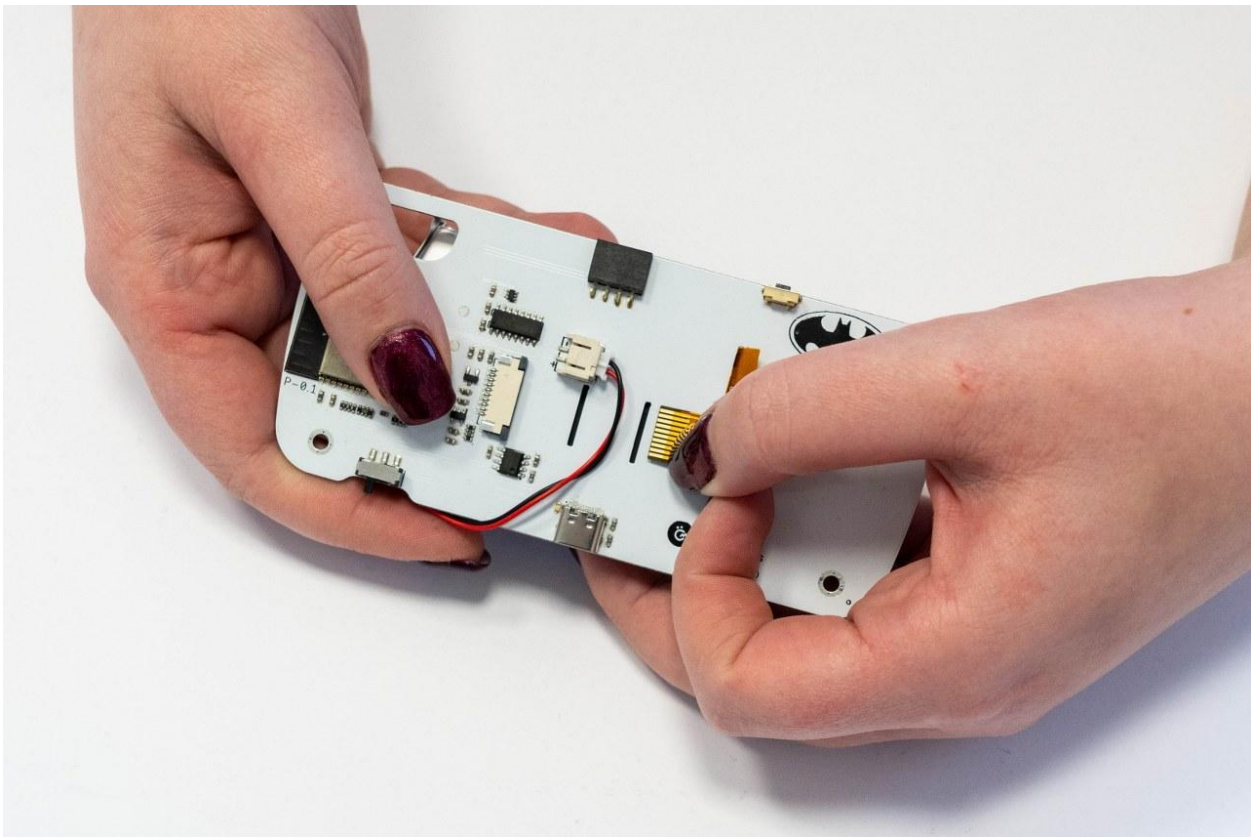


After pulling the ribbon through, the back of the PCB should look like this.

Beware not to damage the ribbon.

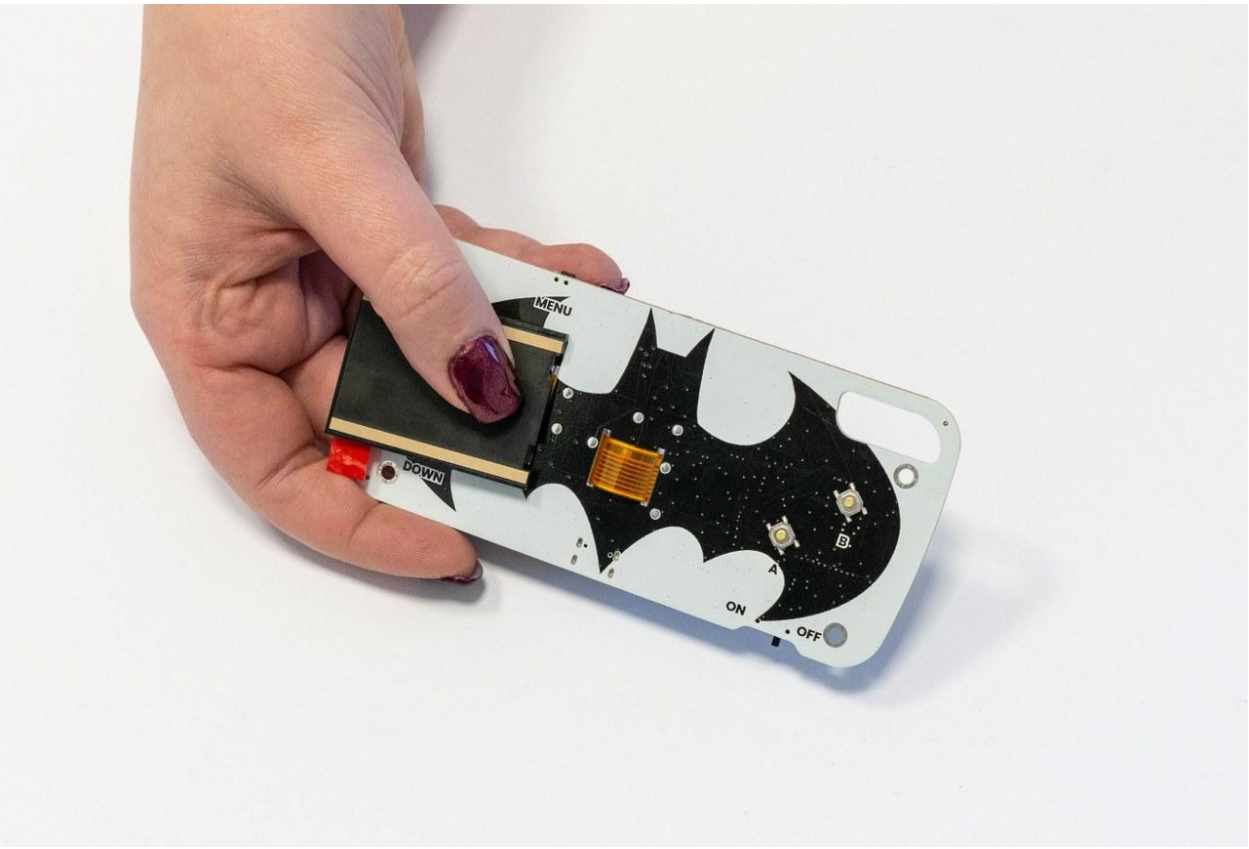


Pull the ribbon through the second hole, as shown in the photo below:




MENU
A
B
ON
OFF

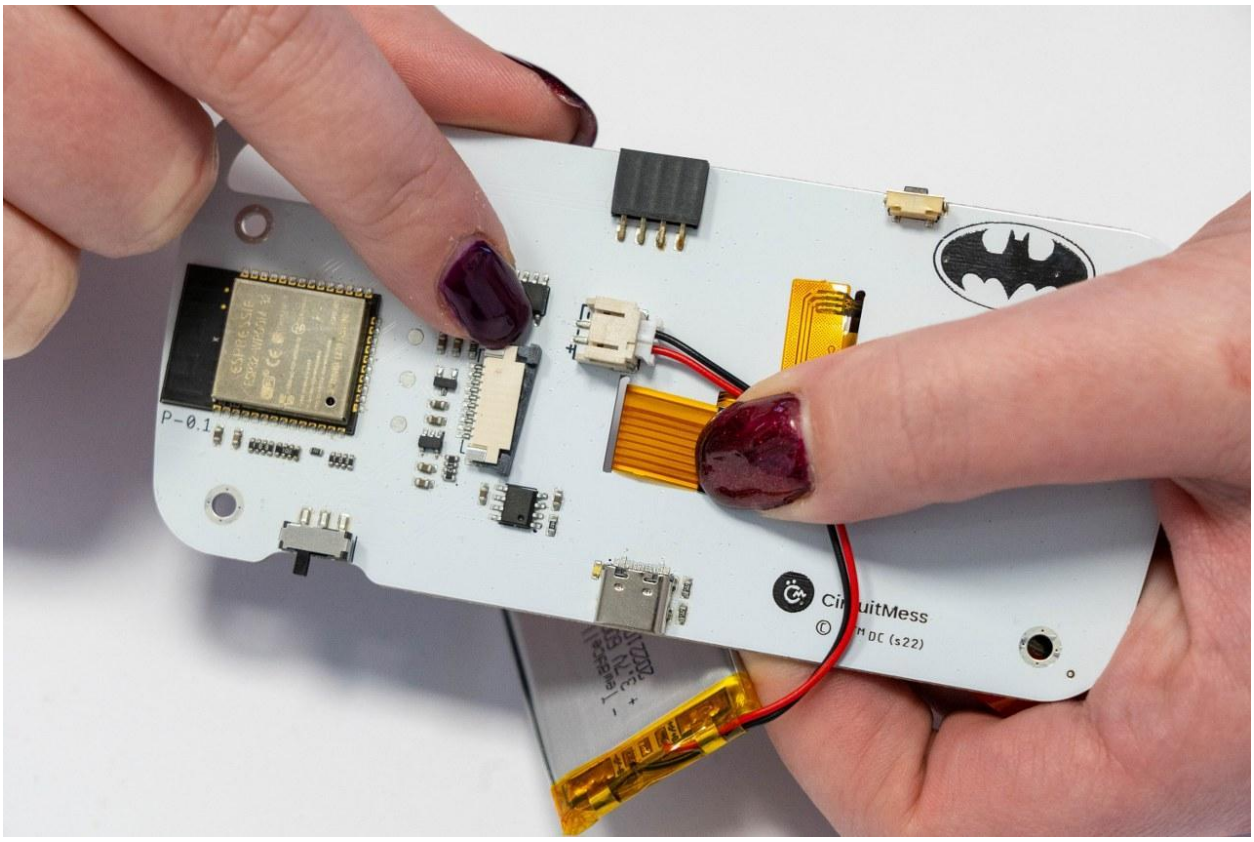
The front of the PCB for the Batcontroller should look like this:



Finally, connect the ribbon to the PCB.

You'll have to pull the grey part out slightly, but not completely. Insert the end of the ribbon into the port and push the grey part back in until it clicks.

Please, make sure that you the ribbon is pushed all the way to the end, or the display won't work.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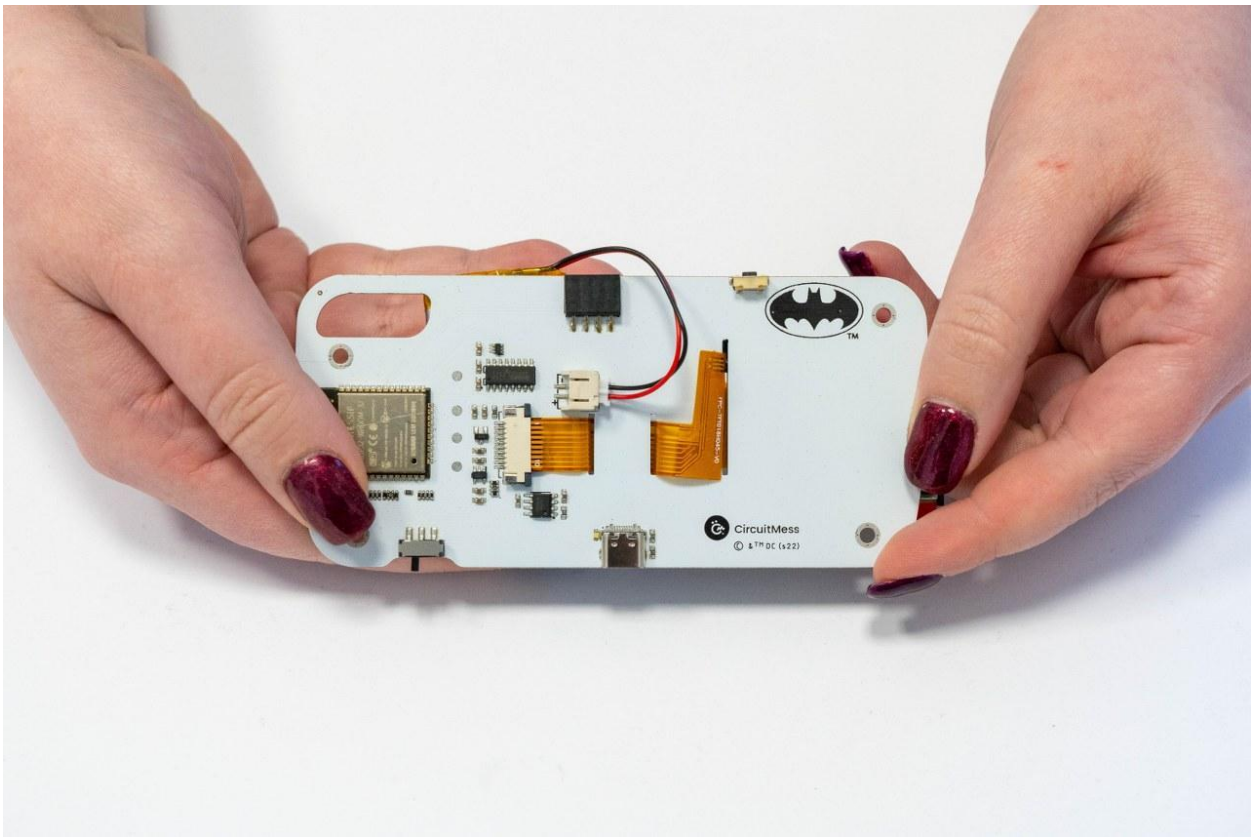
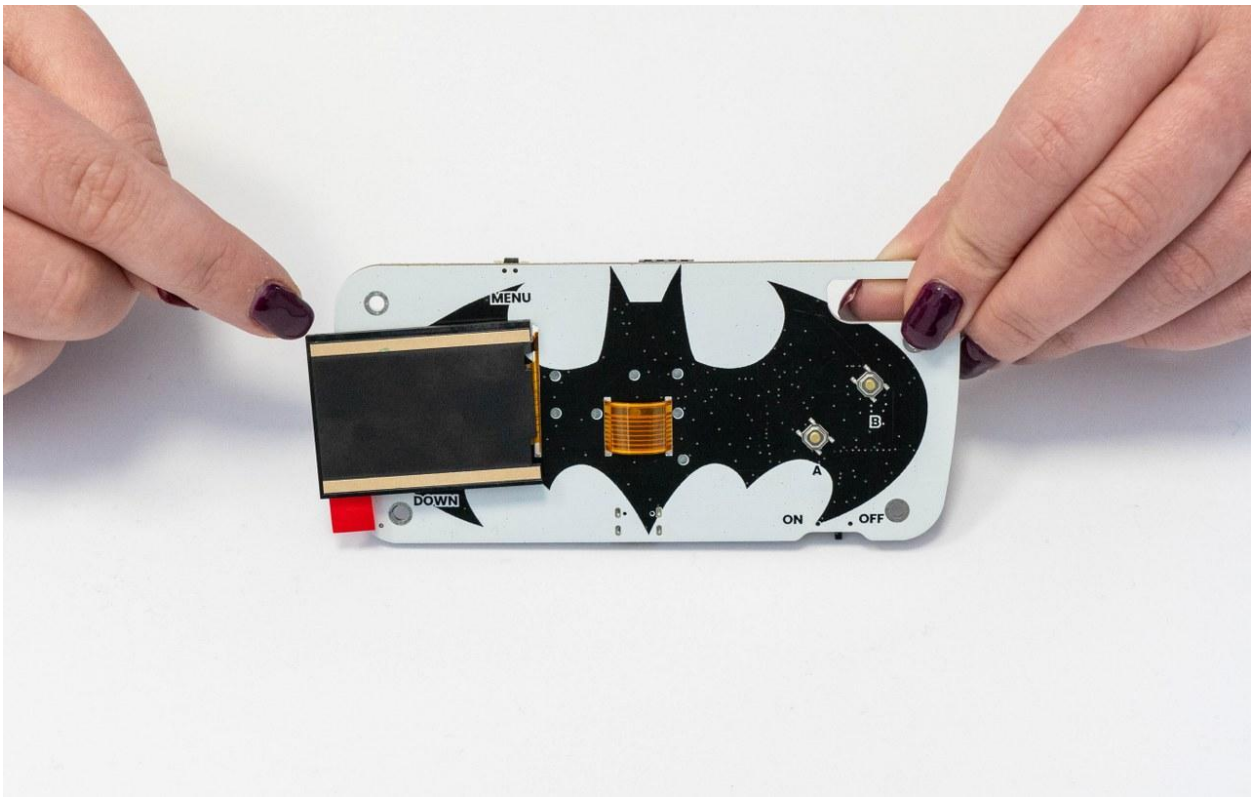


Now that you've connected the display, we need to make sure it stays in place and doesn't move.

You've probably noticed two whiteish stickers on the back of the display.



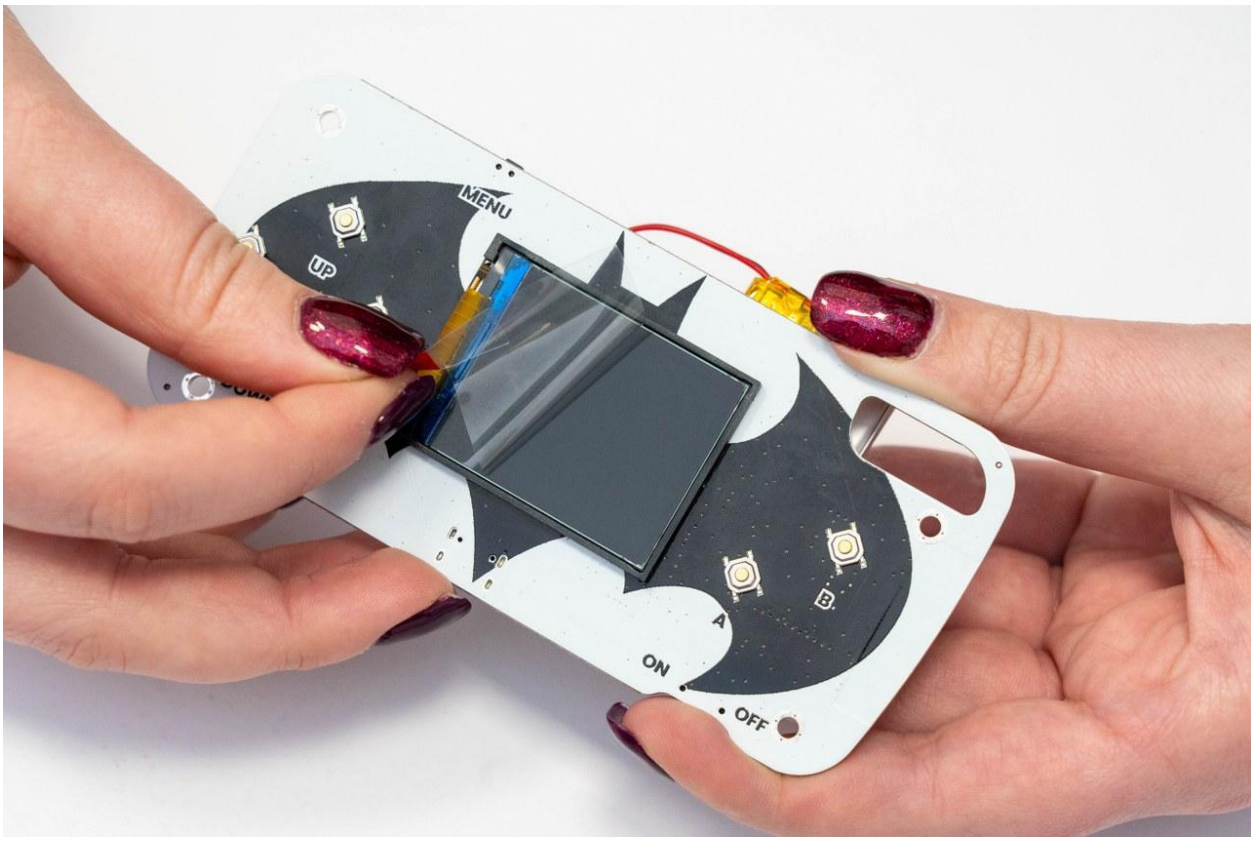
You must remove the stickers and stick the display to the PCB.


MENU
DOWN
A
B
ON
OFF

Be careful when sticking the display on the board. You don't want it to bi tilted.

YOU CONNECTED YOUR FIRST PART! CONGRATS!

We can remove the protective foil from the display now that it is secure.


MENU
UP
A
B
ON
OFF

Looking nice!

Casing up the Batcontroller

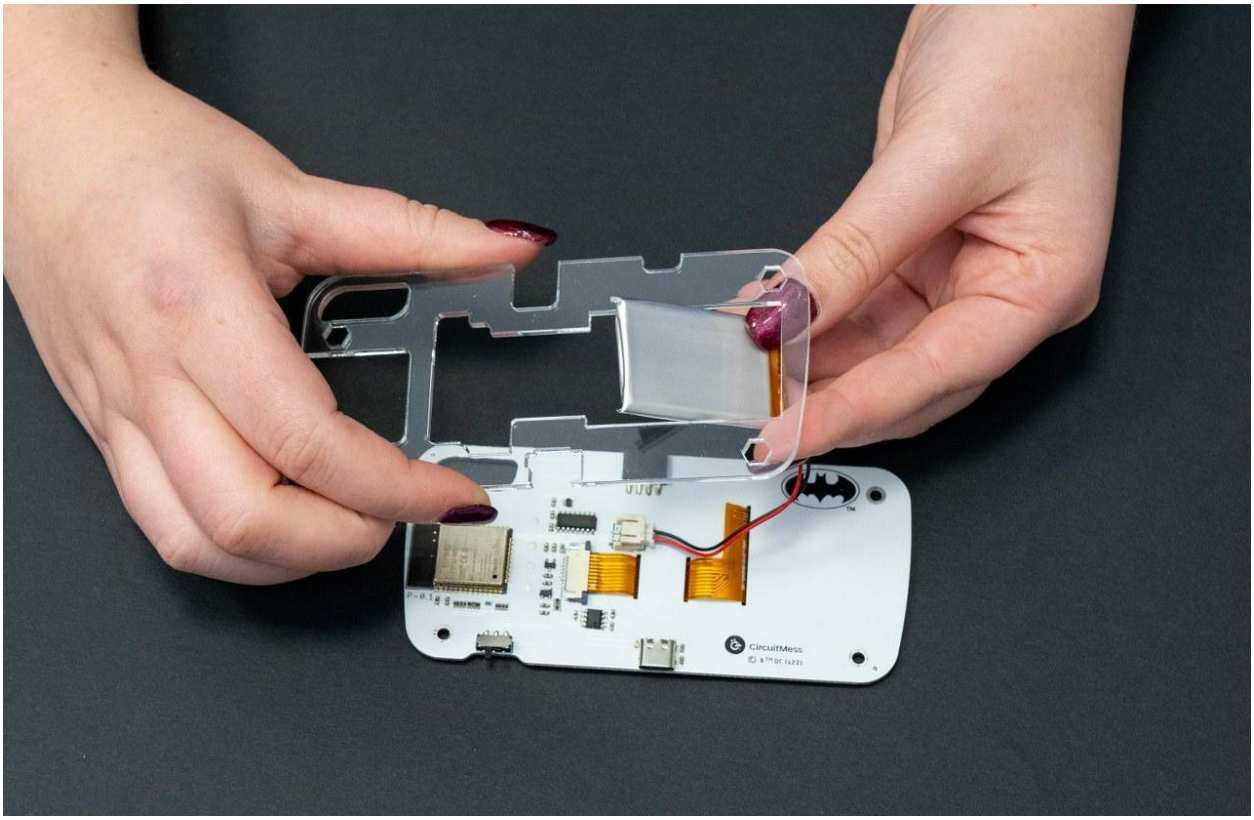
Casing up the Batcontroller

LET'S MAKE SURE YOUR BATCONTROLLER IS PROTECTED.

These are the components you'll need in the first step of casing your Batcontroller:

Check the cuts on the acrylic casing before proceeding to ensure proper placement on the PCB.

You must now pull the battery through the largest oddly shaped hole in the casing.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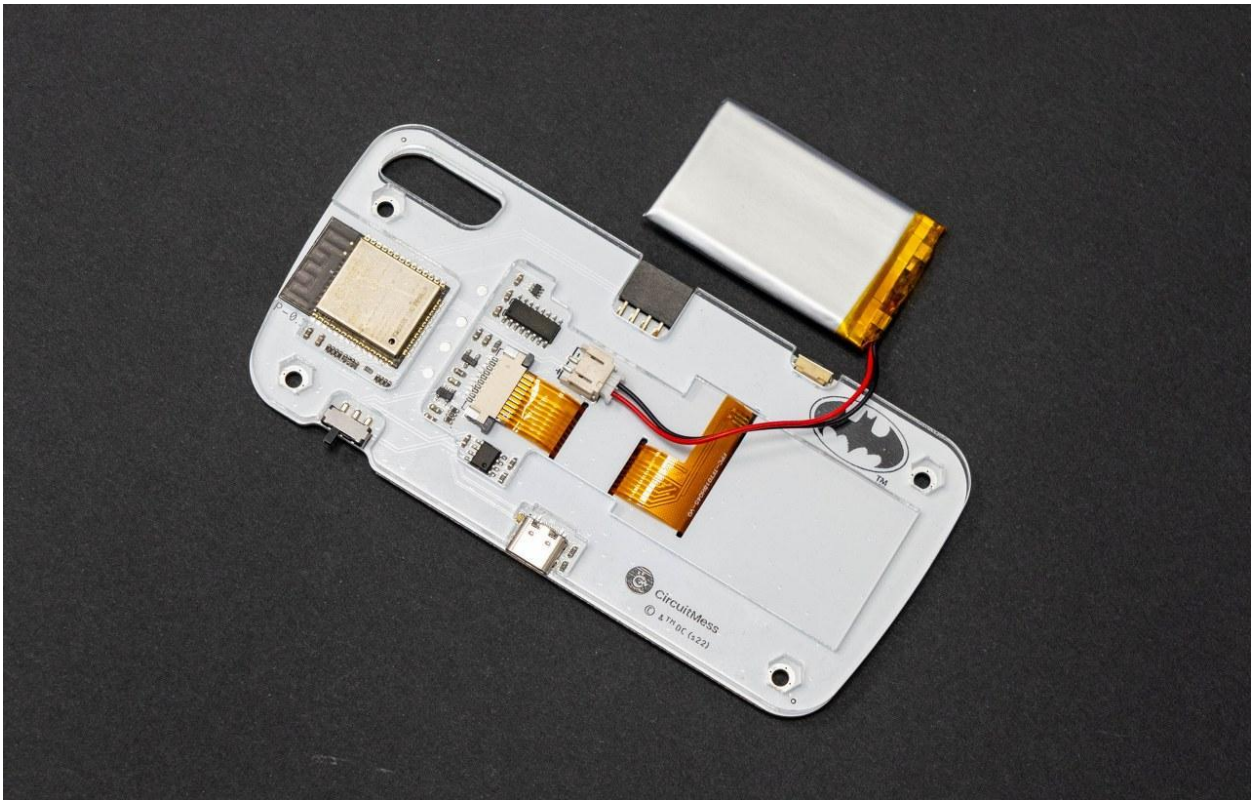
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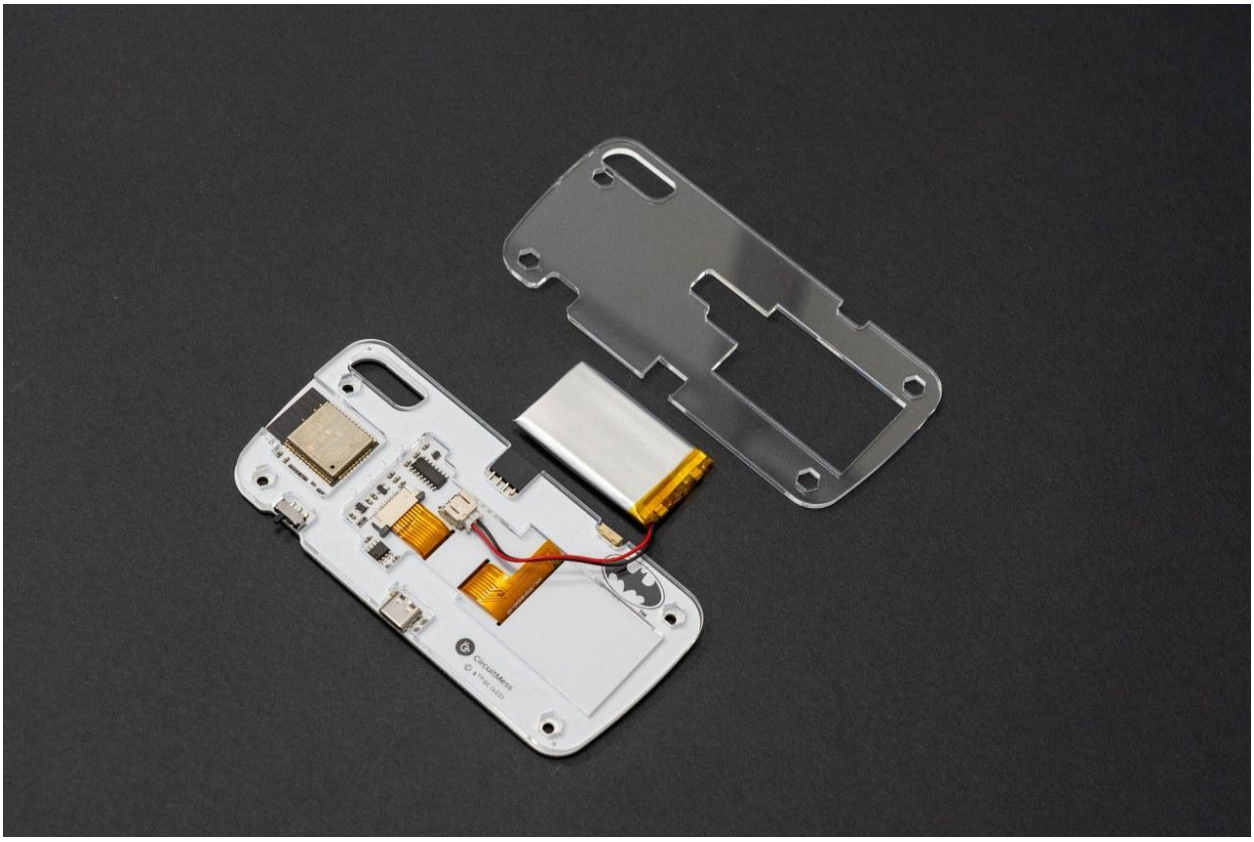
Amazing!

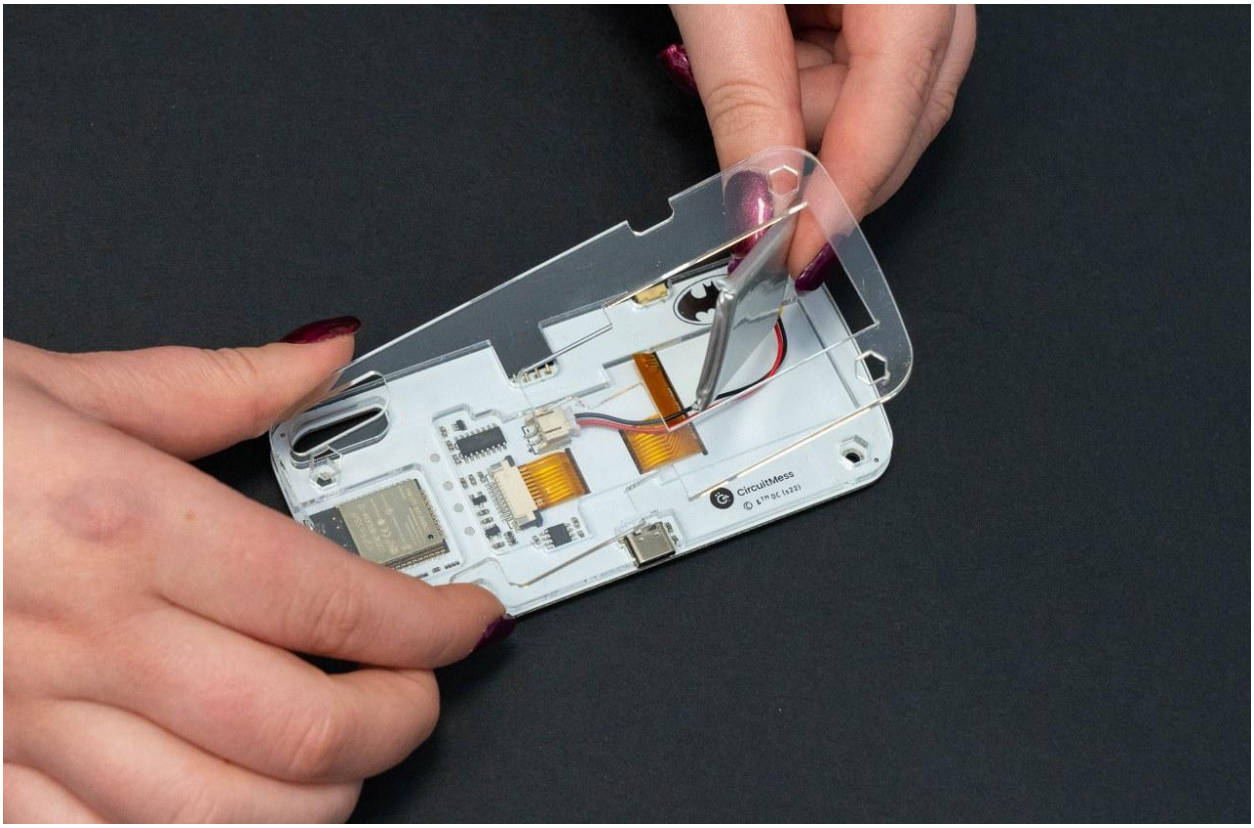
On to the next casing!

We'll use another oddly shaped casing this time.



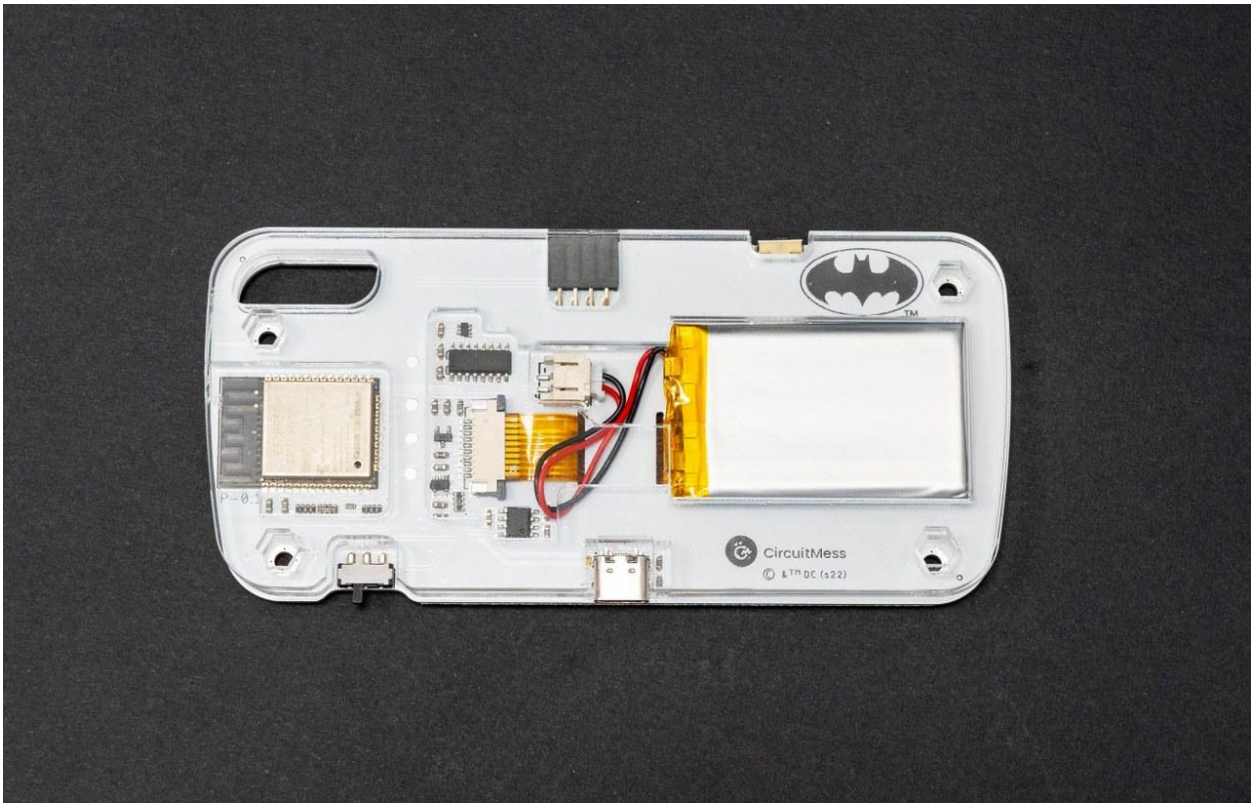
Once again, be careful about which side you place your casing.

You'll have to pull the battery through this one as well.



You'll need to place the wires under the casing so they don't get in your way, and then press the battery into its place.

It will be much easier if you position your battery as shown in the photo below, with the clean side facing up.



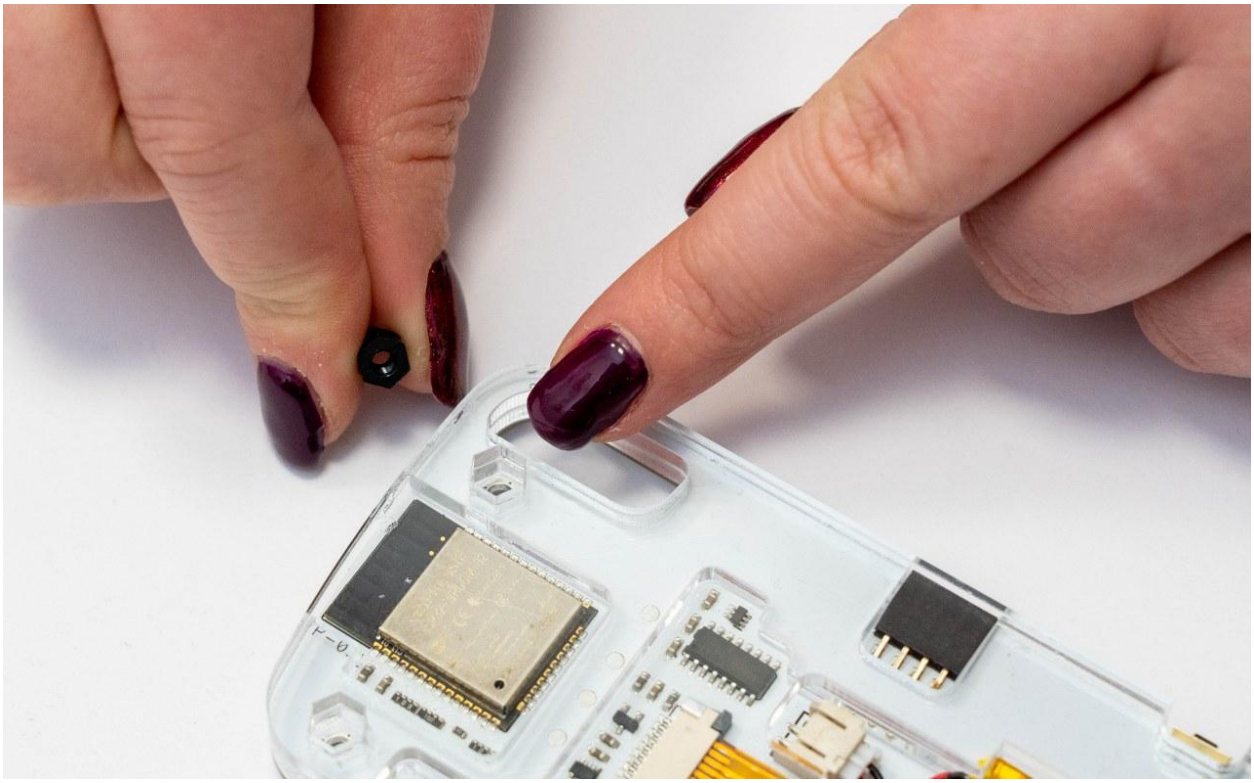
One more casing is coming at the back side of Batcontroller.

Before we do that, we need to insert some spacers into the four holes to ensure that the casings can be fastened.

These are the components you'll have to take now:

You must insert one black spacer into each of the four holes.

Just like this:

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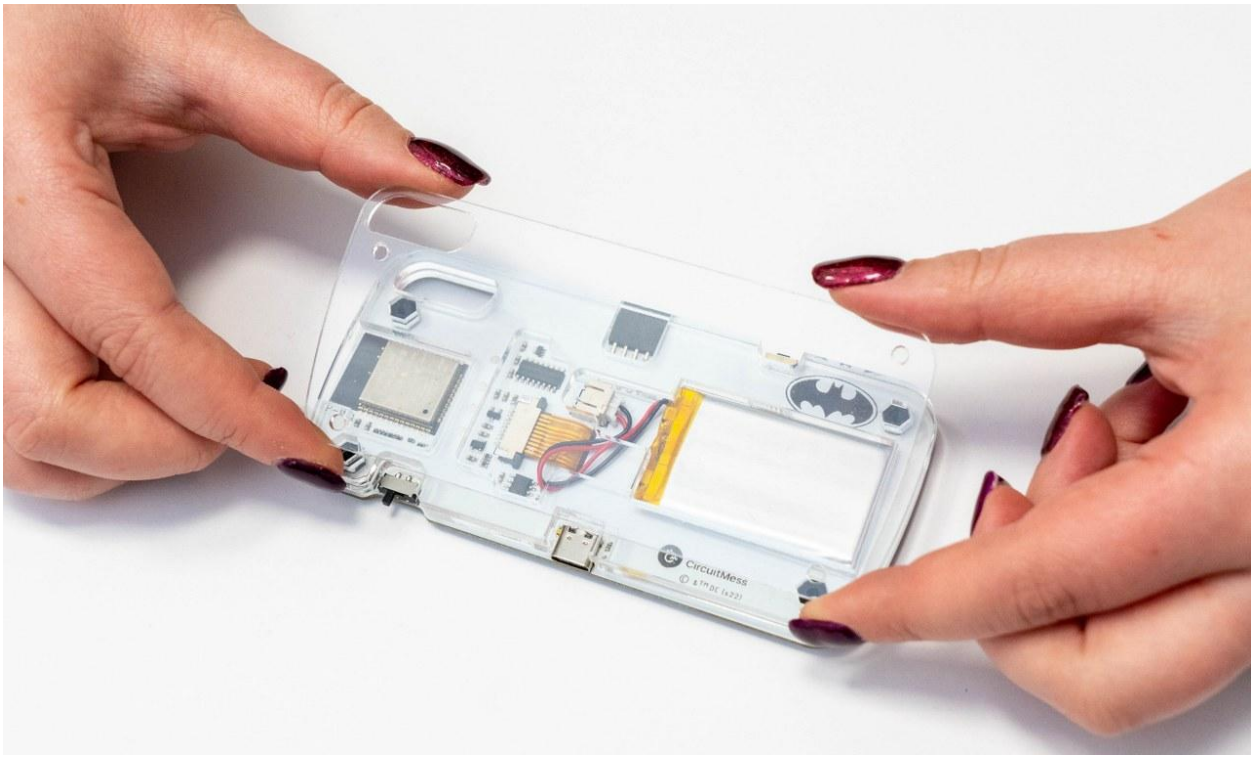
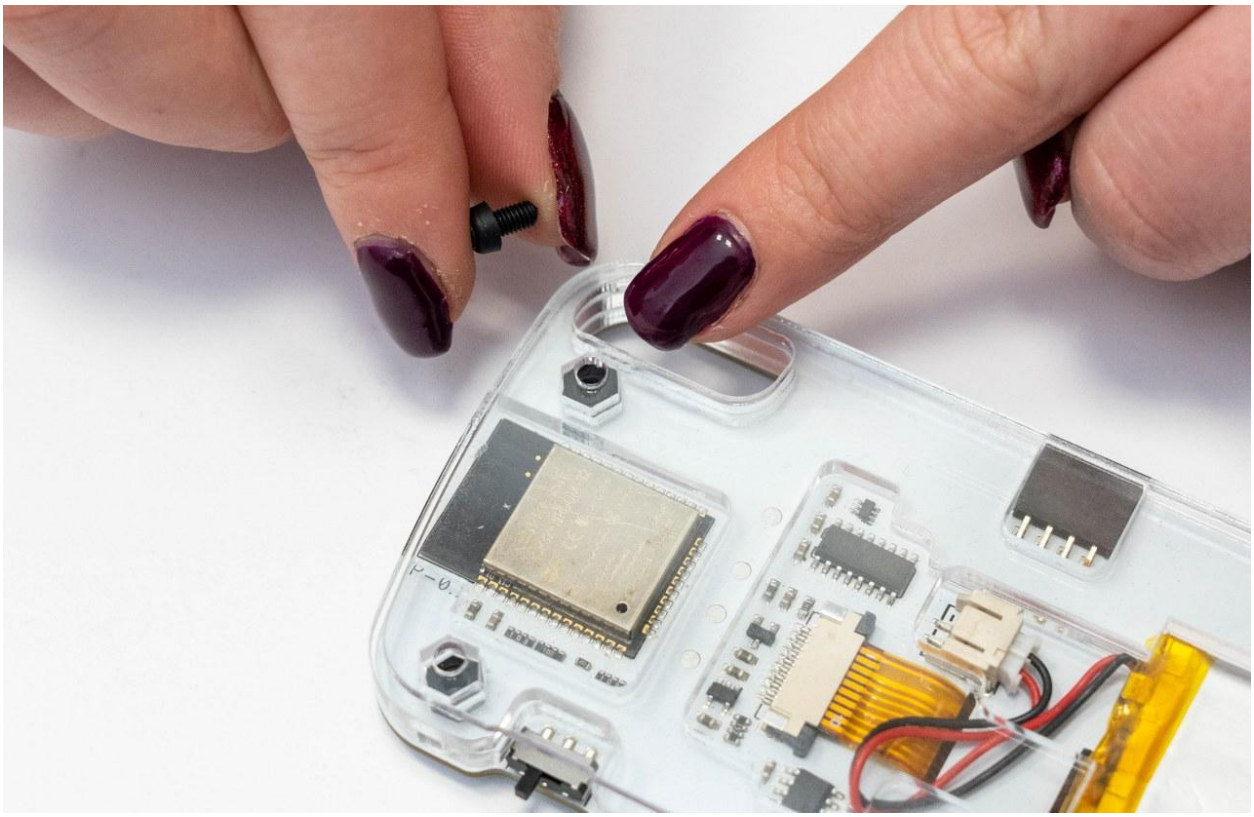
Now, take this casing and four bolts (the smaller ones):

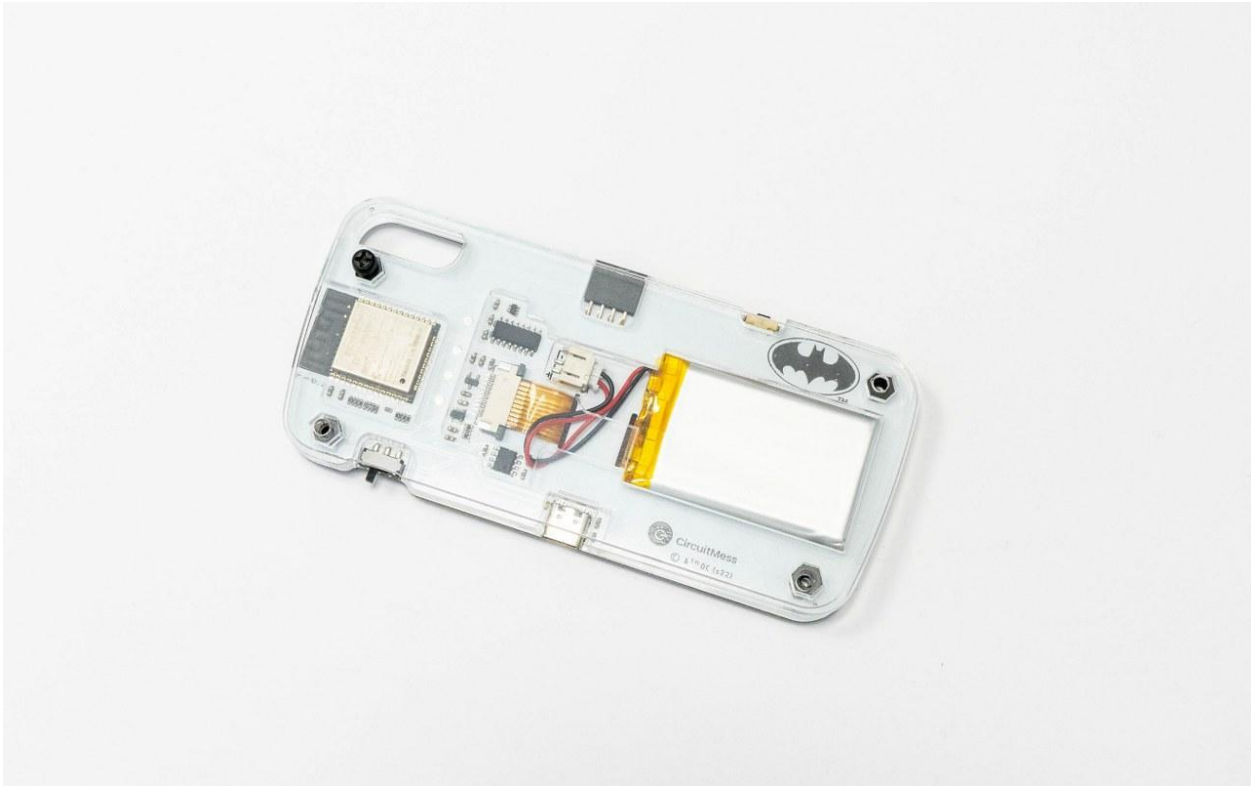
Place the casing on top of the Batcontroller first:

Before proceeding with the assembly, make certain that the top casing is on the correct side.



Place the four smaller bolts into the four spacers:

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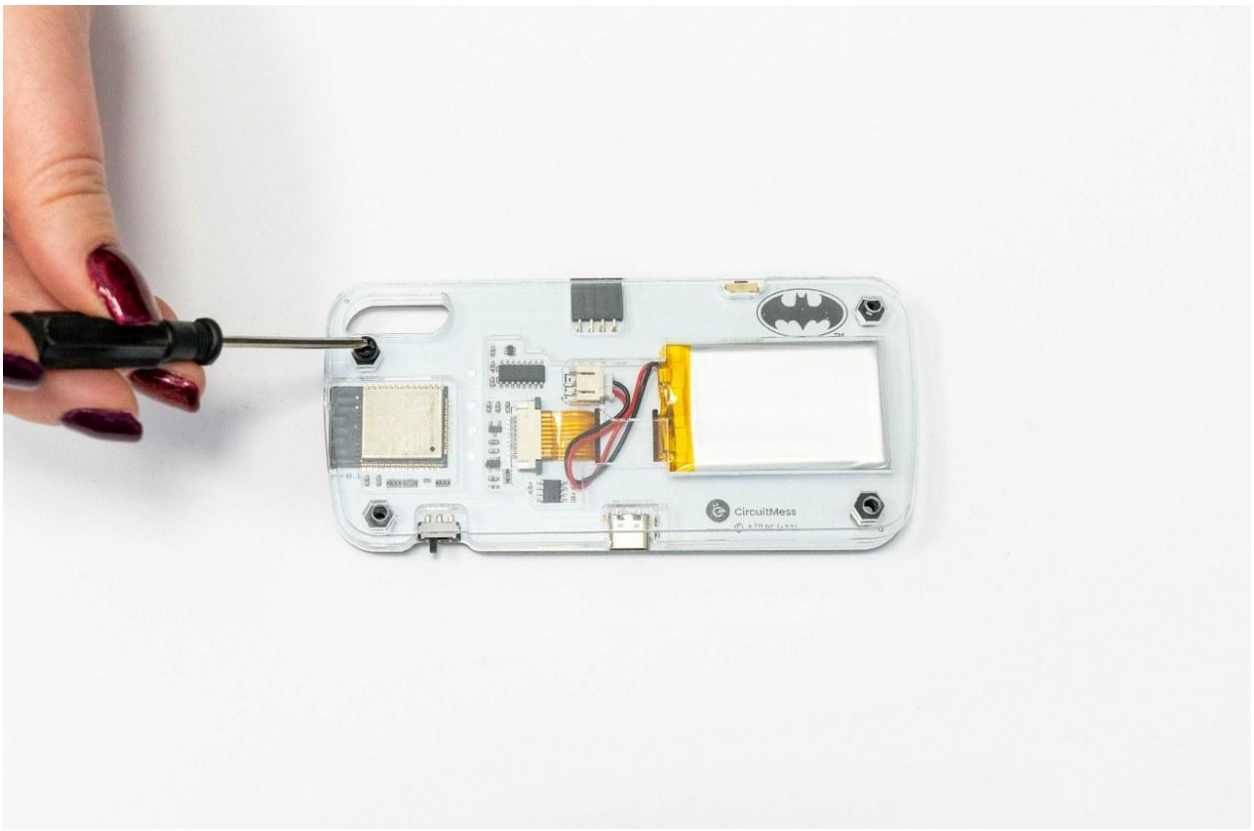
Start tightening the bolts with a screwdriver:

Hold your Batcontroller firmly while fastening to ensure nothing falls off.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Repeat this step for all each of the four bolts, until everything is secure.

Good job!

The back of the Batcontroller is finished.

On to the front side.

Take these six small circle-shaped components, which will be used as buttons.

To begin, we must place the casing on top of the Batcontroller:

Place one of the button caps at each of the six dots indicating where the pushbuttons should be (left, right, up, down, A, and B).

Don't worry if the pushbuttons look a bit tilted. They'll stay in place once the second casing is placed on top of them.


MENU
UP
LEFT
RIGHT
DOWN
A
B
ON
OFF

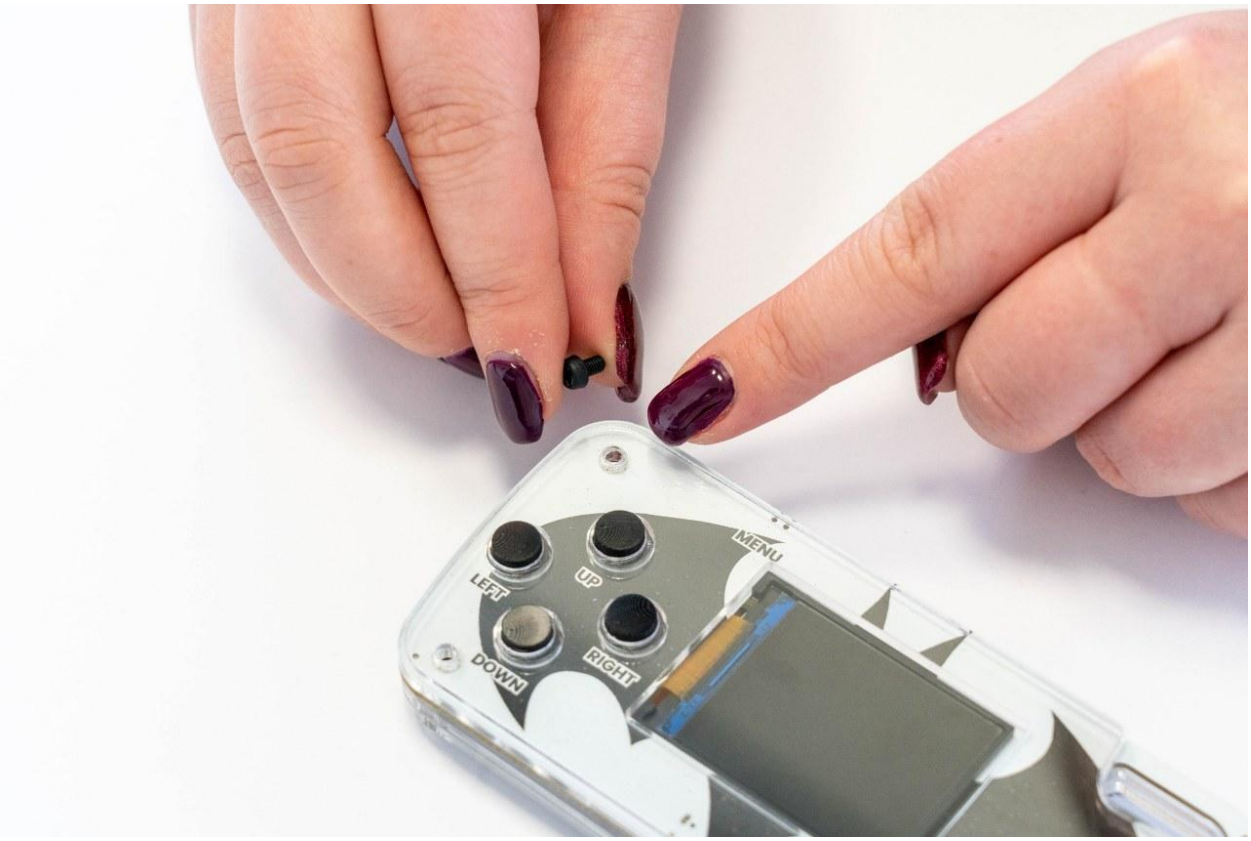
Take another casing, four bigger black bolts, and a screwdriver now.

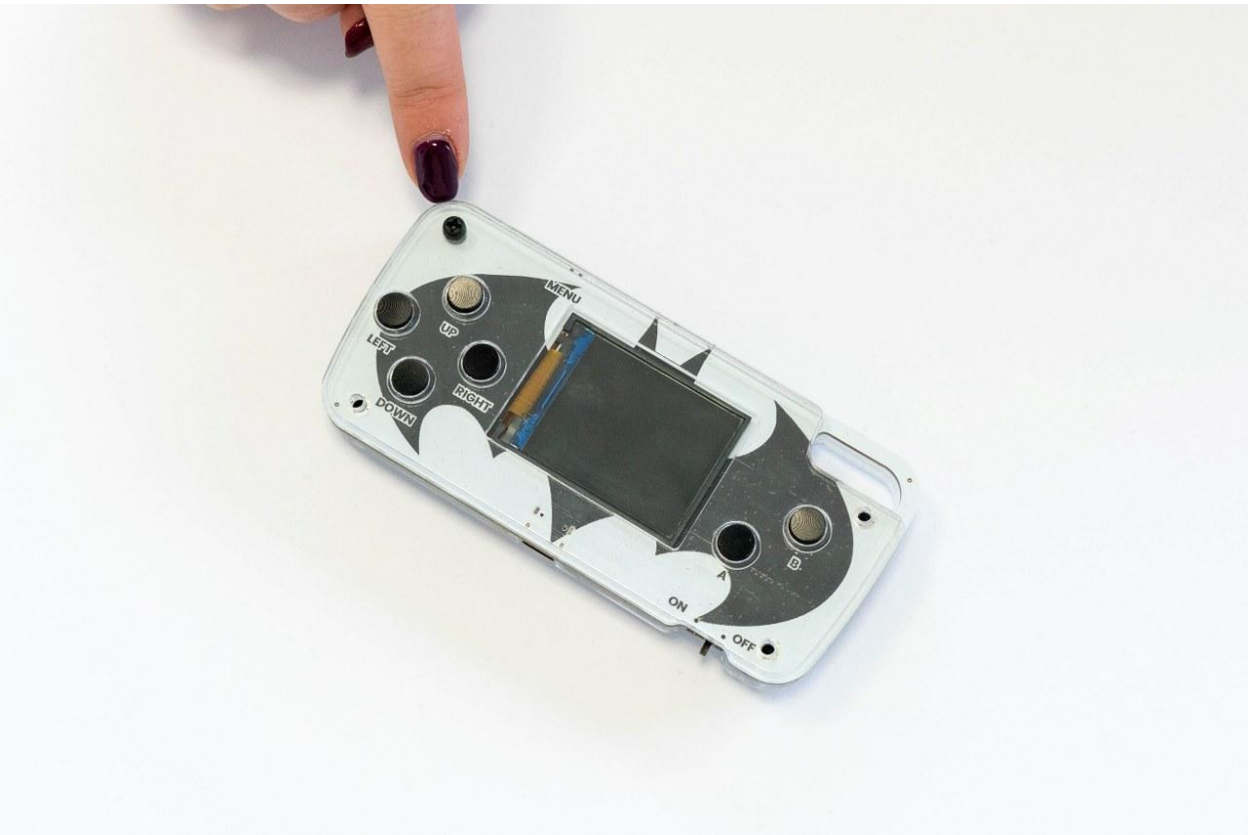
Place the casing on top of the Batcontroller as follows:


MENU
UP
LEFT
RIGHT
DOWN
A
B
ON
OFF


MENU
UP
LEFT
RIGHT
DOWN
A
B
ON
OFF

Take the bolts and put them into the four holes like this:





Tighten the bolts with the screwdriver:

Yaay!

You assembled your Batcontroller.

This is how the final product should look:


MENU
UP
LEFT
RIGHT
DOWN
A
B
ON
OFF

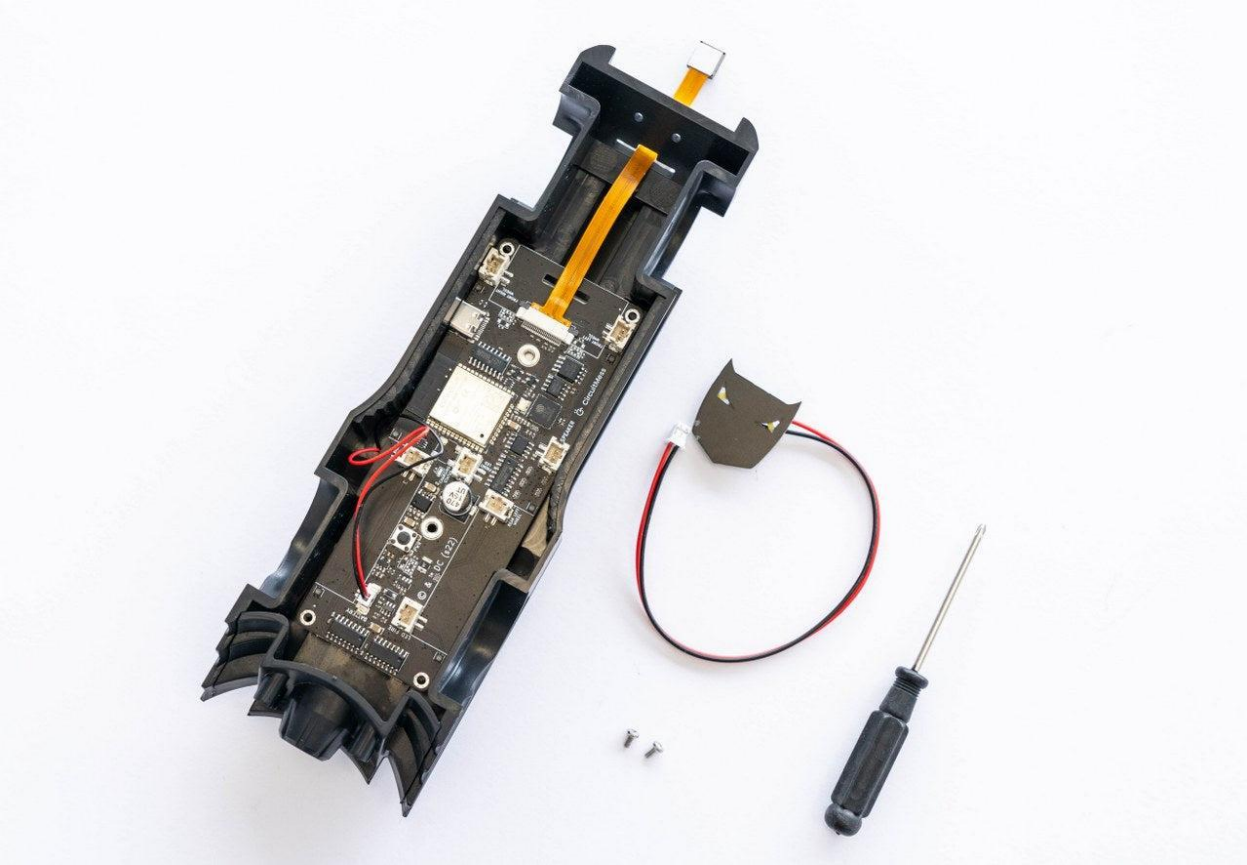
Now is the time to build the main part - the Batmobile!

Let's make Batmobile

Let's make Batmobile

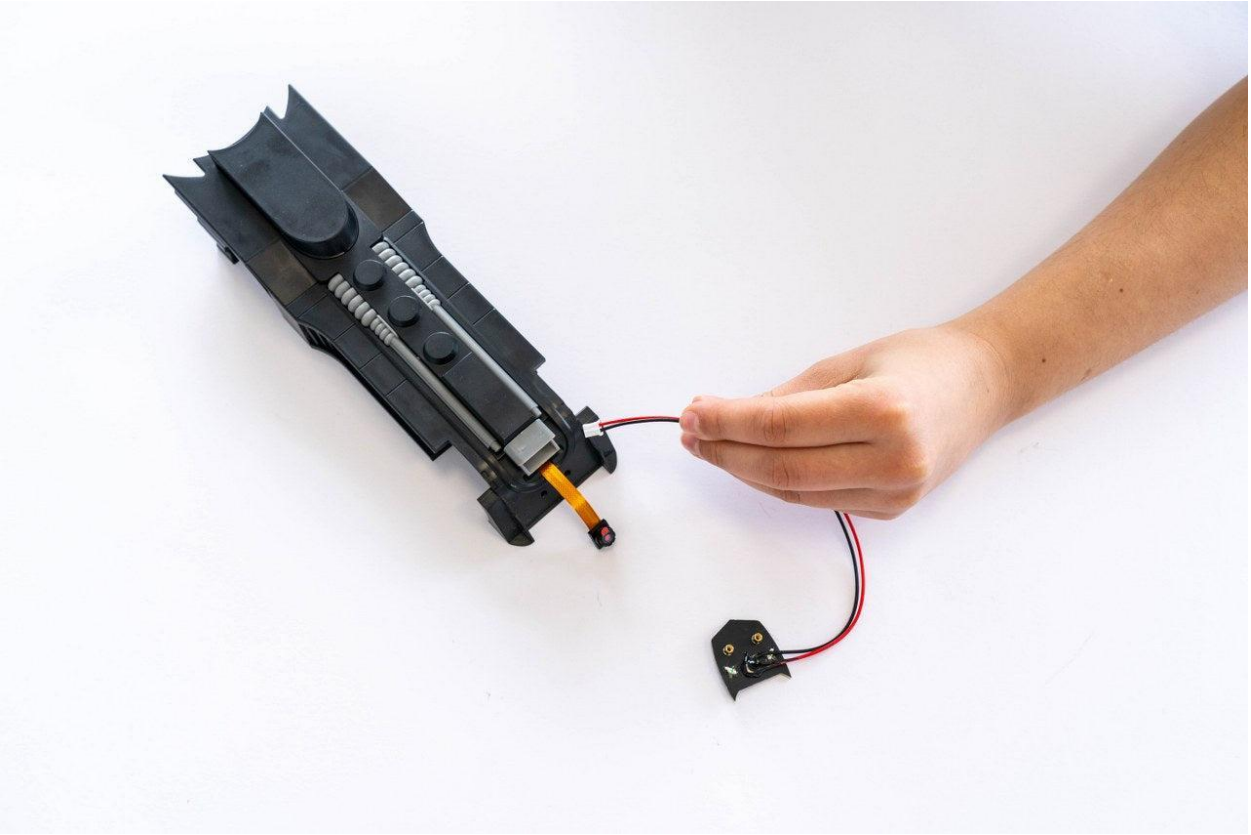
Now comes the exciting part that you've all been waiting for!

Take the chassis with the board, headboard, screwdriver, and two screws (the ones with the round head).

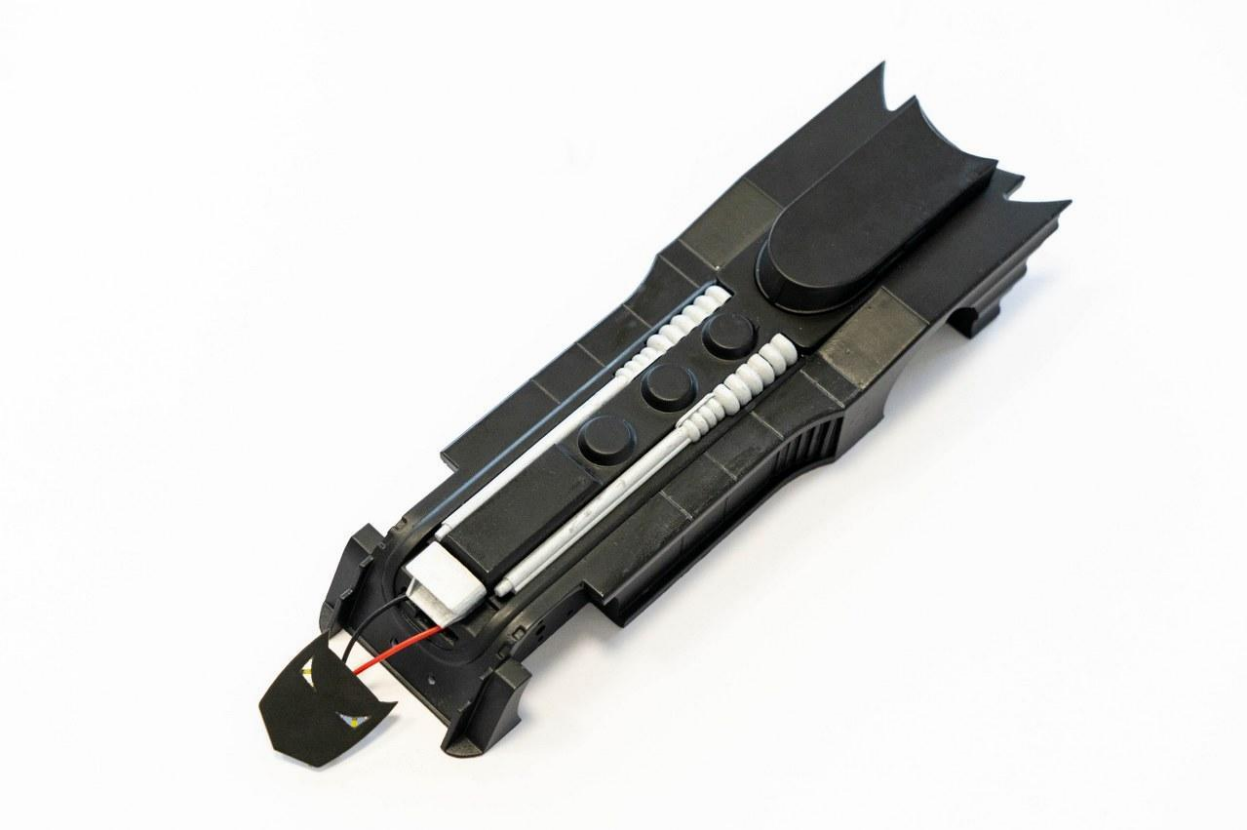


You'll have to pull the headboard through the hole in the Batmobile's head.

Check the photo below to see where you should put the headboard's wire:



When you pull the wire through, it will look like this:

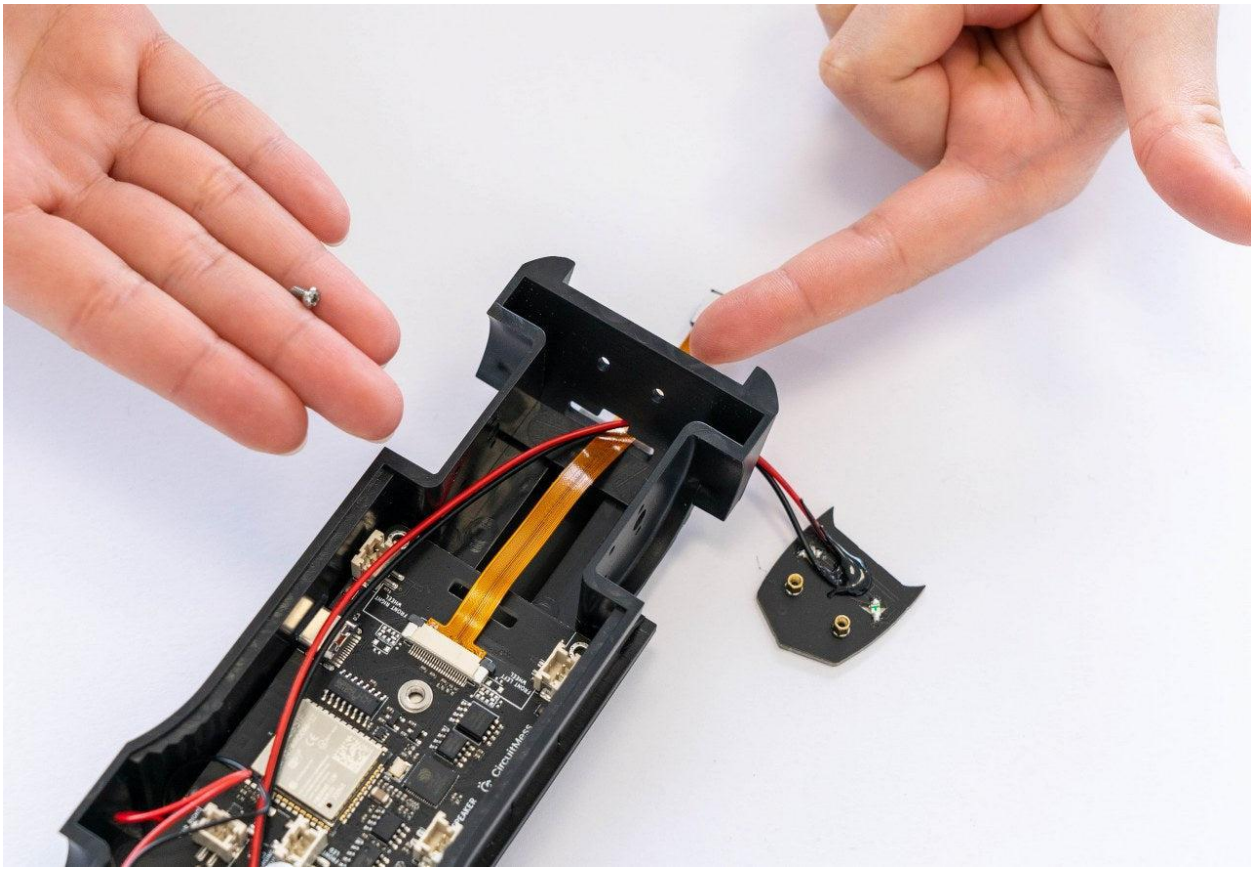


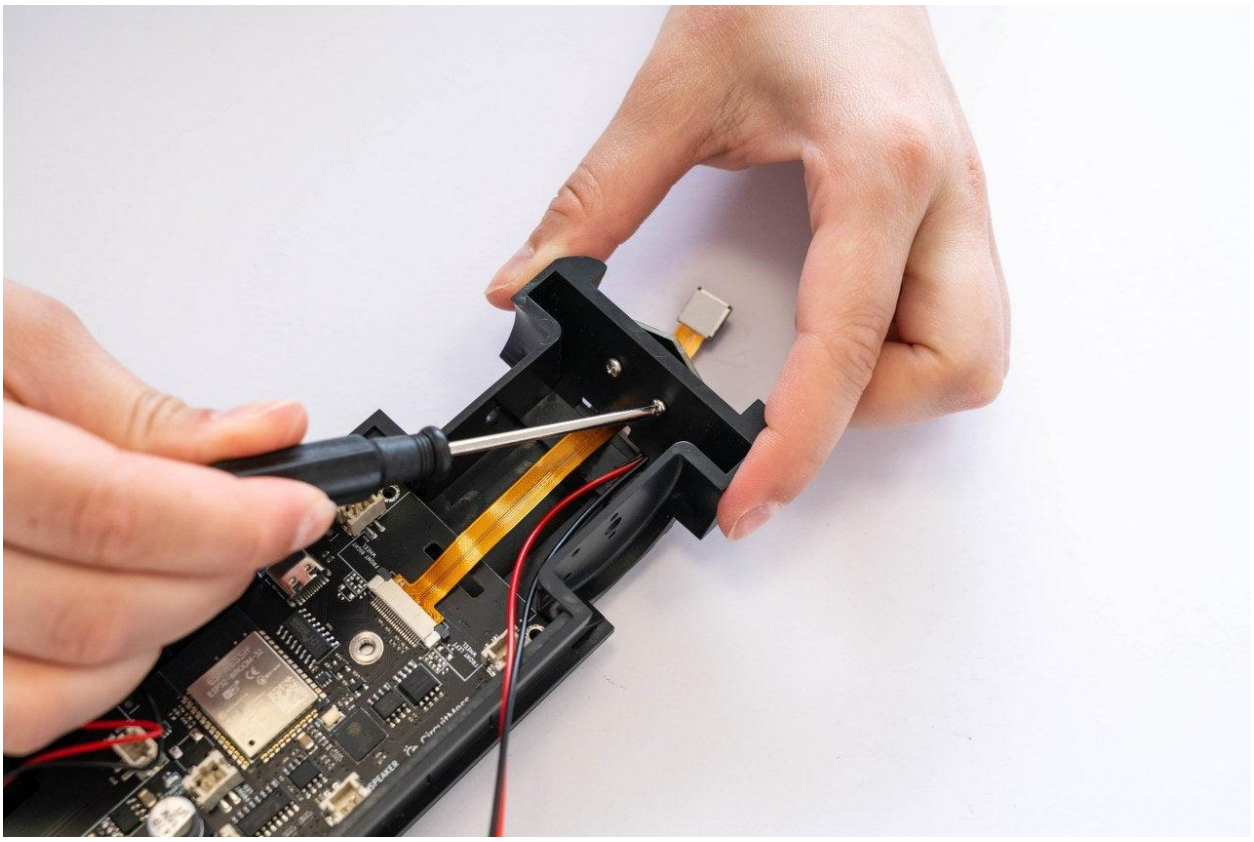
Take two bolts and a screwdriver and turn your Batmobile around.

Take two bolts and a screwdriver and turn your Batmobile around.

You'll see that there are already spacers on the inside of the headboard.

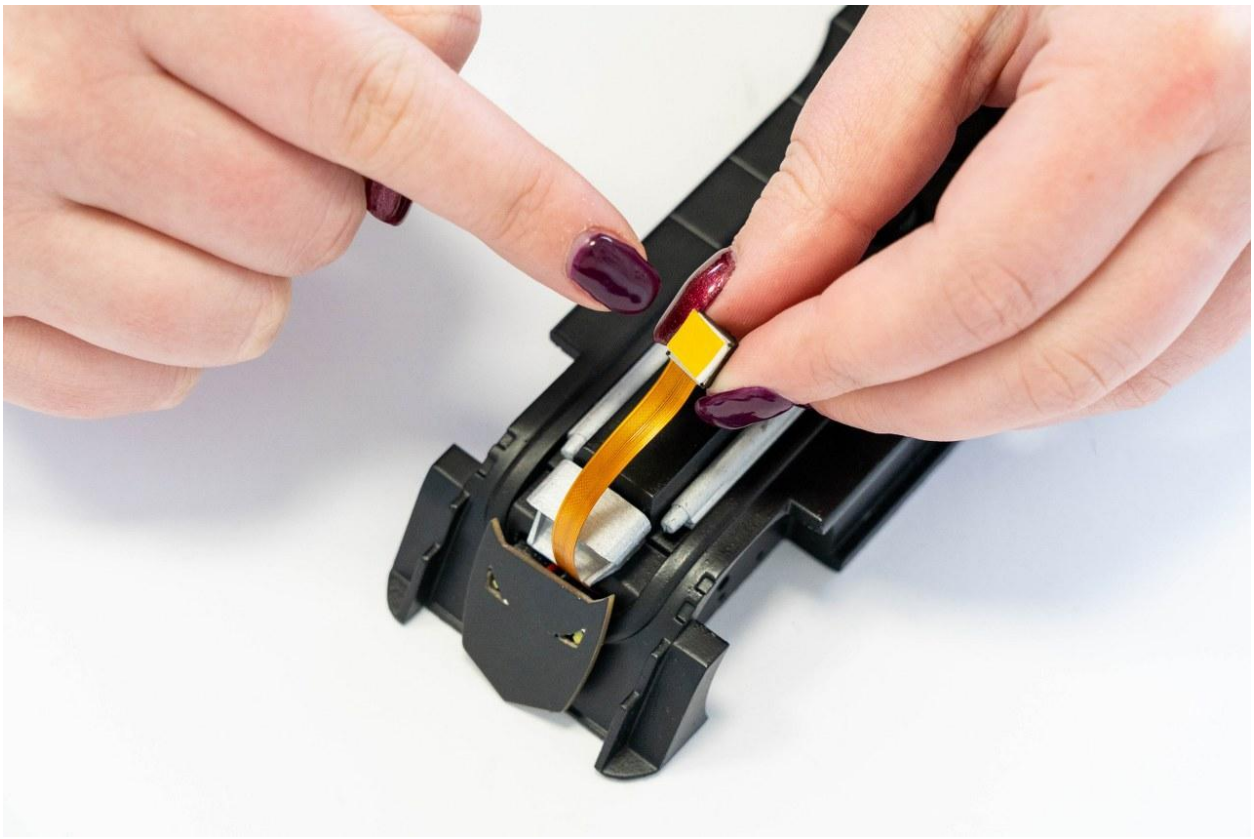
Turn your Batmobile on the back and put the screws from the inside through the spacer to tighten the headboard.

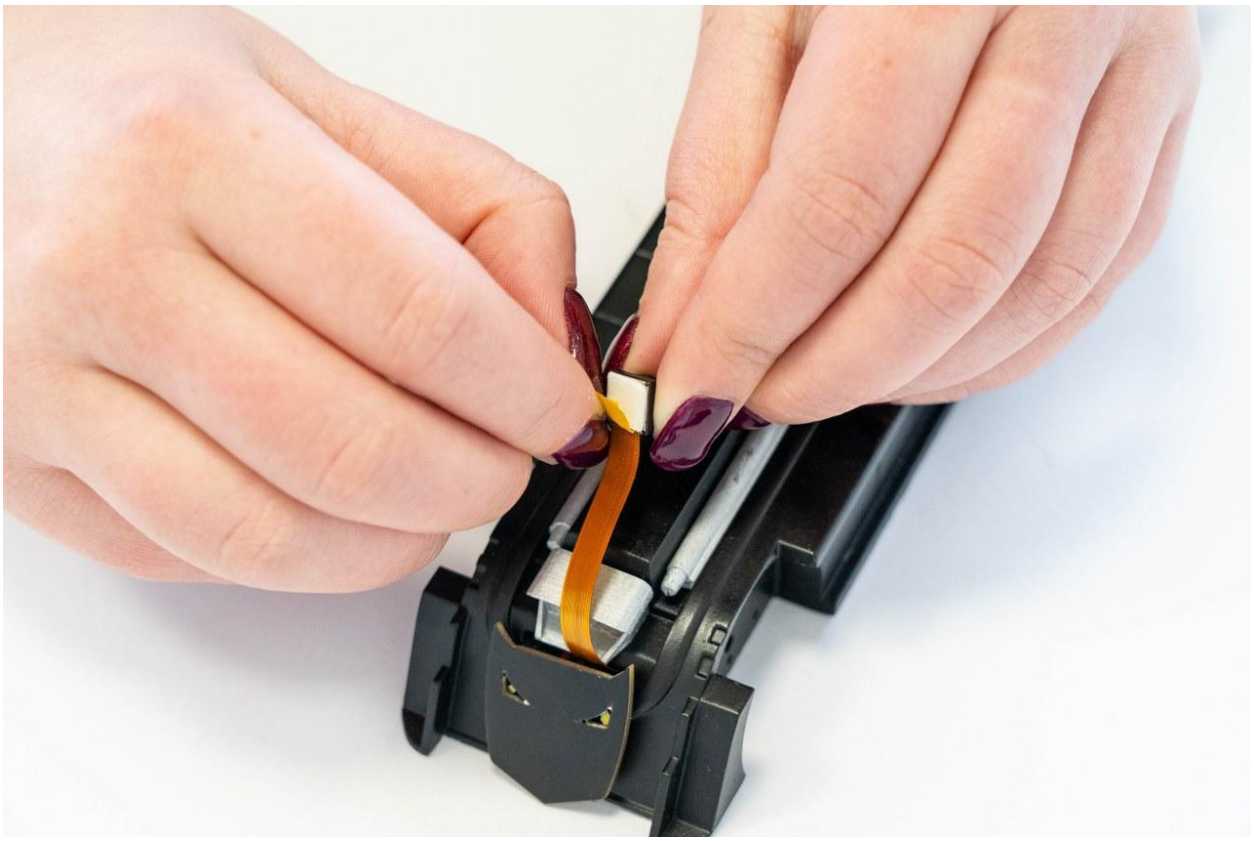




After you've tightened the headboard, you can attach the camera to it.

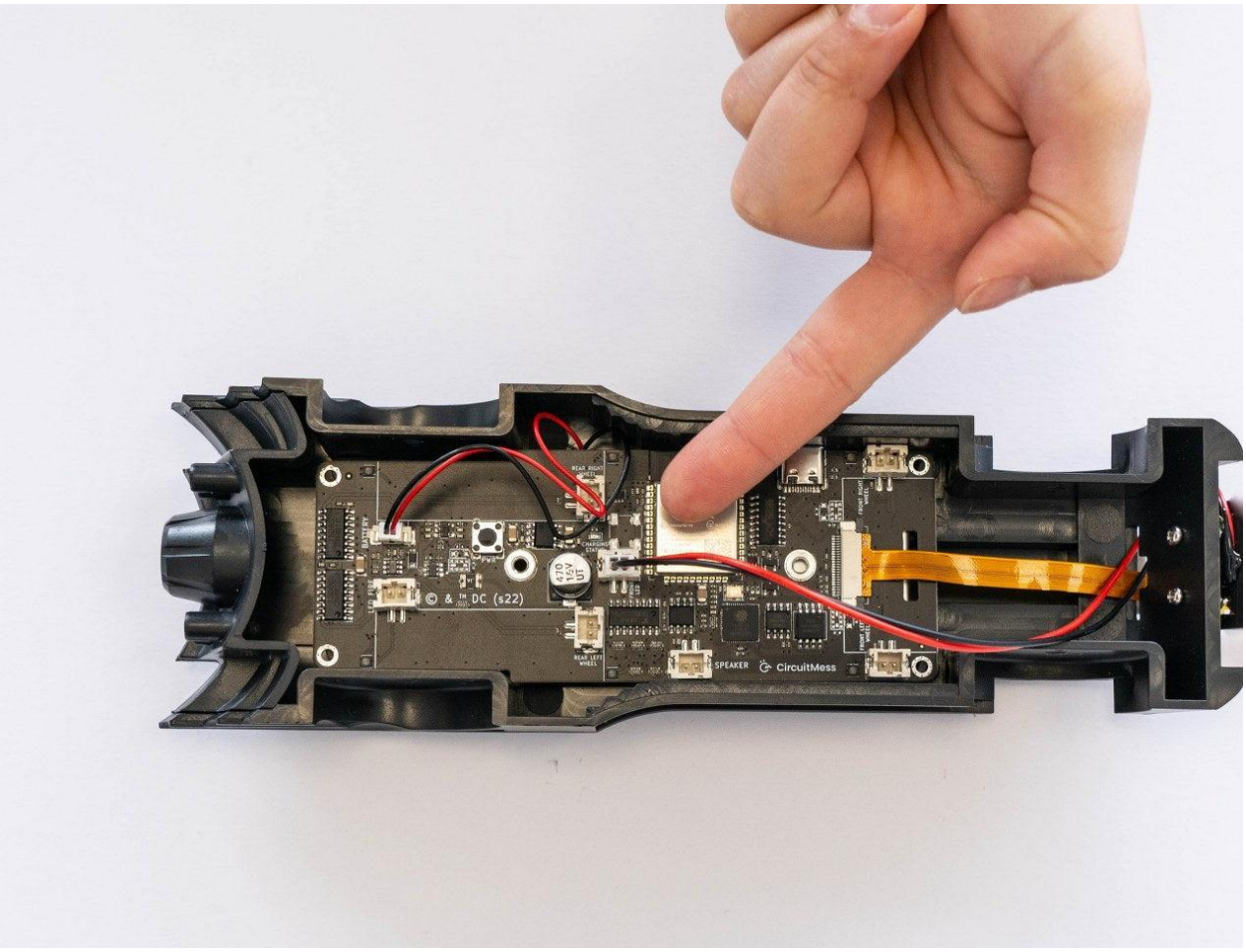
Firstly, you'll have to remove the paper from the sticking pad.





Stick the camera between the "eyes" of the Batmobile in the middle of the headboard.

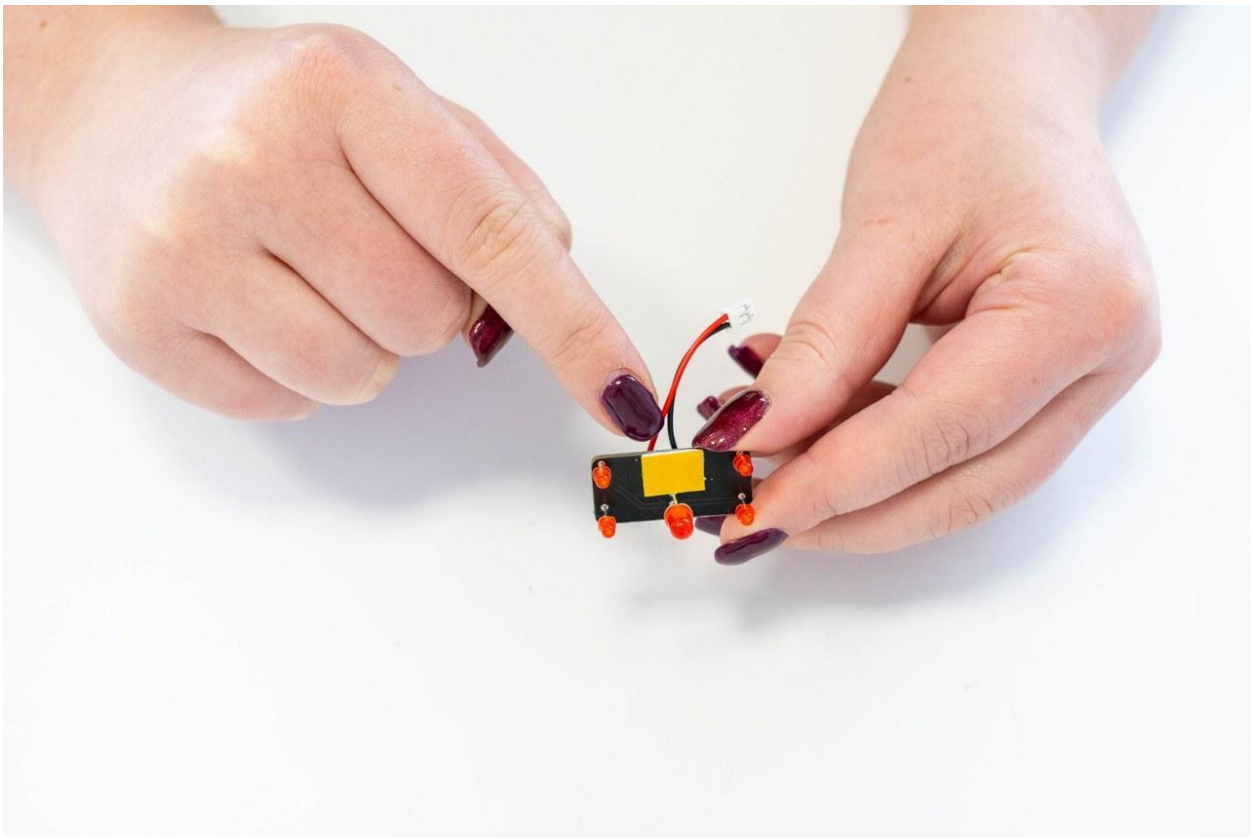
Make sure the headboard is connected to the "Front LED" port.

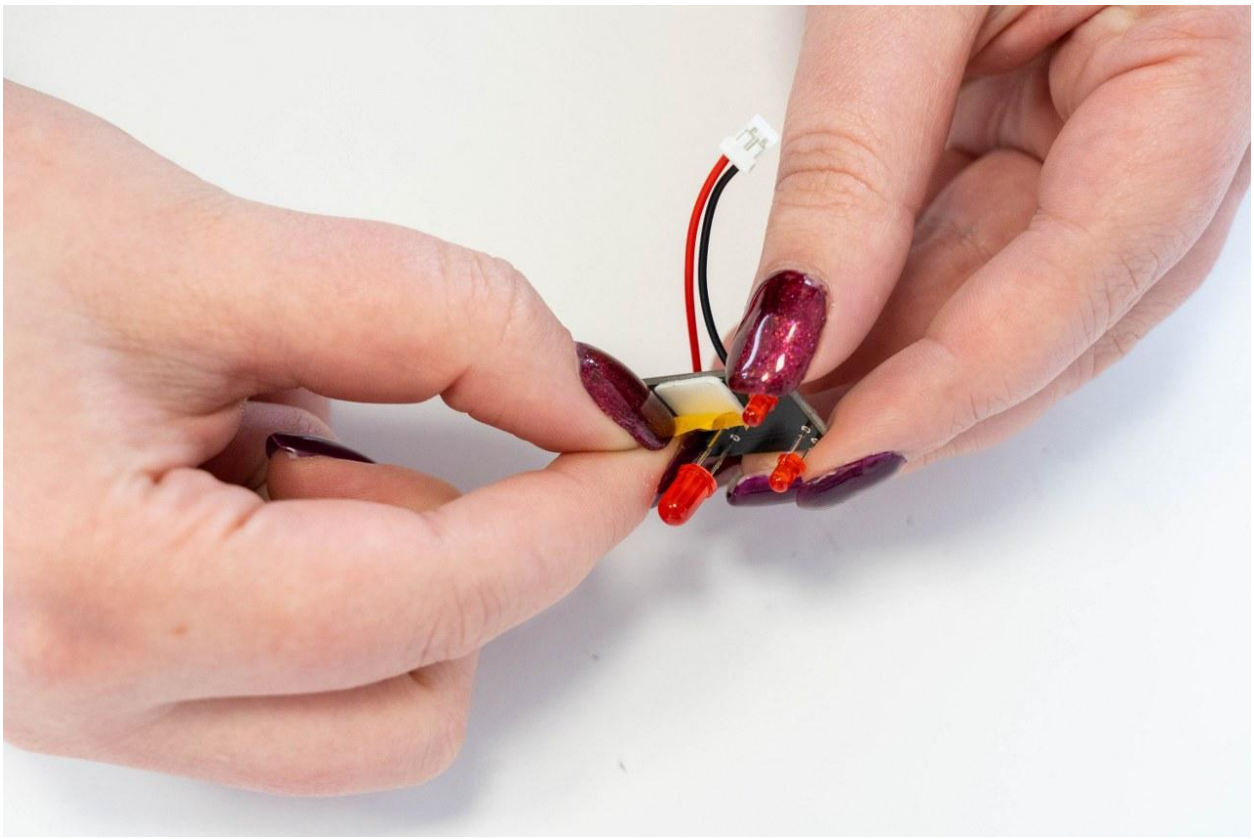


It's time to take the fire board with red LEDs.

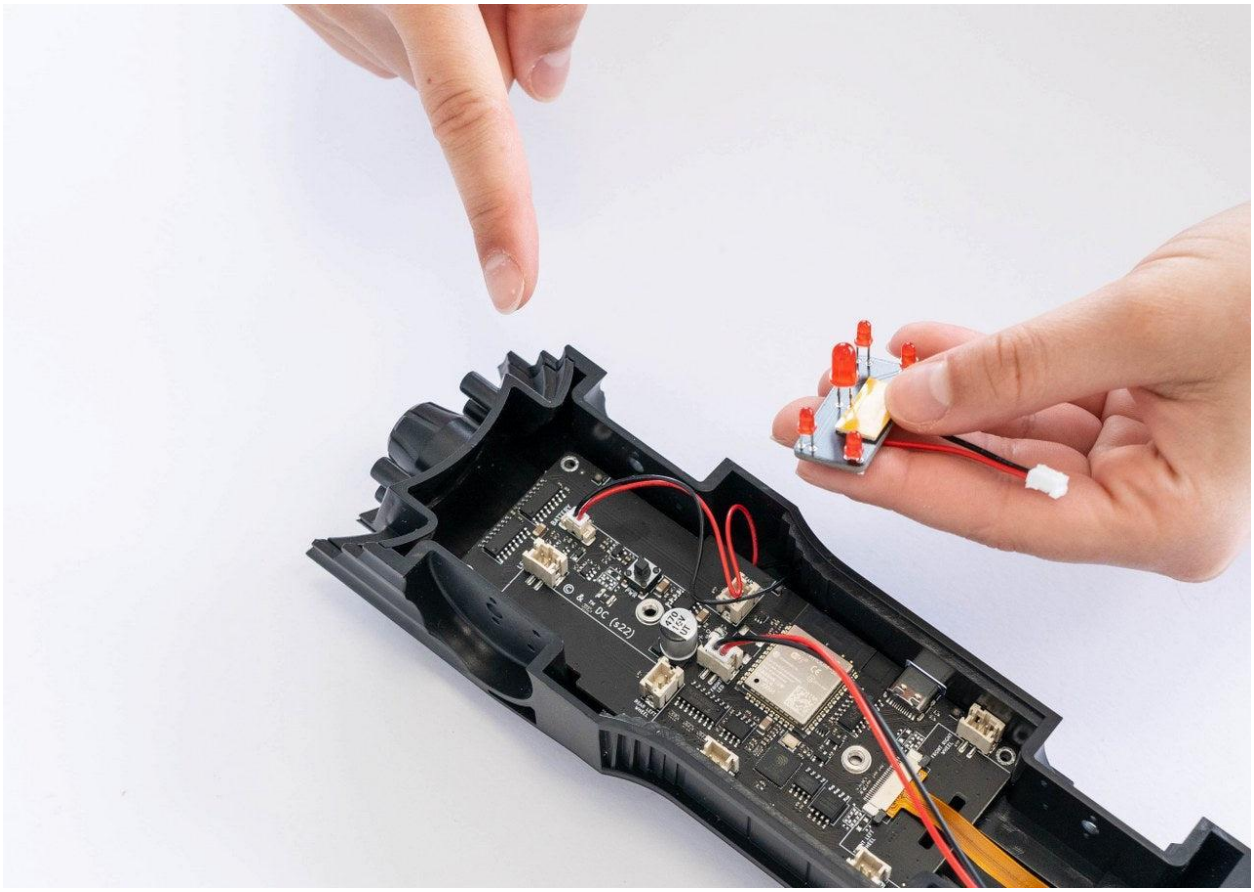
The fire board will be placed at the end of the Batmobile so it looks like the fire is coming from it while driving.

Remove the paper from the sticking pad before placing the board in its place to ensure nothing falls off.

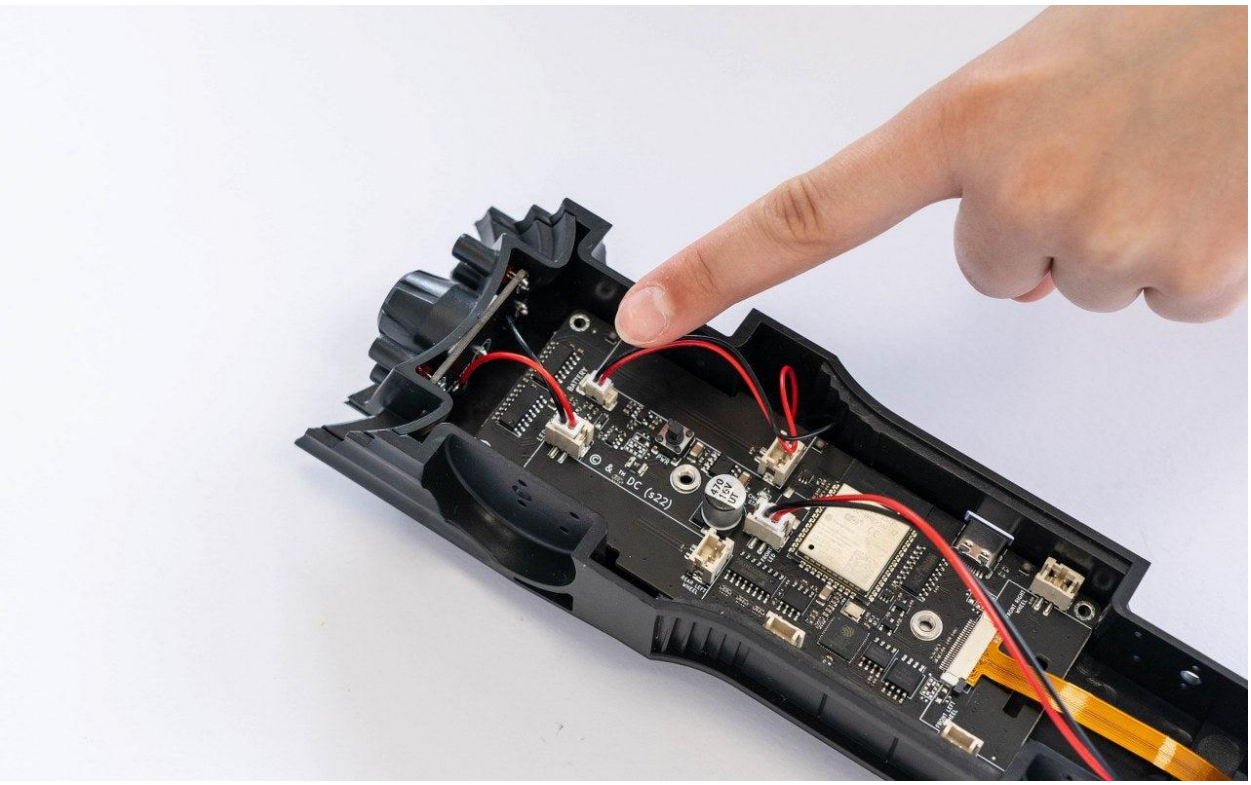




Now place the fire board in its place:



Connect the fire board to the "LED Fire" port.

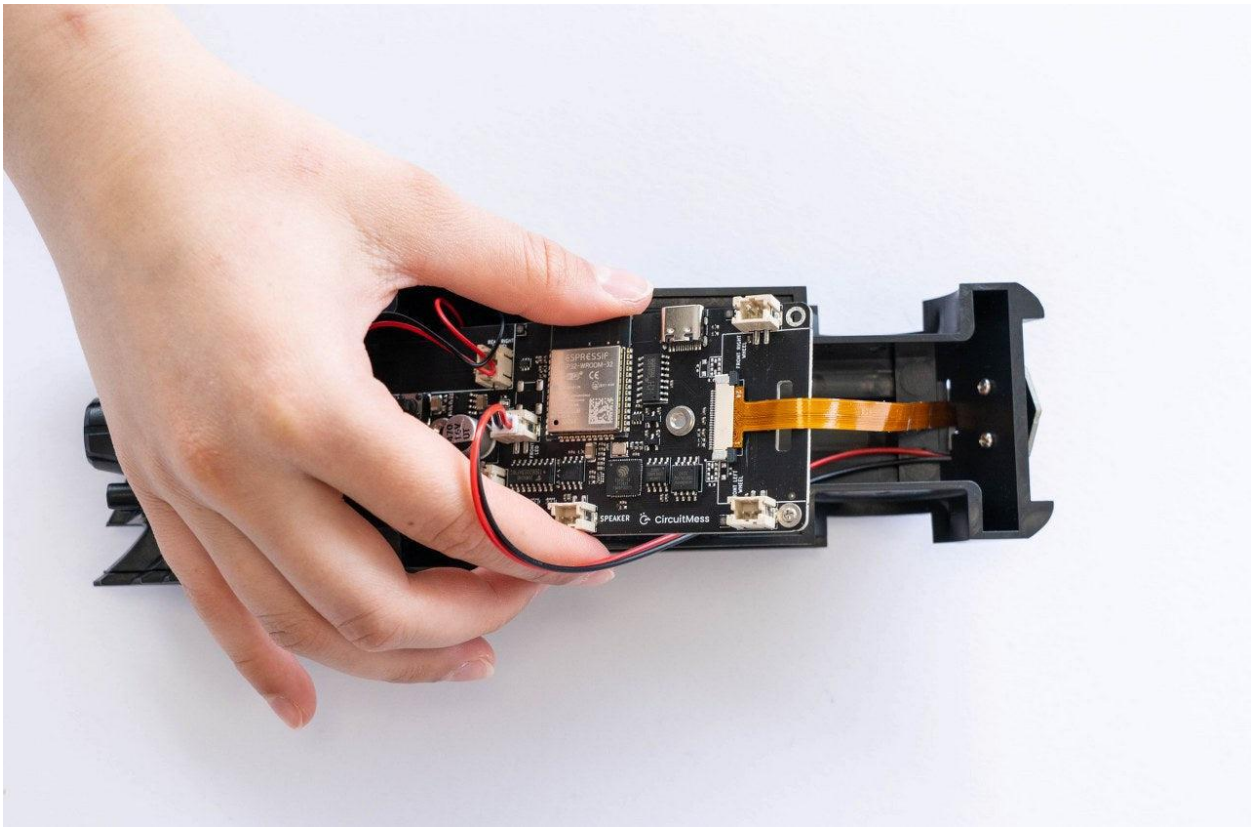


Now take Batmobile, four screws with a flat head, and a screwdriver.

You’ll have to tighten the PCB to the chassis.

To make the process easier, lift the PCB slightly and insert the screws into the four holes on the PCB's edges.

Just like this: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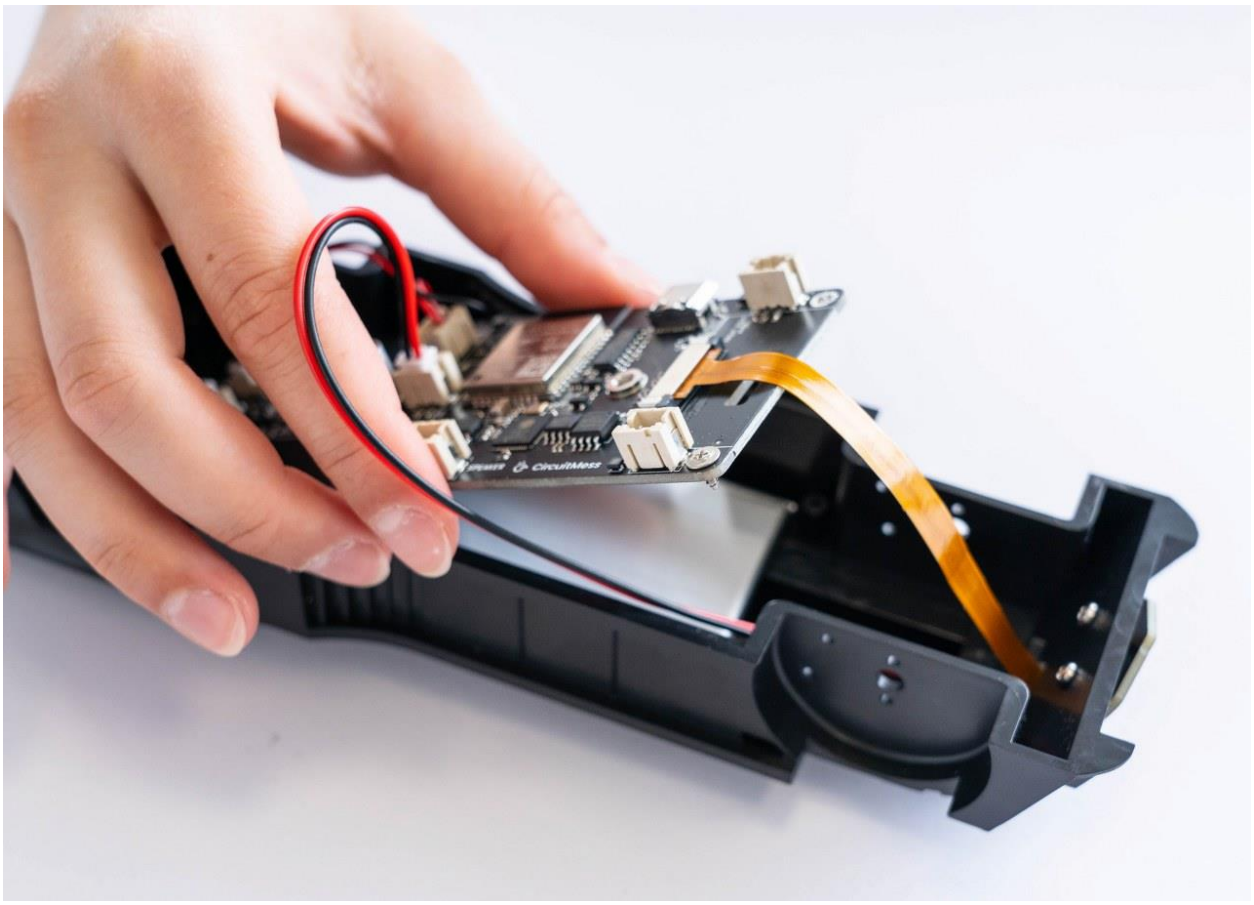
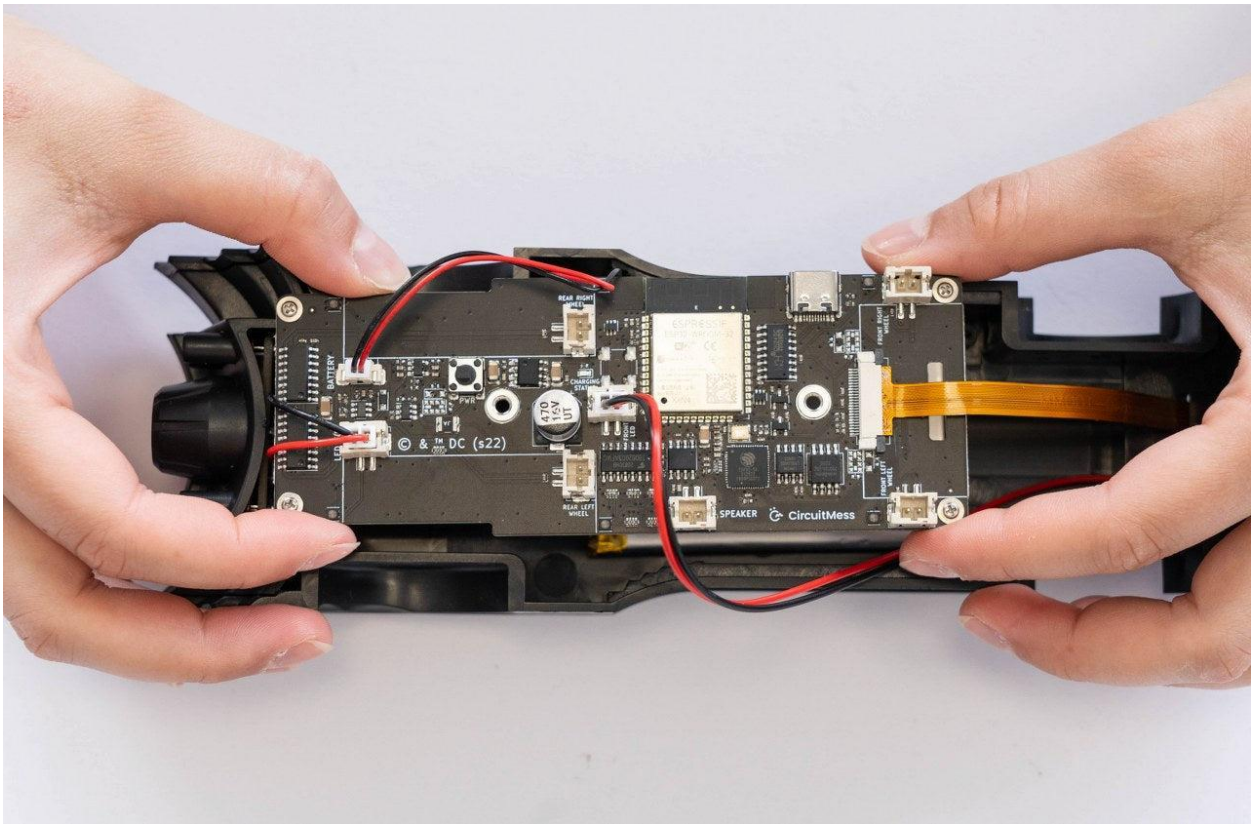
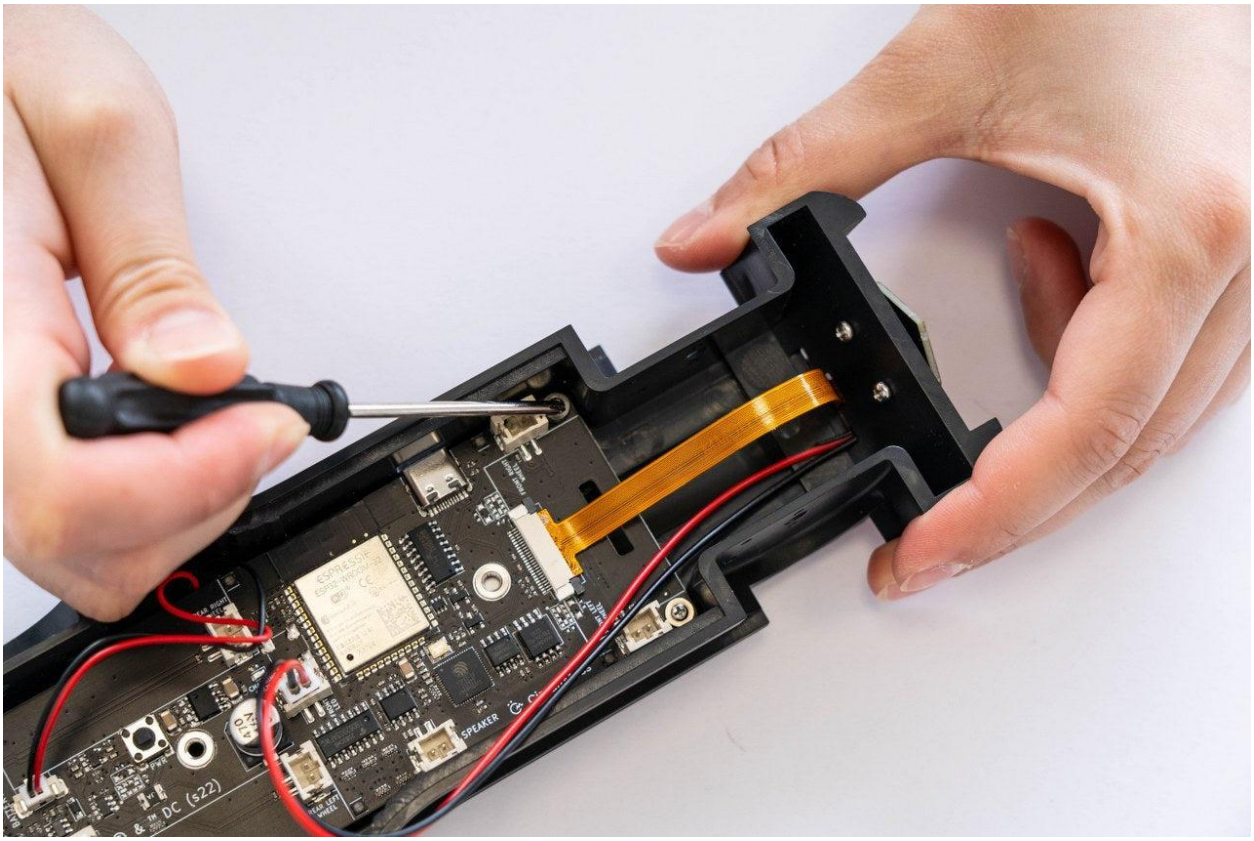
SPEAKER
CircuitMess





Put it back down slowly to make sure the screws fit inside the chassis.

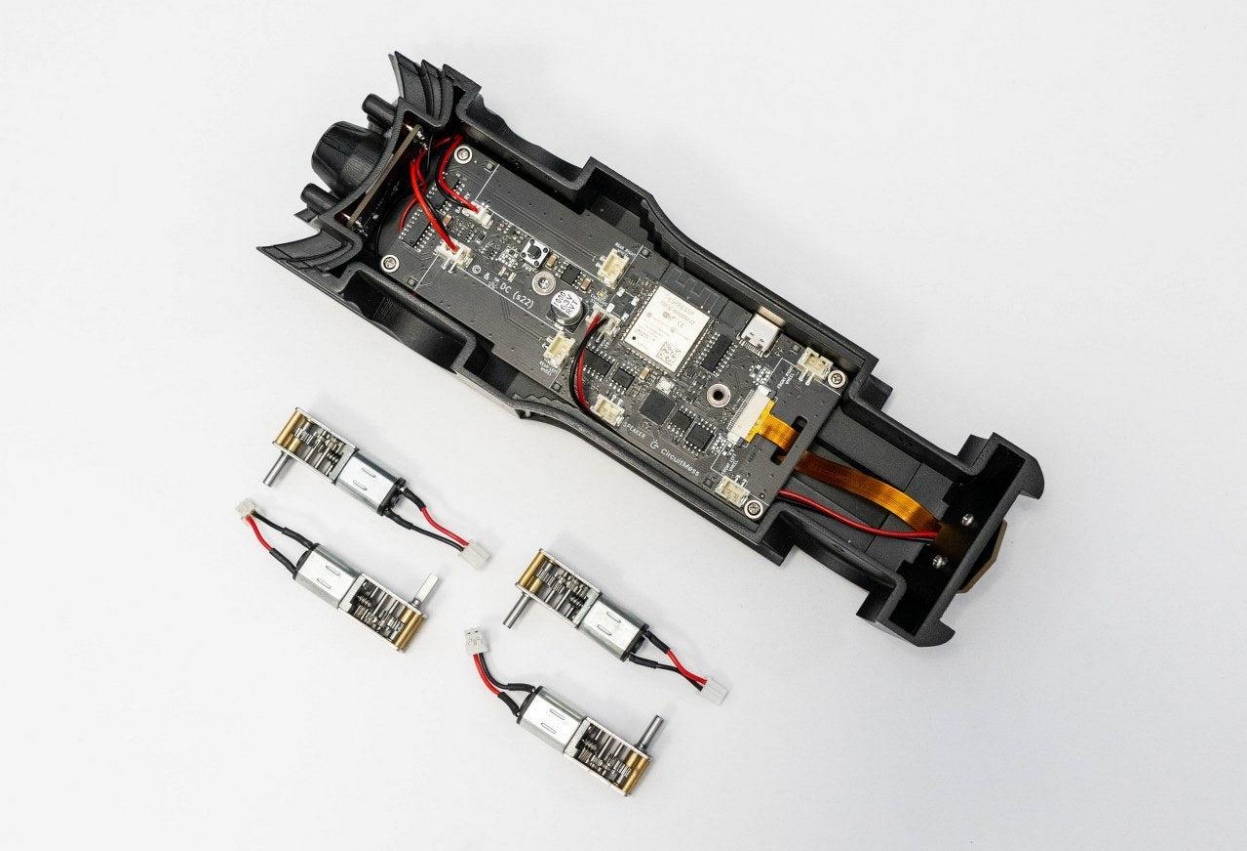
After everything is in place, take the screwdriver and tighten the four bolts as follows:



If all the wires and ribbons are connected and the PCB is tightened, you may proceed.

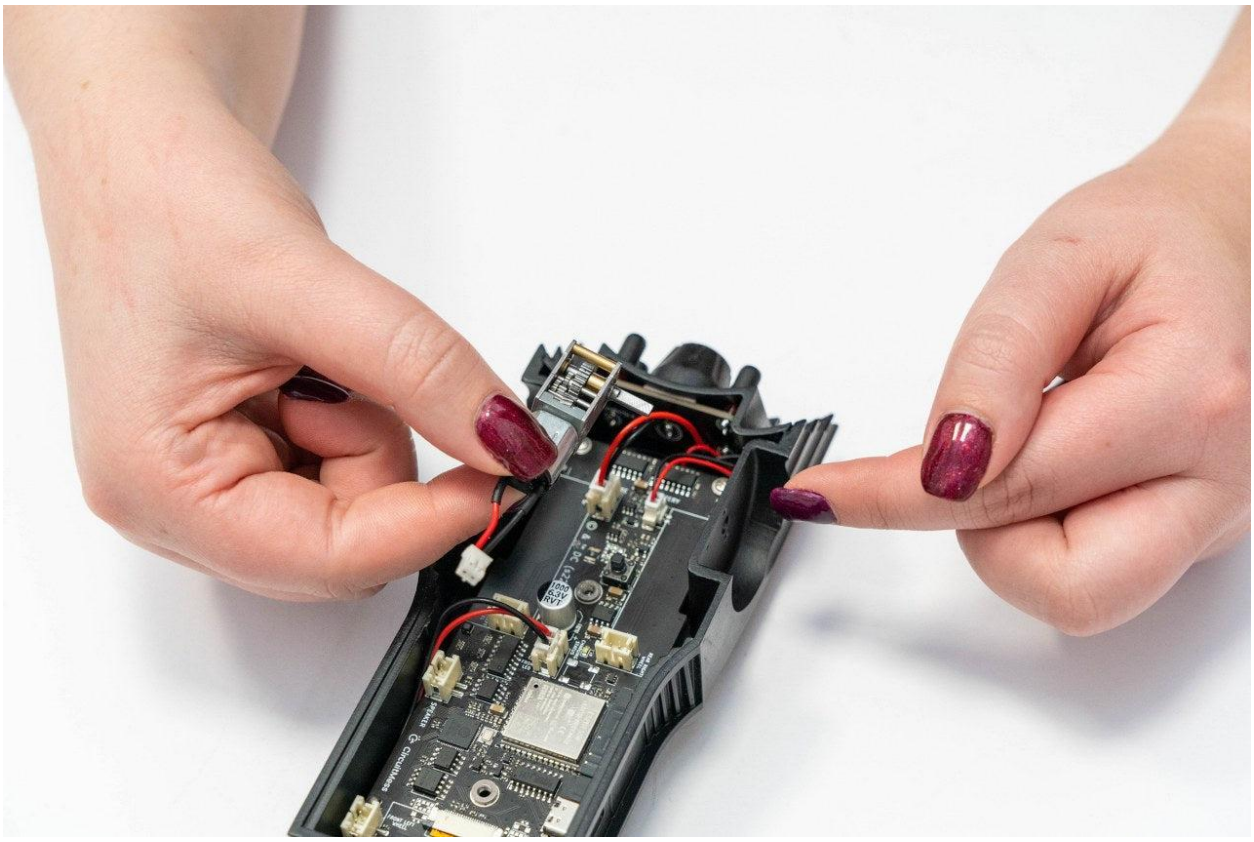
It's time to give your Batmobile power.

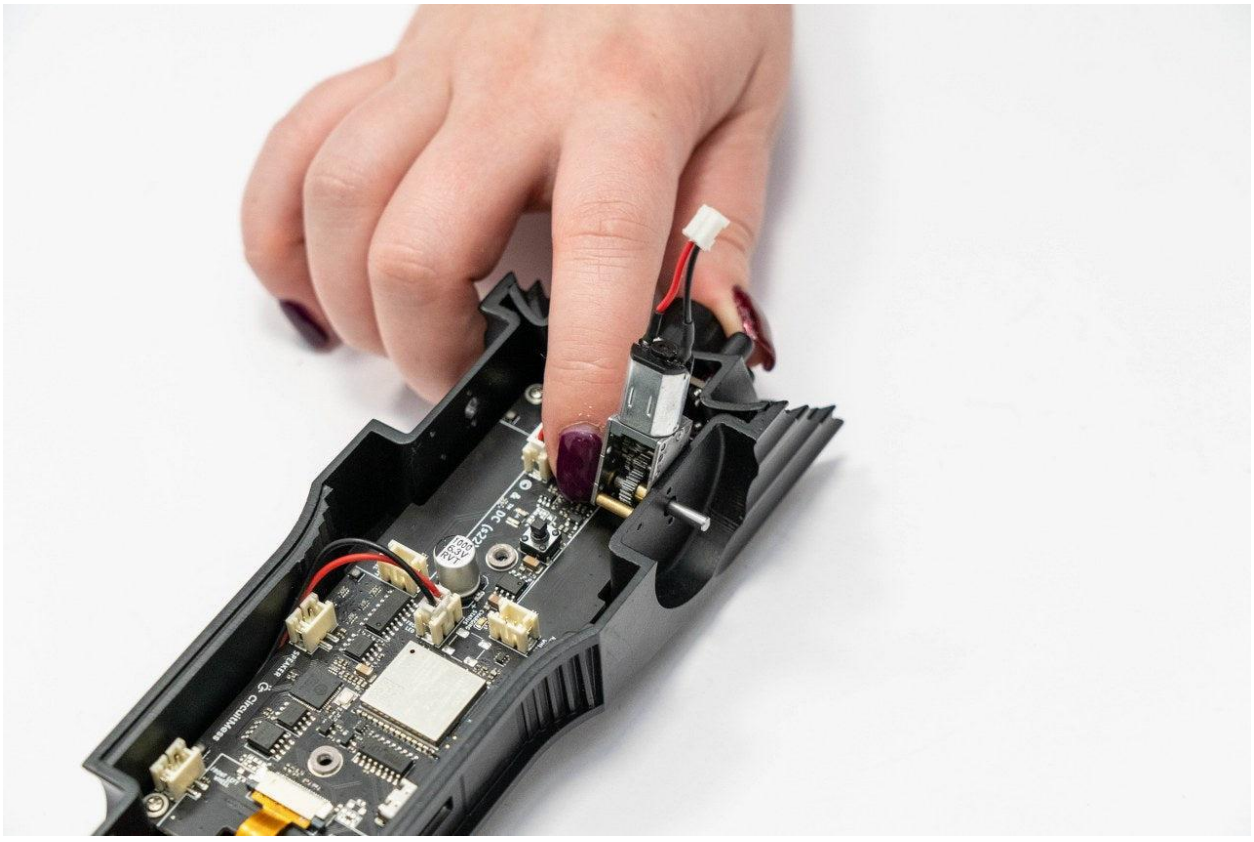
Take the four electro motors:

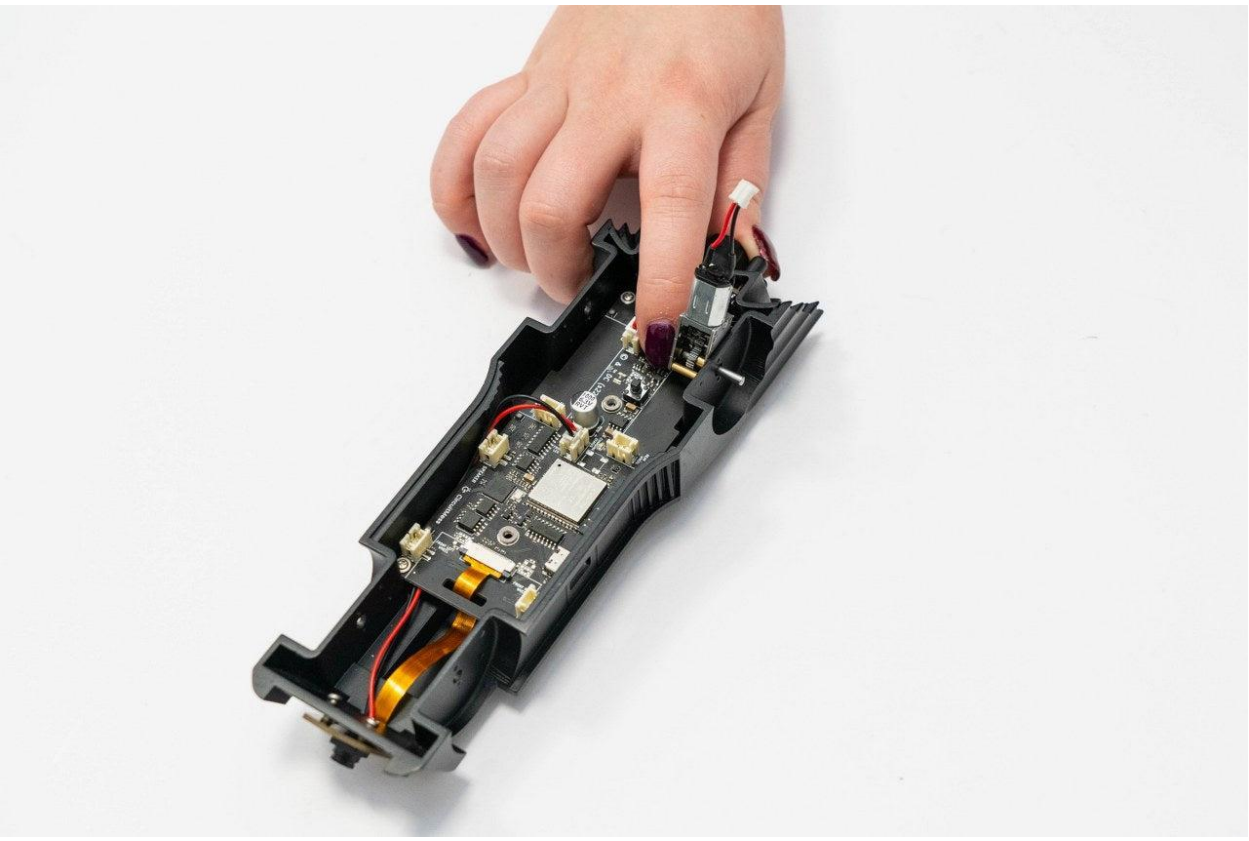


Each motor will be going from the inside of the wheels.

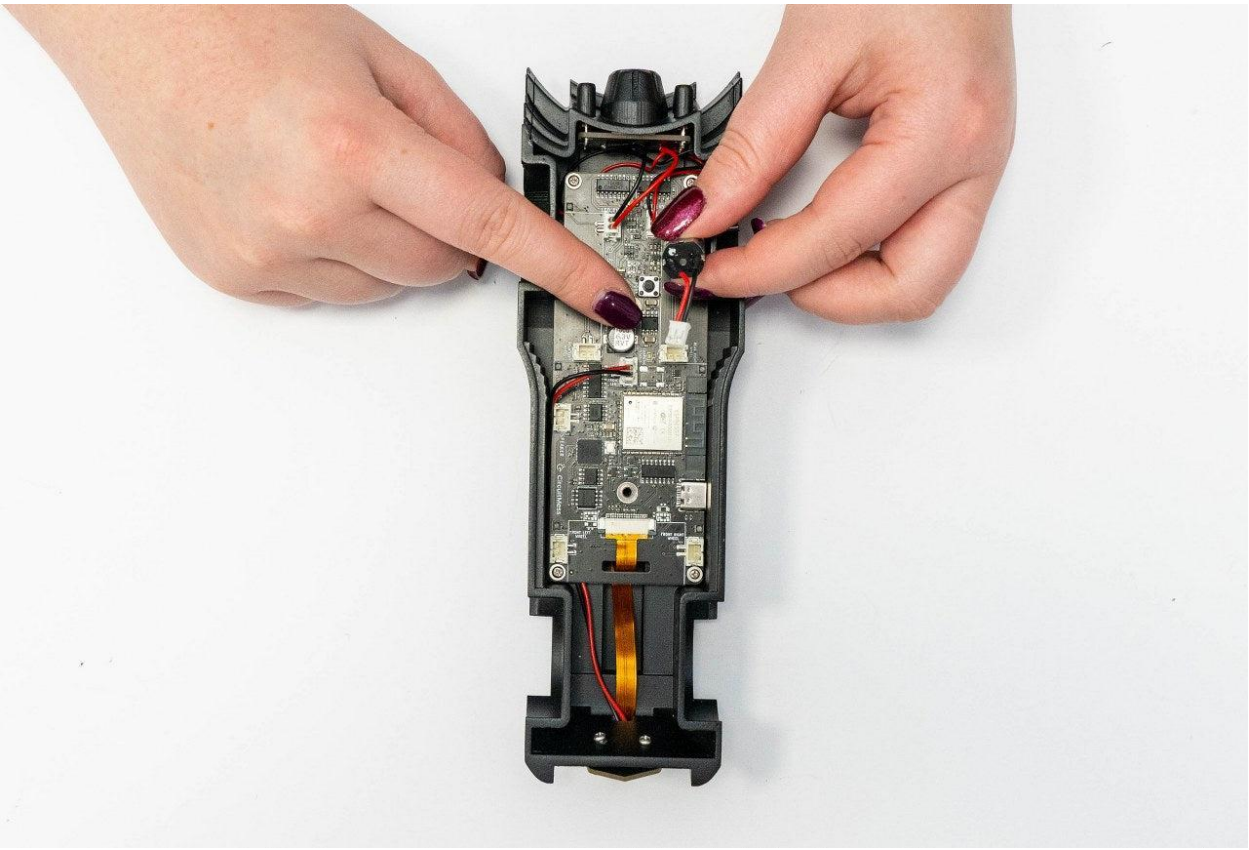
You'll see one larger, and four smaller holes. The motor's pin is inserted into the large one.

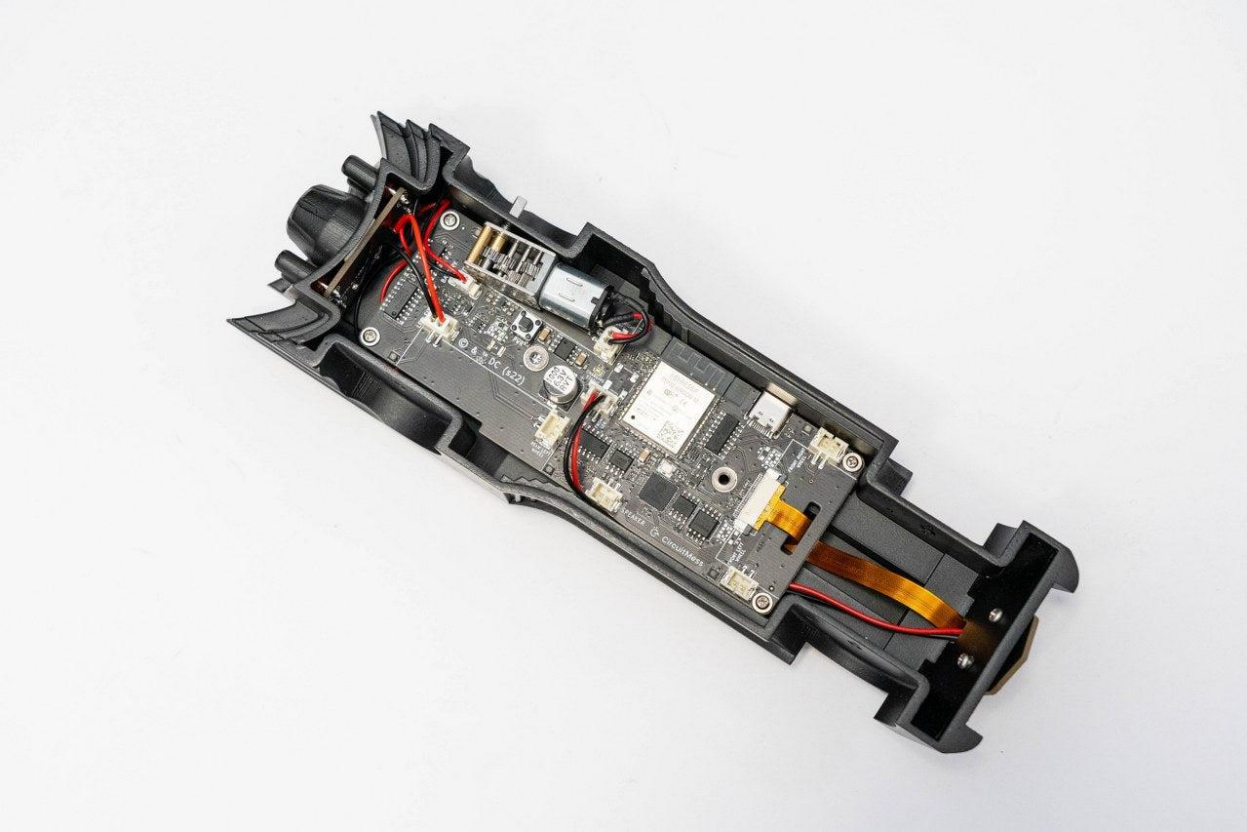




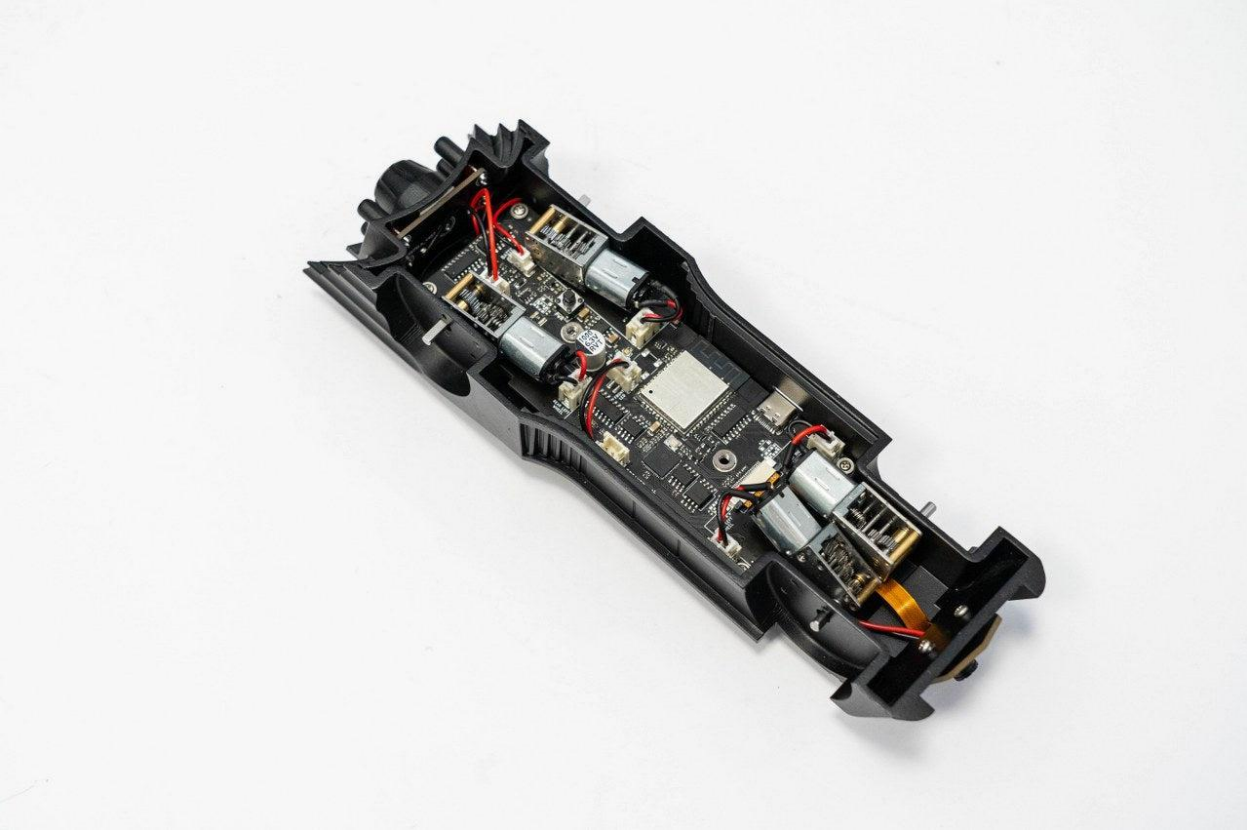


Connect the motor wire to the port below it:



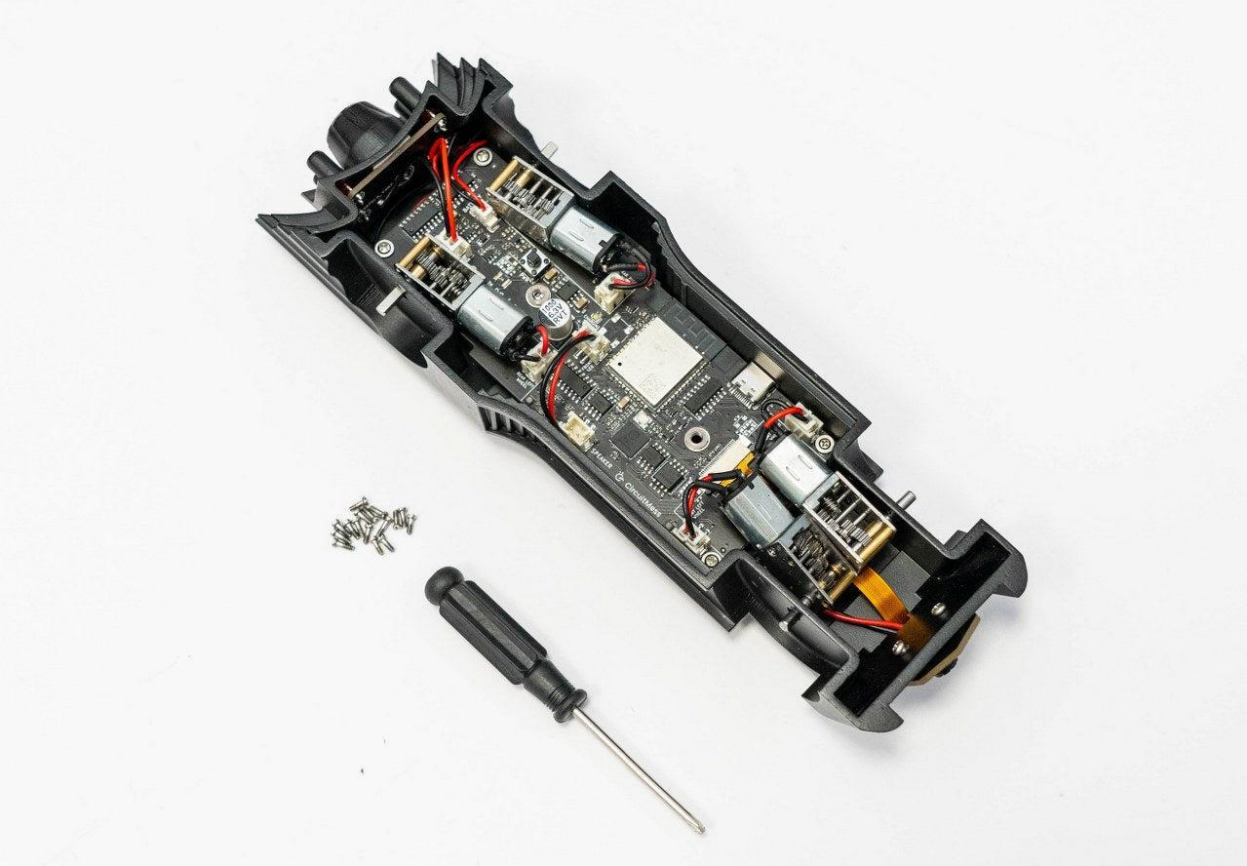


Repeat this step for the remaining motors:



It's time to fasten the motors to the chassis.

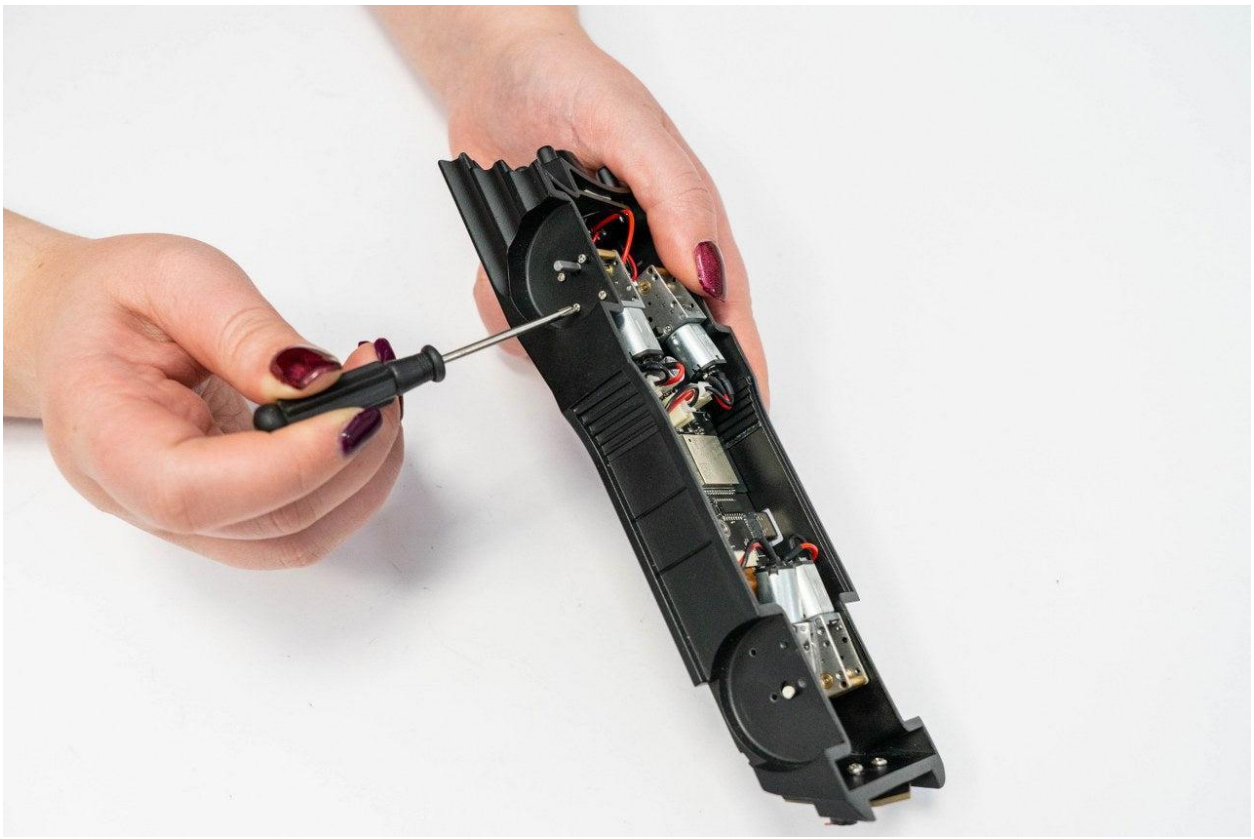
Take the screwdriver and 16 smallest bolts.

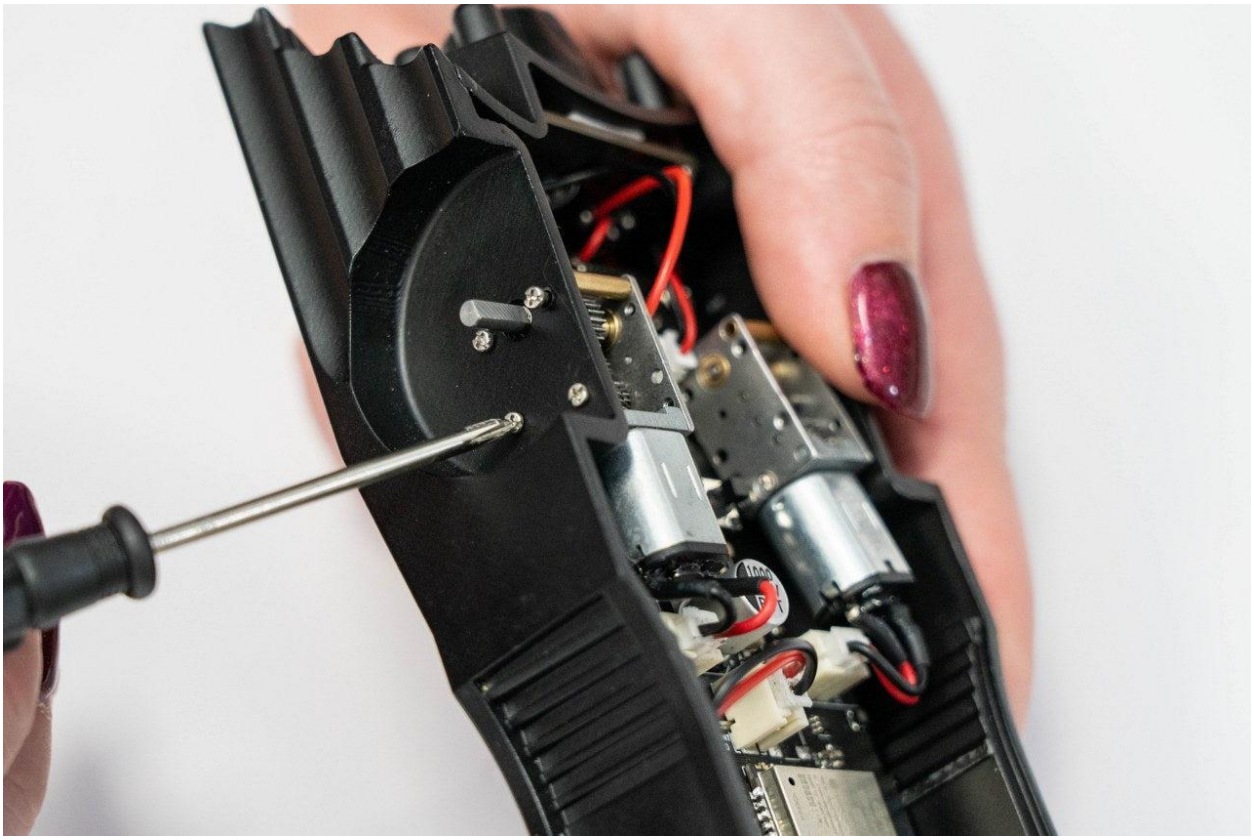


As previously stated, there are four smaller holes on the side where the wheels will be installed. These smaller bolts will go in there.

The bolts will go from the outside:

Insert the bolts and take the screwdriver.

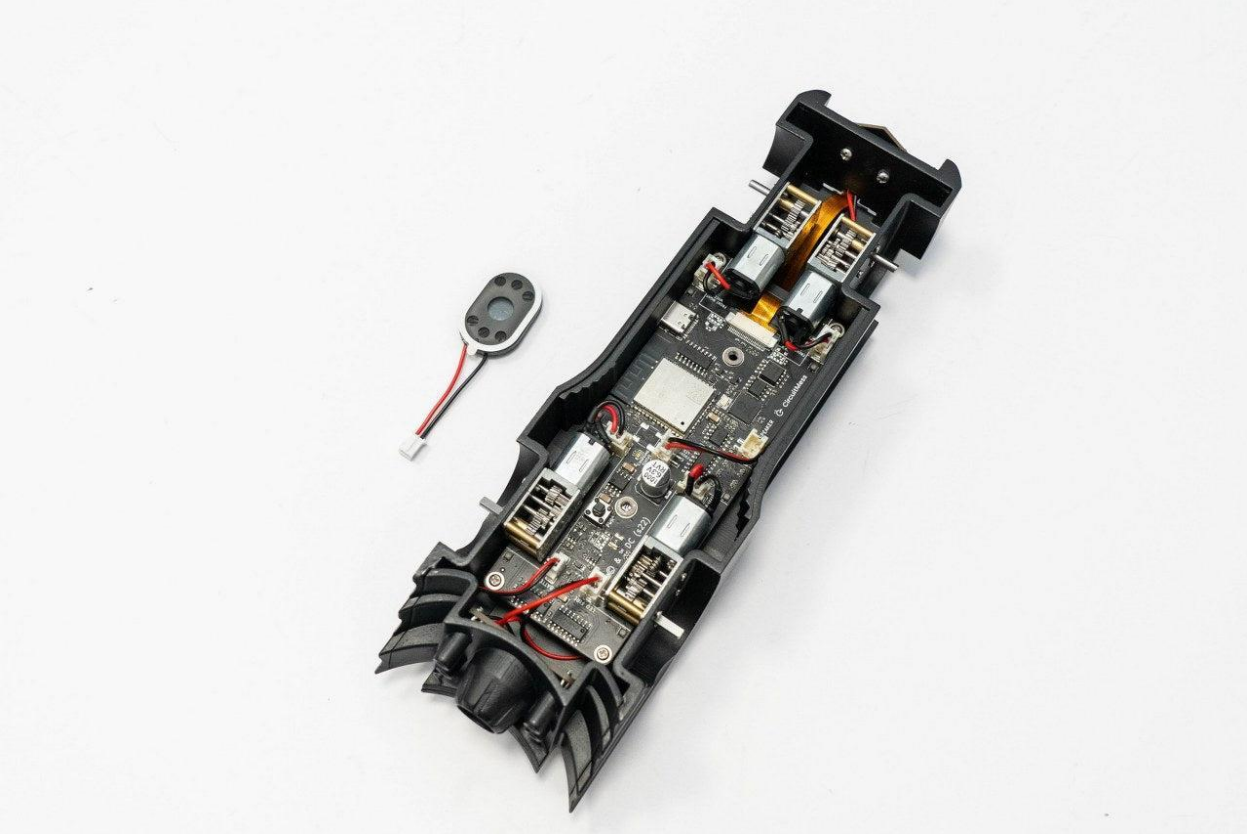




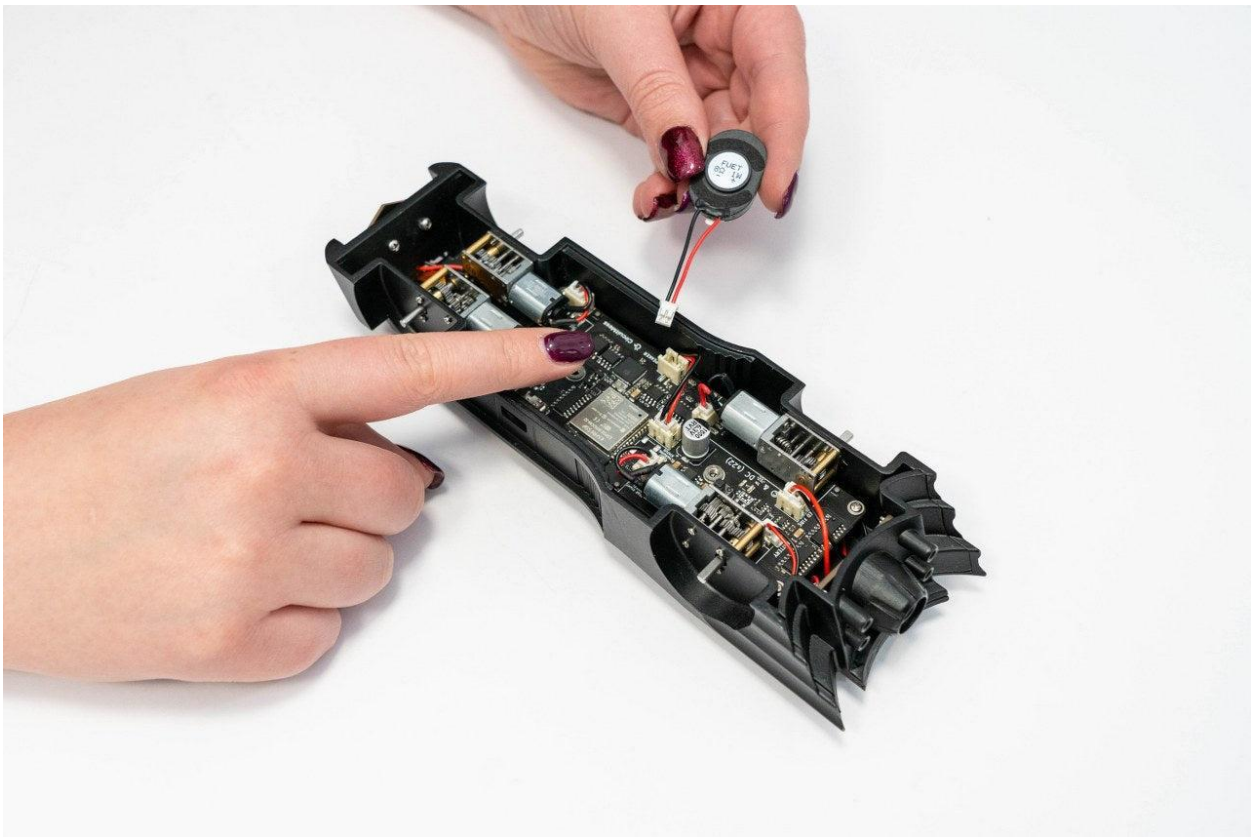
Your Batmobile should look like this:

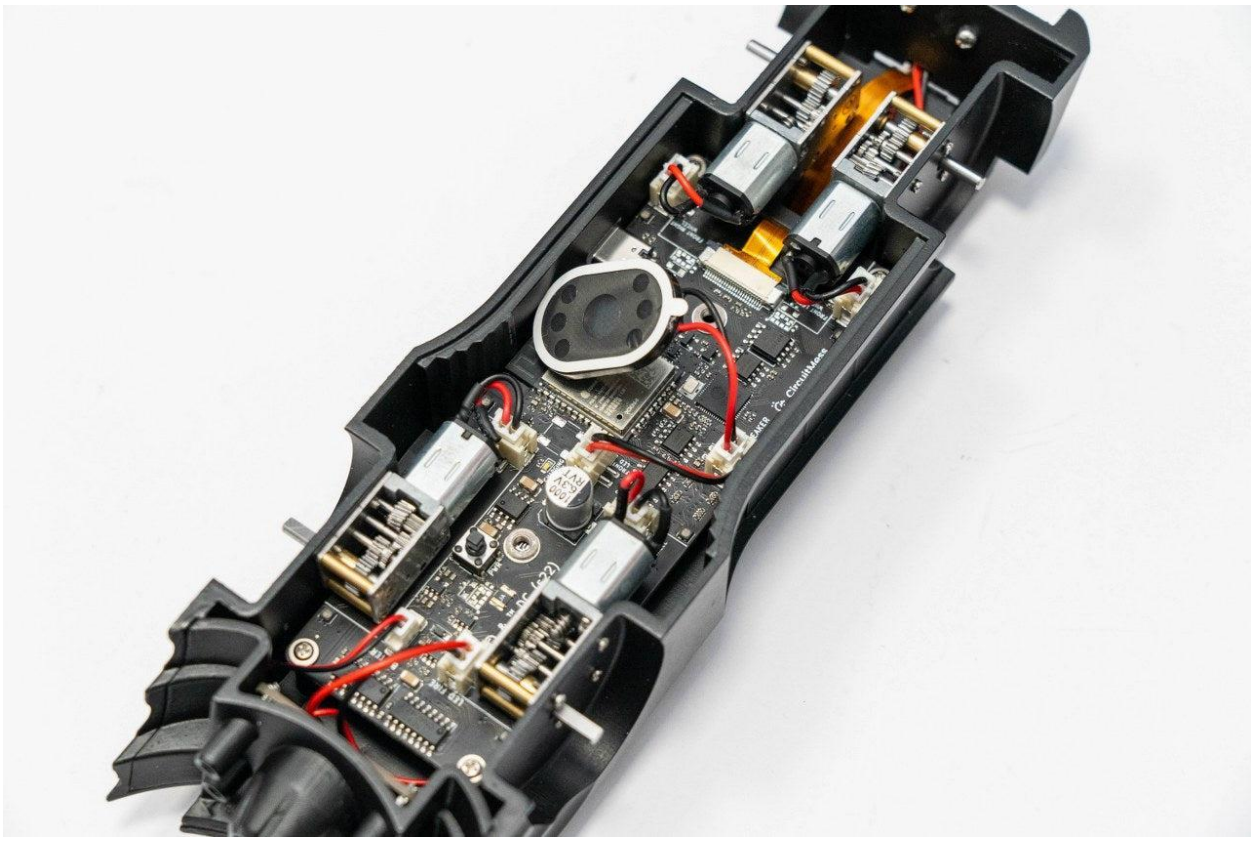
Repeat this step for all four motors:

Connect the speaker now.

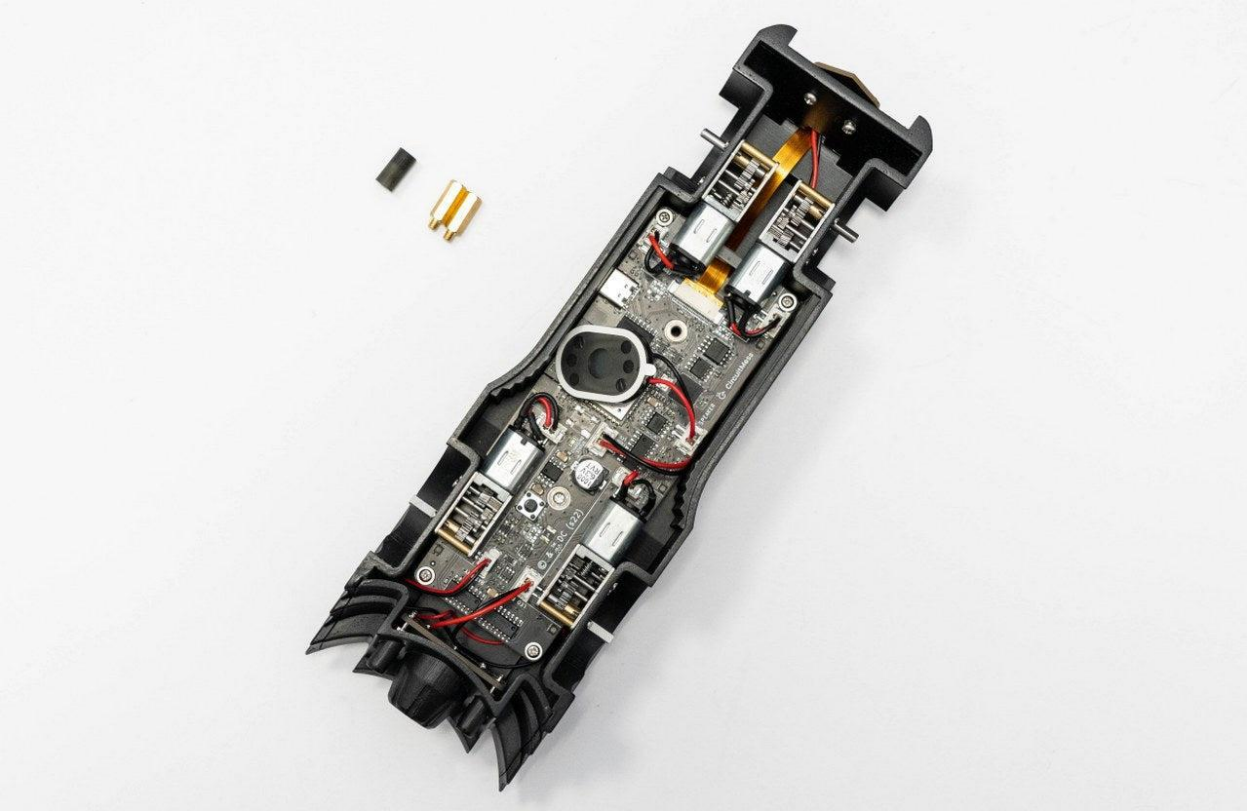


First, connect it to the speaker port:



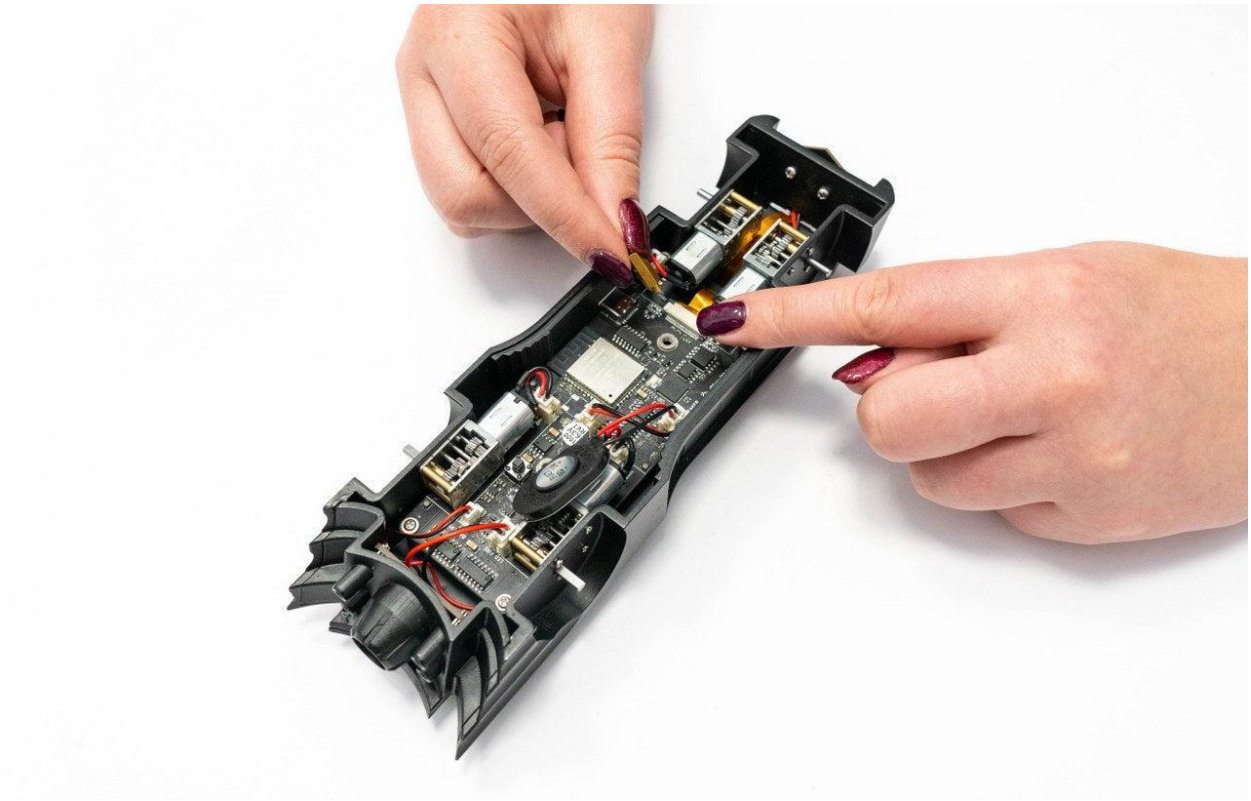


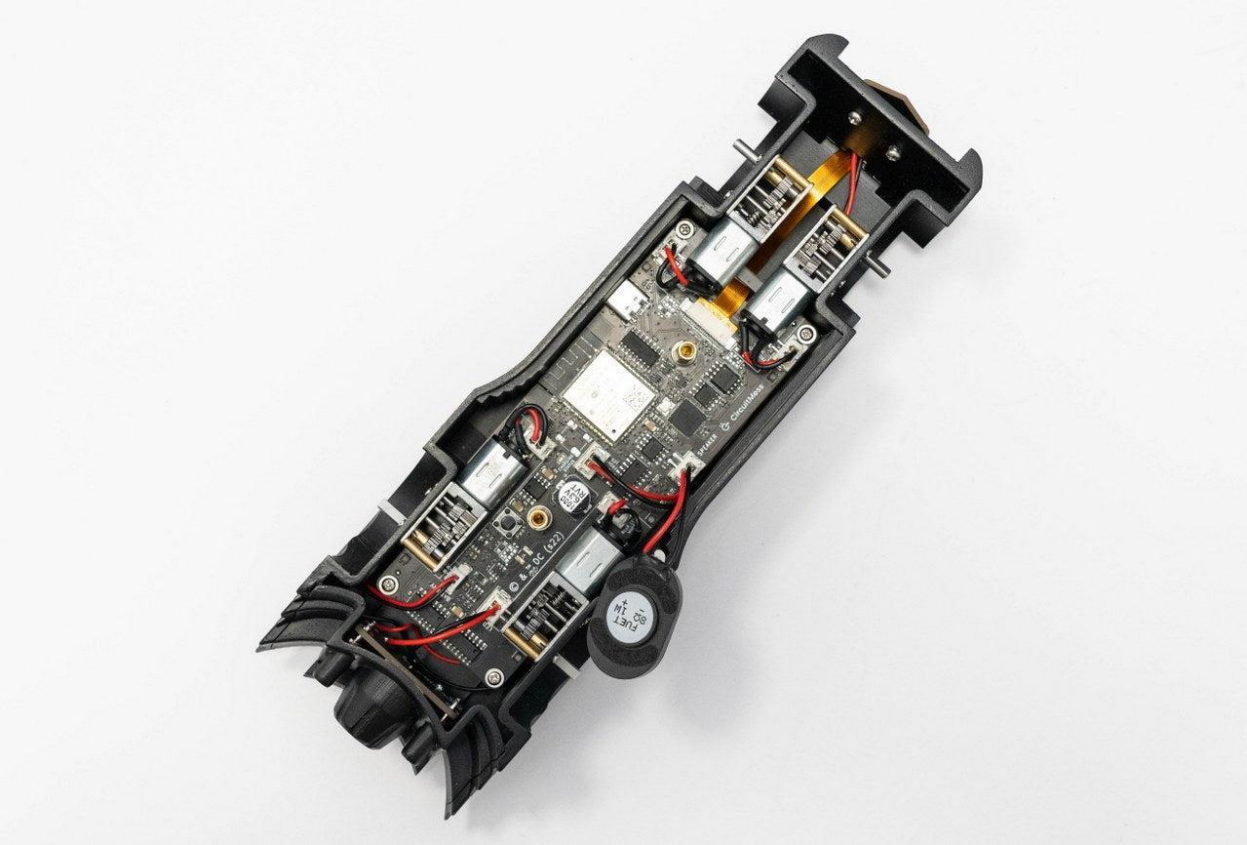
Take two golden spacers and the pushbutton cap (please note that your pushbutton can come in black or white).



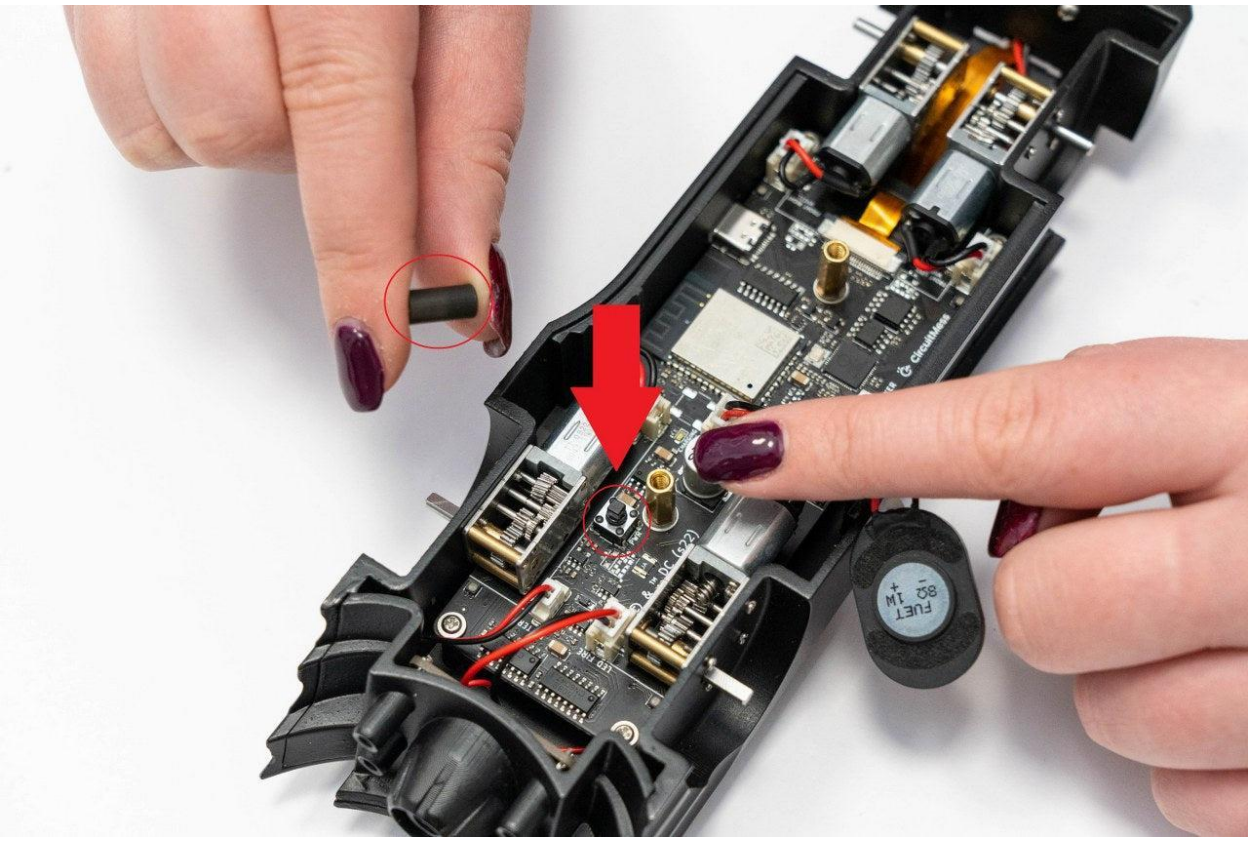
The golden spacers go into the holes in the middle of the PCB.

You have to tighten it with your fingers.

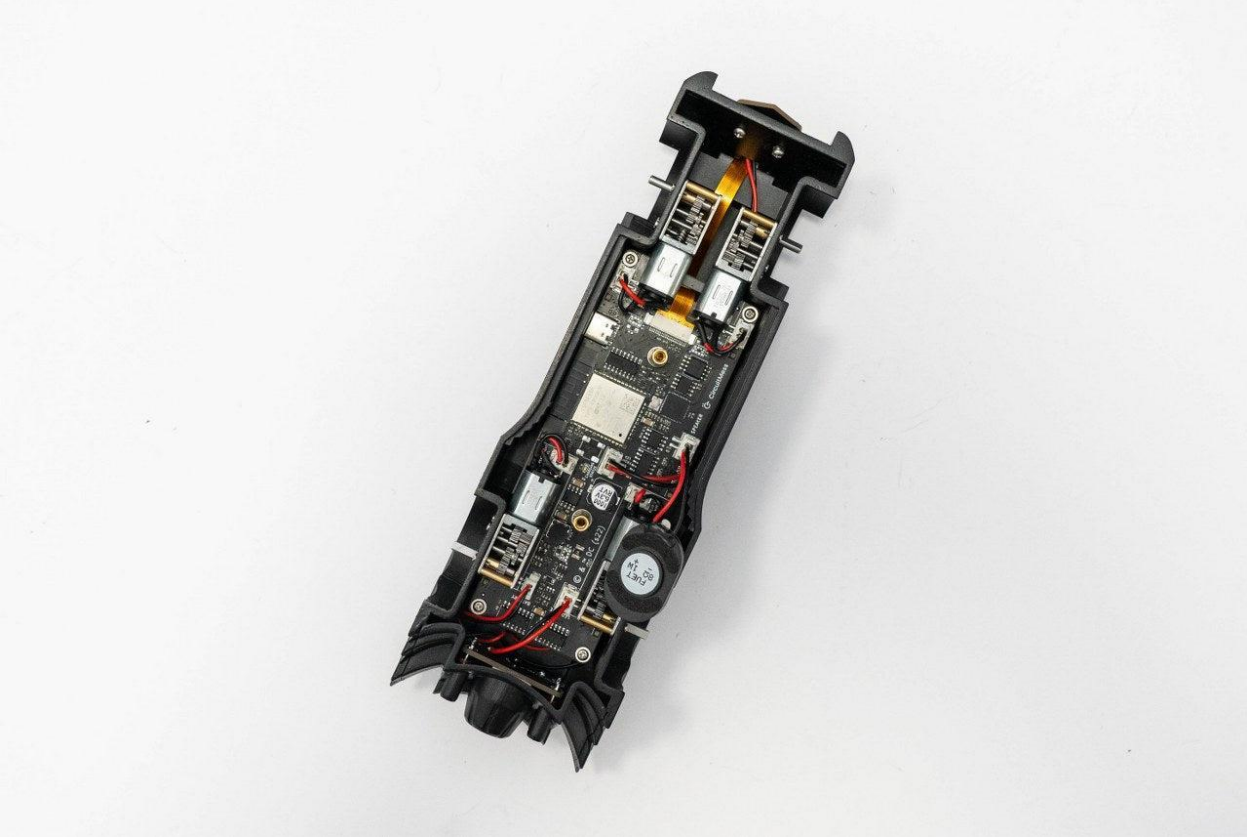




Place the button cap on top of the pushbutton now:



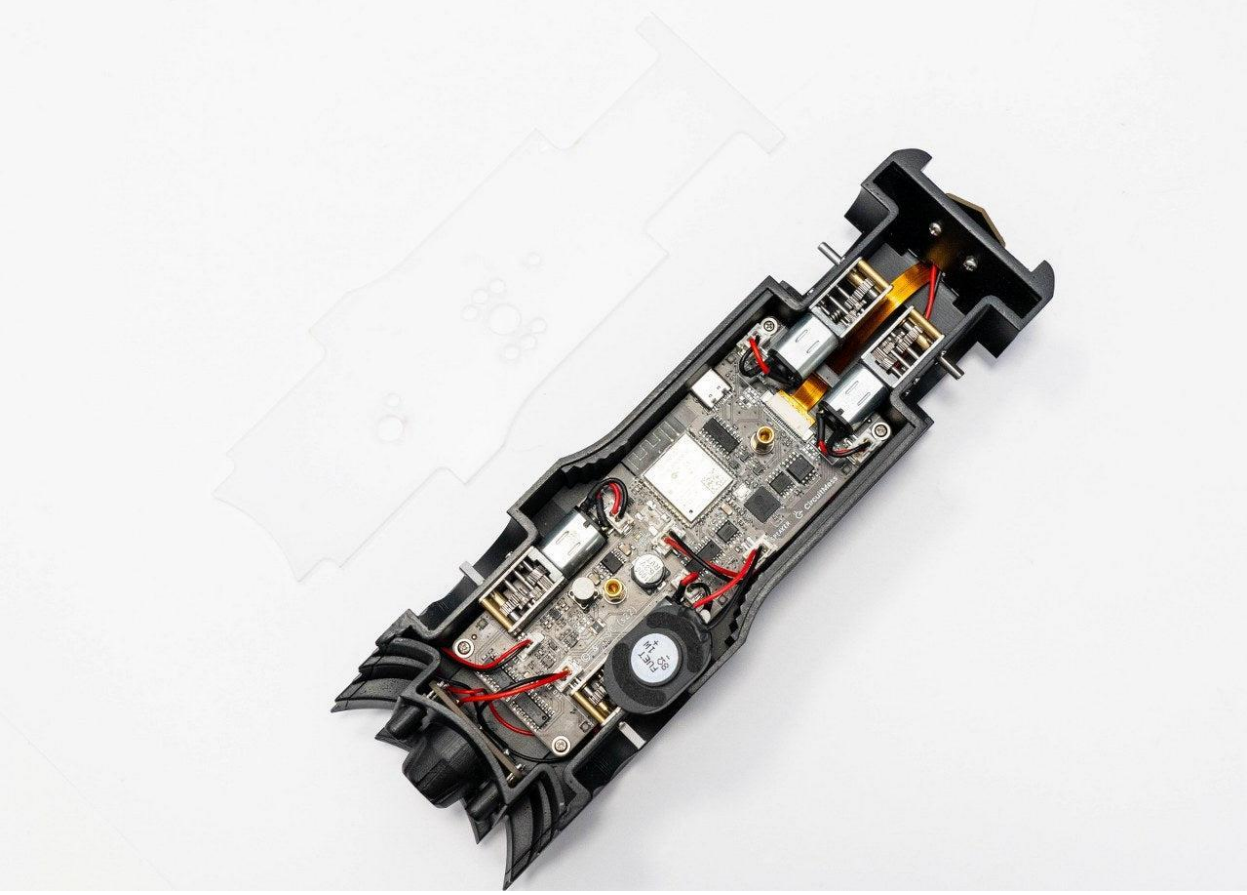
Your Batmobile should now look like this:



The only thing left to do is case the Batmobile's bottom so nothing falls out while driving.

You have a long acrylic casing in your kit, and we must first remove the protective layers from it.

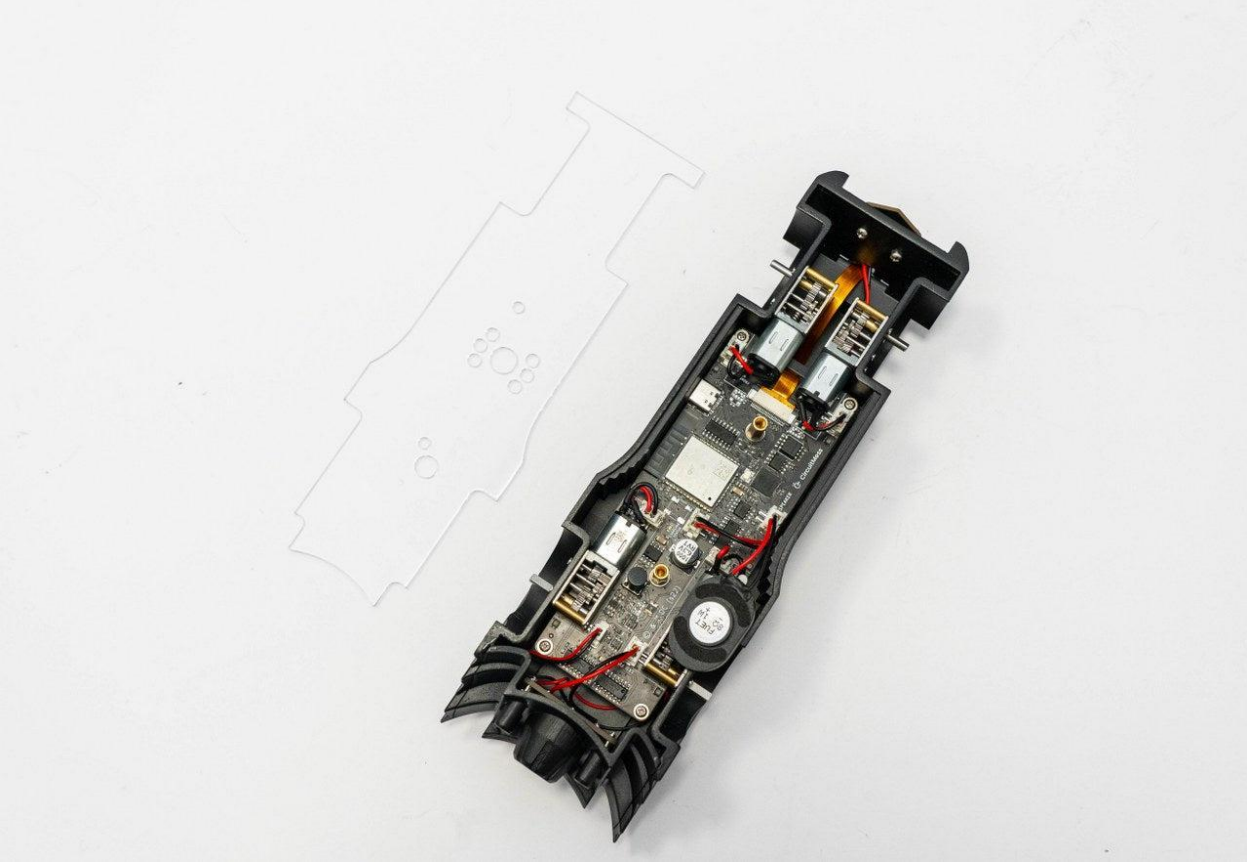
Take these components



and remove the first layer:

Don't forget to peel the other side as well.

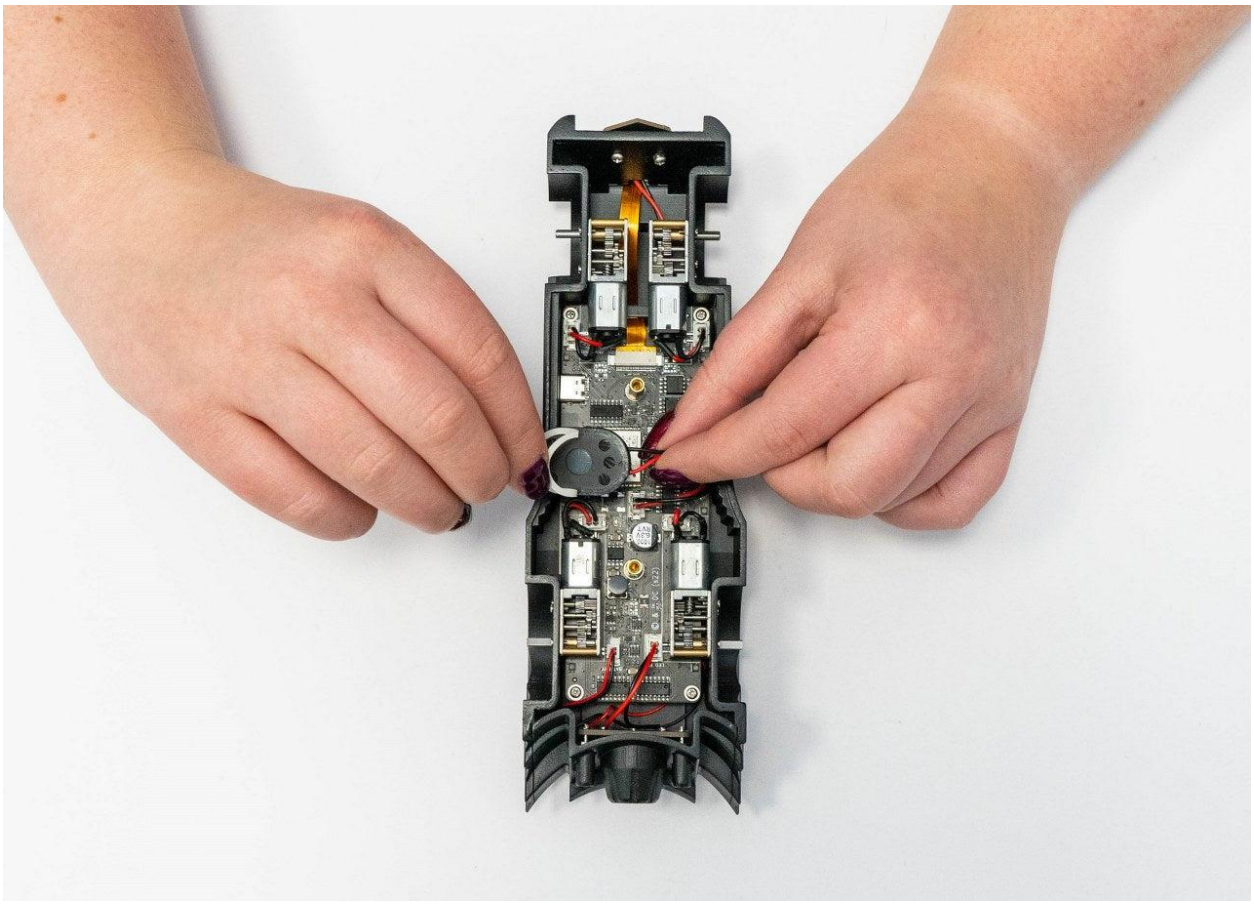
The casing should be totally transparent once you finish peeling the layers off.

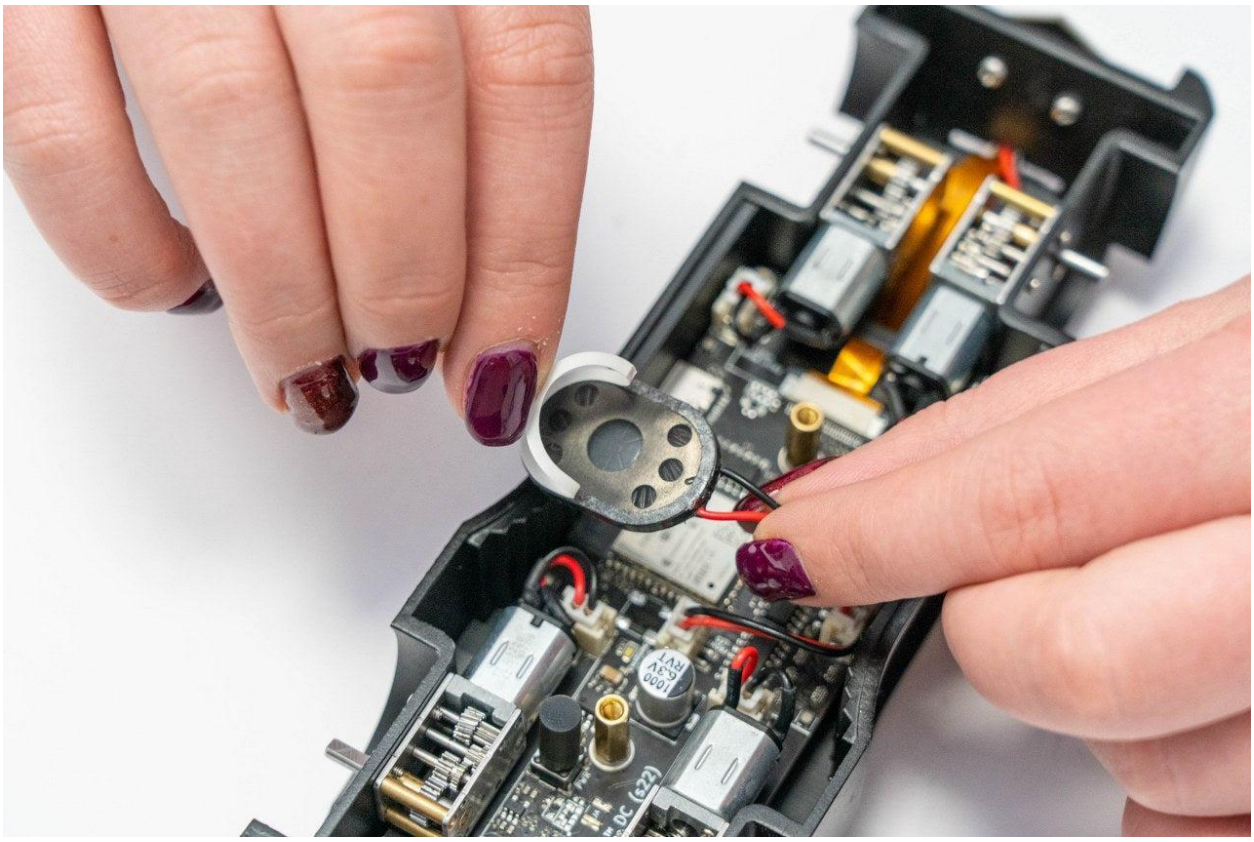


There is a bunch of holes in the middle of the casing - that's where you'll have to stick the speaker.

Before you do that, there is one small but important step to take - remove the sticker from the speaker.

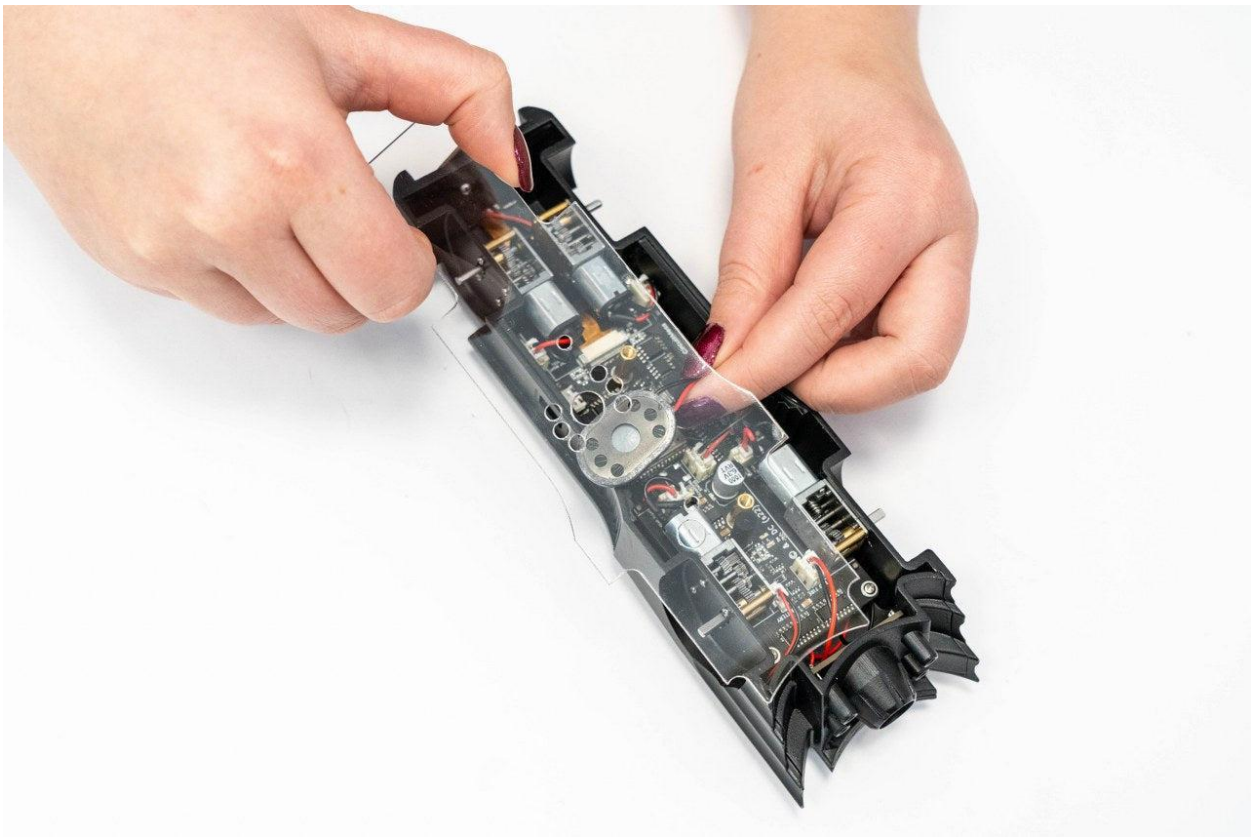
That's white paper wrapping around the front of the speaker.

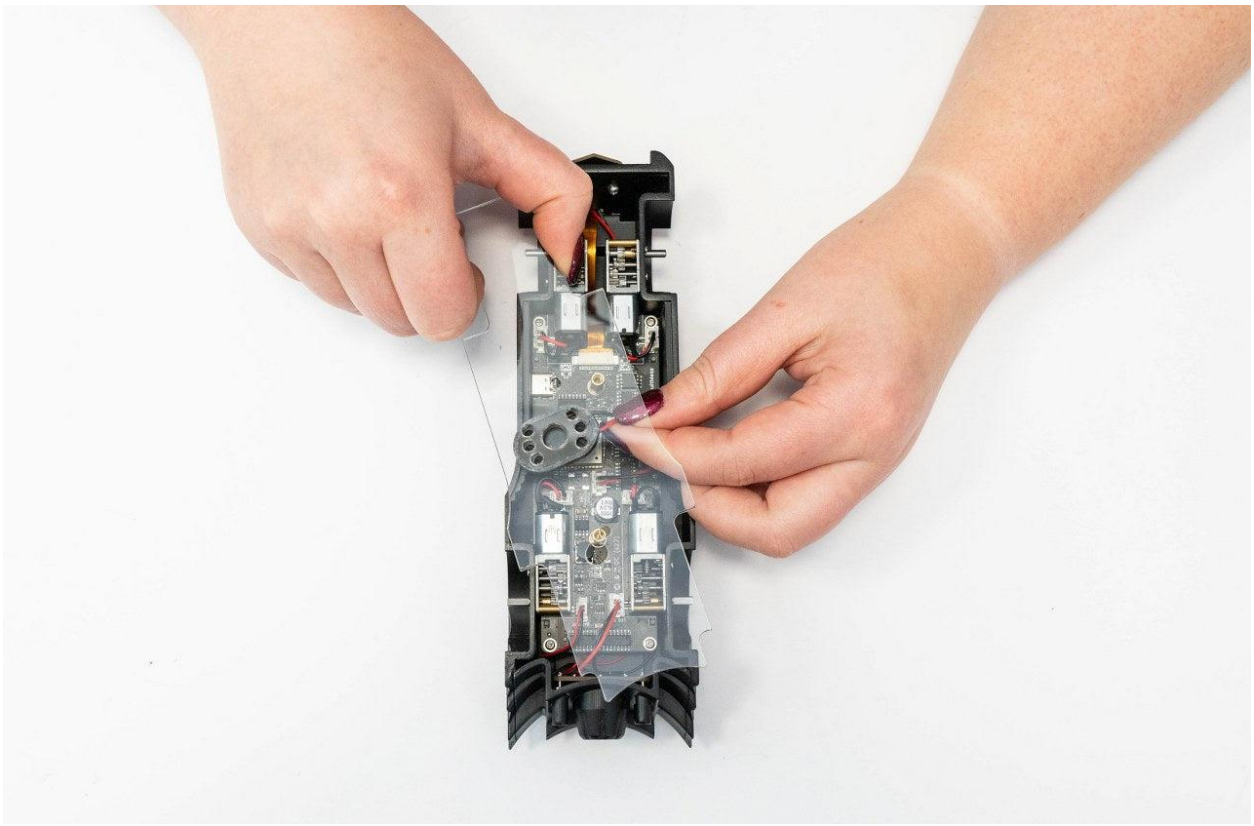


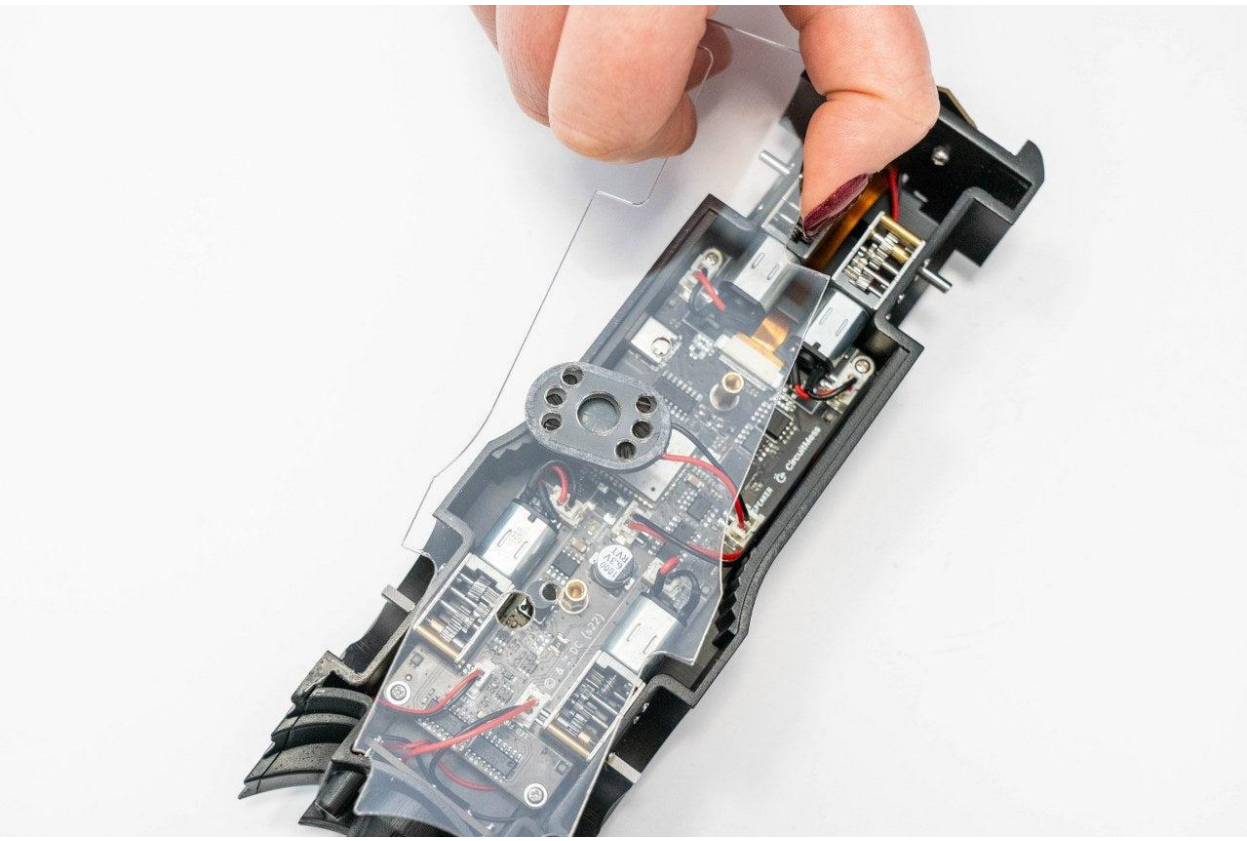


Make sure the casing is on the right side and attach the speaker to it.

Just like this:



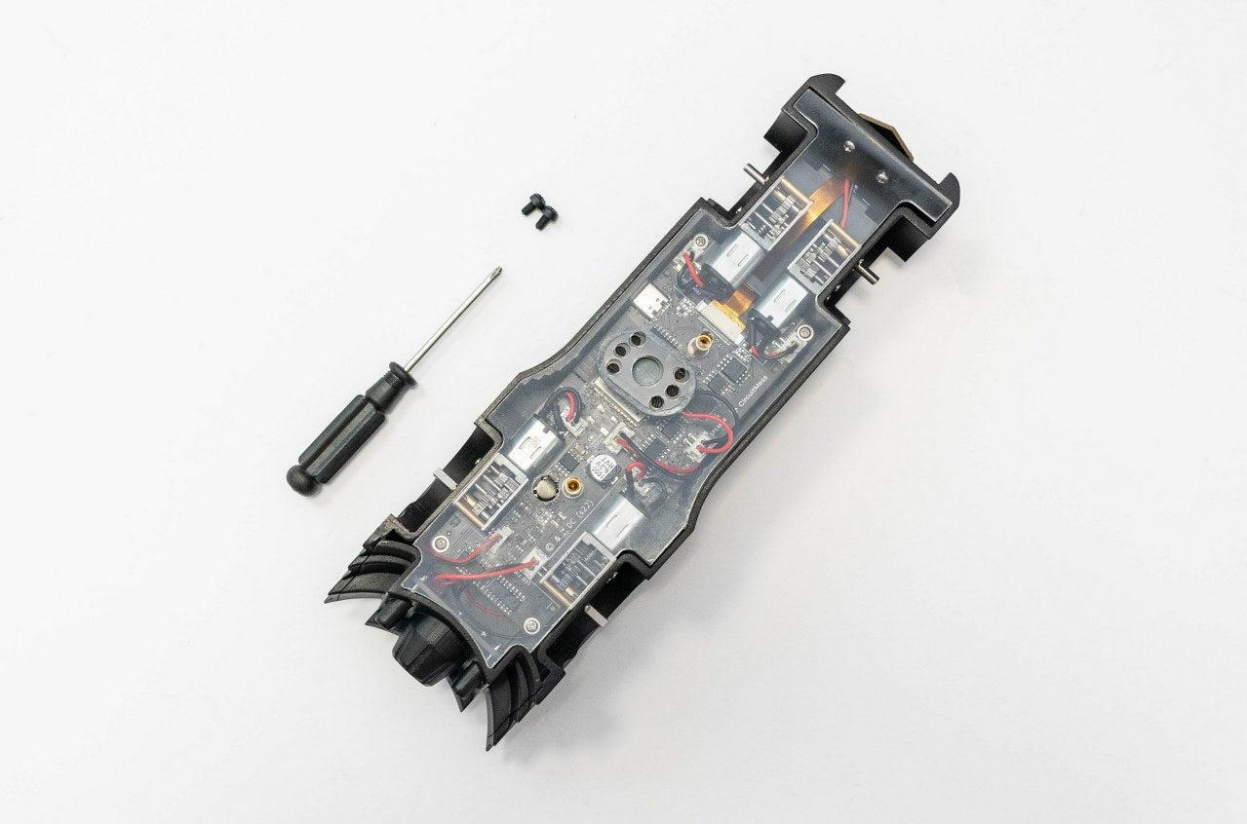




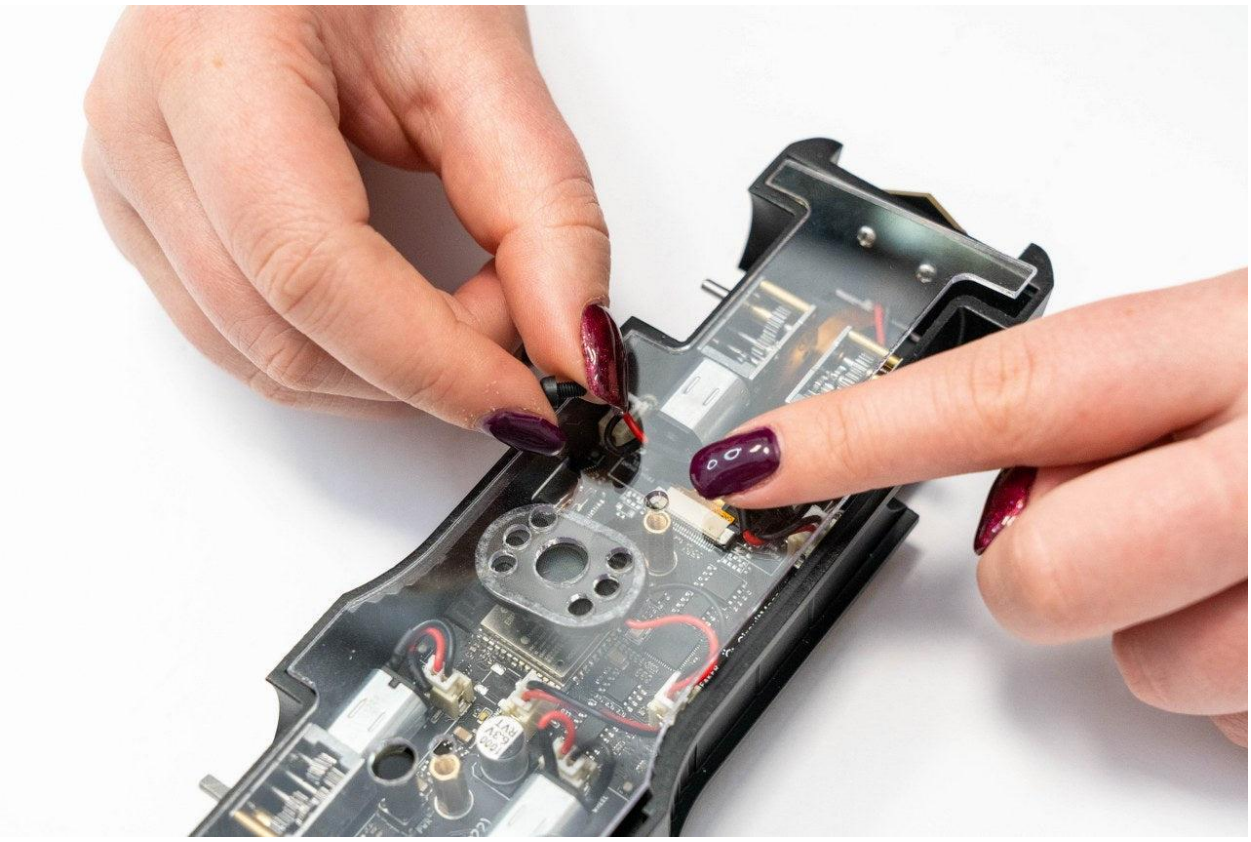
Amazing!

Let's start by placing the casing on top of the chassis.

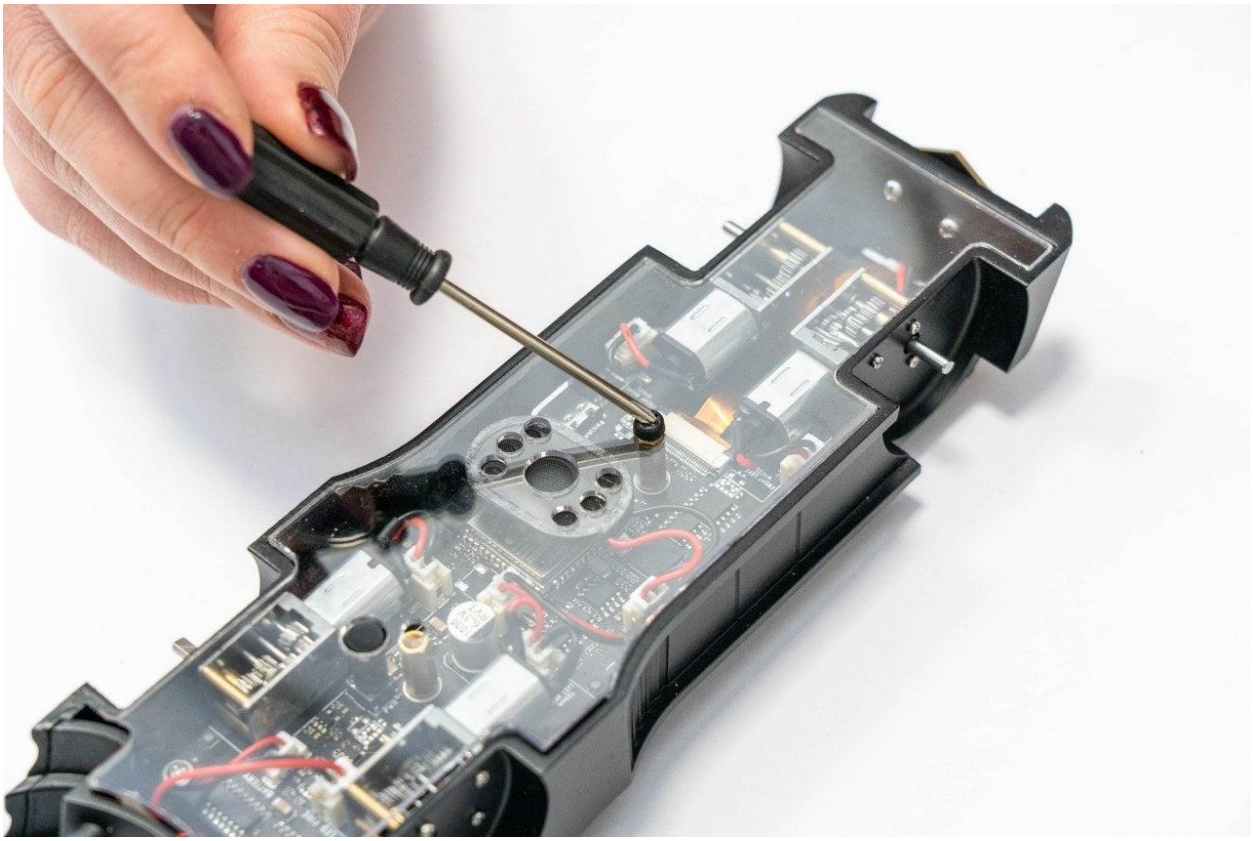
Take the screwdriver and two black bolts.



The bolts will go into the golden spacer we put in the previous step.

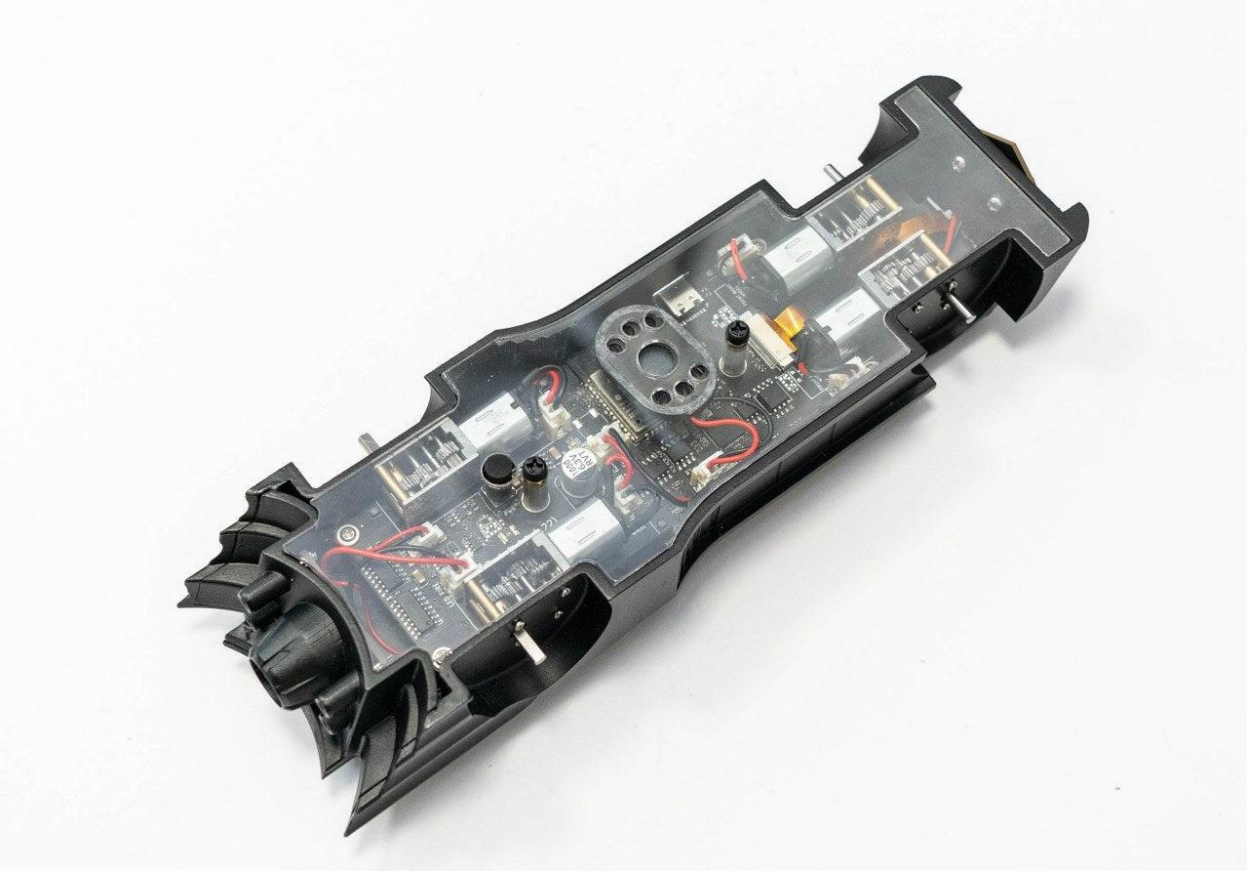


Take the screwdriver and tighten it.



Repeat this step for the second bolt.

Your Batmobile should look like this:



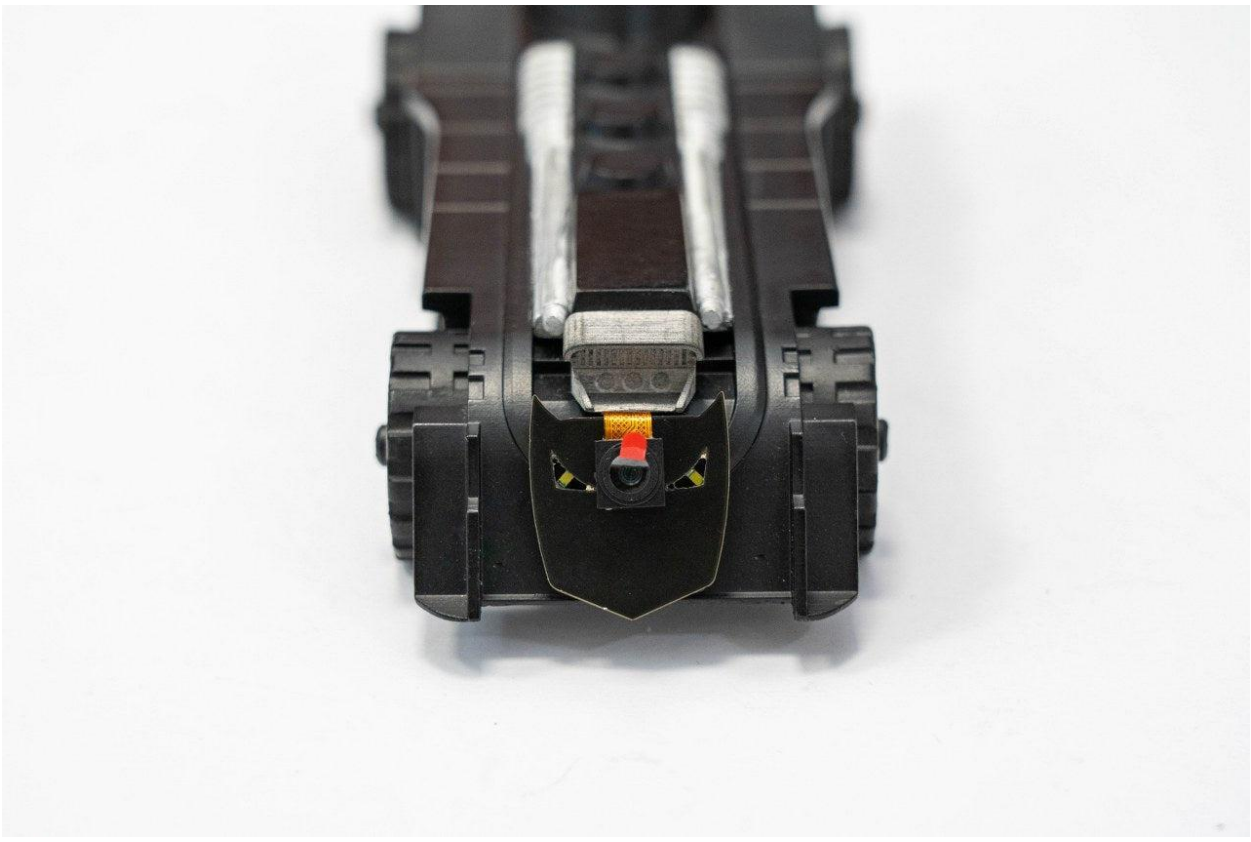
It's time to put the wheels.

Place the wheels on the motor's pins.

Great job!

Your Batmobile has wheels and is a real car now.

The final step is to remove the protective sticker from the camera, if you haven't already.



Amazing!

You've reached the end of the build guide. Your Batmobile is now fully assembled and ready to go!

What's next?

What's next?

Congratulations! You successfully assembled a DIY autonomous robot car, Batmobile.

Please hold the button on your Batmobile for a few seconds to see if it turned on and went into sleep mode.

You'll also need to charge it before using it.

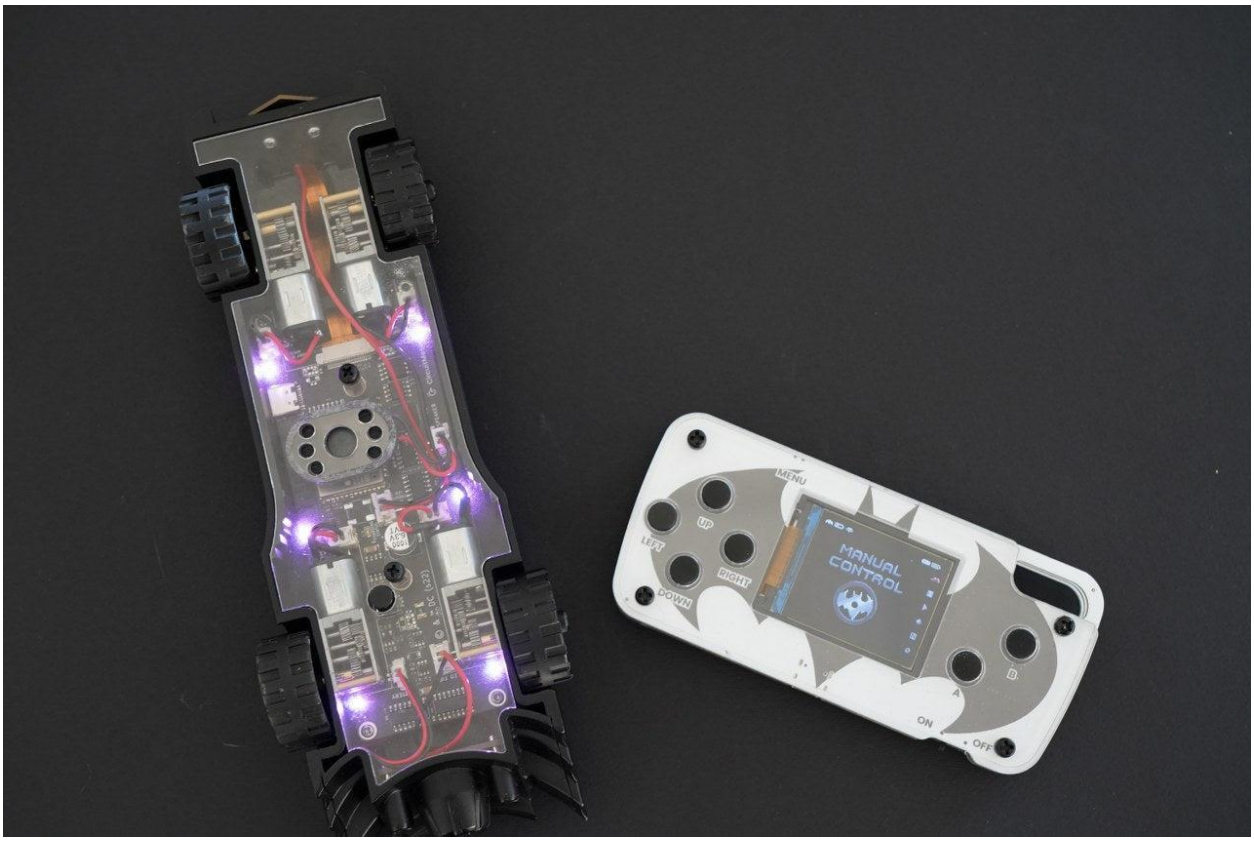
If everything is in order, you should see red LEDs light up the bottom of your Batmobile.

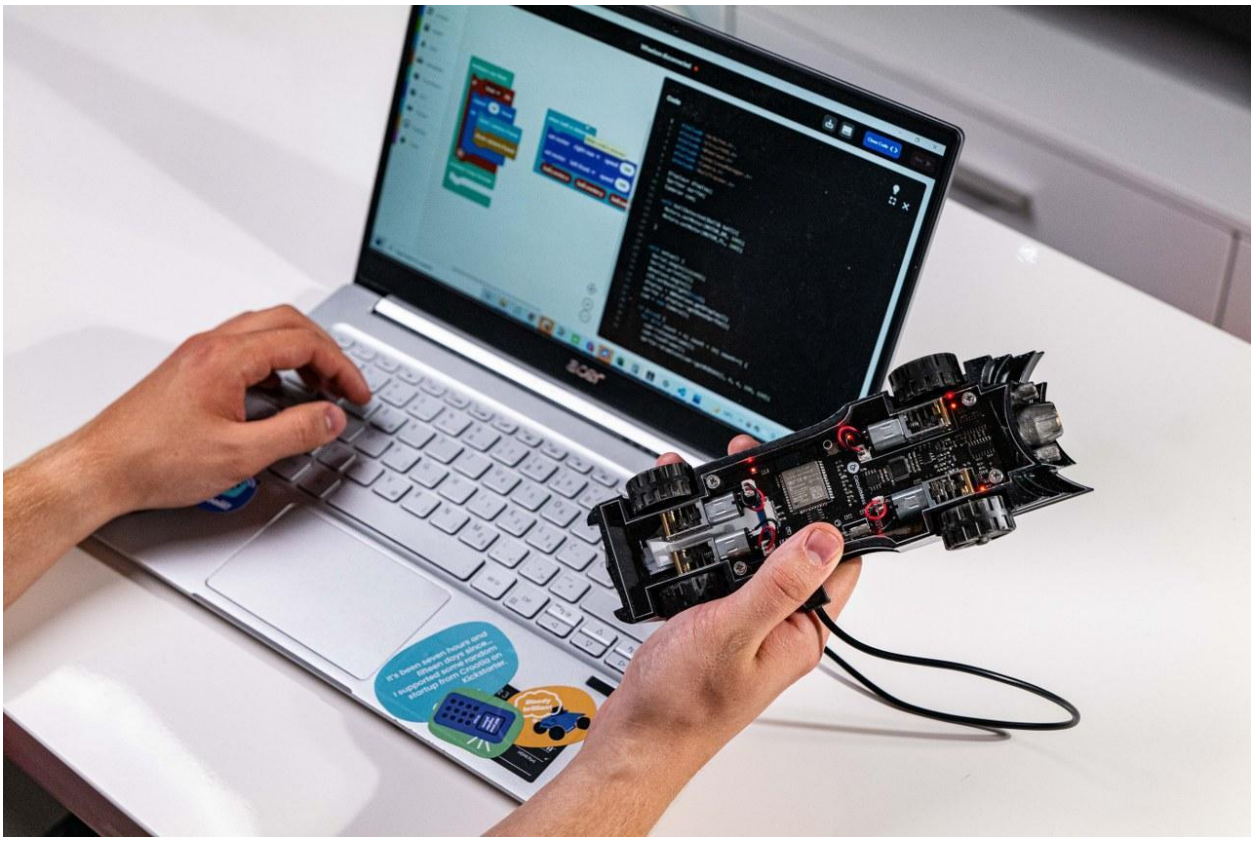
By pressing the Batmobile's pushbutton, you can activate your Batcontroller. The ArUco code is visible on the Batcontroller.

If they don’t connect automatically, try to move the camera and display closer and further from each other until you hear a sound.

When you successfully connect them, the main menu of your Batcontroller will appear, and the LEDs at the bottom of the Batmobile will begin to change colors.

Check the photo:


MENU
UP
LEFT
RIGHT
DOWN
MANUAL
CONTROL
B
ON



To learn how to use all the cool features check the Usage Guide.

Coding guide is coming soon.

Also, we invite you to join our Discord channel and Facebook group, where you'll be able to share ideas, photos, and feedback with fellow makers and get exclusive news from CircuitMess.