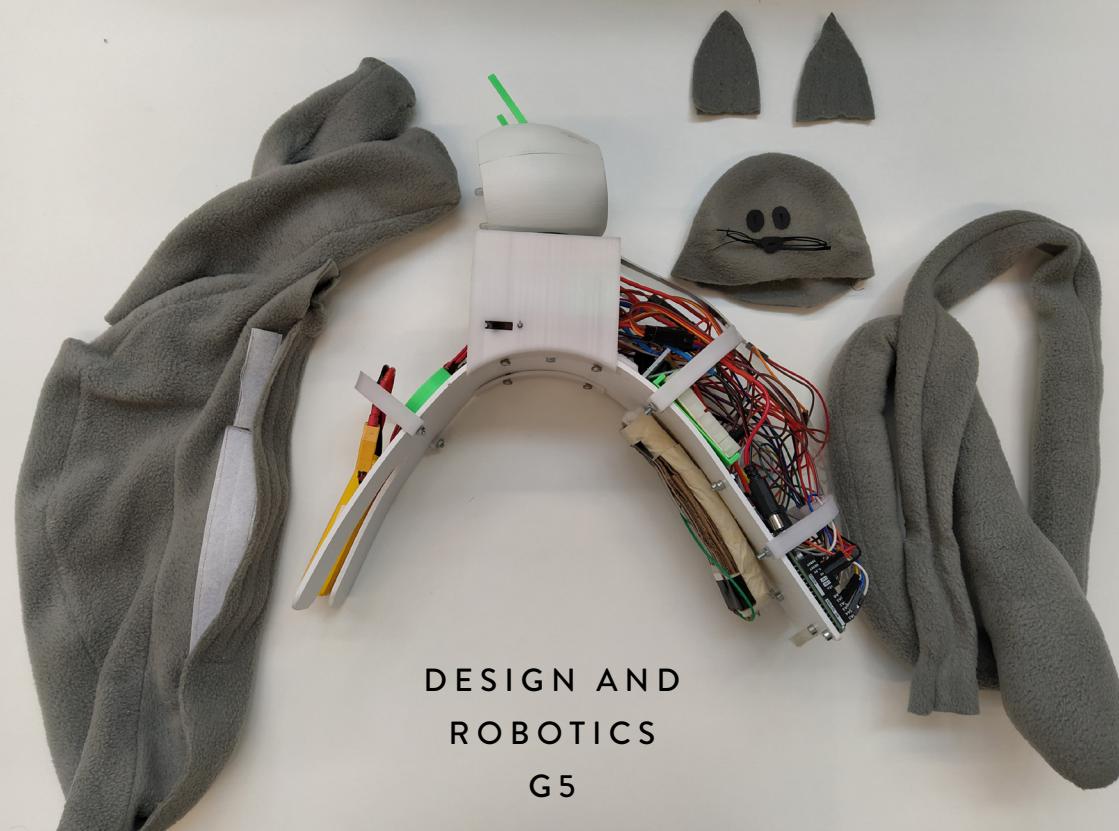




— MAINTENANCE MANUAL —



DESIGN AND
ROBOTICS
G5

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INDEX

INTRODUCTION	05
WIRE CONFIGURATION SCHEME	07
GENERAL DIMENSION	11
ARCHITECTURE	13
MAINTENANCE	21
SPECIAL MAINTENANCE	23





INTRODUCTION

The code is written around the idea of using a state machine, in particular the code is divided into:

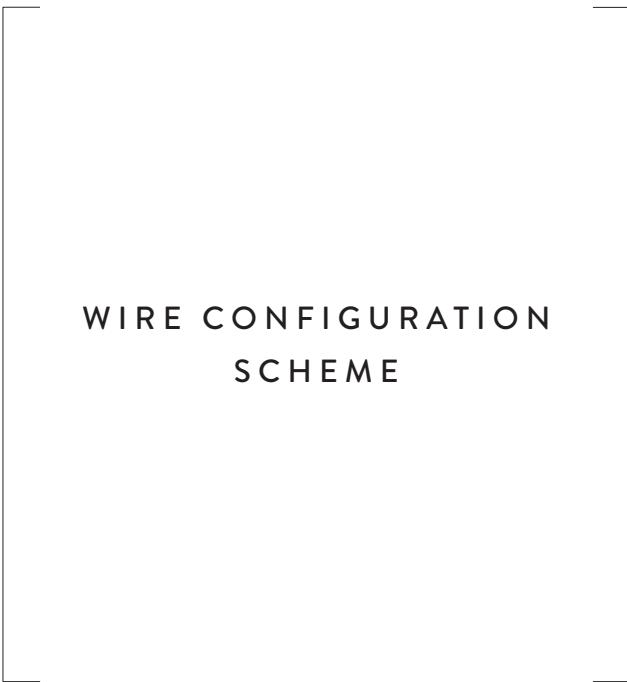
state functions;

transitions functions: check if a condition is met and eventually change state;

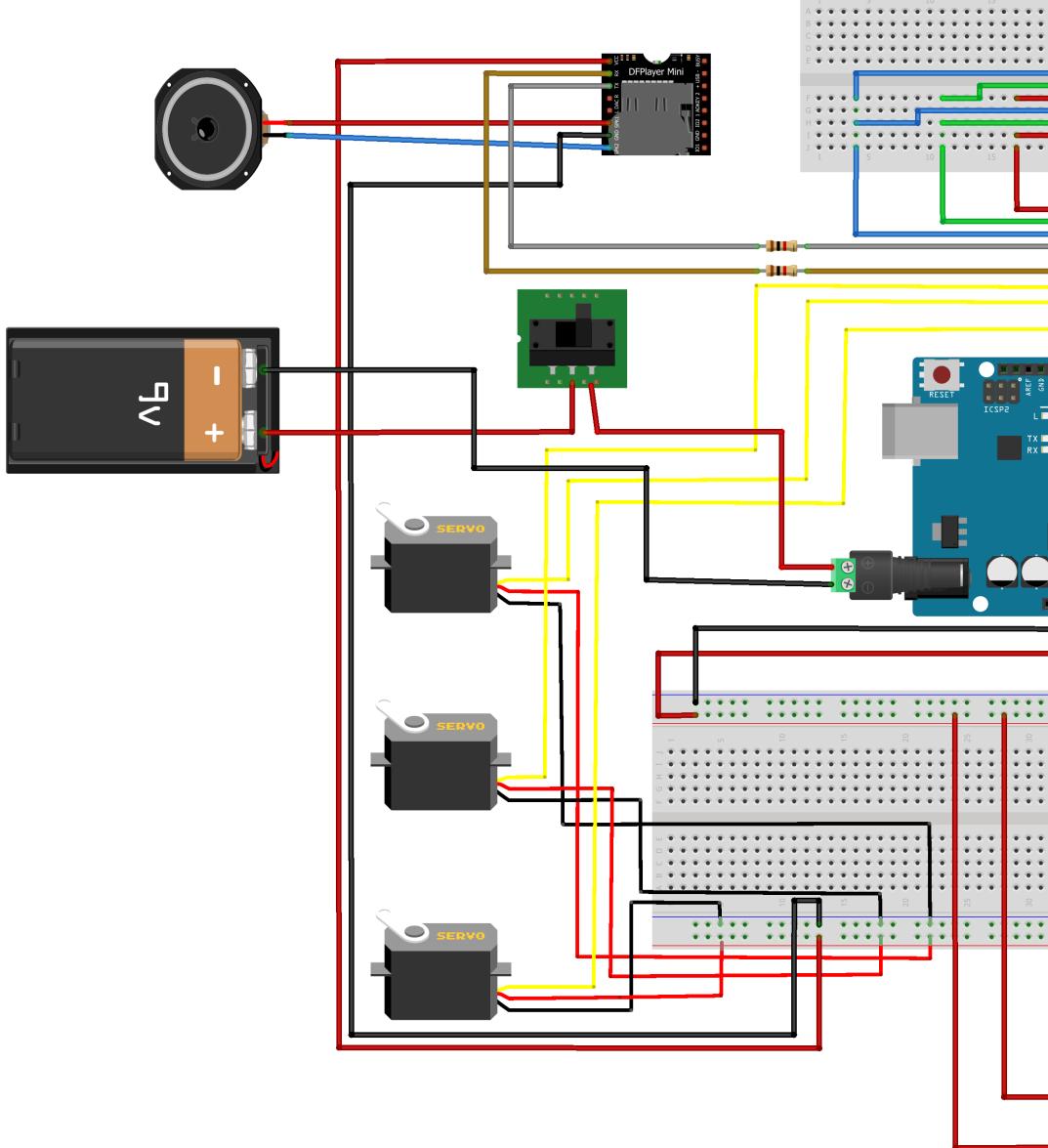
auxiliary functions;

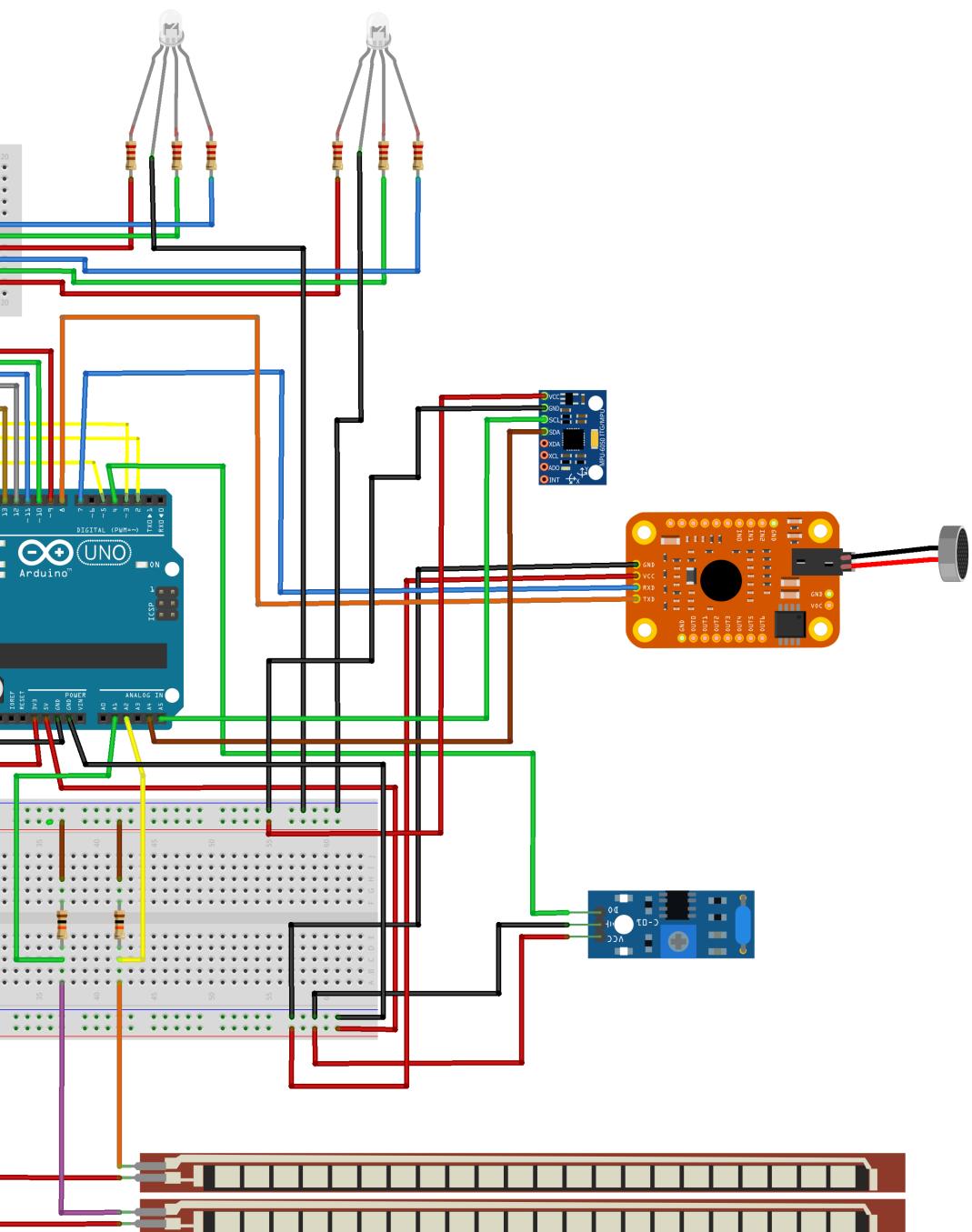
global variables.

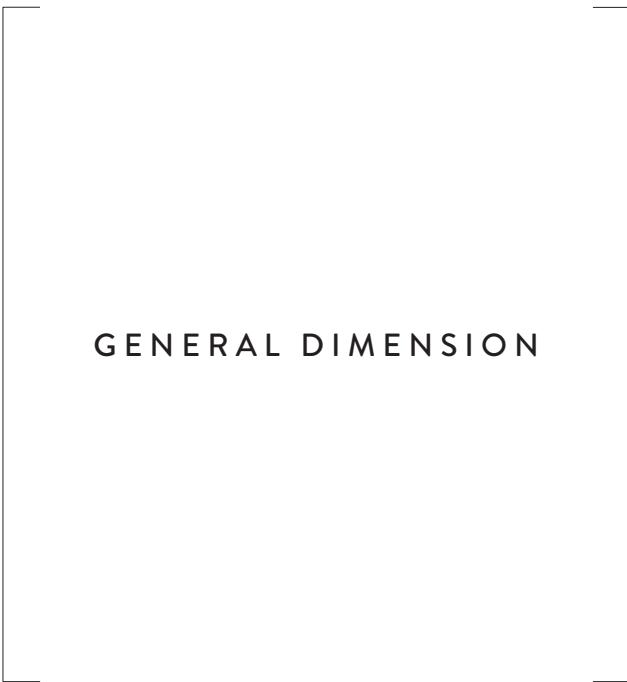
The state machine is divided in two main parts: table state and shoulder state. This distinction is important because we want the robot to behave differently whether it is on the user's shoulder or on the table. In particular when on the shoulder it should be ready to process any meaningful input from the environment, instead when on the table it should go in an idle state where it waits to be picked up by the user.



**WIRE CONFIGURATION
SCHEME**







GENERAL DIMENSION



300

300



90

Dimension of CocoBot are 300 x 300 x 100 mm. A long tail is fixed on the user has a length of 1000 mm. Thanks to this length is suitable for every user.



ARCHITECTURE

EXTERNAL BODY



1 Ears

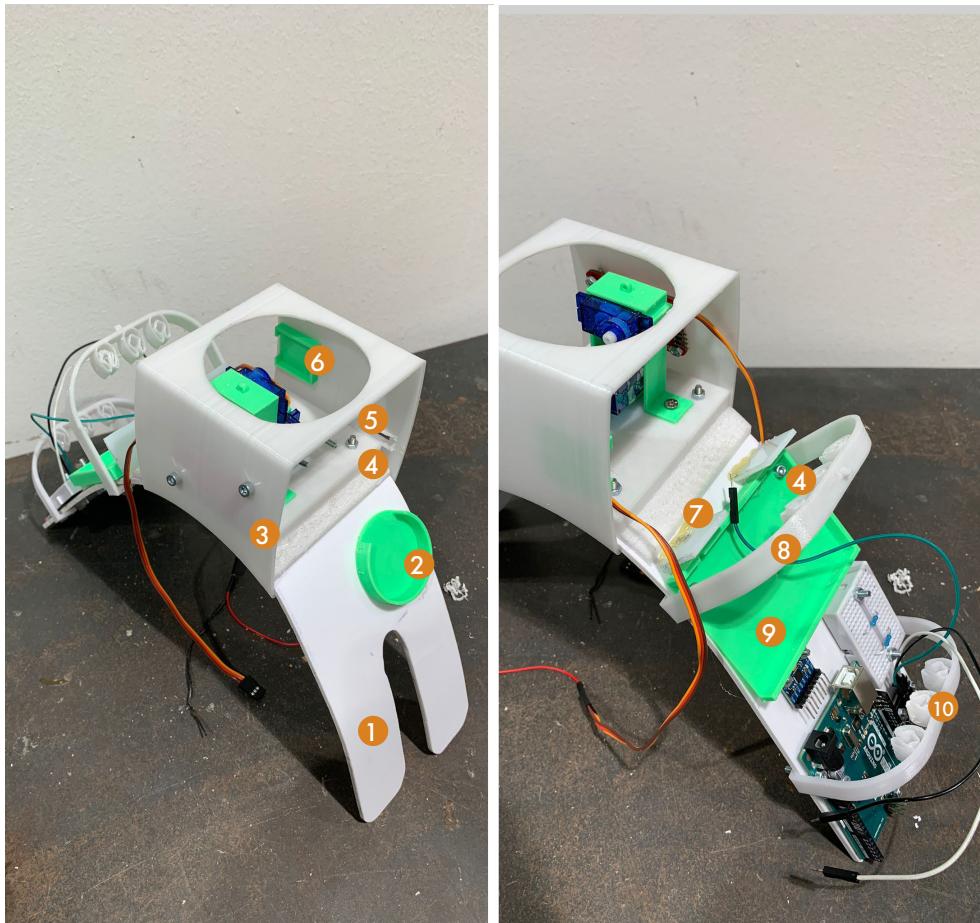
5 Tail

2 Head

3 Papillon

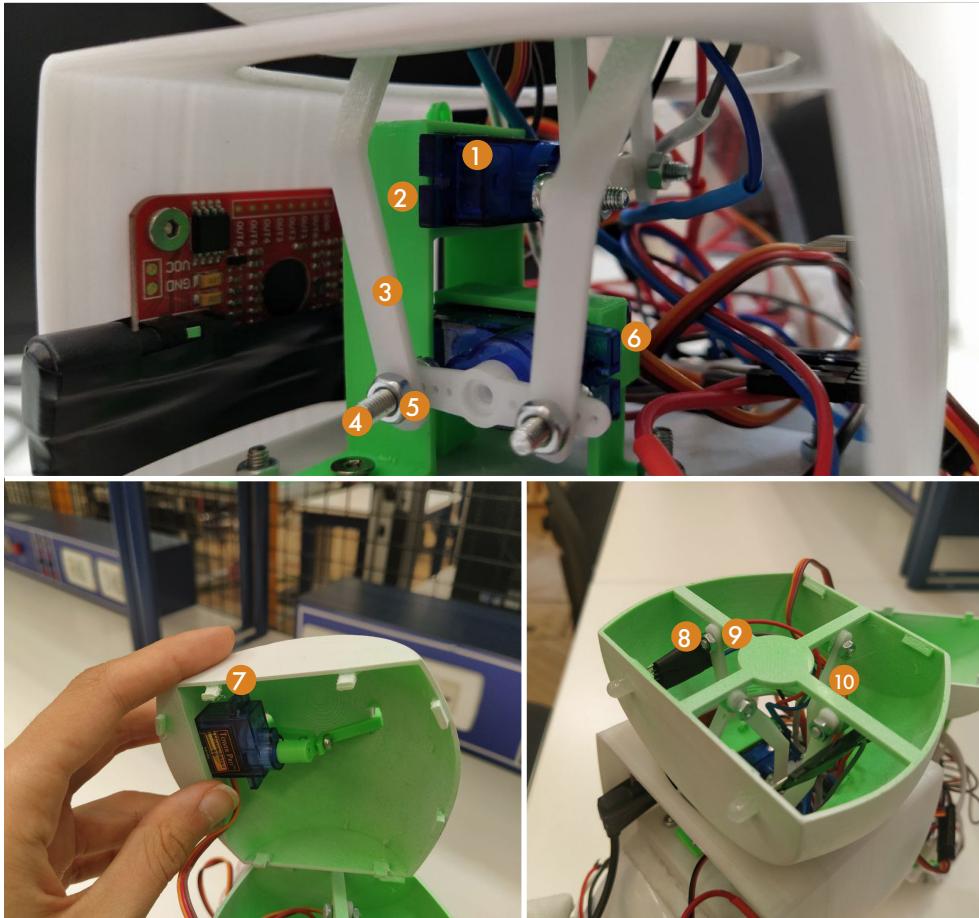
4 Body

BODY STRUCTURE

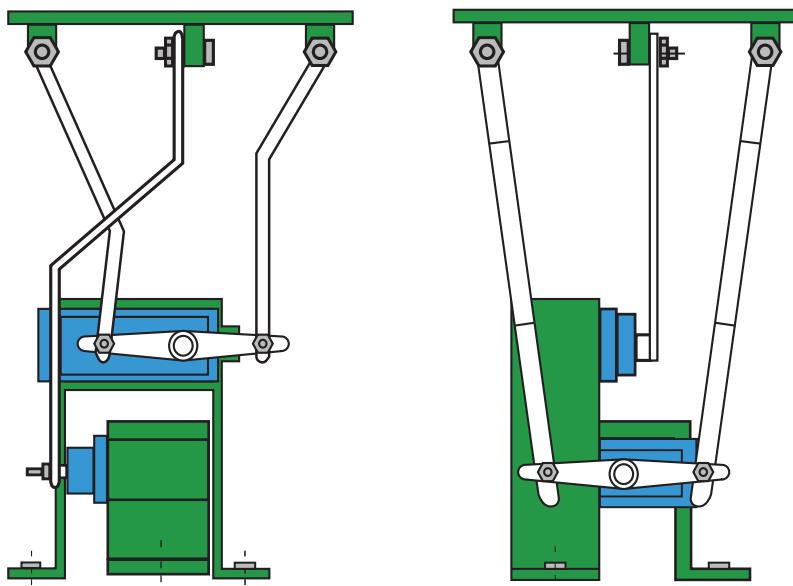


- | | | | | | |
|---|----------------------|---|----------------|----|-----------------|
| 1 | Base (3mm thickness) | 5 | Exagonal nuts | 8 | Breadboard case |
| 2 | Speaker case | 6 | SD music case | 10 | Bottom rib |
| 3 | Principal body | 7 | Millefori wall | | |
| 4 | M3 x 10 mm (X4) | 8 | Upper rib | | |

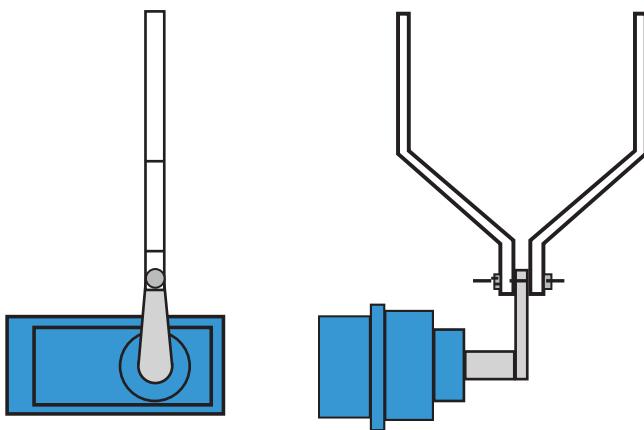
HEAD STRUCTURE



- | | | |
|--------------------|-------------------|--------------------|
| ① Upper servomotor | ⑤ Exagonal nuts | ⑨ Exagonal nuts |
| ② Upper case | ⑥ Bottom case | ⑩ Front-back stick |
| ③ Left-right stick | ⑦ Ears servomotor | |
| ④ M3 x 10 mm | ⑧ M3 x 10 mm | |

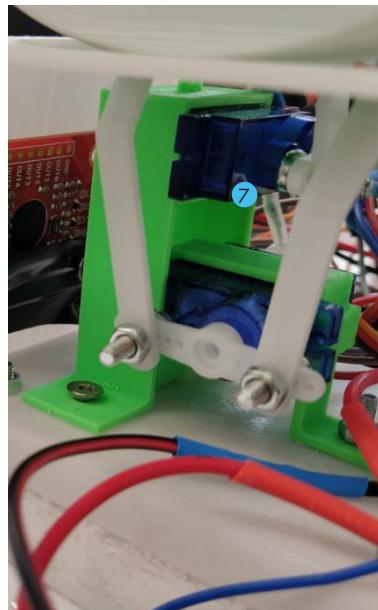
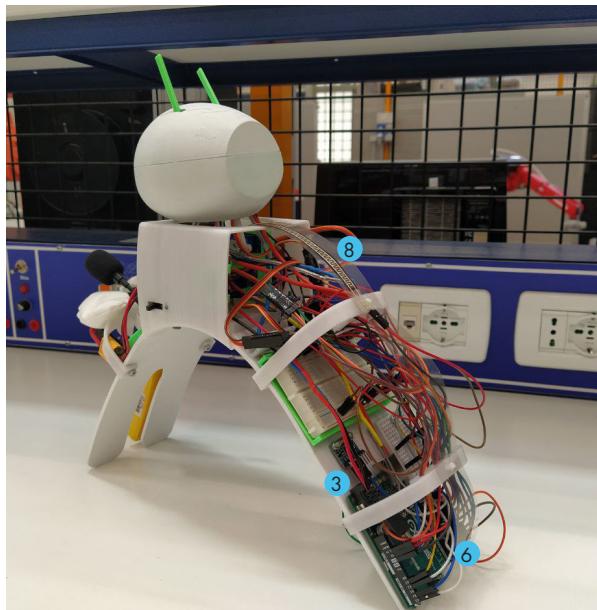
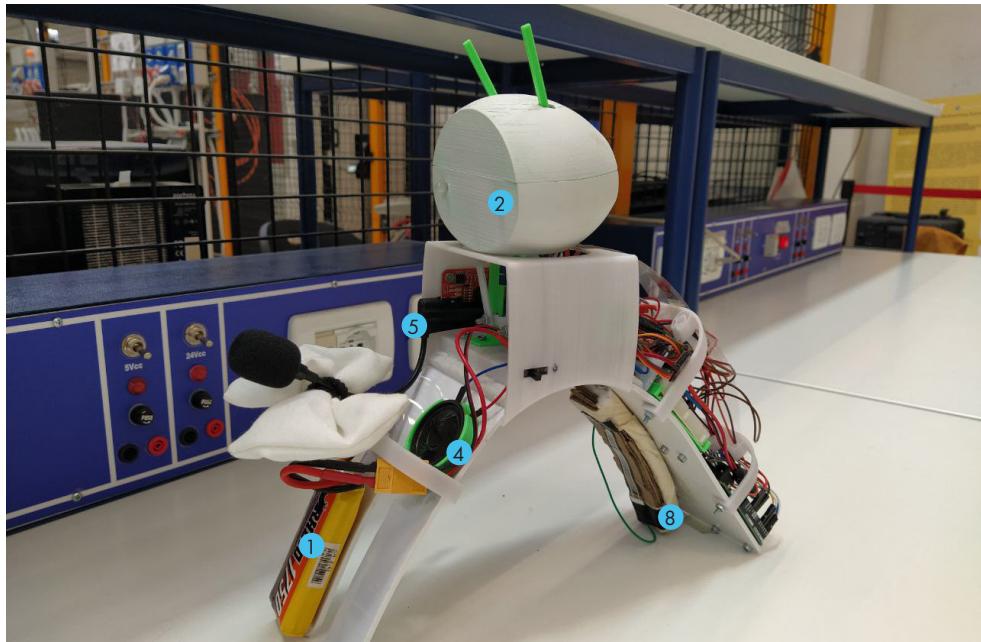


Project view of the head servomotor structure



Project view of the ears servomotor structure

INTERNAL ARCHITECTURE



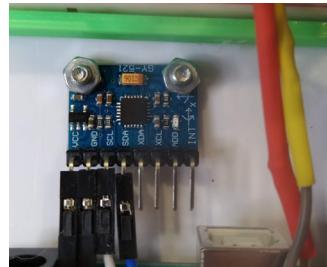
MAIN COMPONENTS



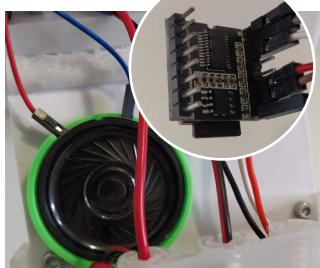
1 Battery Rhino 1750 7.4V



2 LEDs 5 mm RGB



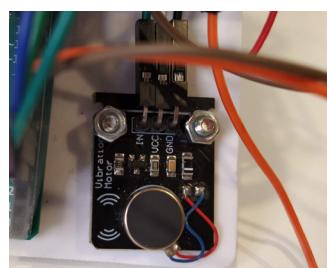
3 Accelerometer-Gyroscope
MPU6050



4 DFMiniPlayer - Mini SD
card 4 GB



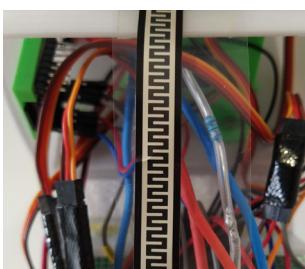
5 Voice recognition
module V3



6 Mini vibration motor
3-5.3V



7 Servomotor 9g



8 Pressure sensor ZD10
100 500 g



9 Arduino UNO

MAINTENANCE

CHARGE THE BATTERY

CocoBot has a chargeable battery (Rhino 1750 7,4 V). It can last for 1 h.

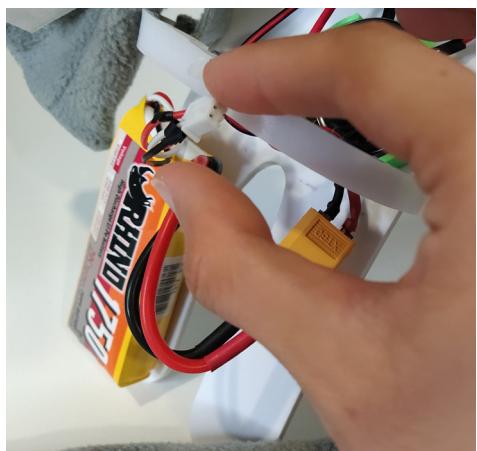
To charge it you need this particular tool



1 Remove the fabric



2 Be sure that switch is turned off



3 Take the white connector



4 Connect it to the recharge station



SPECIAL
MAINTENANCE

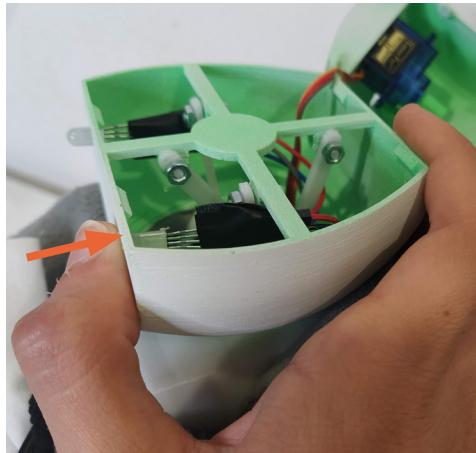
CHANGE THE LEDS

The cheeks of CocoBot have 2 leds RGB. You need to remove the fabric, open the head and remove the led from his hole.



1 Remove fabric from the head

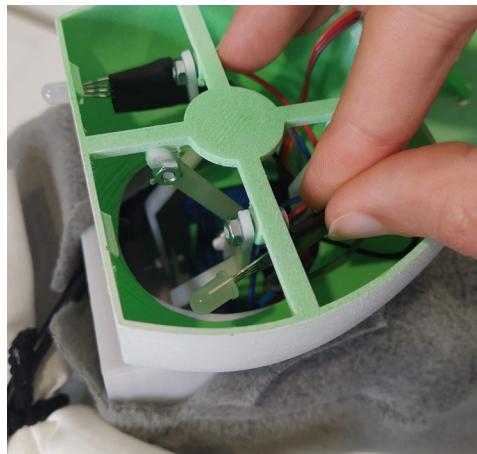
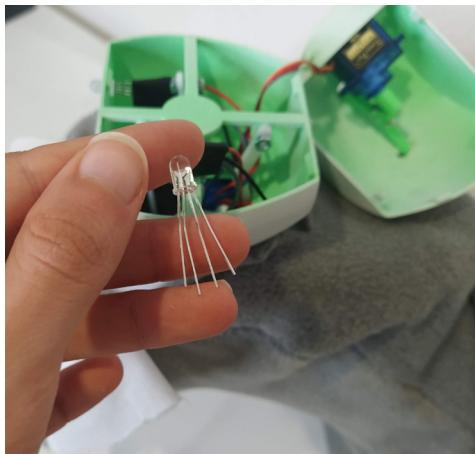
2 Open the upper head and leave on the table



3 Remove from the hole the led



4 Remove cable from the pins

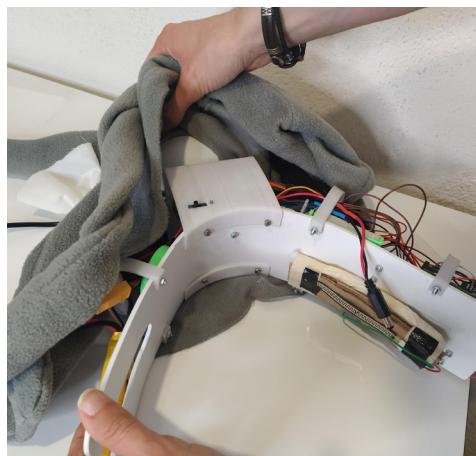


- 5 Attach the cable to the right pin of the new led

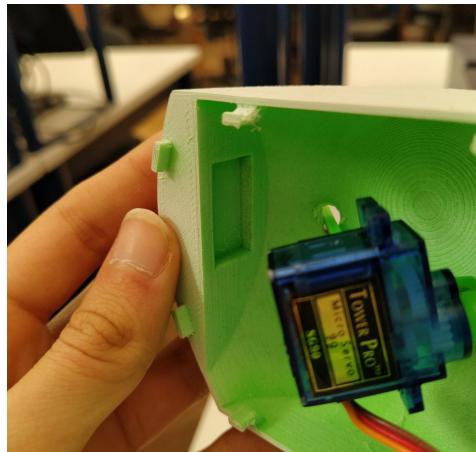
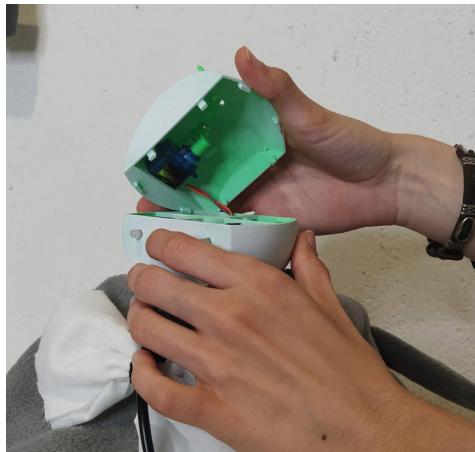
- 6 Reassemble everything put the fabric cover

CHANGE SERVOMOTOR: EARS

One servomotor stays in the upper part of the head.
You need to remove the fabric cover, open the head,
remove arm and then the servomotor

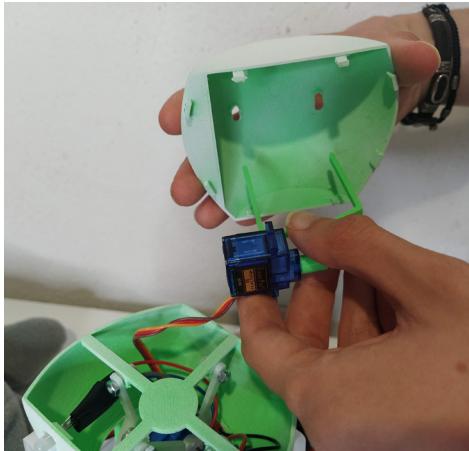


- 1 Remove the ears and the cover from
the head

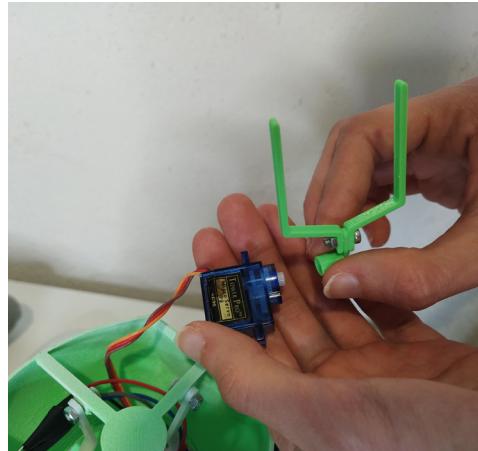


- 3 Open the head

- 4 Remove servomotor from his case

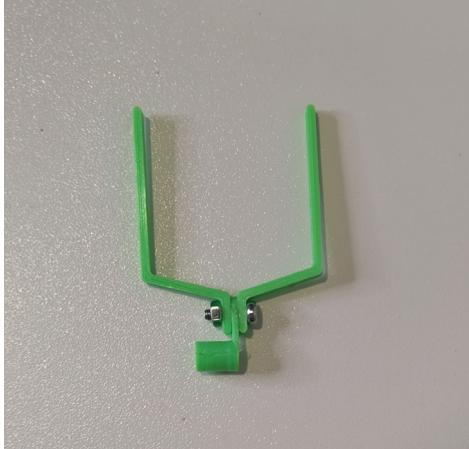


5 Remove all structure from the head



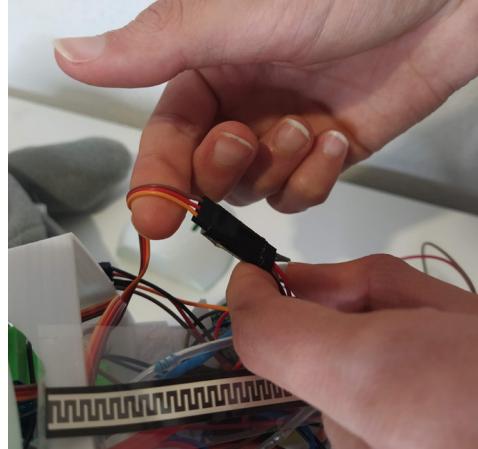
6 Remove the stick arm *

*Remind the position related to the servomotor. It will be the same when you will fix again.



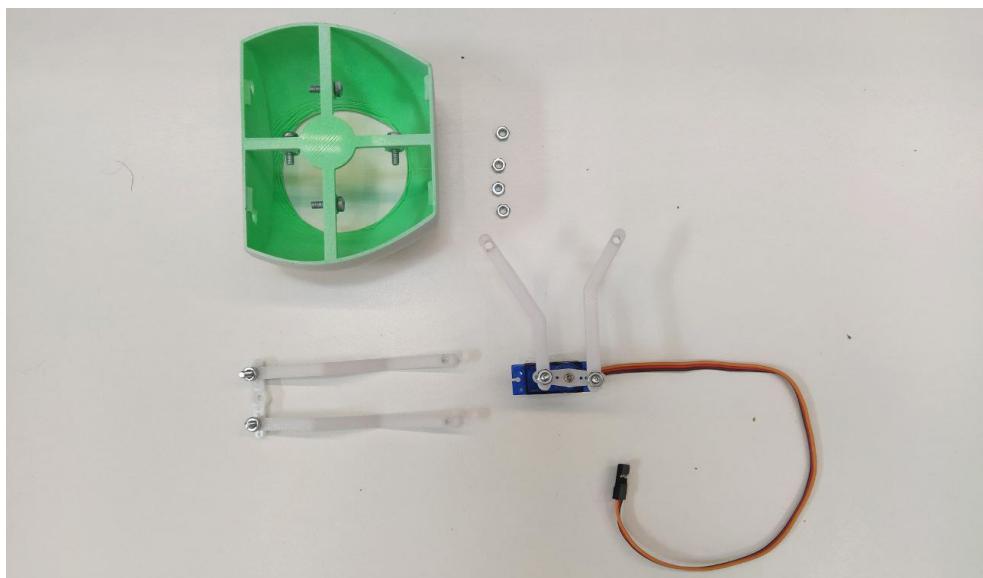
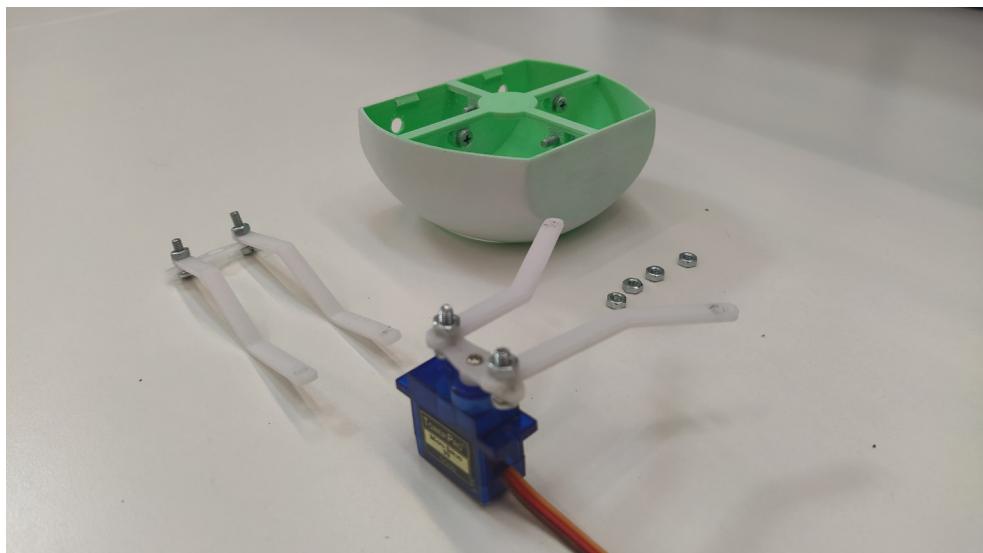
6.1 Detail of arm stick

Metal screws M3 x 10 mm; Exagonal nut M3. No wrench required



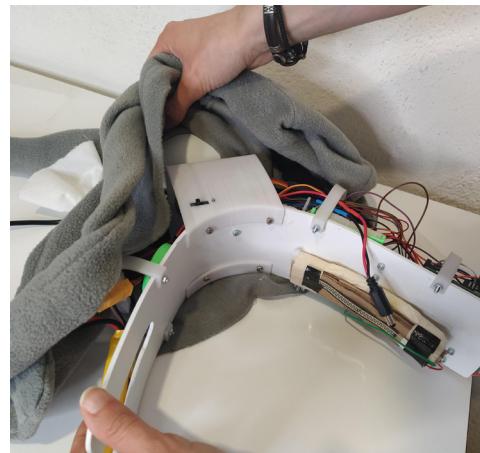
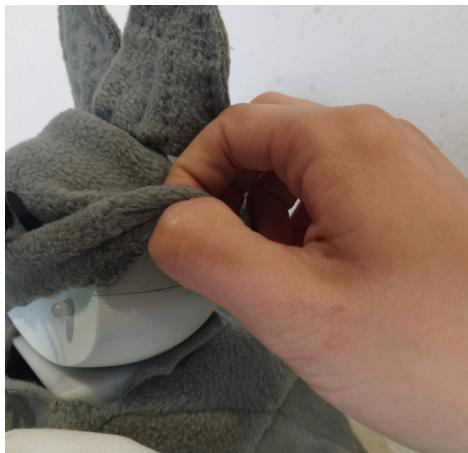
7 Remove cables of servomotor from their pins

DETAIL ON THE HEAD SERVOMOTORS

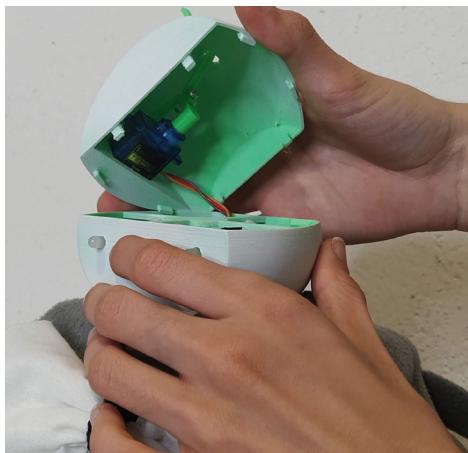


CHANGE SERVOMOTORS: HEAD

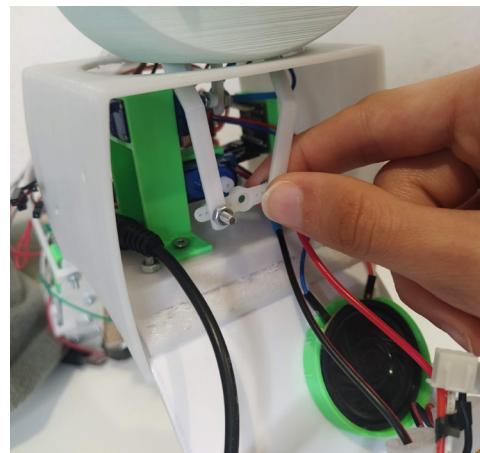
Two servomotors stay in the base of the body. They are fixed in 2 different case. You can substitute independently.



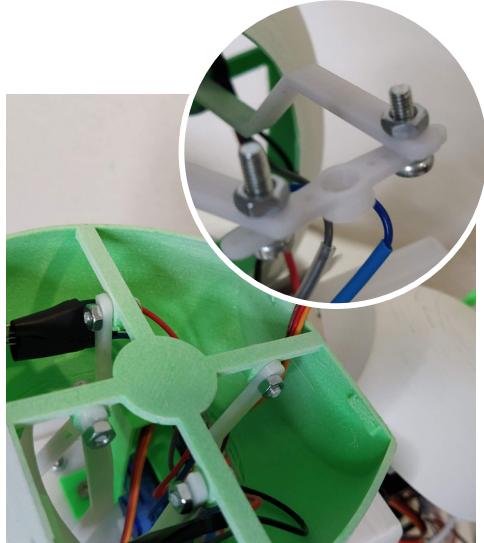
- 1 Remove the ears and the cover from the head



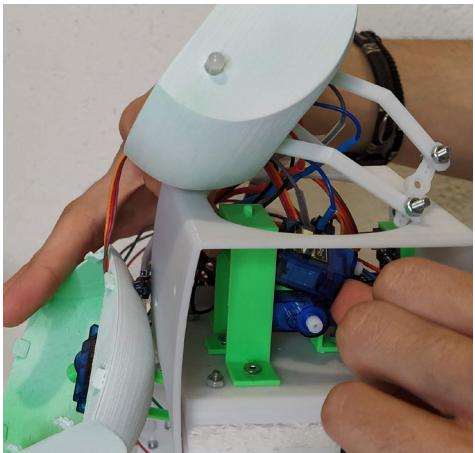
- 3 Open the head



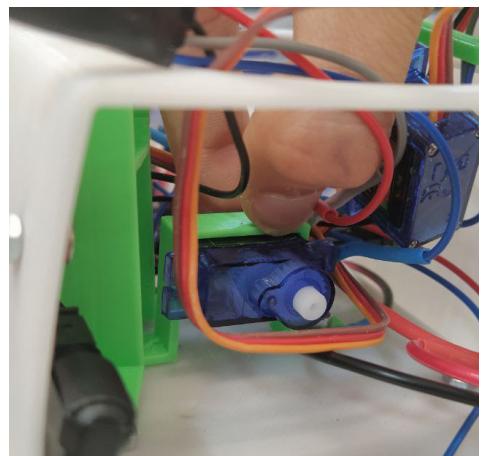
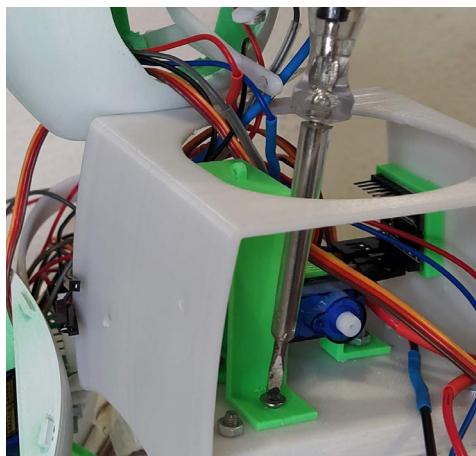
- 4 Remove the arm sticks from servomotors



- 4.1 Detail of the arm sticks
Metal screws M3 x 10 mm;
Exagonal nut M3. No wrench
required



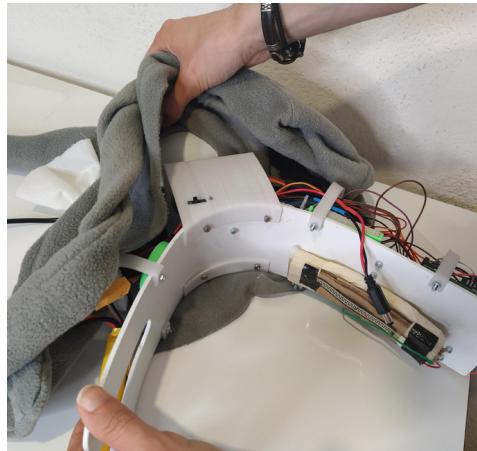
- 5 Remove the upper servomotor (if it is
the only one doesn't work)



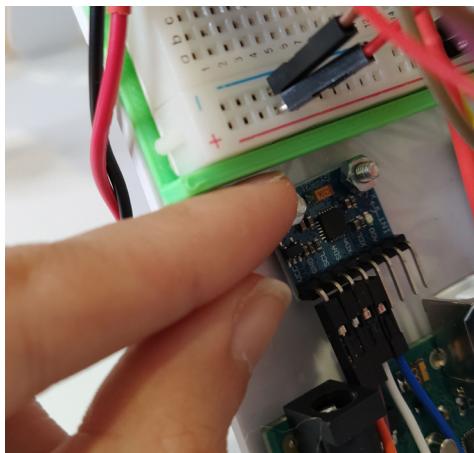
- 6 Remove with a flat wrench the 2
screws M3 x 8mm (for 2nd servo)
7 After removing upper case, remove
the bottom servomotor

CHANGING ACCELEROMETER AND VIBRATION MOTOR

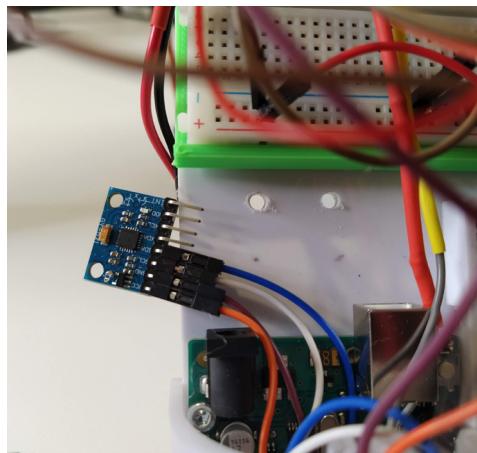
Accelerometer and vibration motor are fixed in the back with 2 M3 x 10mm and 2 exagonal nuts.



- 1 Remove the ears and the cover from the head

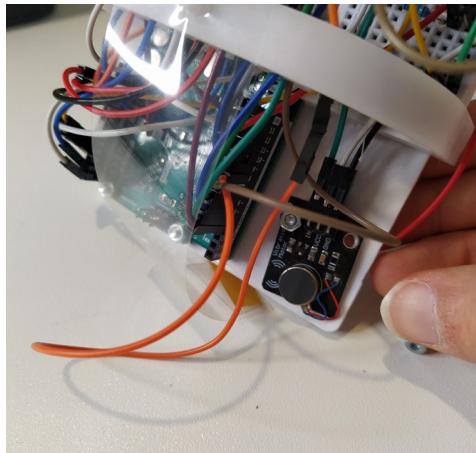


- 2 Remove all the body cover

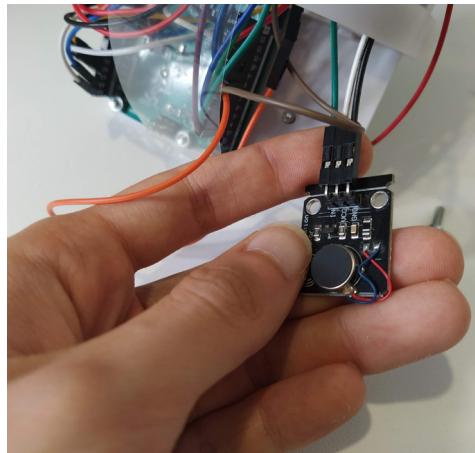


- 3 Remove the nuts from accelerometer

- 4 Remove cables from its pins



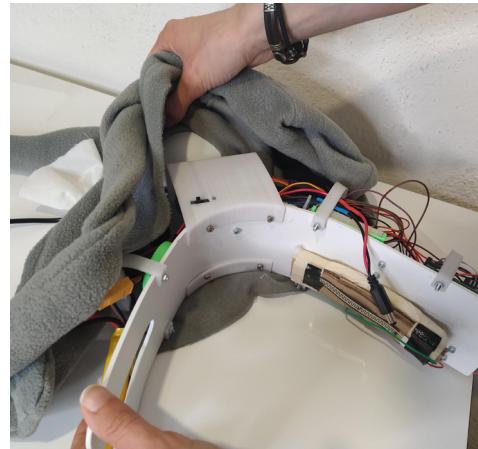
5 Same action for the vibration motor:
remove the nuts



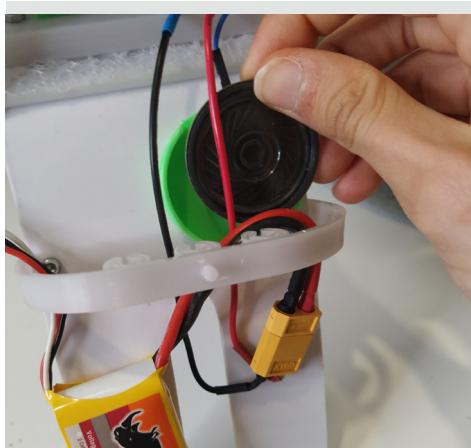
6 Remove the cables from the pins

CHANGING SPEAKER, SD AND MICROPHONE

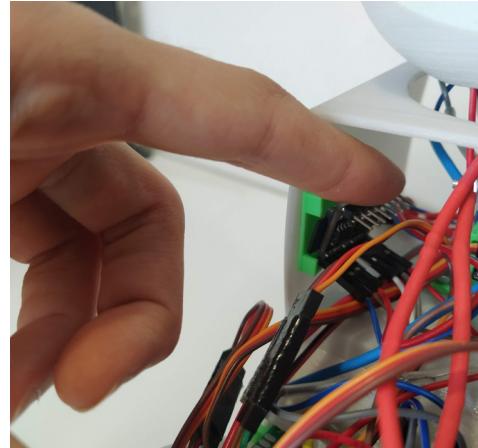
Speaker is fixed in front part in a special case. Even the SD but in the principal body. While the controller of microphone is fixed with 2 M3 X 10 and nuts in the principal body.



- 1 Remove the ears and the cover from the head

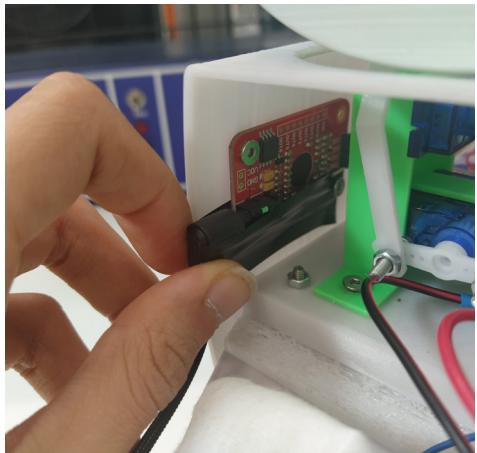


- 2 Remove all the body cover

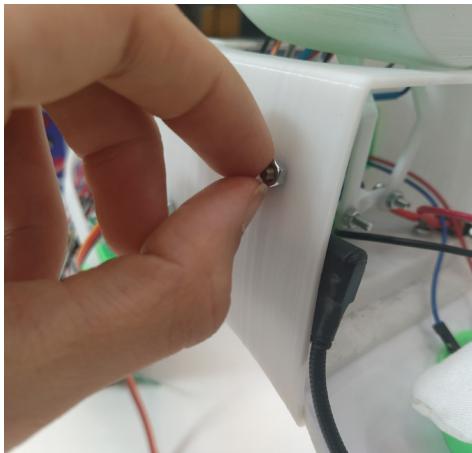


- 3 Remove the speaker from the case

- 4 Remove SD from adaptor



5 Remove microphone from jack attachment



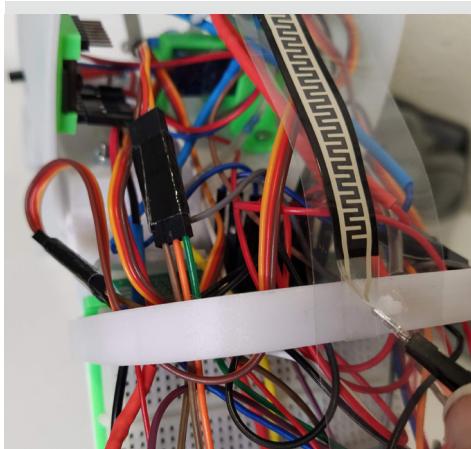
6 Remove the 2 nuts and screws from the microphone module

CHANGING PRESSURE SENSOR

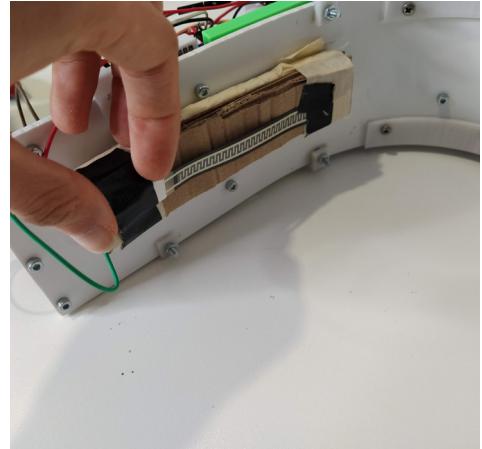
Two pressure sensors, one on the back for the padding and the other on the belly to understand if it stay on the shoulder or on the table.



- 1 Remove the ears and the cover from the head



- 2 Remove all the body cover



- 3 Remove the tape from the sensor

- 4 Remove the sensor from the structure

AIR LAB
ARTIFICIAL INTELLIGENCE AND ROBOTICS LAB

DESIGN
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SYSTEM