PLAYFUL DATA VISUALIZATION FOR AIR QUALITY

Instructions Guide

ROOK
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Mattia Thibault and Artur Cordeiro

Instructions Guide

⚠ WARNING:
If Rook is not in use, the power cable must be unplugged from the power socket.

Do not let children interact unattended with Rook in any way. Keep out of reach of children when one or more panels are open.

Keep Rook in upright position during transportation to reduce the risk of damage to the mist maker unit and the risk of pouring water outside of the water container, which may damage the electronic devices.

NOTICE:
Read all the instruction of this guide before using Rook.

1. Using Rook

The Rook project is based on playful data visualization of the air quality from the database of the Hollandse Luchten, using light and water mist.

In order to make the mist maker work, it's necessary about 5 to 6 liters of clean water in the water container (the bucket), that can be poured into the pipes - in two of them, that you can not see the mist maker unit, to avoid the water fall direct on the mist maker vibrators. The water should be poured carefully inside the pipe to avoid water in other parts of Rook that are not supposed to be wet, like the electric and electronic componets.

To turn Rook on, plug the power cable in the power socket. A white light should flash indicating that the device is connected to the WiFi network. Then, a blue light should flash indicating that Rook got the data from the Hollandse Luchten API.

The light color exhibited is equivalent to the color displayed in the Hollandse Luchten map - hollandseluchten.waag.org/kaart. It ranges from green, 0µg/m^3, to red, 150µg/m^3. When its below 75µg/m^3 the color is "greenish", if it is 75µg/m^3 the color is yellow, and above 75µg/m^3 the color is "reddish". Any value above 150µg/m^3 will be red.

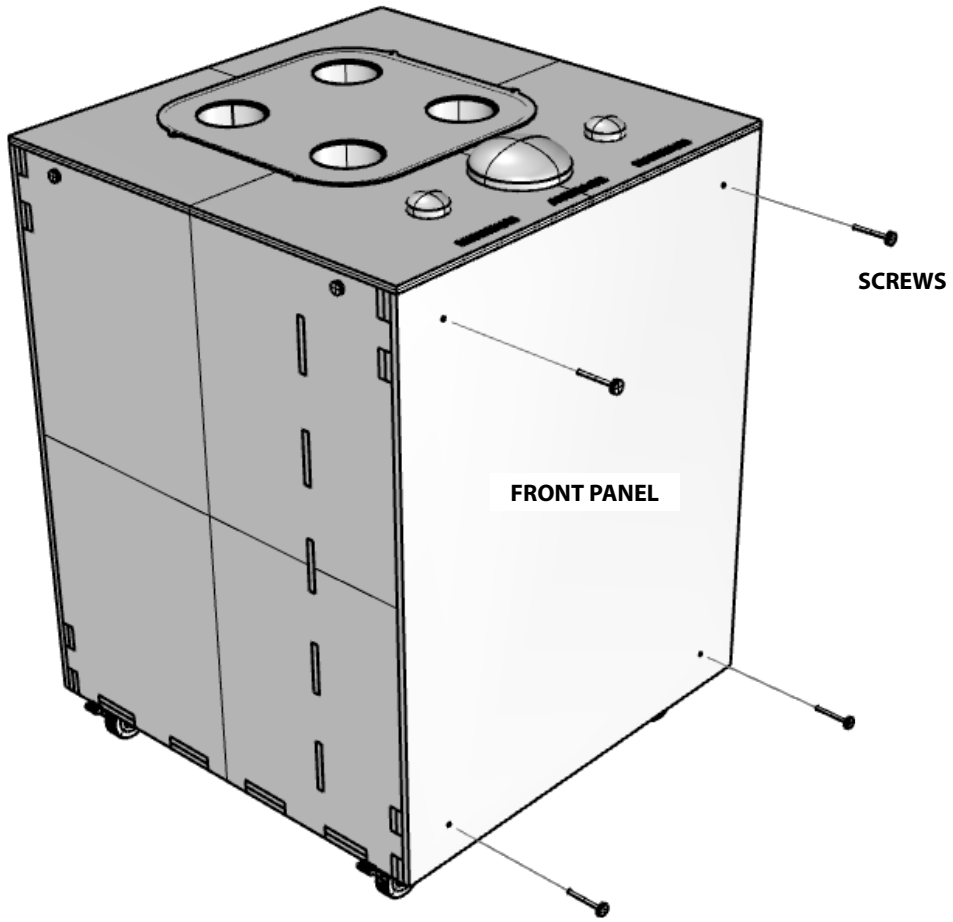
When a button is pressed, the light in the correspondent color is turned on and the relay activates the output power for the mist maker; after some seconds, the relay activates the output power for the ventilator; after some seconds, the output power for the mist maker is off; and then, after some seconds, the light and the ventilator are turned off. The Minimum button shows the minimum value from the last three hours. The Average button shows the average value of one hour from the last three hours. And the Maximum button shows the maximum value from the last three hours. The hours delay is specified in the code, and it can be changed.

2. The front compartment

⚠ WARNING:
First, unplug the power cable from the power socket, to reduce the risk of electric shock.

⚠ CAUTION:
Do not operate the Rook with the front panel open. Keep the front panel closed to reduce risk of electric shock and to reduce the mist getting in contact with the electric and electronic components. The mist can cause damage to the eletronic parts.

To open the front compartment, remove the four screws from the front panel - the one located near the buttons - and then remove the front panel (Img. 1).

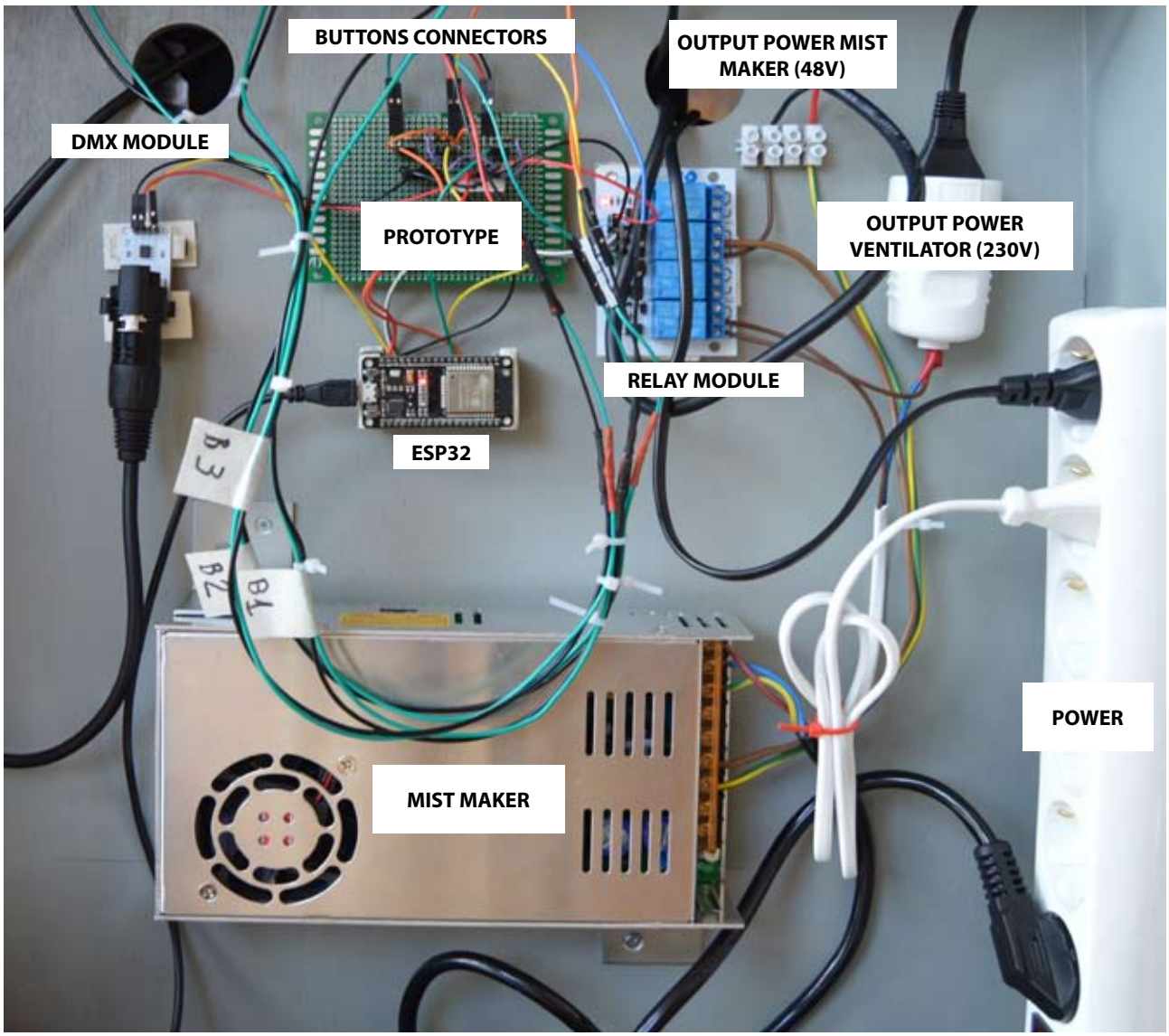


Img 1. Perspective view of the front panel.

2.1 Components in the front compartment

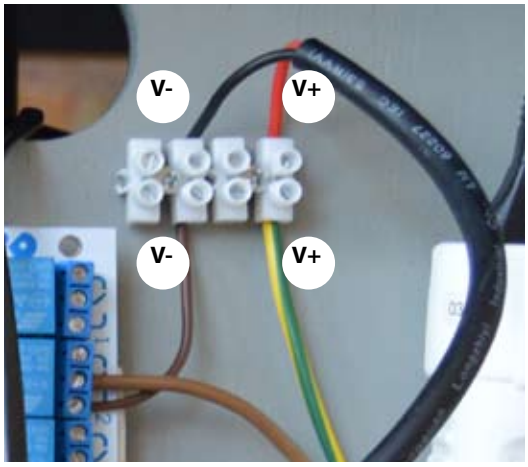
In the front compartment are located the microprocessor ESP32; the DMX module; the relay module and the output power for the mist maker (48V) and for the ventilator (230V); the prototype board with the buttons connectors; the mist maker power supply; the power strip (Img. 2).

⚠ CAUTION:
The connectors in the mist maker power supply, the connectors in the relay and the connectors of the output power are exposed and can cause serious electric shock. When working with these components always remove the power cable from the power socket.



Img 2. Components in the front compartment.

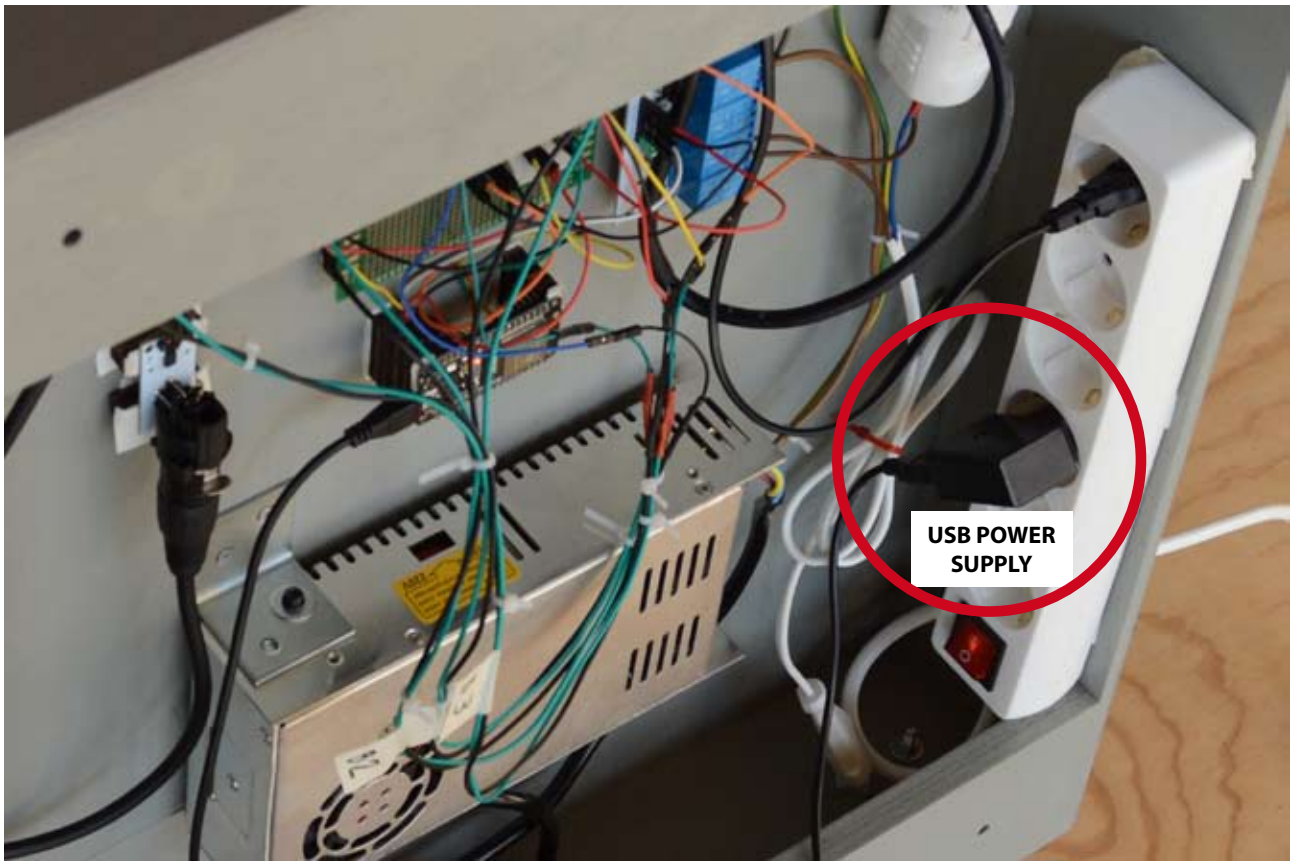
The output power polarity of the 48V for the mist maker are shown in the Img. 3 and alway must be double checked, following the wires from the mist maker power supply. The cable that connects to the mist maker unit is negative (V-, ground, GND) in the black wire and positive (V+) in the red wire, and must be connected to the respective polarity in the mist maker power supply.



Img 3. View of the output power for the mist maker (48V).

2.2 To upload code in the ESP32

To upload code in the ESP32, first remove the USB cable from the USB power supply (Img. 4) and then connect the USB cable to the USB port in your computer. When you are done with the uploading, disconnect the USB cable from your computer and plug the USB cable back in the USB power supply.



Img 4. The USB power supply is located in the power strip.

3. The back compartment

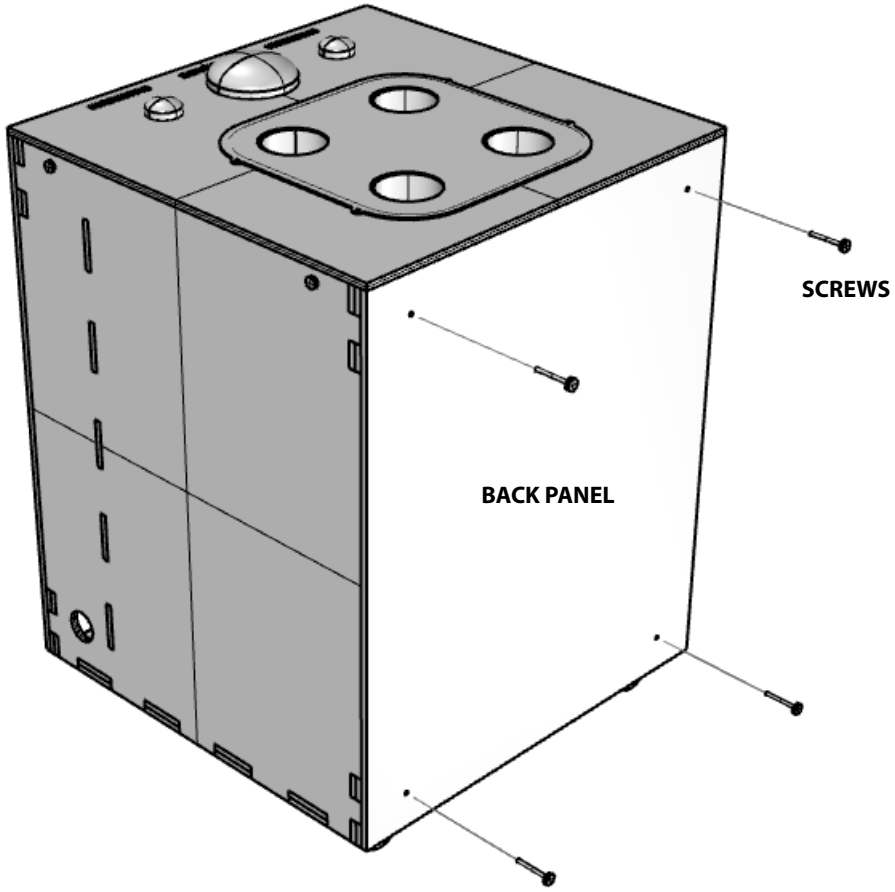
⚠ WARNING:
First, unplug the power cable from the power socket, to reduce the risk of electric shock.

To open the back compartment, remove the four screws from the back panel - the one located in the opposite side of the buttons - and then remove the back panel (Img. 5).

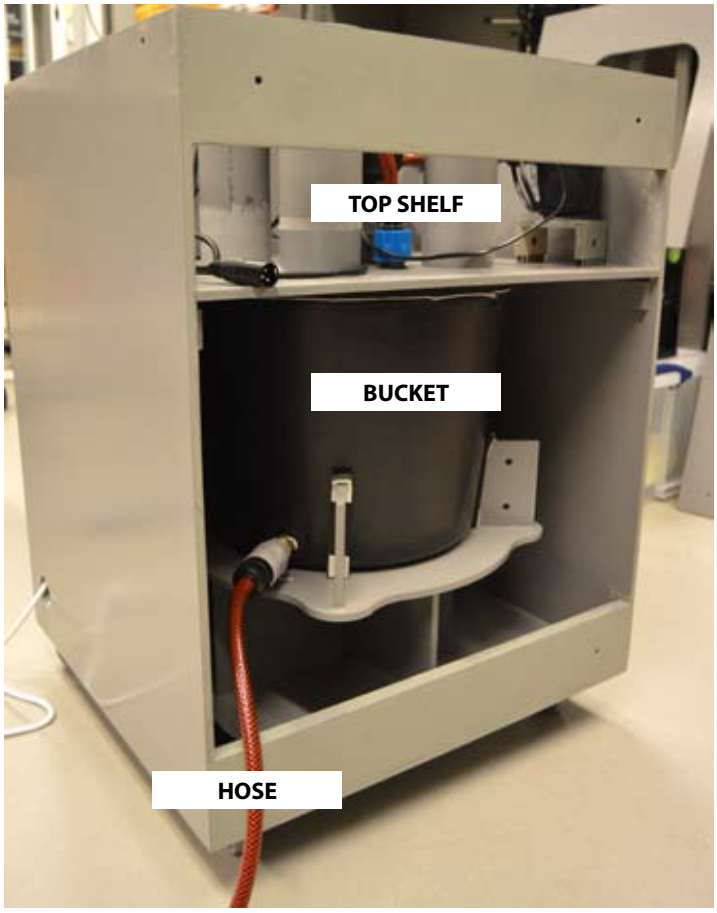
NOTICE:
If the Rook is not in use for a long time, it is recommended to empty the bucket. To do so, open the back compartment and open the hose connector to pour the water of the bucket inside a container.

3.1 The components in the back compartment

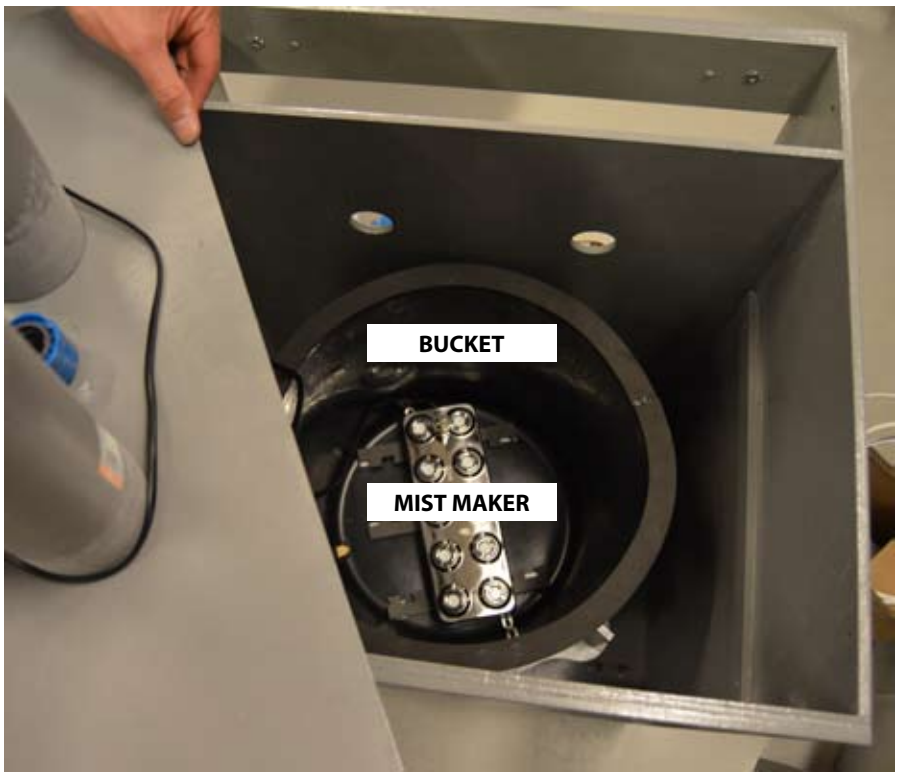
In the back compartment (Img. 6) are located the bucket; the hose to empty the bucket; inside the bucket is located the mist maker unit (Img. 7); on the top shelf is located the RGB light; and the ventilator system. To do maintanance in the top shelf, it is necessary to open the top cover, that is explained in the section 4.



Img 5. Perspective view of the back panel.



Img 6. The back compartment.



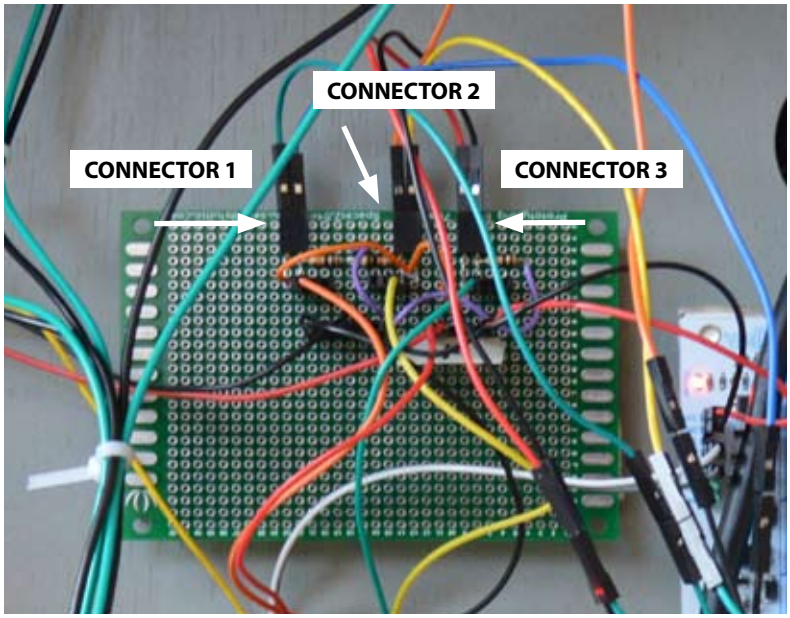
Img 7. The mist maker unit inside the bucket.

4. The top compartment

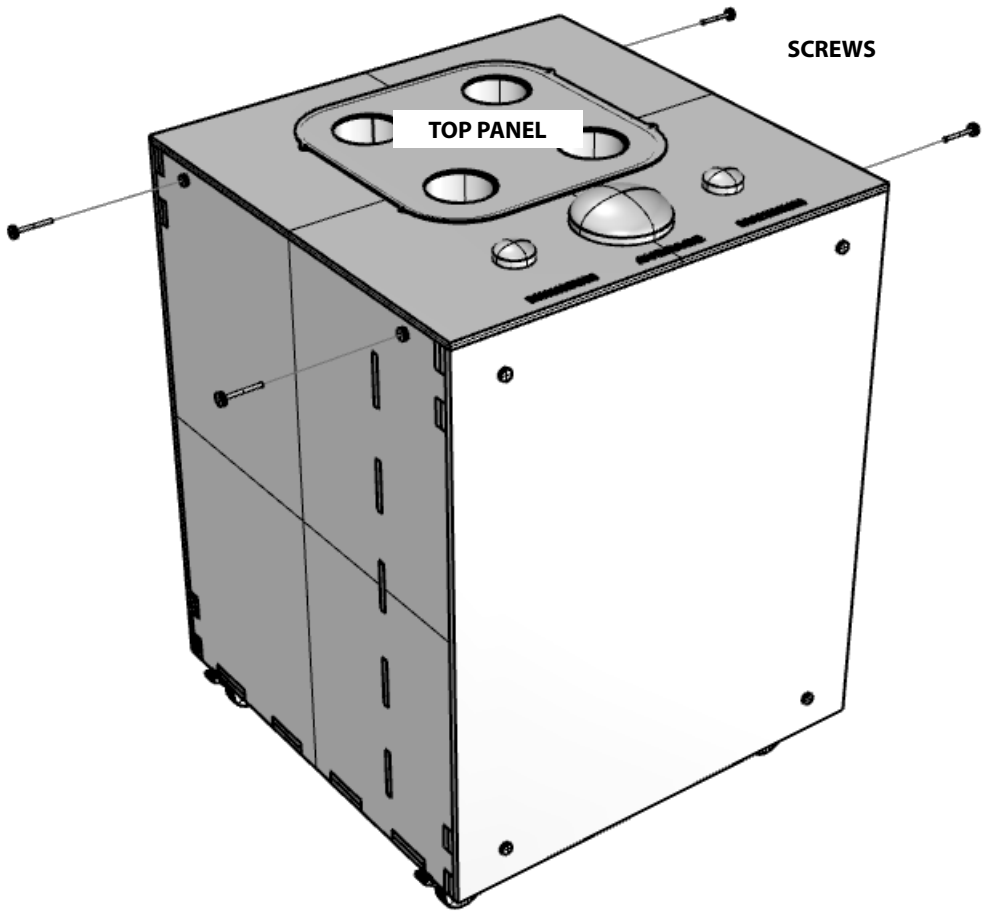
⚠ **WARNING**:
First, unplug the power cable from the power socket, to reduce the risk of electric shock.

To open the top compartment, first open the front compartment (explained in the section 2 of this document), and then carefully unplug the connectors of the three buttons from the prototype board (Img. 8).

Then, remove the four screws, two located in each lateral panels, and remove the top panel (Img. 9).



Img 8. The prototype board and the three button connectors

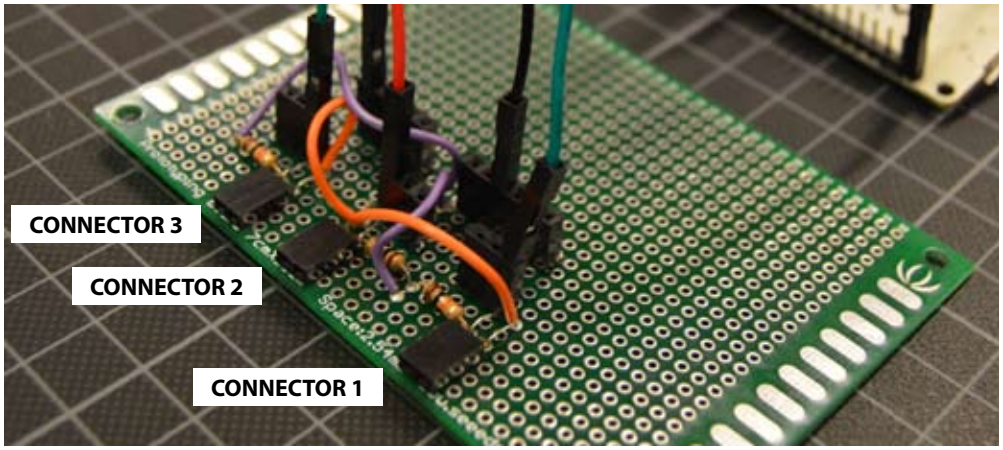


Img 9. Perspective view of the top panel.

To put back the top panel, place it in the right position and fast the four screws, two in each side of the lateral panels. Then connect the buttons.

Each button has one pair of wires, with no polarity, they can be connected in any position of the respective button connectors. The two wires of the button number 1 should be connected in the number 1 connectors of the prototype board, and so on respectively.

Observation: If you want, before you remove the button wires, you can photograph them to remember where they were connected. In case the buttons order are switched, the Minimum, the Average and the Maximum buttons will be in different positions. This can be fixed by connecting in the right position or by changing the pin port in the code. However, each button pair of wires should be kept together, plugged in the same connector pair (Img. 10), to avoid malfuction or unexpected behavior.



Img 10. Three connectors pairs in the prototype board.

4.1 To remove the top compartment

If you want to remove the top shelf, first unplug the power cable from the power socket; unplug the ventilator and the RGB light from the power strip; carefully disconnect the DMX cable from the DMX module; disconnect the mist maker unit cable from the output power connectors. Then, carefully lift the top shelf to remove it from the device, and pay attention to the mist maker cable that should pass by the hole in the shelf.

5. Credits and acknowledgement

The Rook project was developed by Mattia Thibault and Artur Cordeiro in partnership with Waag, and with the collaboration of Yuri Alexsander, Mar Escarrabill, Luis Rodil Fernandez and Jéssyca Rios.

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"The opinions, hypotheses and conclusions or recommendations expressed in this material are the responsibility of the author(s) and do not necessarily reflect the vision of FAPESP".

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