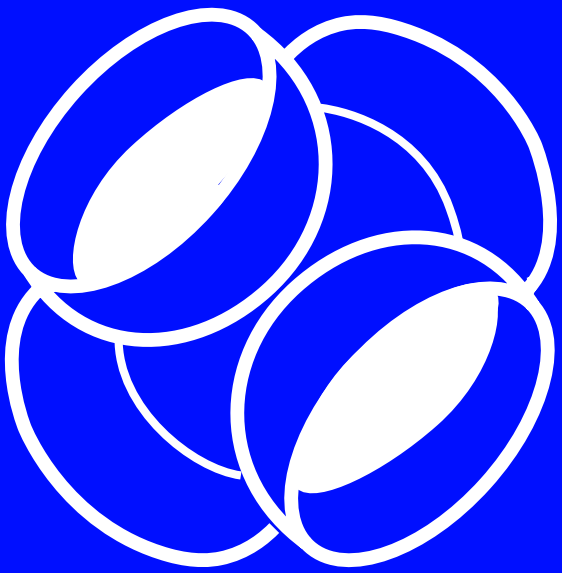
HOW TO BUILD A BRAHMA AMBISONIC MICROPHONE



The
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About

An Ambisonic microphone is used to capture full 3D sound without the concern of placement with respect to the source of sound. The microphone captures sounds from all directions, in a 360 degree manner to give a full sphere spatial surround sound experience.

In conventional recordings, much of the quality of the recording is determined by what microphones you choose (Omni, Cardioid, Hyper-Cardioid) and how and where you place them. But, in an Ambisonic recording, much of this is still in your control after the recording. You can create virtual microphones of different patterns, angle and rotate them. An Ambisonic Microphone also helps record audio with minimal noise, owing to larger 14mm capsules used.

This DIY document will help you build your own Ambisonic Microphone at home using a Zoom H2n Recorder. This will also guide you through the process of calibrating the built microphone and getting it up and ready for uses as diverse as, professional field recordings, virtual reality, music production, film soundtracks, etc.

Introduction

Brahma Microphone is an ambisonic microphone made by modifying the Zoom H2n microphone. The Zoom H2n is the successor of the H2 microphone. Brahma micro capsules in the Zoom H2n are small and convenient to use but capture more noise. By introducing bigger 14 mm capsules that capture less noise in a tetrahedral array to the Zoom H2n microphone, it can be modified as an ambisonic microphone.

List of materials

1. Soldering iron
2. Soldering wire
3. Zoom H2n recorder
4. Tetrahedral Array - 3D printed
5. A lot of small screws (0.8 mm and 1.2 mm mobile sized not sure about dimensions)
6. Small wire cutter (to cut wires)
7. Big wire cutter (to cut off plastics)
8. Two Star Screw drivers (0.8 mm and 1.2 mm - used for mobiles)
9. Four Capsules (14 mm)
10. Multimeter (to check positive and negative terminal)

01

Open the battery cover from the back of the Zoom H2n microphone and remove the batteries if they are present.

02

Unscrew two tiny screws on the top two corners using the small star screwdriver.

As a result, the Zoom label (plastic) comes off. (Note: Be careful when unscrewing so as to not strip the heads of those tiny screws since we need them later to close the microphone. If stripped, kindly find replacements)

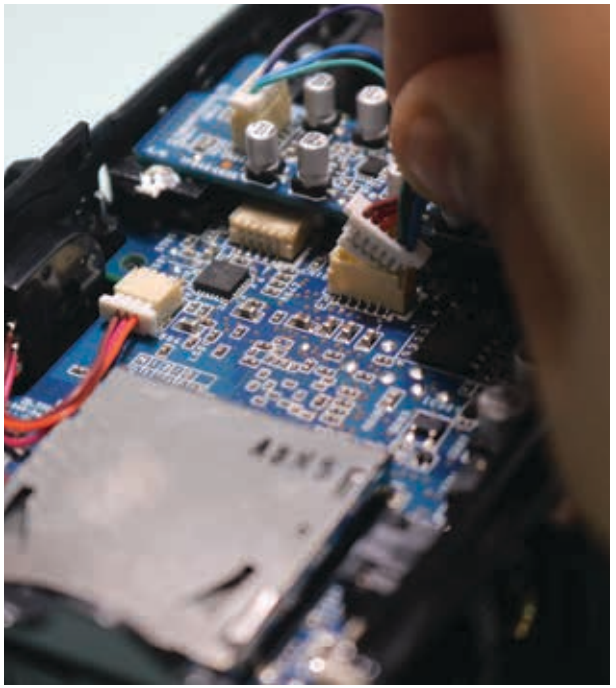
03

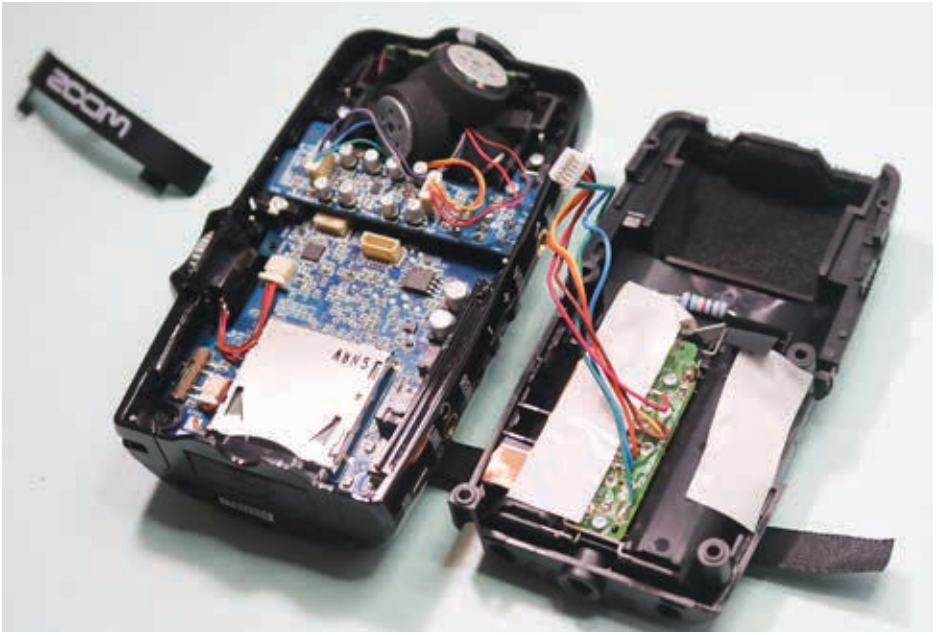
Unscrew four bigger screws on the outer corners around the batteries

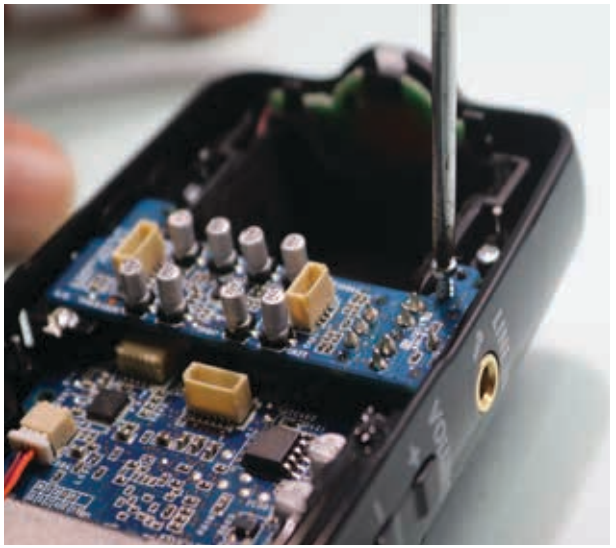
As a result, **the back of the Zoom H2n microphone comes off. Unplug the wires** connecting to the front.

04

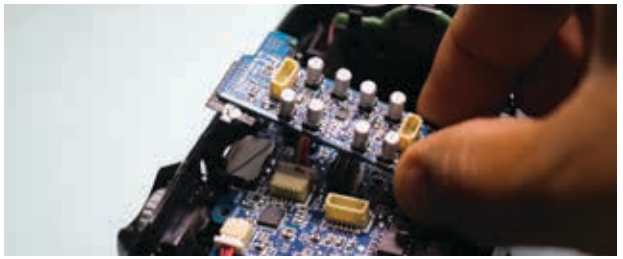
Once the bigger screws are removed, **unplug the back panel from the front half.**







After the back is removed, the microphone **connector panel is unscrewed** and removed from the front half.



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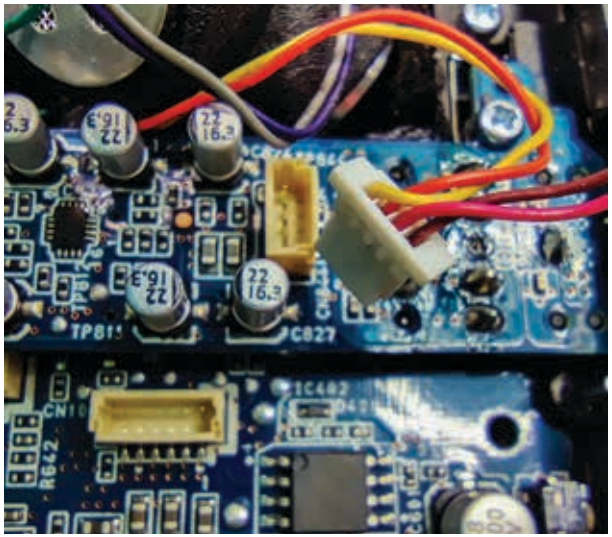
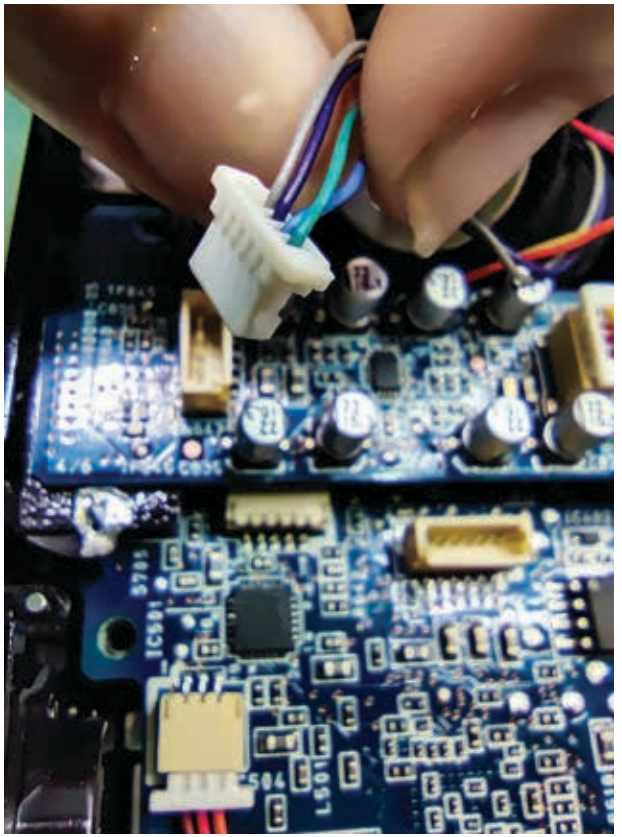




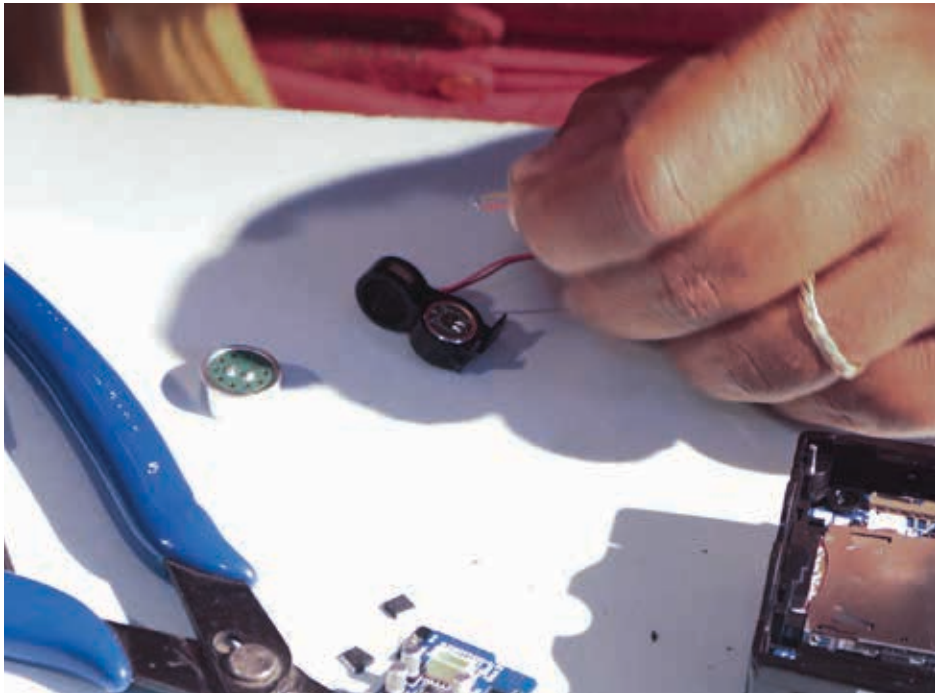
There are **two sets of microphones - Mid Side and XY.** Mid Side has a 5 pin connector - the rear pair - and the XY has a 4 pin connector. **Unplug these connectors** from the small microphone panel.

06

Snip off the capsule holders from the base. As a result, the connectors/ mics are fully detached.

07

Unsolder the connector wires from the MS and XY capsules sets, without damaging them.



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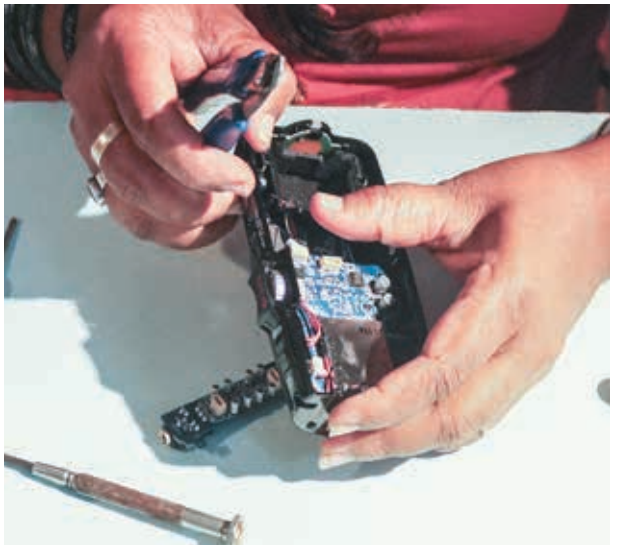
Color of the wires and terminals to microphone capsules. *Mid side microphone M + brown, - right S + orange - yellow XY microphone X Green +, blue - Y purple + grey - (color code may vary, must be checked individually)*

09



Remove the extra plastics on the Zoom H2n capsule area or cut off edges of the tetrahedron to accommodate the tetrahedron array inside the front.

10

Mark the left and right sides of the tetrahedral array and make sure it fits inside the front panel.

11

Insert the wires of XY microphone (yellow/ - left) through the bottom side of the tetrahedral array from the left side and solder it to one of the 14 mm capsules and similarly to the right side (red)

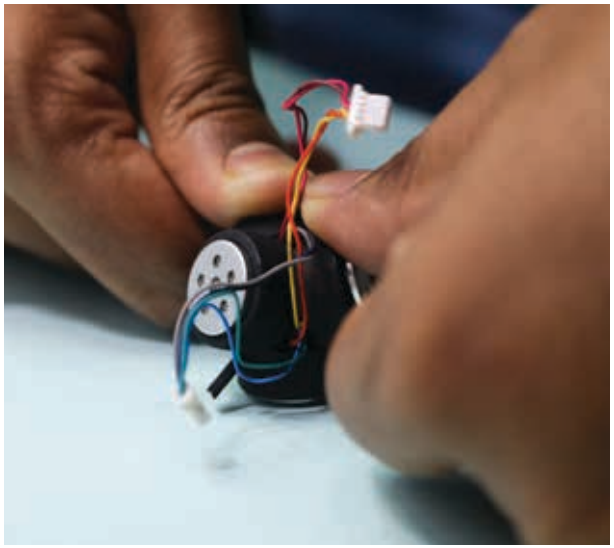
12

Insert the wires of MS microphone [blue - left] through the same side of array

The left wires of XY microphone were inserted, so the wires don't get entangled. And similarly to the right side [black/white] (Note: There are high chances of positive and negative wires getting mixed up - cross-check it with a multimeter)

13

Press the capsules inside the tetrahedral array until they are nicely fit.



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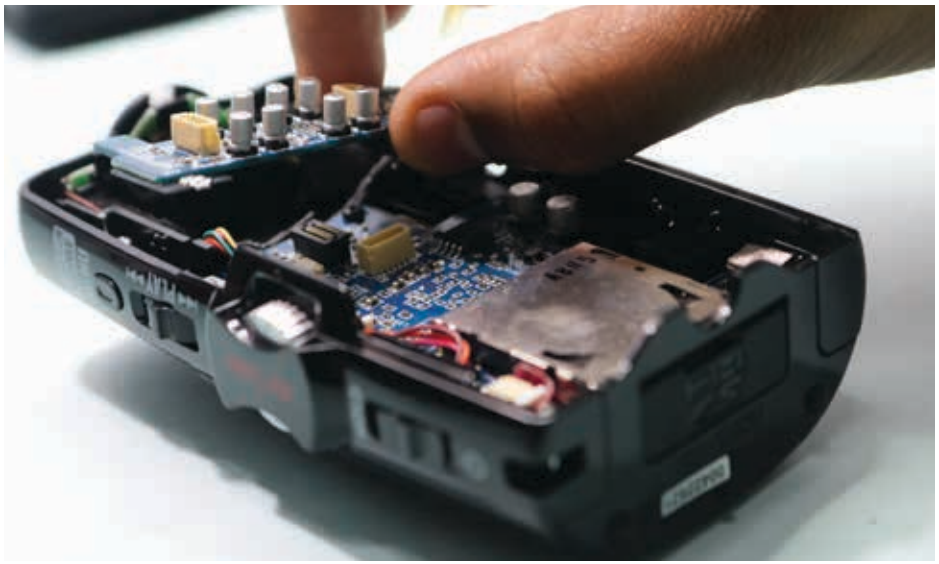
Insert the connector that connects the amplifier and microphone in the front panel.



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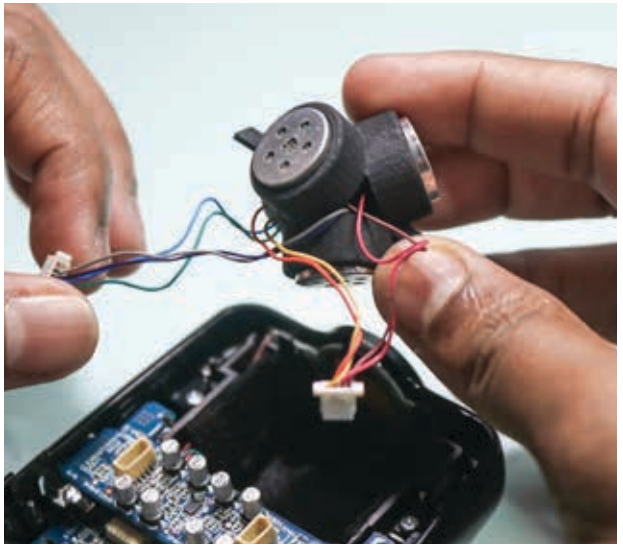
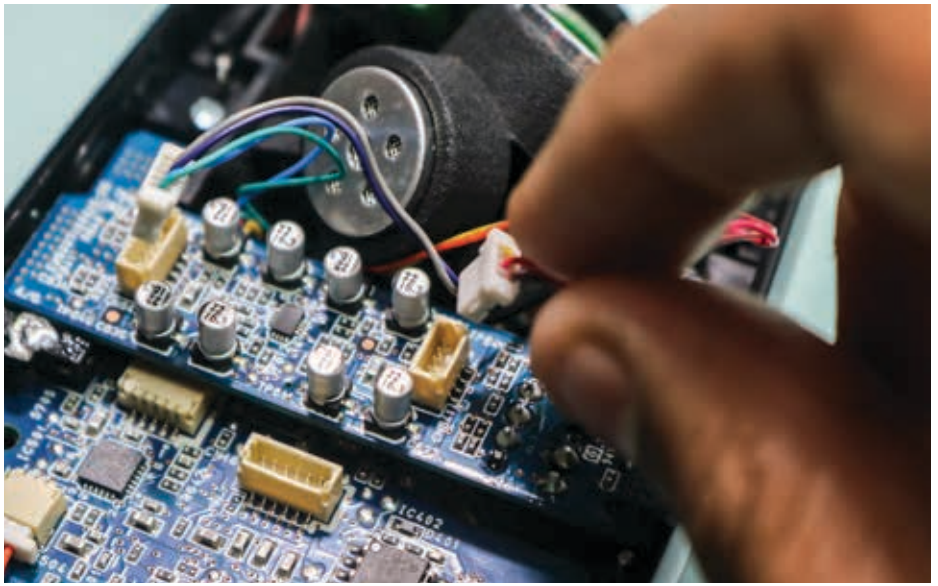
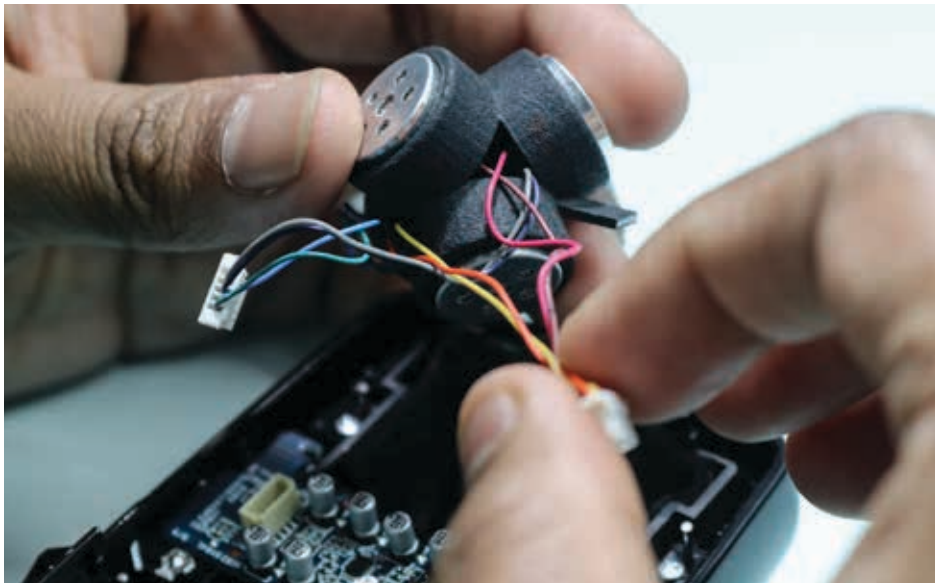
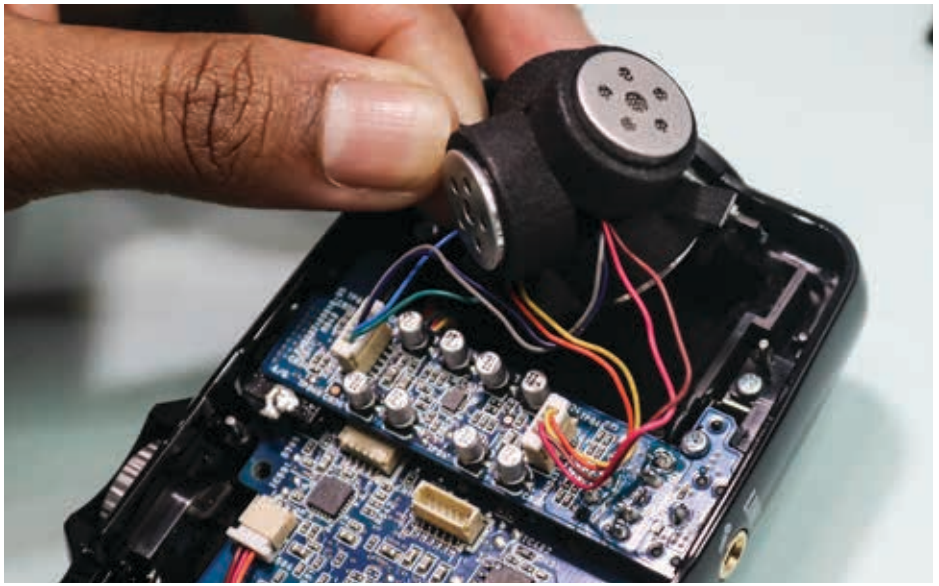


Insert the tetrahedral array by pulling the wires from one side with the capsules mounted with the left side down (front of the array).



Insert inside the front panel from one side and place the 4 pin and 5 pin connectors in their corresponding places.





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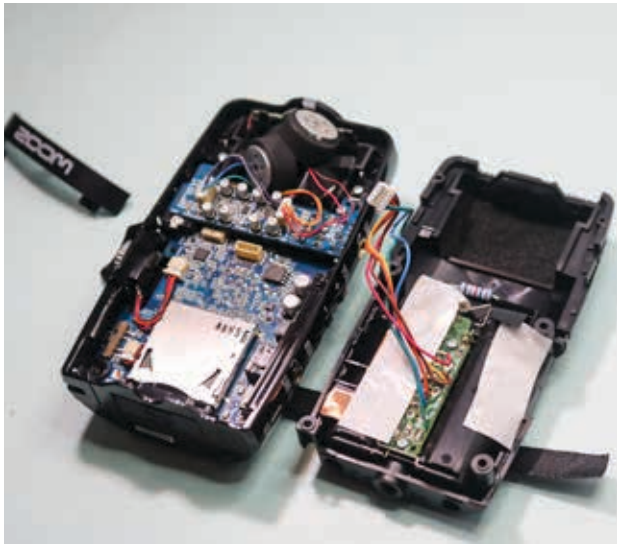
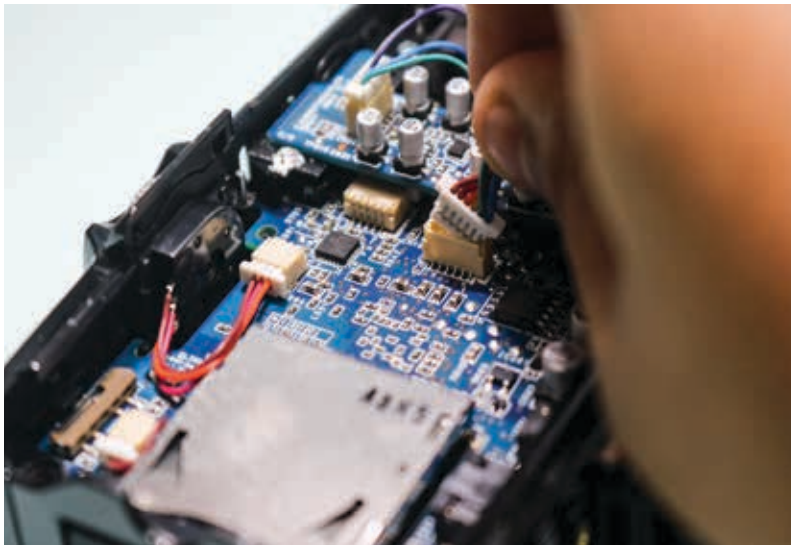
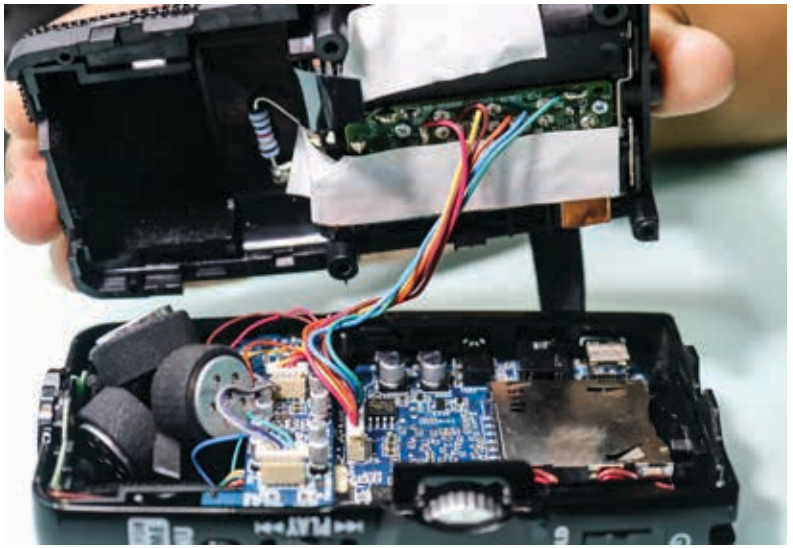




Plug the connector wires of the back to the front to attach the battery compartment. Then, turn on the recorder and check that all four channels are working. The front pair (XY) faces towards the back of the recorder!



When you are recording, you can see the meters which would normally be the front, but now is the rear.

17

Screw the big and small screws back in their places and close the recorder.

Credits

This manual was developed at **TheISRO** by:

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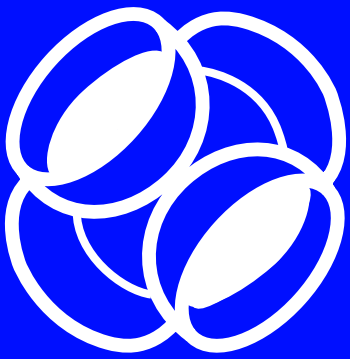
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