

DIY SPEAKER MANUAL

Welcome to the DIY Speaker Manual

This manual will guide you through assembly of the DIY speaker with procedures and pro tips.

After finishing this project, you should know how to solder and assembly which you will be able to use for creating other projects in the future.

Equipment requirement:

- Soldering Iron
- Solder
- Wire cutter
- Tape
- Solder Wick/ Solder sucker

Getting started

Safety precaution (Optional)

- Suggest wearing safety goggles, to protect your eyes while soldering and clipping component legs
- Wearing a mask and open window to reduce inhale of solder fume during soldering
- Put a clear rubber mat beneath components, to prevent them slipping away.

Project Duration

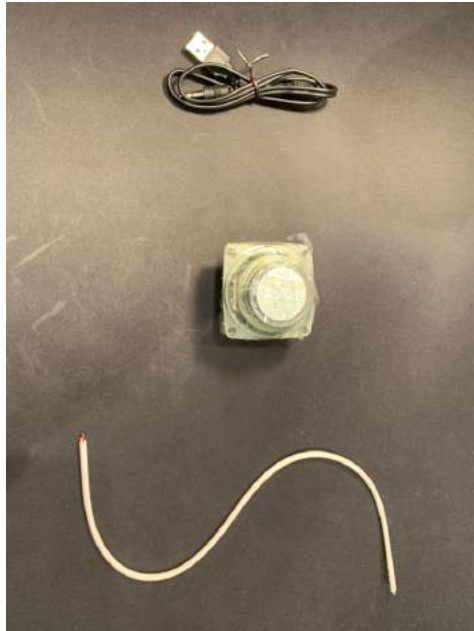
- It will take around 150 minutes to complete both speakers, and more hours to enjoy music after finishing the speaker. So, make sure you reserve enough time for it.

Parts/Components

1x USB A and 3.5mm Stereo to USB mini cable

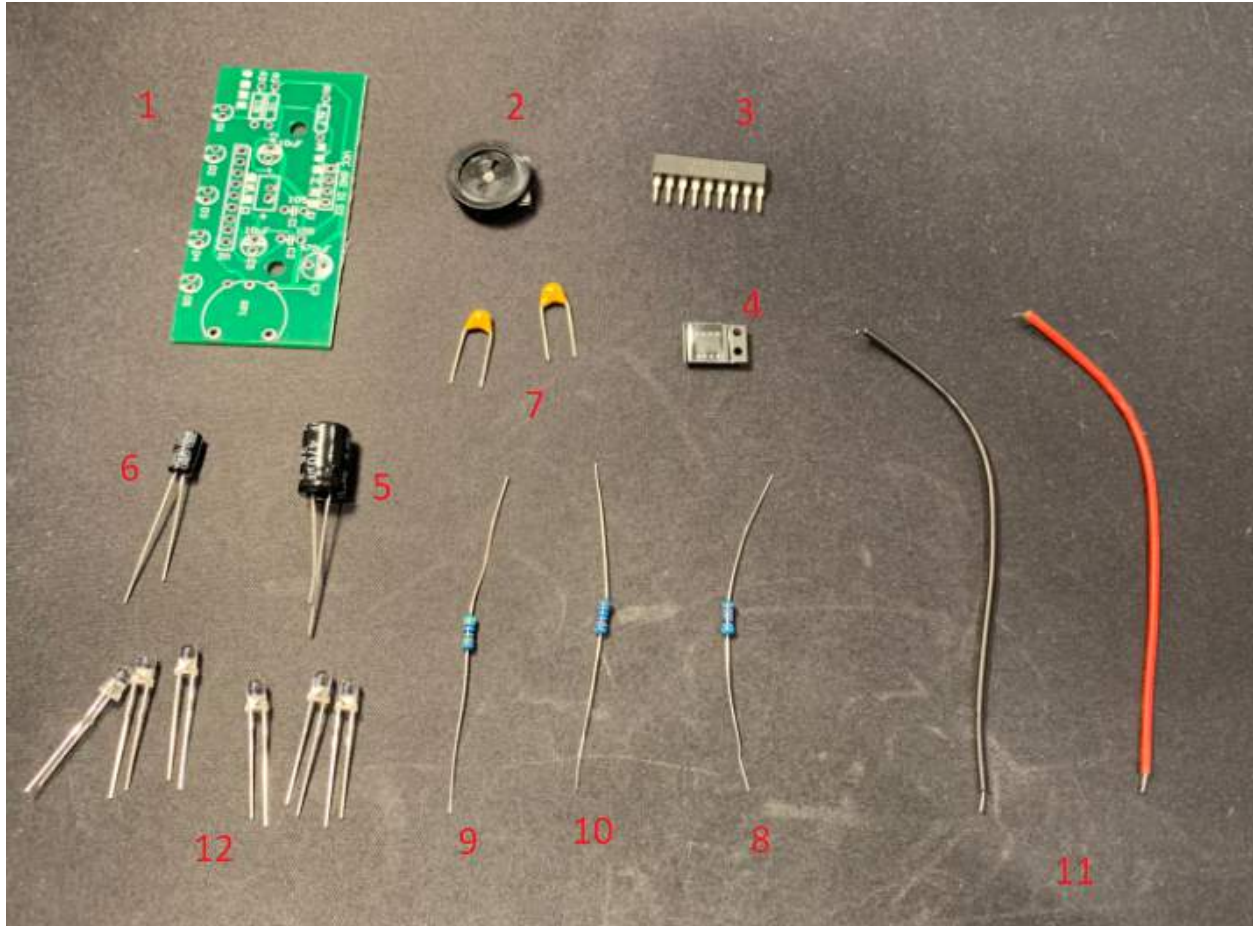
1x 4 conductor cable, 4x24AWG

2x 4 Ohm 4 Watt Speaker 2.5x2.5x0.8 in.



Small Bag 1:

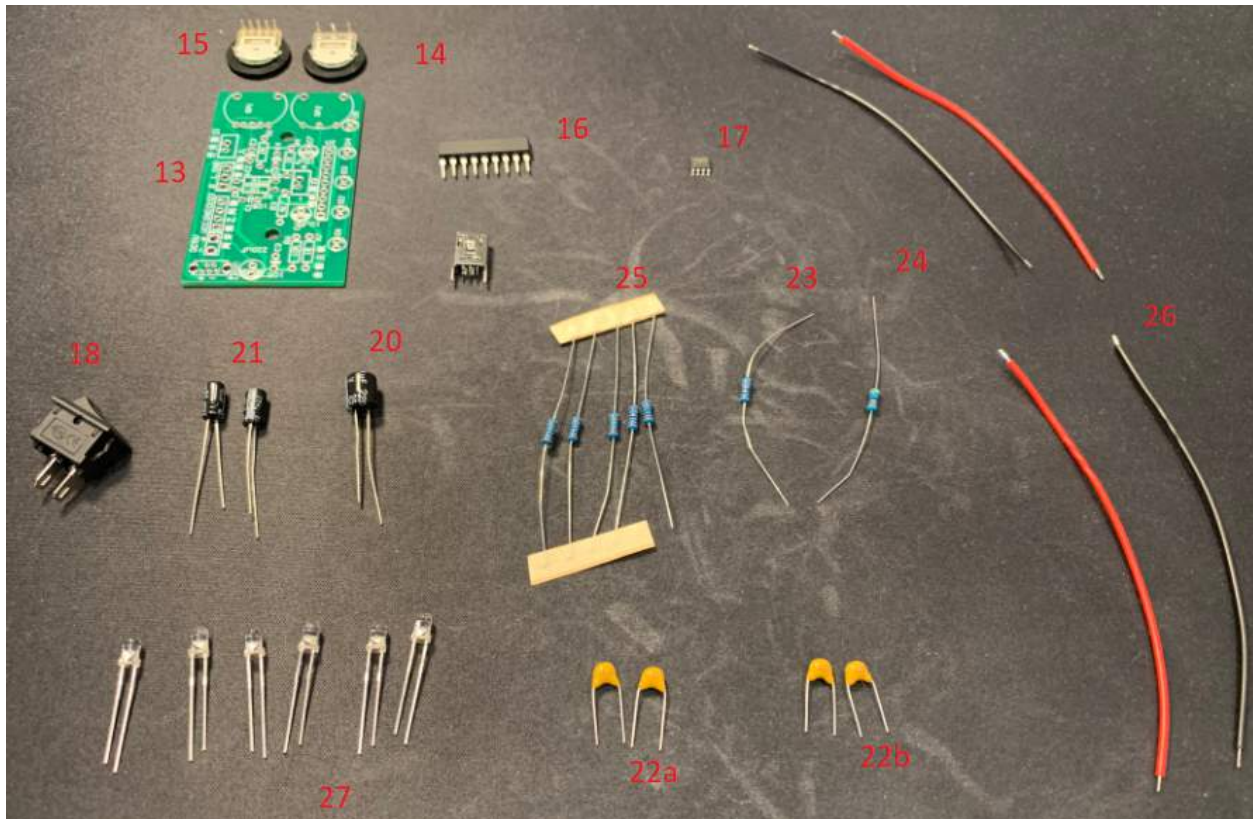
- 1) 1x Printed Circuit Board 1 (PCB 1)
- 2) 1x B103 10K Ohm 3-Pin Single Linear Dial Wheel
- 3) 1x KA2284 5-Dot mono LED Level Meter Driver
- 4) 1x MD8002A Audio Amplifier
- 5) 1x 25V 470uF Electrolytic Capacitor
- 6) 1x 25V 10uF Electrolytic Capacitor
- 7) 2x 1 uF Ceramic Capacitor (Marked as 105)
- 8) 1x 1/4w 10k ohm resistor - brown - black - black - red - brown -
- 9) 1x 1/4w 4.7k ohm resistor - yellow - purple - black - brown - brown -
- 10) 1x 1/4w 1k ohm resistor - brown - black - black - brown - brown -
- 11) 2x Jumper Wire black and red
- 12) 6x Blue Led 3mm (1 is spare)



Small Bag 2:

- 13) 1x Printed Circuit Board 2 (PCB 2)
- 14) 1x B103 10K Ohm 3-Pin Single Linear Dial Wheel
- 15) 1x B503 50K Ohm 5-Pin Single Linear Dial Wheel
- 16) 1x KA2284 5-Dot mono LED Level Meter Driver
- 17) 1x NS8002 Audio Amplifier
- 18) 1x Switch
- 19) 1x Mini-USB socket
- 20) 1x 25V 220uF Electrolytic Capacitor
- 21) 2x 25V 10uF Electrolytic Capacitor
- 22a) 2x 0.22 uF Ceramic Capacitor (Marked as 224)
- 22b) 2x 1 uF Ceramic Capacitor (Marked as 105)

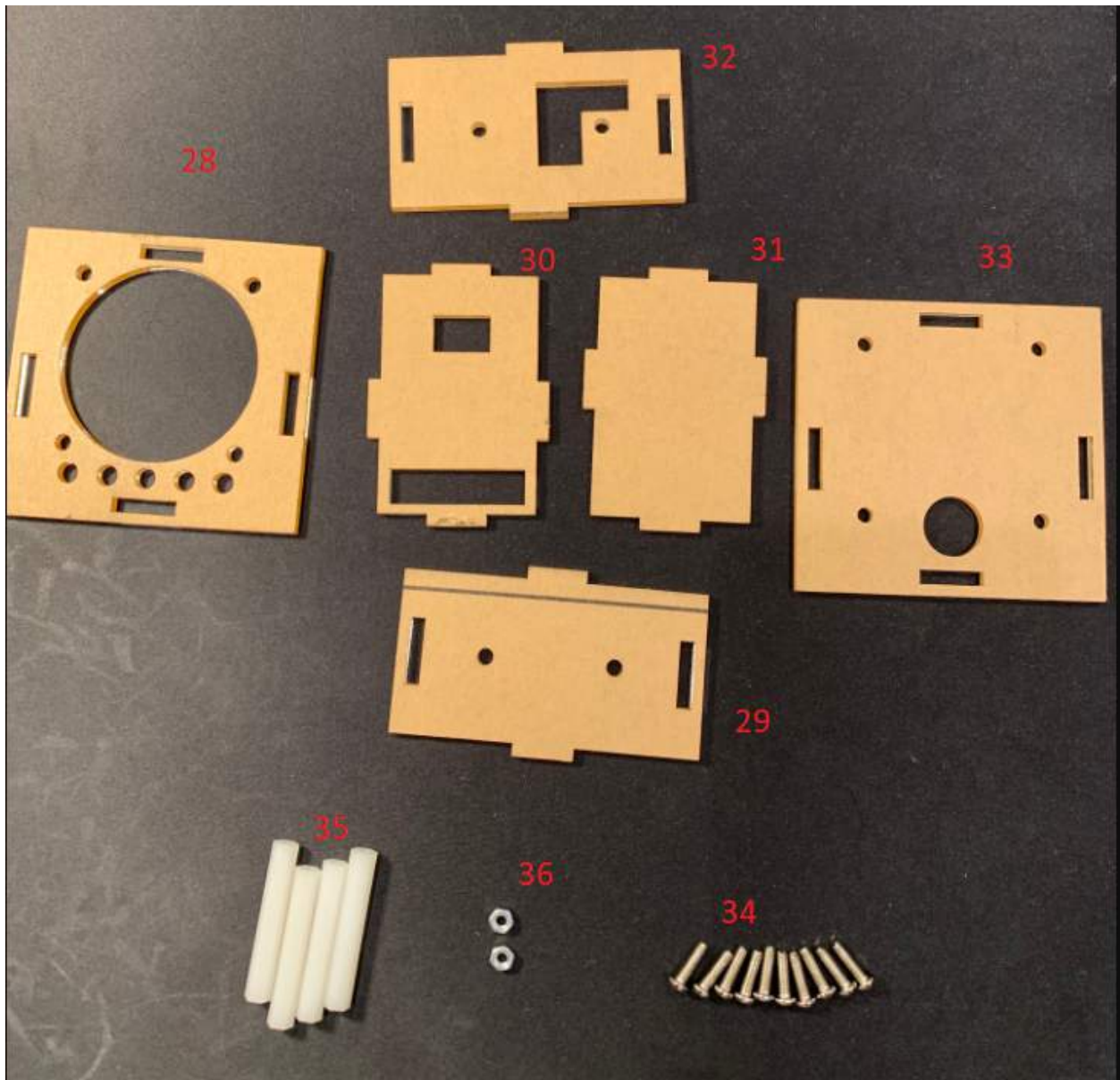
- 23) 1x 1/4w 10k ohm resistor - brown - black - black - red - brown -
- 24) 1x 1/4w 4.7k ohm resistor - yellow - purple - black - brown - brown -
- 25) 5x 1/4w 1k ohm resistor - brown - black - black - brown - brown -
- 26) 4x Jumper Wire 2x black and 2x red
- 27) 6x Blue Led 3mm (1 is spare)



Speaker Container bag 1:

- 28) Container component 1
- 29) Container component 2
- 30) Container component 3
- 31) Container component 4
- 32) Container component 5
- 33) Container component 6
- 34) 10x Screws M3x10mm
- 35) 4x Standoff M3x35mm Female to Female

36) 2x M3 Nuts



Speaker Container bag 2:

37) Container component 1

38) Container component 2

39) Container component 3

40) Container component 4

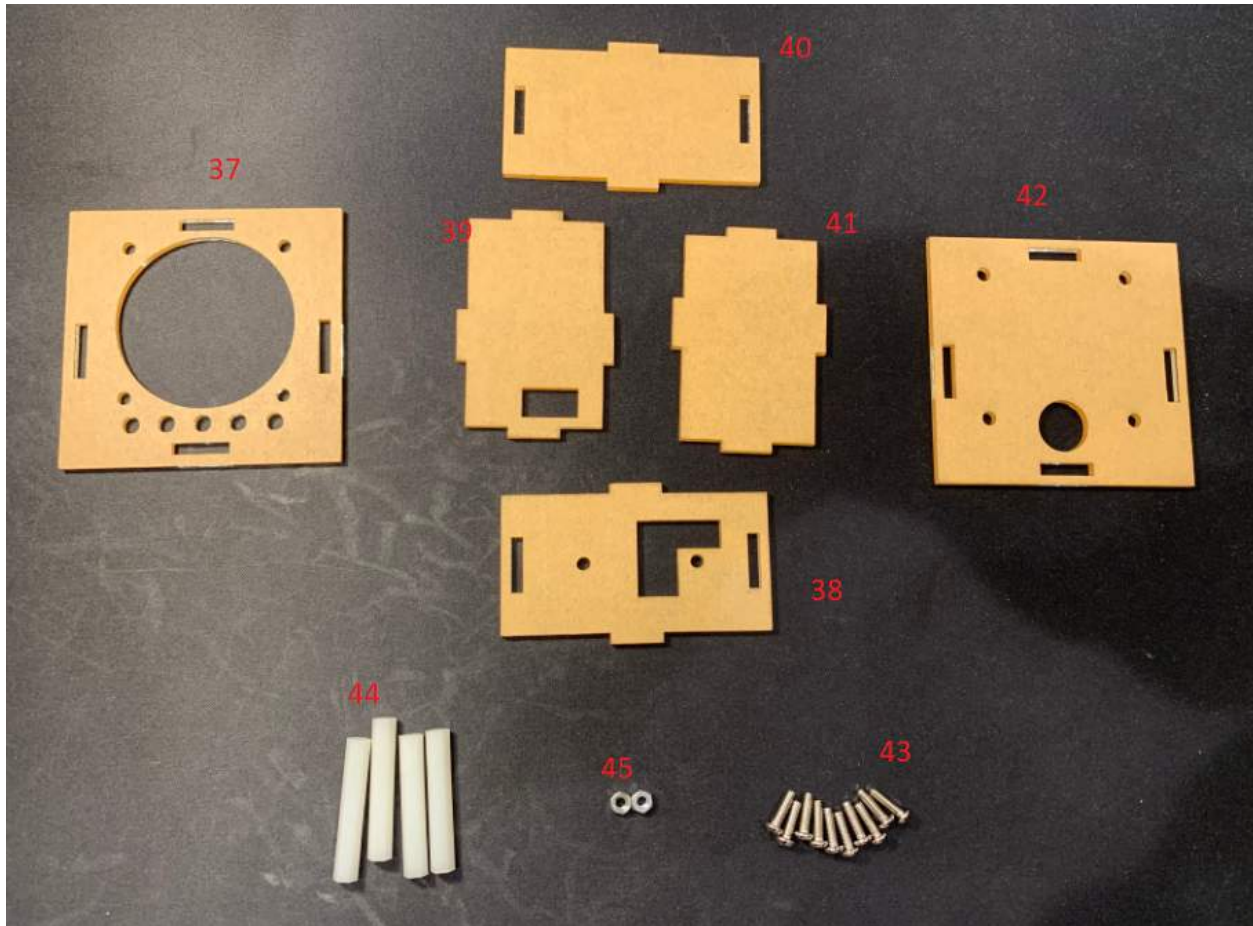
41) Container component 5

42) Container component 6

43) 10x Screws M3x10mm

44) 4x Standoff M3x35mm Female to Female

45) 2x M3 Nuts

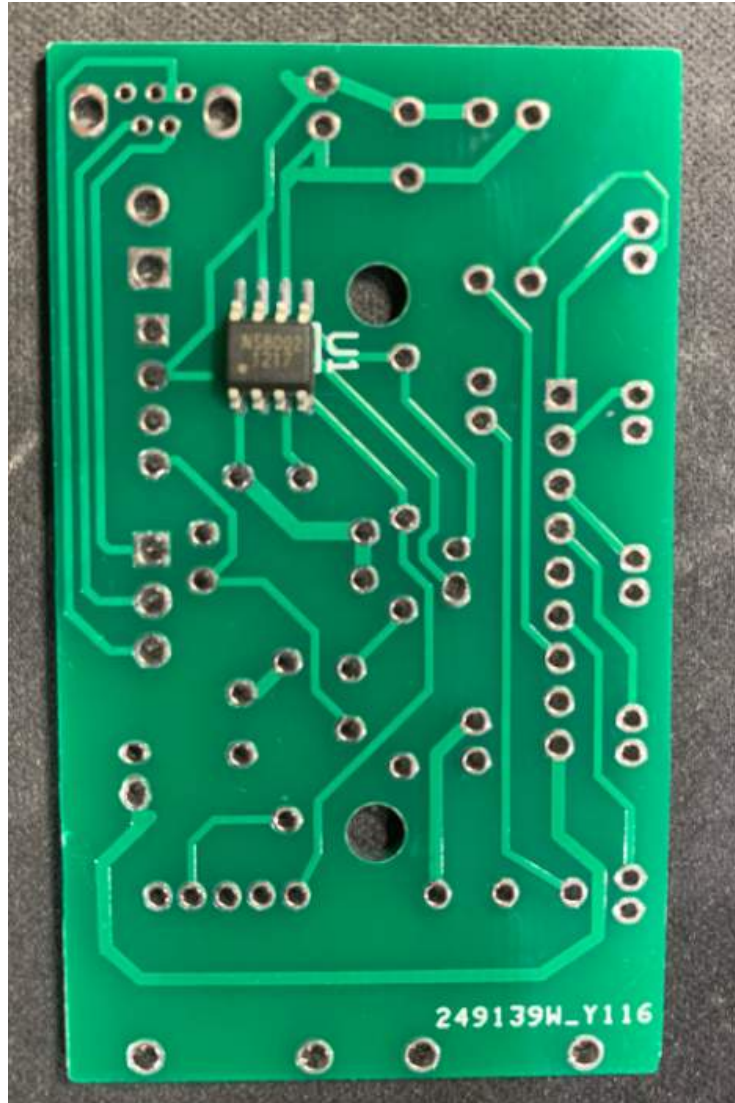


===== PCB 1 =====

Tips Solder the smaller parts first, it will make the whole process easier

Step 1

Mount the MD8002A Audio Amplifier first, notice to put the black dot side align to the curve side.



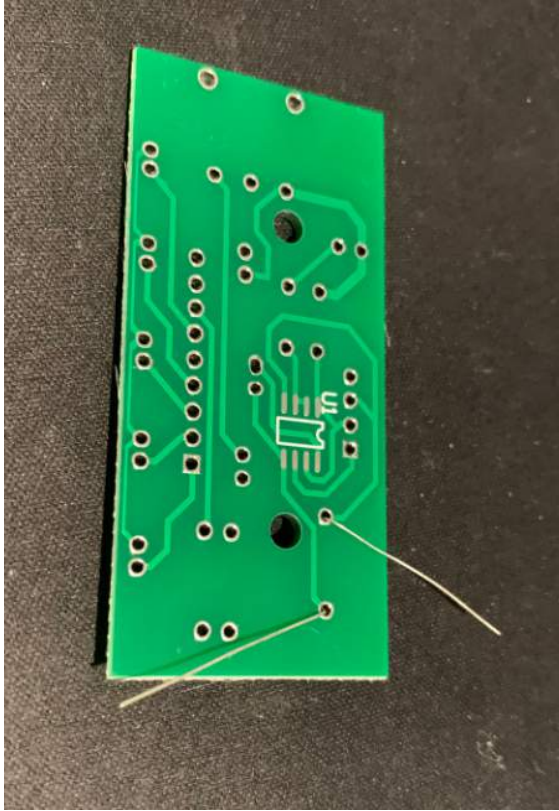
Notice solder a leg on either corner first to stabilize it, then proceed to solder the rest of the legs.

Step 2

Proceed to solder the resistors, you can bend them like a U-shape before putting both legs through the PCB board that states the according value.

You can start with the greatest value to the lowest.

Tips Bend the legs of the resistor like this



under the PCB, to avoid it moving around, to have an easier soldering environment

After soldering the resistors, you should cut off the legs. This act will prevent short circuiting from occurring and also makes it easier to solder other components.

Step 3

Next step is to solder the capacitors, you will start with the ceramic capacitor, they have no polarity therefore, solder it into both "105" on the PCB would be fine. As for the electrolytic capacitors, you will do it in the later steps as they have a bigger size. they have polarity. The longer leg represents the positive pole and shorter leg and the side with white part represents the negative pole. Insert the negative pole leg into the pin with white strips. Repeat this step with the 3 ports on the PCB with the respecting value stated on the PCB.

Step 4

Solder the Single Linear Dial Wheel, beware not to add too much solder or else the solder will block the rotation of the wheel.

Step 5

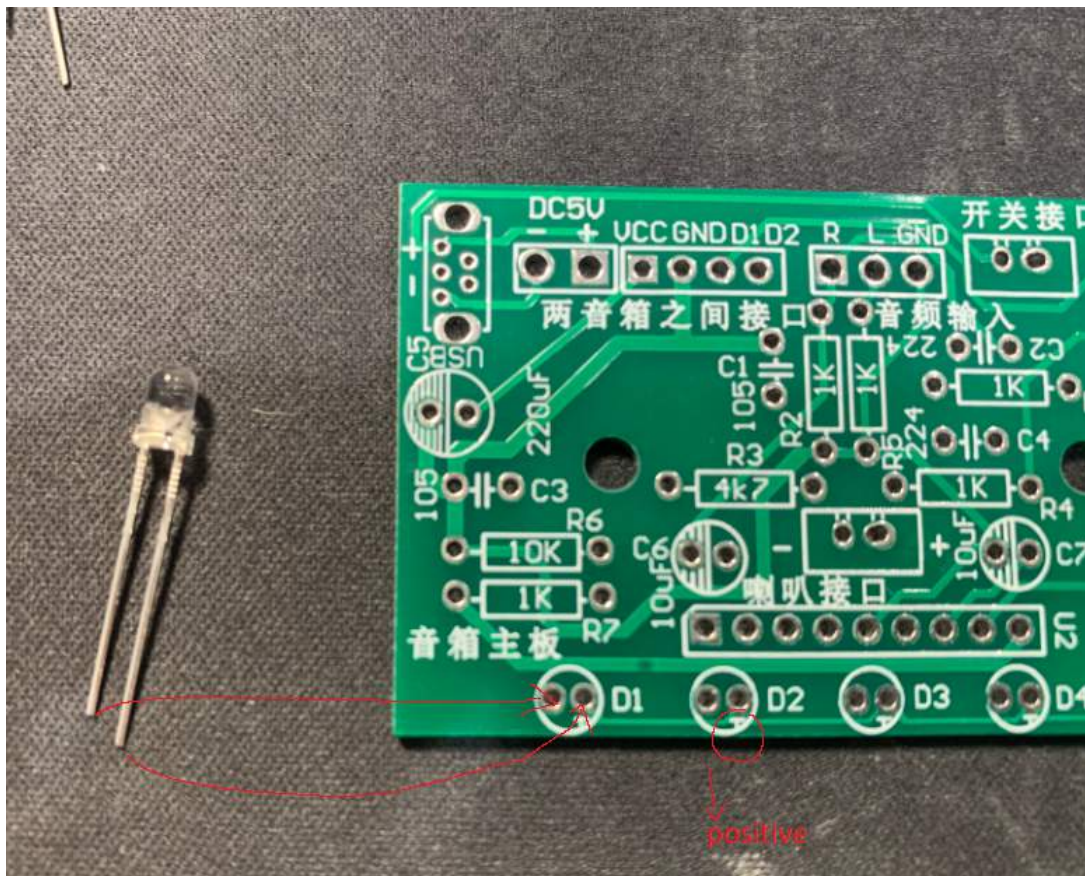
Solder the KA2284 5-Dot mono LED Level Meter Driver, face the tilted side to D1, D2, , D5 side.

Step 6

Now you can solder the Electrolytic capacitors. Remember that they have polarity. The longer leg represents the positive pole and shorter leg and the side with white part represents the negative pole. Insert the negative pole leg into the pin with white strips. Repeat this step with the 3 ports on the PCB with the respecting value stated on the PCB.

Step 7

Now plug the LEDs into D1 to D5 pins, as LEDs are diodes, they have polarity just like Electrolytic capacitors and just like them, the longer leg represents a positive pole. Plug the longer leg into the positive pin as stated on the board but remember to reserve enough space to bend it, and then solder it.



Step 8

Check whether the soldering ports are overlapping another port or not, if so the you will have to desolder it and use a solder wick to absorb.

=====**PCB2**=====

Step 9

Move on to another PCB board, repeat step 1-8, but there are two things to be aware of. First is that there are 2 values of ceramic capacitor here, so solder them into the stated "105" and "224" pins. Another point to notice is that there are two types of Single Linear Dial Wheel, solder that 3 pin one in RP2 and 5 pin one in RP1 on the PCB.

Step 10

Solder the Mini-USB socket on the "USB" part of the PCB board, this will be the power and audio source for the speaker.

Step 11

Solder two jumper wires on the 2 pins of the switch, then solder the other end of the two jumper wires on the board. The polarity does not matter here.

Step 12

Solder the black jumper wire on the negative pole of the speaker and red to the positive. Then solder the other side on the PCB.

Step 13

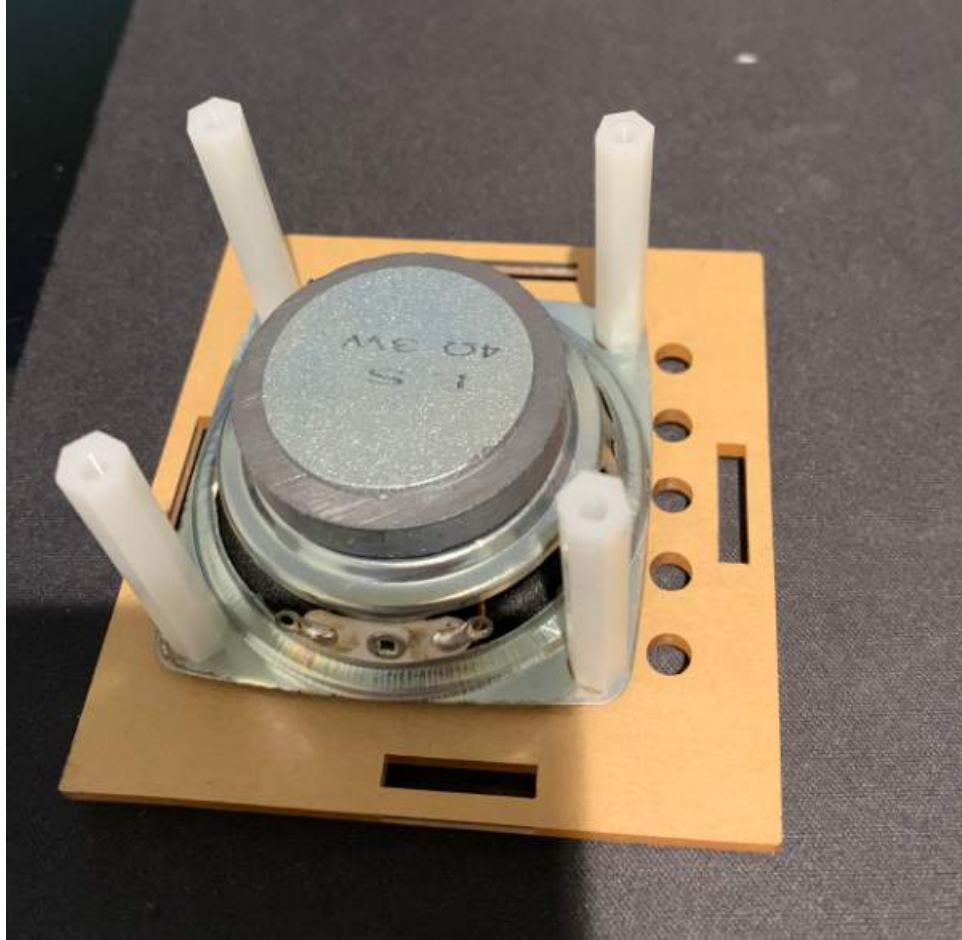
Stripping the multicore cable on both ends, reveals the 4 jumper cables inside. Proceed to strip the 4 different color jumper cables on both sides. Solder the 4 cables on the port with "VCC GND D1 D2", make sure the color on both PCBs are matching.

Step 14

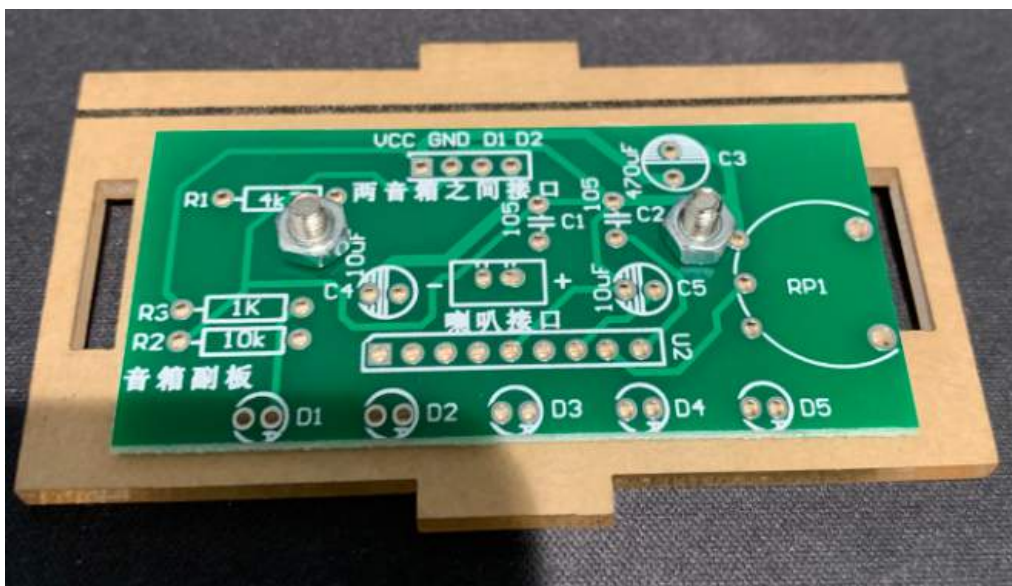
Plug the USB A into a power source and the 3.5mm plug into an audio source, then plug the Mini-USB into the socket. Turn on the switch to see whether it is working or not. If it is not working, check the soldering ports, cables, and power source. If it is working, then proceed to step 15.

Step 15

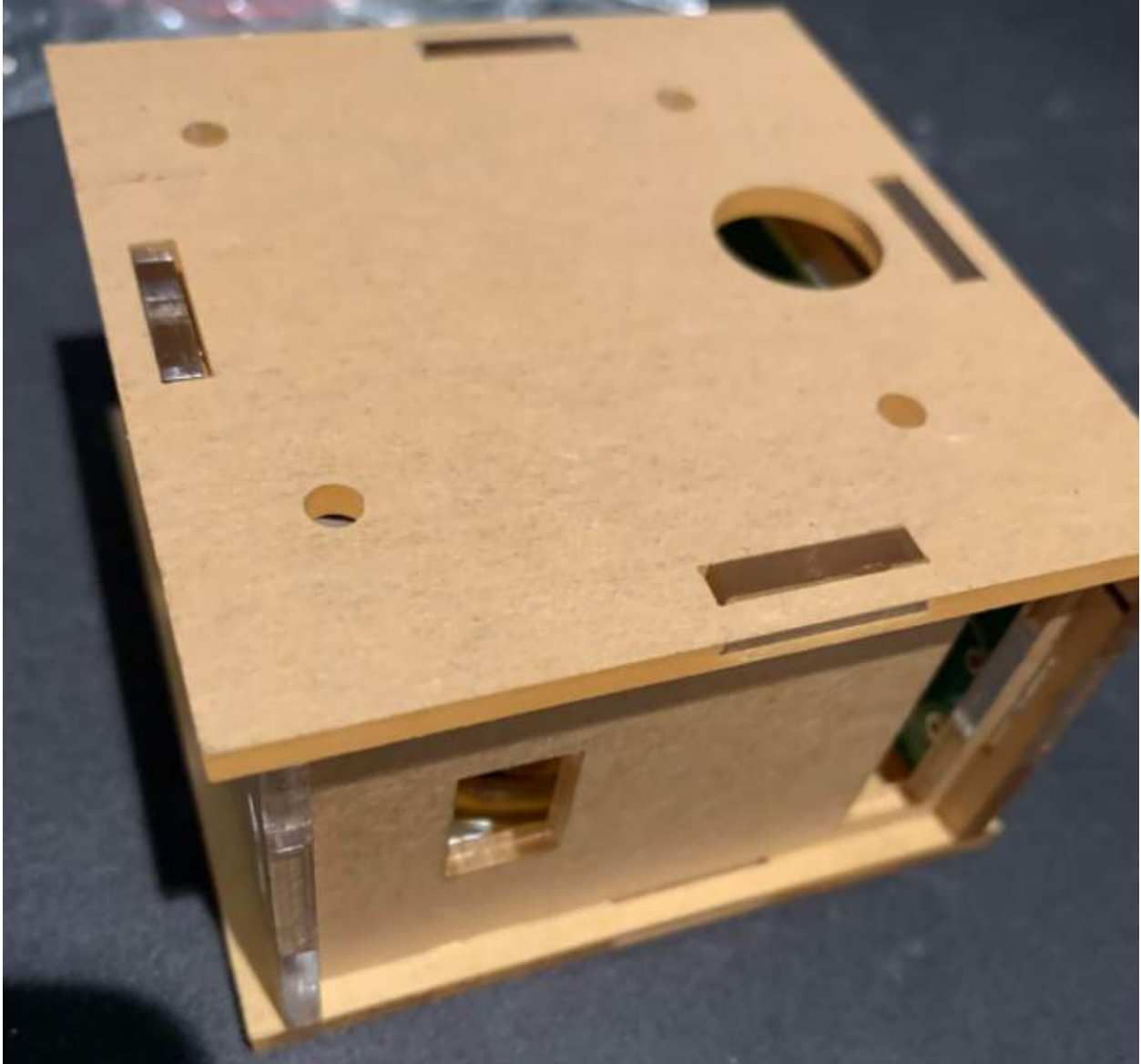
Desolder the 4 jumper cables from one side of either PCB, put Container component 6 through the cable in the big circle hole then resolder the 4 jumper cables back to the PCB. Remove the protection layer at this point, screw the speaker on Container component 1 like shown in figure below.



Assemble the container by following the figure below.

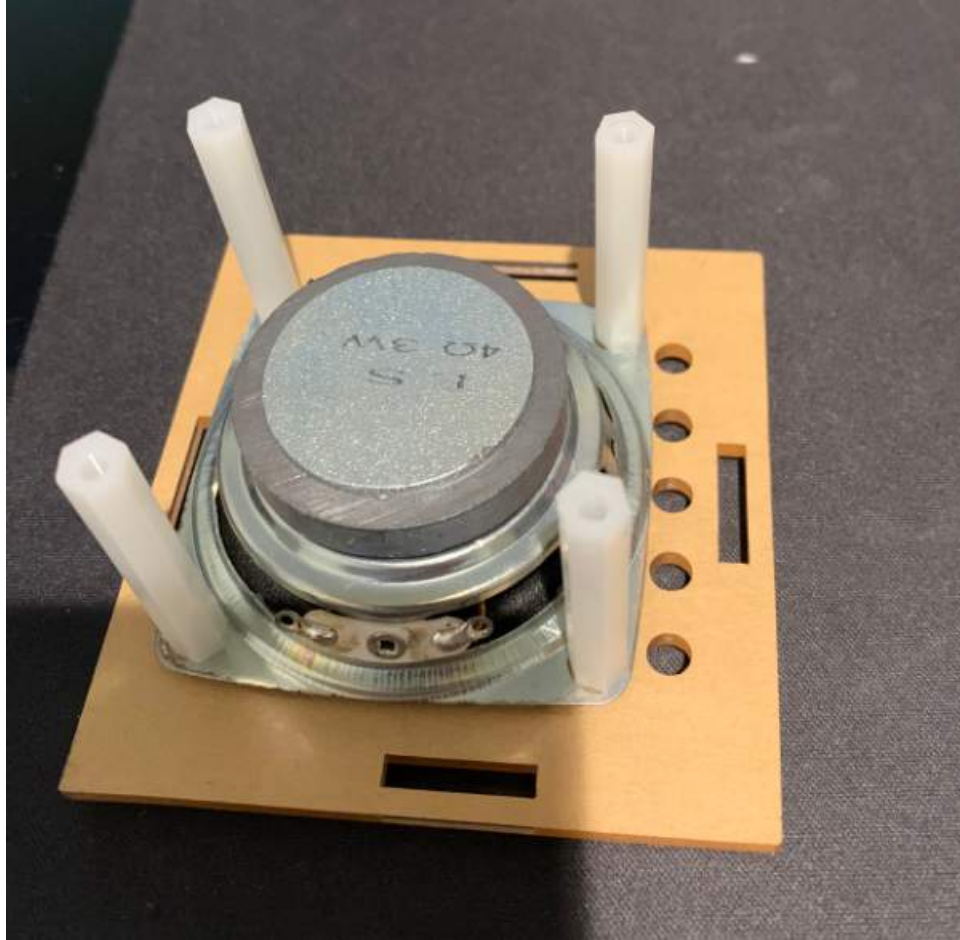




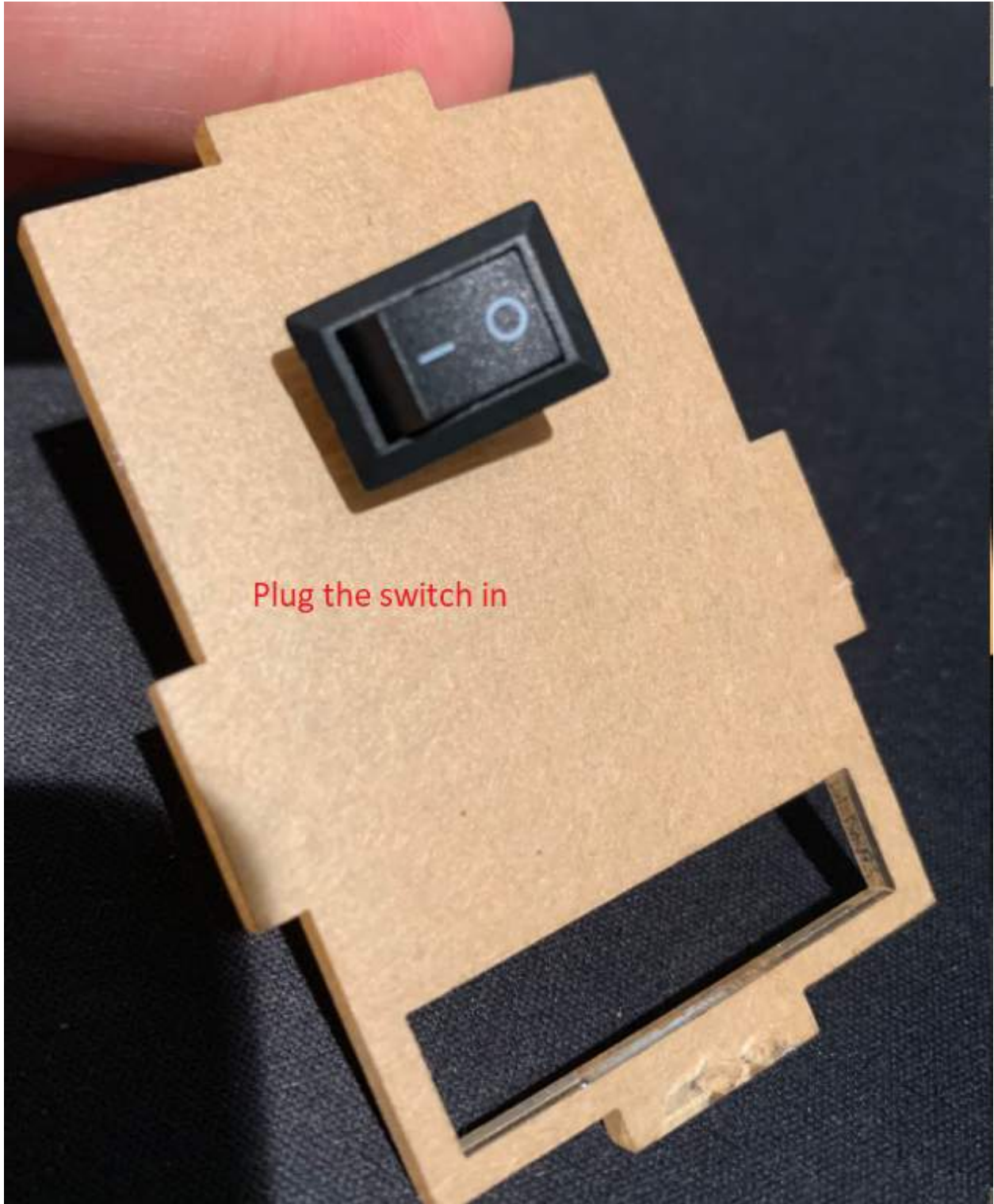


Step 16

Remove the protection layer, screw the speaker on Container component 1 like shown in figure below.

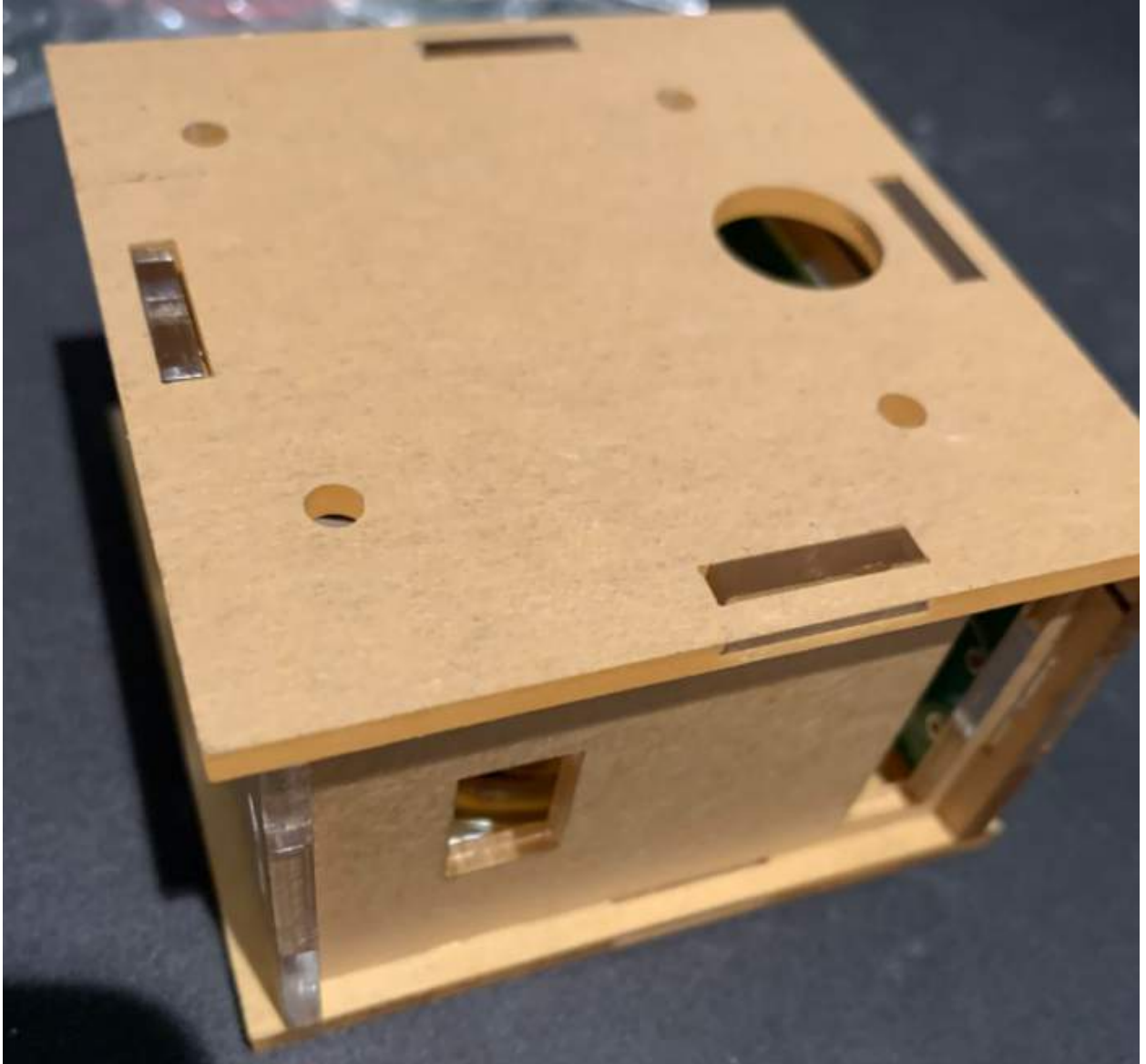


Desolder the switch from PCB, plug the switch on Container component 3, then resolder the switch back to PCB. Plug the Mini USB cable into the socket and get the other end through the hole of Container component 4.



Plug the switch in

Assemble the container by following the figure below.



Step 17

Plug the USB to power source and 3.5mm plug to audio output to test how the speaker works!