soniphorm

SoundSniffer assembly instructions

Thank you for purchasing the soniphorm SoundSniffer preamp. The SoundSniffer is a simple battery powered, three channel mono preamplifier with dedicated circuitry for 3 common sound sensors - piezo, coil and electret. **Customers who purchased an assembled SoundSniffer can skip to the second last page for box assembly instructions**

In your kit you will find the following:

1x	SoundSniffer PCB
1x	9v battery cable
1x	TL074 quad opamp
4x	minijack sockets
3x	minijack plugs
3x	50cm lengths of stereo mic cable
1x	Electret condenser mic capsule
1x	Piezo disc (contact mic)
1x	10mH inductor coil
1x	10k potentiometer
1x	SPST slide switch
1x	led
2x	100 ohm resistor
1x	220 ohm resistor
2x	1k ohm resistor
2x	10k ohm resistor
5x	47k ohm resistor
3x	100k ohm resistor
1x	8.2M ohm resistor
1x	10nf ceramic capacitor
1x	10pf ceramic capacitor
2x	2.2uf electrolytic capacitor
2x	10uf electrolytic capacitor
4x	100uf electrolytic capacitor
1x	box, consisting of 7 parts

The “Coil” channel has a high gain of 1000 in an inverting amplifier configuration.
The “Piezo” channel is a transimpedance amplifier that buffers the high input impedance of a piezo.
The “Mic”channel has a gain of 100 in an inverting configuration and supplies a voltage of 4.5v to the mic capsule.

(Please note that there is a mistake in the text on the underside of the PCB - COIL and MIC should be swapped (where is says COIL is actually MIC, and vice versa). The correct labelling is on the box, so this is only an issue if you intend to use the PCB in a custom case.)

PCB assembly and legend

Below are the component values for the resistors and capacitors:

C2	10p		R2	100r		**Solder in this order for best results**
C3	10n		R8	100r		**- detailed instructions below.**
C6	2.2u		R7	220r		
C1	2.2u		R15	1k		Resistors
C9	10u		R3	1k		Ceramic capacitors
C5	10u		R1	10k		LED
C4	100u		R16	10k		Minijack sockets
C7	100u		R10	47k		Switch
C8	100u		R11	47k		Electrolytic capacitors (with 90 degree leg bend, see below for
C11	100u		R9	47k		more details)
			R13	47k		9V battery cable
			R14	47k		TL074 OpAmp chip
			R12	100k		Potentiometer
			R6	100k		
			R4	100k		
			R5	8.2m		

Detailed Assembly Instructions

Begin by soldering the resistors. Bend the legs to fit into the board (**Fig. 1**).
Once in the board, slightly bend the legs outwards so the resistor doesn't fall out - you want the component to be flush to the PCB (**Fig. 2**). Depending on your soldering skills, you may choose to place all of the resistors in the board and solder in one pass (**Fig. 3**), or do each separately. Flush cut the legs after soldering (**Fig. 4**).

Next, solder the ceramic capacitors and LED. After that, solder the minijack sockets and the slide switch (**Fig. 5**) Take care to solder the 9V battery cable correctly. There is a + sign on the top of the PCB, make sure the red cable goes through this hole from the top so as to fit into the box (see below for more details on box).
Ensure you have bent the legs of the electrolytic capacitors **90 degrees** from the body to ensure good fit in the box (**Fig.6)**.
Solder the opamp IC and potentiometer last. There's less risk of damaging the IC if it is soldered at this stage, and the pot makes soldering other parts more awkward if soldered earlier.
PLEASE NOTE: Do not use an IC socket for the TL074, as the 9V battery will not fit in the box if you do!

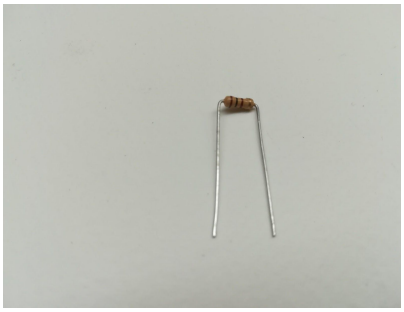


Fig. 1

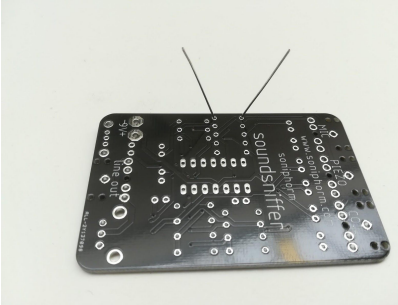


Fig. 2

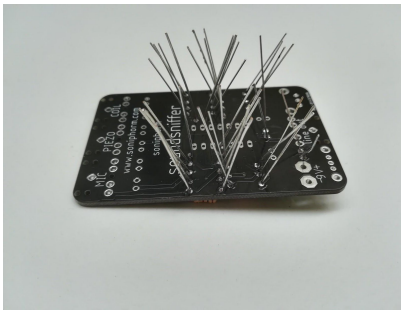


Fig. 3

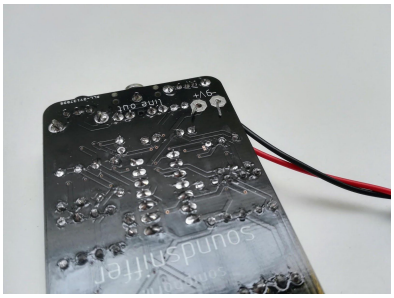


Fig. 4

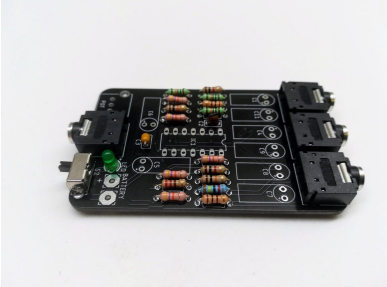


Fig. 5

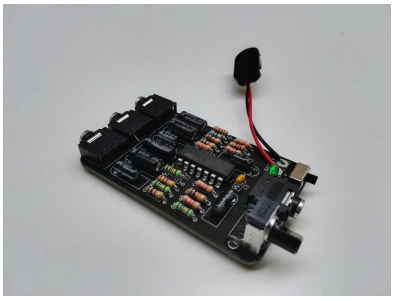


Fig. 6

Assembling the Sensors

Making the cables

Prep the cables first by stripping the outer insulator (**Fig. 7**). Isolate the two strands of string and cut off (**Fig. 8**). Strip the red and blue wires (**Fig. 9**), and twist the outer shield wires together into one (**Fig. 10**). Twist the blue and red wires together into one. The sensors are all mono, but the plugs are stereo. The plugs will be wired to work in mono however. Tin the wires with solder and trim(**Fig. 11**). The red/blue wire should be threaded through the Tip and Ring metal tab holes (**Fig. 12**), and the shield through the Sleeve hole (**Fig. 13**). Solder these in place and trim off excess cabling. Bend the metal strain relief tabs gently onto the cable (**Fig. 14**). Finally, screw on the black plug casing (**Fig. 15**).

Fig. 7

Fig. 8

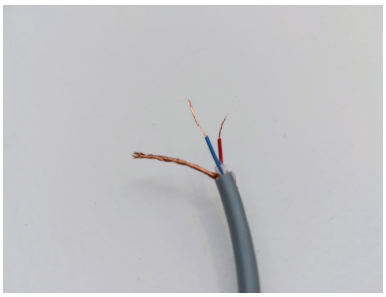


Fig. 9

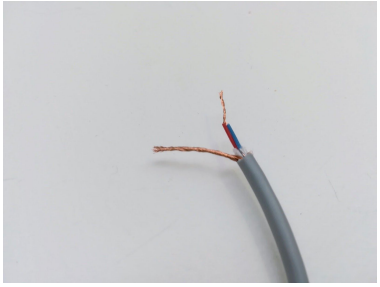


Fig. 10

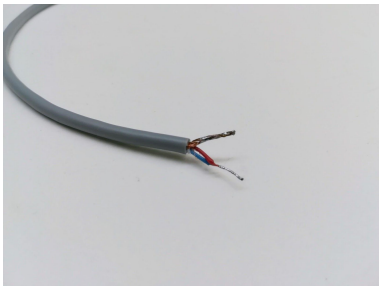


Fig. 11

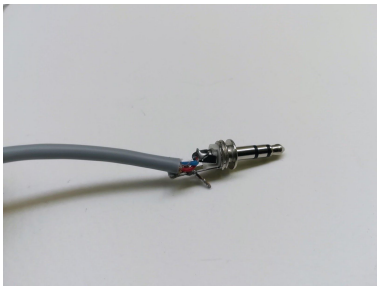
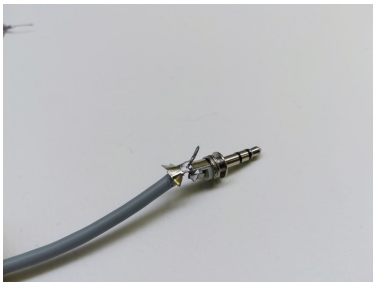
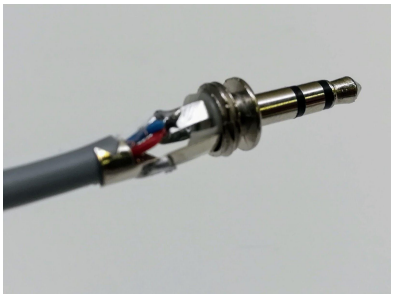


Fig. 12





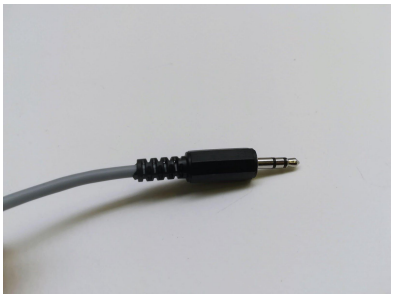


Fig. 13 Fig. 14 Fig. 15

Making the Electret mic:

Electret capsules contain internal circuitry which require power that is supplied by the MIC channel. The ground is connected to the solder tab that has 3 small radial connections to the metal case(**Fig. 16**). Twist and tin the wires and bend them in opposite directions (**Fig. 17**). Solder the cable to the solder pads on the electret using a low heat and short amount of time (**Fig. 18**). If you have hot glue, stick some to the back of the electret and cable to insulate the connections and provide some strain relief (**Fig. 19**). Heat shrink or electrical tape could also be used to cover this.

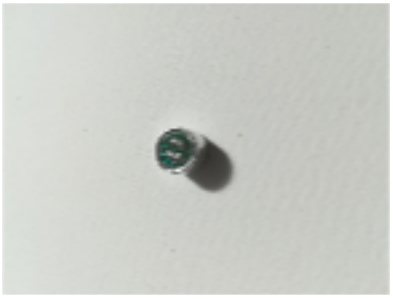


Fig. 16

Fig. 17

Fig. 18

Fig. 19

Making the Coil:

The inductor coil is not polarised so it doesn't matter which leg is connected to the signal or ground. Wrap the wires around the legs and solder in place (**Fig. 20**). Trim excess wire (**Fig. 21**). Use some electrical tape to ensure no short circuits occur. (**Fig. 22**). If you have heat shrink, cover the coil and wire with this and melt to size.

Fig. 20

Fig. 21

Fig. 22

Making the Piezo / Contact Mic:

Remove the existing cables. (**Fig. 23**). Solder the shield cable to the brass disc of the piezo. Solder the blue / red signal wire to the piezo crystal (**Fig. 24**). The crystal is tricky to solder so it's best to pool a bit of solder to the tip of your iron, hold the signal wire in place on the disc and quickly place the solder. This way the solder already melted on the iron will drip off and hold the wire in place without burning the quartz crystal. For strain relief and insulation, hot glue, electrical tape or similar can be used (**Fig. 25**)

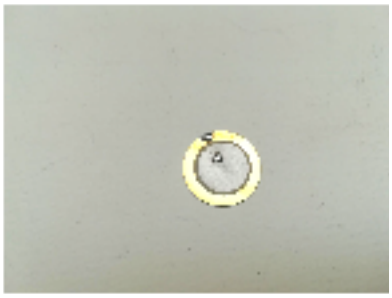


Fig. 23

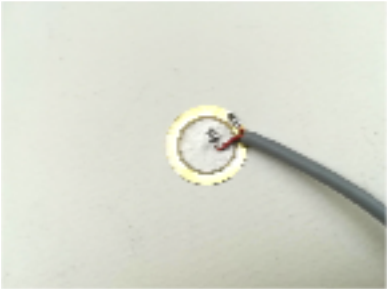


Fig. 24

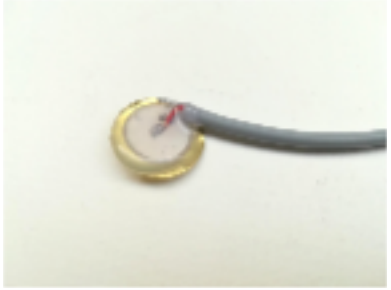


Fig. 25

Assembling the Enclosure

The enclosure included in each SoundSniffer kit is made from laser cut 3.2mm MDF and 1.5mm birch plywood.

Construct in this order for best results:
In Fig. 26 from left to right is an end piece and the two side pieces. Look closely at the side pieces (Fig. 26) and notice that the small slot on each is slightly darker and wider on one side than the other (Fig. 27). The end piece with Coil, Piezo, Mic engraved on it faces outwards, and the side tabs fit into the slots on the wider side. Press the thinner end piece into the sides with the slightly wider slot (**Fig. 29**).

Next place the assembled PCB into the 3 joined sides (Fig. 30), and add the other end piece with text facing outwards (Fig. 31). Gently press the four sides into the base piece (the large rectangular piece without any text) to get good alignment, (Fig. 32) then firmly press until a good join is made (Fig. 33). It is intended that these five pieces stay together forever, with the top only removable to change battery.

Fig. 26

Fig. 27

Fig. 28

Fig. 29

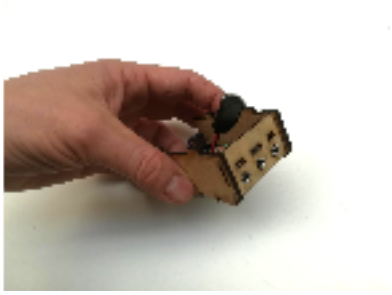


Fig. 30

Fig. 31

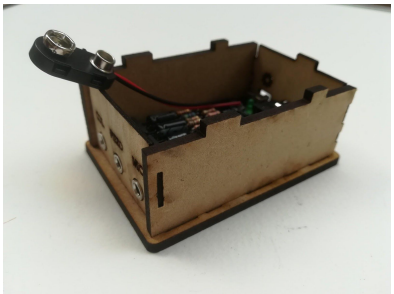


Fig. 32 Fig. 33 Fig. 34

The two remaining pieces are the top lid and battery holder (Fig. 34). The battery holder joins to the side of the lid without text (Fig. 35). Now place the PP3 9v battery into the box (Fig. 36) and close down the lid firmly (Fig. 37). Make sure all slots and finger joints are aligned correctly before applying too much pressure. The finished box should look like Fig. 38.

To replace the battery, the top lid can be removed. It is easiest to remove it by prising open the end nearest the Line Out (Fig. 39).

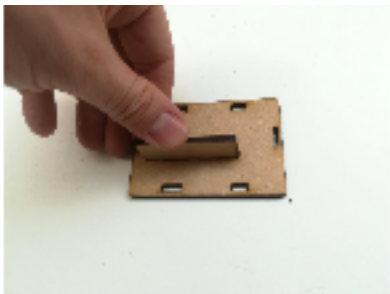


Fig. 35 Fig. 36 Fig. 37

Fig. 38 Fig. 39

Any questions or problems get in touch ed@soniphorm.com

Happy Sound Sniffing!

2-05-18
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