

SYSTEM SOUND 3 DIY

from noise.technology

For board version. 3.0. Updated 11/25/24

Hi! Thanks for buying this **System Sound 3** DIY kit.

These instructions are basic. Much more detailed instructions are available online at:

www.noise.technology/diy/syso3.0.html.

There you will find photos, a clever interactive BOM and more: info about mods, manual, links.

If you have problems, comments, corrections or praise please send email to info@noise.technology.

System Sound 3 has more parts than before, and the layout is somewhat tight in places. The suggested order of assembly is helpful in that regard.

Tick the ○'s as you go.

!!! ☞ Read the notes first – marked like this.

System Sound 3 controls and connectors

System Sound 3 has four "channels" with level controls: microphone, input 1, input 2 and the oscillator. The inputs are dual, meaning two jacks share the same gain control. These four gain controls form the bottom row of controls.

After gain, the channels are summed in pairs: microphone + channel 1, channel 2 + oscillator. These go to tilt equalisers (with slightly different tilt frequencies). These, and the oscillator frequency knob, form the middle row of controls.

The two tilts go to either side of a blend knob. This controls which pair (mostly) goes to the send. The crossfader doesn't cut the signal completely; there is always some bleed.

The blended signal goes to an internal feedback path to the "norm" inputs. If nothing is plugged into these jacks, the blended signal arrives instead: oscillation! The aux jacks don't break the feedback.

The blended signal also goes to the send output, which has its own level control. The send output is in anti-phase of the normalised feedback path.

The tilts are also summed and sent to the line out and amplifier, without being affected by the blend control. The amplifier has a gain knob.

Three switches (not counting the power switch) set different modes in the System Sound:

The "osc fm" switch sends channel 2 (feedback or input signals) to the oscillator pitch, instead of any of the outputs. Right means fm on.

The "sine/noise" switch sets the oscillator between a sine wave (sort of) and noise (sort of). Up is noise.

The "out cut" switch cuts the microphone and channel one from going to the line or amp outs.

When engaged, these channels only go to the blend/send path and output. Up means cut.

Apart from "out cut" and the aux inputs, System Sound 1 and 2 work exactly as System Sound 3.

Bill of materials in order of assembly

Resistors	Qty.
○ 1M	2
○ 100K	3
○ 51K	3
○ 1K	20
○ 10K	24

Sockets ¹	Qty.
○ LM358	7
○ NJM2113	1
○ PIC12F1840 ²	1

Power	Qty.
○ 1n4004 diode	1
○ Power switch	1

!!! ☞ Note: make sure the switch is flush against the board. Don't skip the mounting pins.

○ 7805 regulator	1
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!!! ☞ Note: Screw this to the board before soldering. From the bottom: screw, PCB, regulator, lock washer, nut.

○ Nut, M3	1
○ Screw, M3x6mm	1
○ Lock washer, M3	1

Capacitors	Qty.
○ 100µF (6.3mm diameter)	10
○ 1µF (4mm diameter)	17

!!! ☞ Note: the capacitors above are polarised. Long leg = +.

- 1 You can use the included sockets, most people do. If you're sure about soldering (and desoldering!) you can put the chips straight in the board. It is more reliable. If not, put the chips into the sockets later on.
- 2 The oscillator chip can't be reprogrammed in-circuit, so I always socket it. E.g. if I come out with a new oscillator or you want to code one.

- 22nF 2
- 47nF 3
- 100nF³ 5

Connectors Qty.

- Audio jack 6
- Power connector 1

!!! ☞ Note: don't solder the power connector yet! Wait until the lid is attached, then push it inwards into its recess. Then solder.

Mechanical Qty.

- Standoff, M3x10mm 5
- Bolt, M3x6mm 10
- Lock washer, M3 6
- Rubber foot, M3 4

The left speaker standoff doesn't have a rubber foot. It should have a lock washer between PCB and both bolts. The mounting hole between LED and the right speaker connector is not used.

The other standoffs should have a lock washer for the top bolt, but they aren't necessary during assembly as you will remove the lid a few times.

The lock washers for the speaker connectors go *below* the connectors to raise them up.

Controls and panel stuff Qty.

- Control switches 3

!!! ☞ Note: make sure these are flush against the board. You can either tape them down with masking tape, or solder one of the mounting pins from the top. Space is a bit tight so use tape if you're not so sure about your soldering.

After soldering one pin, replace the lid to see that the switches are straight. Fasten a few of the bolts to make sure.

If a switch is wonky, reheat the pin and correct. Then do the remaining pins.

- Led 1

!!! ☞ Note: The LED is polarised. Long leg = +. Put the LED in place but don't solder it yet. First, do the electret steps below. Then, push the LED through the lid and solder it.

- Microphone 1
- Plastic standoff 1

!!! ☞ Note: The microphone is to be mounted with a standoff so it pokes through the lid. It is also polarised, but the hole will make it difficult to place it backwards.

First, push the microphone leads through the standoff, and then through the boards. Bend the leads to keep it in place and solder one lead lightly.

Then screw the lid on again. Poke the standoff with a screwdriver so it's directly under the microphone. Then, pushing the microphone down, reheat the lead you soldered. Then solder the other one.

Remove the lid. Put the chips in their sockets.

- Potentiometers (all 50K linear) 10

!!! ☞ Note: place the pots, then mount the lid, screw the standoffs into place, and then fasten the potentiometer nuts (using washers).

Solder the pots after this. Don't forget to solder the mounting pins.

Done! Now, to test your device:

Turn on the power⁴, the LED should come on straight away.

Turn up the volume on each of the the four channels in turn and check that there is sound on the line and send outputs (using the send volume).

Twist the tilt EQs and blend to get different sounds.

Turn on FM and turn up channel 2 and the oscillator. Turn the frequency knob.

Plug things into the inputs and turn the gains up.

Use "out cut" to take channel 1 and the mic out of the line mix.

Connect a loudspeaker by pushing down the springs, then turn the amp gain up.

Enjoy!

Max Wainwright

³ If you want to, the tilt equalisers and DAC can be modded by shifting the nF-range capacitors around. See web instructions for more information.

⁴ The power connector expects around 7 to 12V DC, centre negative – Boss standard. System Sound is protected from reverse voltages. 500mA or more is good but less will work when not using large speakers.