



Systral – Build guide

Introduction:

Systral is a 12hp stereo filter with shared frequency control (but separate resonance controls) for both channels. It also includes gain pots for adjusting the incoming signals strength on each channel and this is not to be underestimated since the incoming signals strength dictates pretty much how this circuit behaves, check out the Lesja demo on YT for more info¹.

It is based on the Korg MS-20 filter but the vision here was to break it down to make it as dirty as possible. Unstable resonance through red LEDs and a analog noise source normaled to the CV input was an effort to achieve this. The CV noise is also audible by turning up the resonance which is by design (and the noise is not (like in Mörser) normaled to the audio path since this sounded so great on its own.

There is a dedicated noise output for making this part available to the rest of your system and other modules. Making Systral an awesome sound source on its own being capable of making windy sounds, lasers, and sci-fi landscapes without any input signals at all (as long as you crank the resonance).

There is a shared blend pot, the dual one, letting the user blend between low and high pass (rather than having outputs for these functions it lets just explore the places between these filters).

The left input is also normaled to the right input so you can create a stereo filtered signal with just one sound source.

It's a second release out of (more) filthy filters named after 90's Bremen hardcore bands, the first one was Mörser (also released in 2025).

¹ <https://youtu.be/18mrXmRrRs?si=xLDyobd1ldqW4HNy&t=268>

Acknowledgements:

Systral draws heavy inspiration on the original MS-20 (Korg) filter released in 1978, so credit to Korg for that one. The now legendary clone of the same filter by Rene Schmitz² is the base for Systral. It famously uses Green LED's instead of diodes in the feedback/resonance path, which I swapped out for red ones for a more unstable and gritty response. The blend function between high and low pass was generously implemented by Kassutronics and I borrowed that idea from that clone (in turn also based on Rene's schematic)³.

Build instructions:

I usually place the power header and solder it in first. Then I place all the jacks and solder in the ground pin (the one sticking out from the jack) from above. Place pots, the leds (short leg through the square pad) and put the panel on and make sure everything looks good from the front. Solder everything in. "

Disclaimer, this schematic is based on using red leds so substituting them for other leds is not recommended, this is because the through hole leds peaking out from the pannel are complimented by red SMD ones pre-soldered on the board. Using other LED's than red would mean mixing different colors. I haven't tried that myself but might actually might be a cool idea to experiment with. Your miles might vary.

Then double check for any shorts before plugging it in and testing it, the attach all nuts before the knobs. You are then done.

² <https://www.schmitzbits.de/ms20.html>

³ <https://kassu2000.blogspot.com/2019/07/ks-20-filter.html>

BOM

Part	Designator	QTY	INFO	Product link
Thonkiconns	J1-J6	6		thonk, tayda, aliexpress: https://www.thonk.co.uk/shop/thonkiconn/
Alpha 9mm potentiometer T18 100K Lin	RV1-RV3, RV5-RV7	6	Pots	https://www.thonk.co.uk/shop/alpha-9mm-pots-vertical-t18/
Alpha 9mm potentiometer T18 DUAL 10K LIN	RV4	1	Pot	https://www.thonk.co.uk/shop/alpha-9mm-pots-vertical-t18/
LED RED 3mm (standard, not bright)	D1,D4	2		https://www.taydaelectronics.com/led-3mm-red.html
Eurack power pins 2x5	For SV1	1		https://www.taydaelectronics.com/2x40-pin-2-54-mm-double-row-pin-header-strip.html
Tall Synthpointer - Small - T18 Shaft	For RV3	1		https://www.thonk.co.uk/shop/tall-satin-synthpointer-knobs/
Micro knob T18 black	SW 1	6		https://www.thonk.co.uk/shop/micro-knobs/