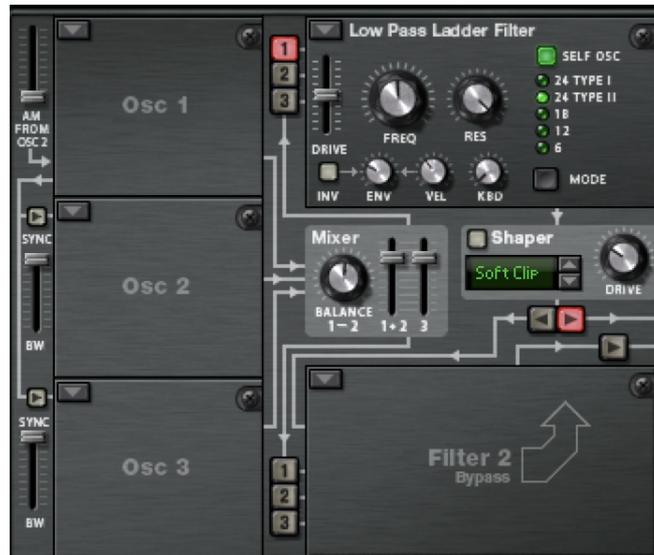


# Hummingbird sound tutorial using a self oscillating filter

*Note: This is possible with every synthesizer that has a self oscillating filter and a routing matrix*

First of all we need a solid sound source. Something that sounds similar in sound range to the bird sound we want to recreate.

You can use a normal oscillator for this, but in this case I used a Low Pass Ladder Filter as sound source.



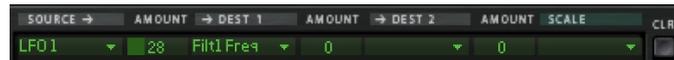
A normal Low Pass Ladder Filter will create no sound at all. That's why it's important that it can self oscillate. Turn up the resonance (RES) and choose a fitting frequency (FREQ), 777 Hz in my case. Now you should be able to hear a “R2D2” like sound if you turn up the frequency quickly. Afterwards choose settings for your Amp Envelope. I suggest a bit of sustain.

**TL;DR** Modulating the frequency knob will create our notes and the resonance will “create” our sound.



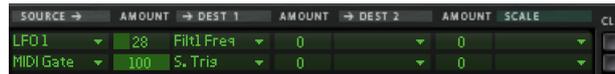
Now we want our note to behave in a certain way. We are going to modulate our frequency knob with a LFO. Make sure “key sync” is on, so the LFO restarts its cycle every time you press a key. Also choose a rate (Hz).

# Hummingbird sound tutorial using a self oscillating filter



We will start hearing changes once we start programming the matrix. LFO (Source) affects (amount=value, how much) Filt1freq (our frequency knob)

Now we got a solid sound source, but it still does not sound like a singing bird. That's why we will build a sequence using a step sequencer.



Now we need to use the matrix again. Select gate from "MIDI KEY" (note input) with 100% value and send it to destination "Sequencer trigger".

**TL;DR** Make the MIDI gate trigger the sequencer.



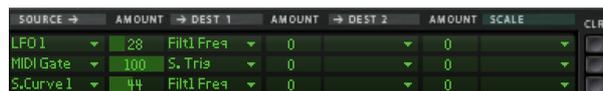
Make sure your sequencer is turned on and runs one full cycle. For this example we will use 12 steps, but you can choose less or more. Also un-sync the rate of the step sequencer playing, but keep it around 8 Hz.



Now we will modify the gate length to get a more randomized sound. The gate length sets the length of the played note in each step. Change the gate length for each step, until you get a natural pattern.



Next will fiddle with the step duration to get an even more randomized sound. The step duration sets the time of how long a step is being played. Randomize them as well, experiment.



By now your patch should sound more like a bird. For a final touch we will add a change in notes. For this we will use our curve knobs in the step sequencer to affect the frequency knob from our Low Pass Ladder Filter. Therefore we need to program the matrix once again and set a value for the curve knob to affect the filter frequency knob.

**TL;DR** Program matrix so that curve knob affects filter frequency knob.

## Hummingbird sound tutorial using a self oscillating filter



Now set values of the curve knobs to create different notes for each step, or groups as seen above. This will create a more randomized effect in notes and therefore a more natural bird sound.

*That's pretty much it. Have fun with your new patch!*