

# Voltage Controlled Filter based in CD4007

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This VCF is based in the Sallen-Key structure, using a MOSFET N-channel transistors of CD4007 as variable resistors, to take advantage of coupled pairs inside.

The CD4007 is a MOSFET dual complementar transistor pair plus inverter.

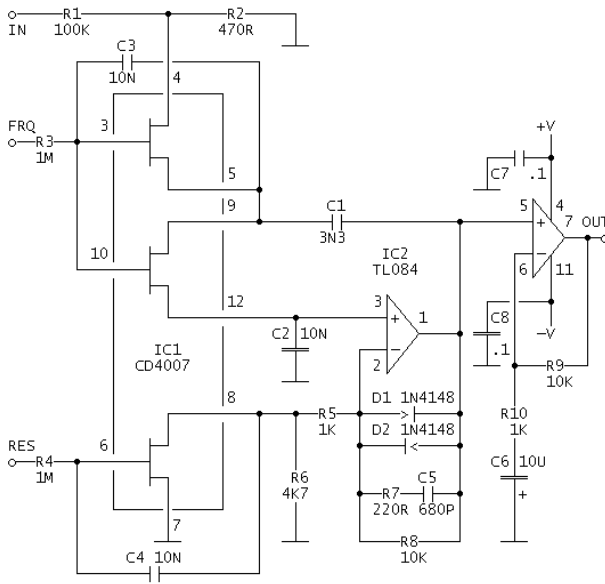


figure 1

One interesting characteristic is the voltage controlled resonance, useful for example for multiples VCFs in a polyphonic configuration.

The input network composed by R1 and R2 reduces the maximum input signal of 2.0V ef to 10 mV, in order to maintain the distortion inside acceptable limits.

The capacitor C3 reduces the distortion and D1 D2 limits the amplitude in resonance near the oscillation region.

The feedback R7 C5 helps the linearity of gain over the audio range, avoiding oscillation in high frequency.

The second stage is a linear amplifier with a gain of 10, compensating the input attenuation.

The frequency control is about 800mV per octave, in the range of 100 Hz to 5 KHz, whit an offset of 1V approximately, depending of device used. Out of this range has a non-linear behavior.

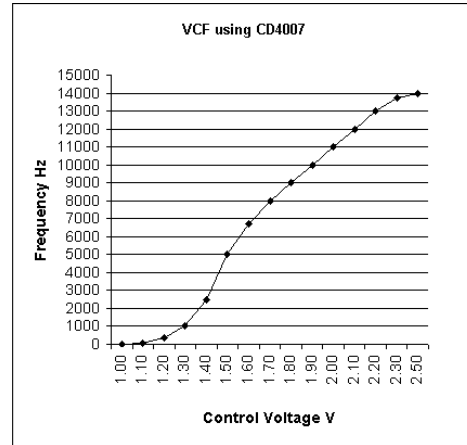


figure 2

The control response for resonance is shown below and shows an offset of 1V approximately.

Voltage control (V)	Gain (Q)
1.0	0.8
1.3	1.0
1.6	1.3
1.9	1.6
2.2	2.0
2.5	3.0
2.8	oscillation.

figure 3

The maximum input signal for normal operation is 2.0 V ef. for a supply of + / - 5V.

The behavior of this filter is satisfactory when the linearity of control voltage is not a critical requirement, such as EFX Boxes or small resources synthesizers.