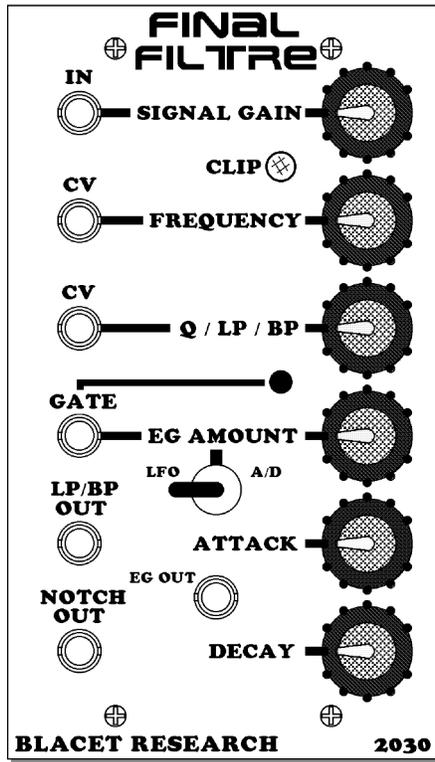


FINAL FILTER

BLACET RESEARCH MODEL FF2030 LOW PASS/NOTCH FILTER

Users Manual



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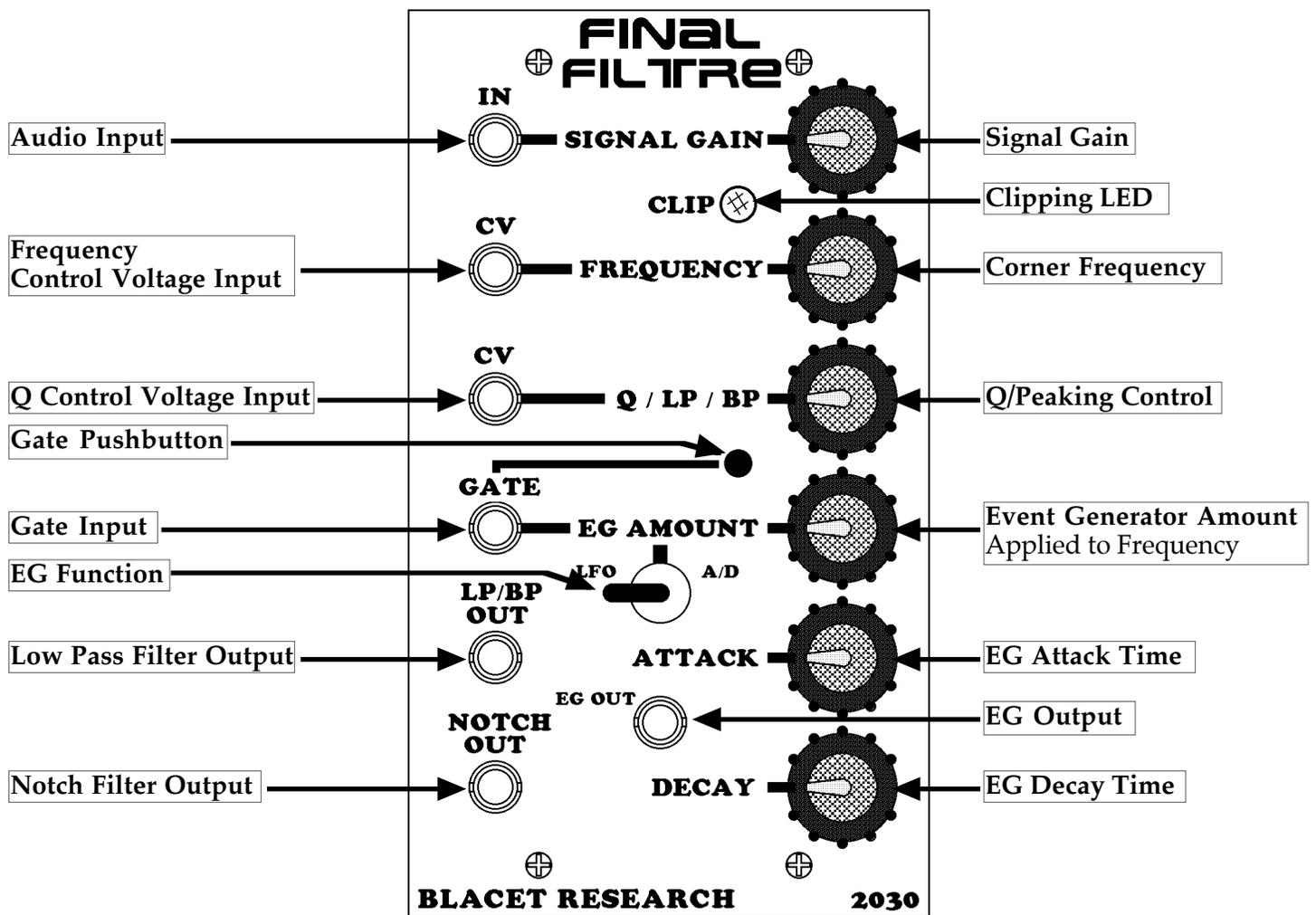
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Introduction

The Final Filtre is a high quality five pole low pass filter designed around a high accuracy, low noise, low distortion switched capacitor filter IC. The Final Filtre includes 1V/oct voltage control of the frequency and voltage controlled Q. A notch filter output is also provided.

The Filtre includes a built in event generator, making it more versatile than the usual synth module. It's more like an effect box, although it is right at home in any modular system. The EG functions either in the LFO or AD (attack/decay) mode, providing modulating waveforms ranging from the low audio range to 30 seconds in length.

Filters are one of the main devices responsible for the characteristic sound of electronic music. Users will appreciate the liquid quality and clean tone of the Final Filtre.



Controls and Operation

Audio Input, Signal Gain Pot, Clip LED: The core of the filter will start to clip at around 4 V, so input signals can be scaled by the Signal Gain pot as required. The pot is actually an attenuator, so the maximum gain is one. The clipping LED will start to flash when overload is detected. Overloading will not hurt the filter, but may not sound pleasing in all cases.

Frequency Control Voltage Input Jack, Frequency Pot, EG Amount Pot: The corner frequency of the filter is changed by the sum of the CVs generated by the jack and the two pots. The total CV is about 10V and higher voltages will have no effect on the frequency. In typical use, the corner frequency is set with the Frequency pot and modulation is applied via the EG Amount pot. External modulation can be supplied from a MIDI-CV converter, LFO, sequencer, etc. via the jack. This jack can also be used to set the corner frequency by itself.

Q Control Voltage Input, Q/LP/BP Pot: “Q” is the “peakiness” of the corner frequency response and the tendency of the filter to self oscillate. As the pot is turned CW, the sound will become sharper and assume a nasal quality. Past 75% rotation, the filter will oscillate at the corner frequency. The “LP/BP” designation points out that the corner frequency of the filter (point at which the filter will start to attenuate higher frequencies) will start to show a response peak as the Q control is rotated CW, approximating the sonic characteristics of a bandpass (BP) filter. This type of filter passes only frequencies in a “band” or range. As the Q control effects the internal gain of the filter, clipping will occur more readily as the control is rotated CW. Adjusting the Signal Gain pot will allow cleaner sound in this case.

EG Amount Pot, Gate Jack, Gate Pushbutton, LFO/AD Switch, Attack Pot, Decay Pot, EG Out Jack: The event generator supplies frequency modulation to the filter, with the EG Amount pot regulating the level. The unattenuated EG signal is available at the EG Out jack for external use.

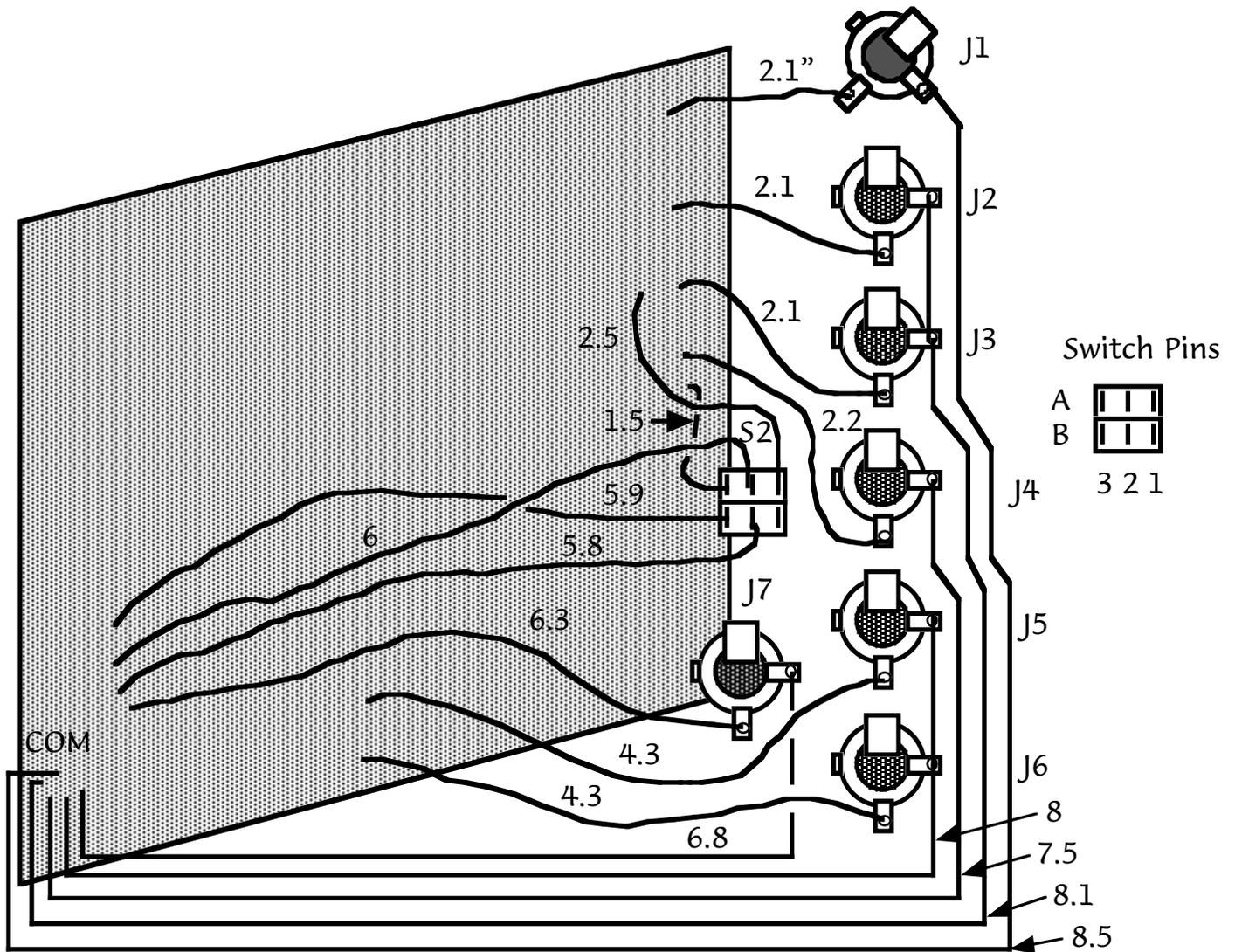
The LFO/AD switch determines the function of the EG and the function of the Gate jack (and Gate pushbutton). In the LFO mode, the jack functions as a gate or on/off control for the EG waveform. It also restarts or syncs the EG cycle each time the voltage at the jack goes high. As long as the voltage is high (>0.6V), the LFO will run; bringing the gate voltage to ground will truncate (ground) the LFO waveform. The Attack and Decay controls effect the rising and falling segments of the LFO waveform. With both controls set equally, a triangle wave will result. With increasing attack time, the wave will become more like a positive sawtooth. With increasing decay time, the wave will become more like a negative sawtooth.

In the A/D mode, the Gate jack functions as a trigger, with each positive voltage transition allowing one complete attack/decay cycle to complete. The cycle will be retriggered by gates that occur during the attack portion of the cycle. The Attack and Decay controls effect the ramp up and ramp down time of the A/D waveform.

Low Pass Filter Output, Notch Filter Output: The gain through the Final Filter is typically one (unity, noninverting) for mid levels of Q. While the LP output should be familiar, the Notch Output may be new to some users. A notch filter is also called a band reject filter. It's the opposite of a band pass filter. All frequencies are passed except for a narrow range around the corner frequency of the filter. The audible effect is frequently described as a type of “phasing” sound and indeed it does have a pleasant kind of subtle “swirliness” that makes it a good mood (not “Moog”) filter. Try long LFO sweeps on bright pad type sounds. The notch response is most pronounced at lower levels of Q. The sound will assume some self oscillation characteristics as the Q pot is rotated. Other subtle differences from “legal” notch filter response are due to the presence of auxiliary low order LP filters used in the design for anti alias and clock removal purposes. Some of the LP response is actually fed back into the Notch output to accentuate tonal qualities at higher levels of Q.

Power Input jack J8: A source of regulated +/-15Vdc power (such as the Blacet PS500) must be supplied to this PCB jack to run the Final Filter. Connections to this jack should be made only when the power supply is OFF and the connector must be positioned correctly on the pins. As using the wrong supply can cause damage to the unit, please contact us if you have any questions!

Front Panel Wiring



Calibration

RT1 sets the initial frequency (C1, 32.7 Hz). RT2 sets the scale of the response and is calibrated at C7, 2093 Hz. The two trimmers will interact, so the procedure will have to be repeated. Exact calibration is not too critical.

Warm up the board for 5 minutes minimum. Disconnect all signal and CV inputs. Turn the Frequency and EG Amount pot to minimum. Turn the Q pot to maximum. Connect a frequency counter to the LP output. Turn RT1 to read approx. 32.7 Hz on the frequency counter. Connect a DMM set for voltage to the test point pad right behind pot R2 (marked "TP1"). Turn the Frequency pot until you read 6.0V. Check the output frequency and adjust RT2 to read approximately 2093 Hz. It saves time if you somewhat "undershoot" each adjustment value as you repeat the procedure and zero in on the optimal values.

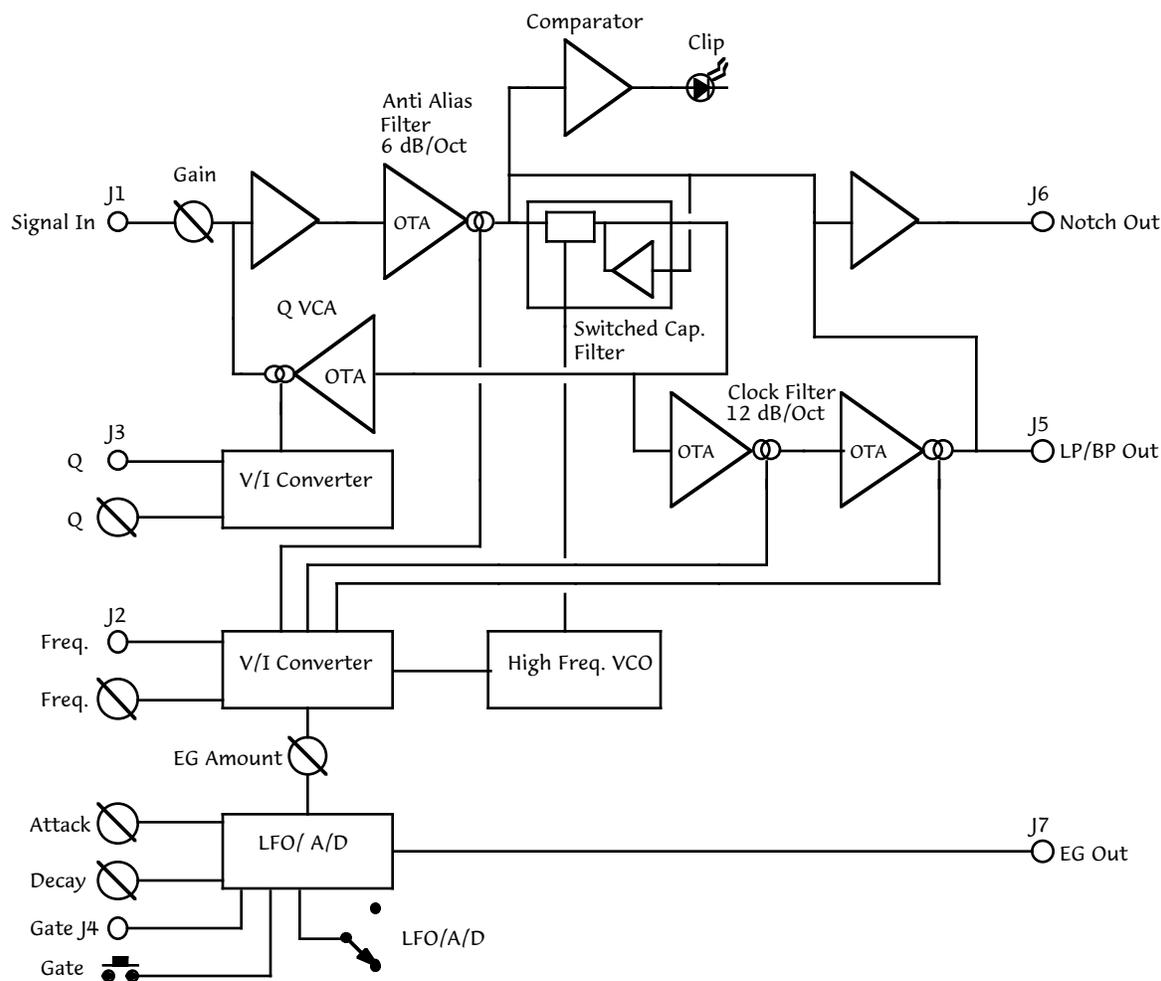
Calibration of the two trimmers can be a bit tricky; try adjusting the "wrong" trimmer. After the scale is adjusted, check the maximum oscillation frequency, which should be 8372 Hz or better.

Troubleshooting, Repair, Warranty

If you encounter problems that you can't solve, contact us, preferably via e-mail with a description of the problem. We can then help you get your module working.

The parts contained in this unit have been carefully selected and tested. They are guaranteed for 90 days from the date of purchase. If you believe that you have a defective part (or if you have a part missing), contact us so we can provide you with a replacement or repair.

Block Diagram



Specifications

Front Panel Size: 5.25 x 3" W
Module Depth: 6.5"
Input/Output Jacks: 3.5 mm (1/8")
Input Level: 0 to 10V P-P
Gate Level: 0.6V
CV Range: 0-10V
Output Level: 13 V max
Frequency Range: C1 to C9, 8 octaves, 32 Hz to 8371 Hz
Power: +/-15 Vdc @+57/-51 mA