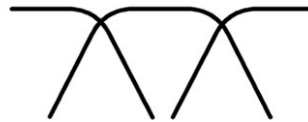


CrossOverFilter

BugBrand



Audio Crossover Filters have long been used in PA racks to split audio signals into two or more frequency bands for individual amplification, but their use in the studio has been more occasional despite the great possibilities they offer for creative processing and spatialisation. They have tended to be rack devices of limited versatility, so have been distinctly lacking in the playability department. The *CrossOver Filter* aims to redress this balance and presents a design with wide control in a very playable desktop format.

Within the *CO Filter* are two full spectrum Voltage-Controlled State-Variable Filters with adjustable Resonance up to self-oscillation. The filters, which can be run in either Series or Parallel arrangement, split the audio input into three frequency bands which each have an individual output or can be mixed via normalisation to a single output.

Please consult the Block Diagram in tandem with the following section descriptions.

Input Preamp – The unbalanced mono 1/4" Input passes through a buffer and preamp offering clean gain up to +26dB via the yellow *Drive* control. Internal signal levels are higher than typical line levels as the filters spring from modular synth designs and, as such, some input gain is usually applied to balance the signal levels with the self-oscillation amplitude. [Unity gain is approximately 9-10 o'clock on the dial – aim for this if using a direct output from a modular synth]

State-Variable Filters – The two filters are identical, but their input & output arrangements are different. The filters are 2-pole 12dB/Octave, cover the entire audio spectrum from approximately 20Hz to 20kHz and have Low/Band/High-pass outputs. Resonance is adjustable with the red *Q* control up to the point of self-oscillation (fully clockwise) at which point a pure sine-wave is produced.

Each filter has a Control-Voltage (CV) summer which combines the black *Cutoff* dial with any modulation source. Modulation can be switched between either an external source (blue *CVF* banana socket) or the internally routed Band-Pass signal from the filter for chaotic audio-rate self-modulation. The blue *FMod* dial is polarizing, giving negative modulation depth with counter-clockwise settings, zero depth in the mid position and positive modulation with clockwise settings.

CV scaling corresponds to the 1V/Oct exponential control standard when using an external CV source with *FMod* turned fully clockwise. [Adjusted to track over c.5 Octaves when calibrated – fine tuning via the internal trimmers may be required dependent on your system. The CV Summing is not temperature compensated.]

Series/Parallel Mode Switch – The standard CO Filter behaviour uses the *Series Mode* where the High-Pass output of Filter 1 passes to the input of Filter 2, thus generating a *Mid Band* with independently adjustable Low/High-Pass Frequencies.

It was, however, a simple design addition to offer a switchable *Parallel Mode* where Filter 2 receives the same dry input signal as Filter 1. In this mode the Mid Band now behaves as a Low-Pass filter in the same manner as Filter 1 but fully independent.

Outputs – The three frequency bands each pass through a switch offering phase inversion or muting, before a green Output Level control and buffer. Each output is on Impedance Balanced 1/4" and the Low and Mid bands are Normalised so that when nothing is plugged in to either one the signal passes on to mix at the High Output.

Expansion Headers – On the back of the main circuit-board are three headers which can be connected to the optional *CrossOver Expander* panel and which present extra options for the two filters, basically making them full featured independent SV-Filters for use in a modular system. The Expander requires no extra power.

Exp F1 / F2 [4 pin x 2] – These carry an extra audio input into each filter (expecting +/-5V signal) along with individual Low/Band/High-pass outputs (unattenuated +/-5V signal)

Exp CV [2 pin] – This offers an extra 1V/Oct input to each filter's CV Summer.

Power – The CO Filter runs from a +/- 15V bipolar supply – the same standard as used for BugBrand Modular systems. For the standalone device a DC/DC converter board is mounted internally which hooks to the CO Filter's power header of via a 4 way cable. This is made separate from the main unit so that the module can be used in a larger system if required.

An external 12V DC power pack (minimum 0.5A with 2.1mm centre positive plug) is supplied which operates on any worldwide mains voltage.

The module draws approximately 70mA from each side of the bipolar supply.

Interfacing with Banana Sockets – As 4mm banana cables do not carry a ground connection, you *must* join the CO Filter's system ground (Black *GND* banana on the rear panel) to the CV source's ground.

Banana-to-Banana – External banana systems should have a Ground banana socket, typically located on the PSU. Connect a banana cable between this and the CO Filter's *GND* socket and then patch between systems as required.

Banana-to-Jack:

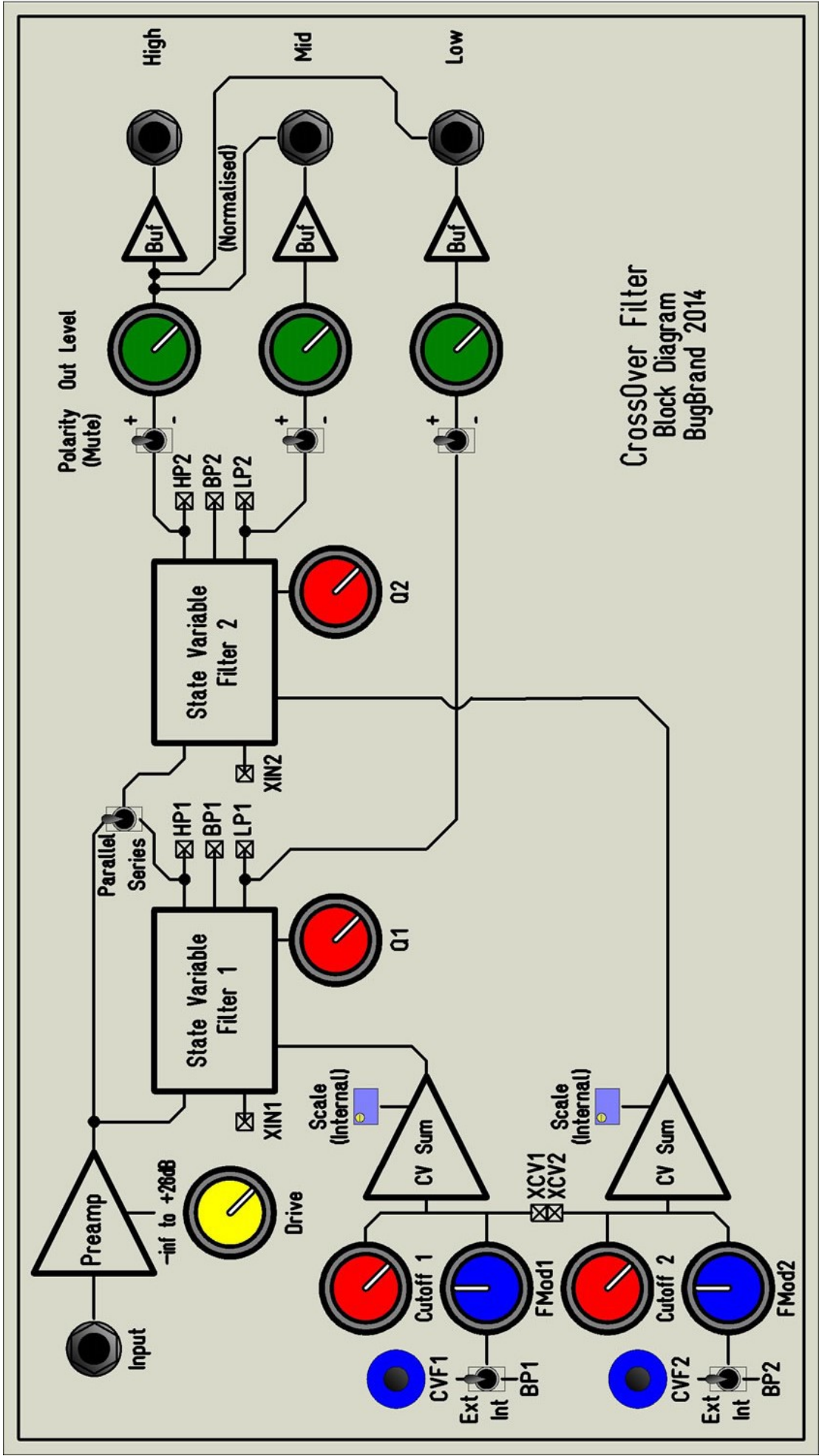
This first connection is made with a two wire cable assembly – jack to twin banana:

- the *BLACK* cable, from jack sleeve, plugs to the black *GND* banana socket on the rear of the case.
- the *WHITE* cable, from jack tip, then plugs to the CV destination.

Further connections from the same piece of external gear can then be made with just a CV signal cable – further ground connections are only required when introducing further external gear.

Guarantee

The CrossOver Filter comes with a 2 year 'reasonable' warranty. If any mechanical or electronic failure occurs within the period, I will repair the fault free of charge. This excludes failure from maltreatment or modification and any cosmetic degradation. Contact should first be made via email to discuss the problem. Shipping to return the device is paid by the user and I cover return shipping. Failures that are not covered by this guarantee may be fixed at standard rates.



Crossover Filter
 Block Diagram
 BugBrand 2014