

MxRF – VMMF Filter Documentation

Resources

Etsy Description (unedited)

A 2 pole state variable filter with a couple of differences. The 'Voltage controlled Multi-Mode Filter' (VMMF) is a 2 pole OTA based filter. It has a few controls that are not normally found on filters, and probably for a good reason. Emits a range of gritty and squishy sounds.

There's no 'resonance' knob, resonance and character of the filter are instead adjusted by the interplay of a few other parameters. This is true of most of the controls on the VMMF, the impact of most controls will depend on the interplay of settings. This leads to the filter excelling in use for evolving sounds, but also great if you want to settle in a specific area and explore.

Real talk, it can be less intuitive than a lot of filters, but it's rewarding to explore, especially if you enjoy harsher sounds.

On its own, it can be a nice sine wave oscillator, tweaking the controls can allow for reasonable 1v/o tracking. It can also ping beautifully, and responds very nicely to frequency modulation whilst doing either of these things. Works nicely for pingy bloopy krell patches.

PCB + Panel comes with SMD components pre-soldered. All other parts are readily available.

Kit comes with all the bits, including ribbon cable and screws. SMD components are pre-soldered.

Fully built and tested also comes with all of the bits, but (where applicable) they are pre-attached using lead free solder.

Controls:

- * Frequency - controls the cutoff

- * Feed - controls the feedback amount (It was challenging to decide which way this knob felt intuitively 'less backwards', but the point of this filter is motion, so just keep turning it until it feels right)

- * W - controls a crossfade of what is sent to the feedback
- * E - controls the centre frequency and stability of the filter (it changes the balance of the bandpass and lowpass that goes back to the differential inputs of the OTA, this does have quite an impact on the volume, and can get a bit weird)
- * Drive - controls the gain at the input (does not go down to zero, goes up too far).
- * S - controls the 'squelchiness' of the filter (by sending the input signal to the cutoff, particularly interesting with square waves, and can create some interesting 'doubling' of the sound on sweeps), this also helps keep the output a little more 'stable' in terms of following the input signal.
- * CV - gain for one of the CV inputs (post gain bandpass output is normalised to here to add additional grittiness, not that it really needs it).
- * Low - gain of the lowpass output (from zero to too much).
- * Band - gain of the bandpass output (from zero to too far).
- * Mix - mixes the input signal in at the mix output. The lowpass signal that is sent here is inverted, so you can mix the low and original for some highpass type responses, or other combinations.
- * Switches - these select which signal is sent to each side of the W crossfader. To the right is recommended, to the left for wackiness, and potential nothingness (- with some care, and the left switch to the left, the VMMF pings beautifully).

Inputs:

- * In - audio in (post gain bandpass is normalised here)
- * CV x 2 - top one has attenuation

Outputs:

- * L - lowpass output
- * B - Bandpass output
- * M - Mix of the low (inverted), band and original signals

Videos:

Some jamming with a single square wave into the VMMF <https://youtu.be/nh1KrCC3m2A>

Some droning with a square wave and LFO

<https://youtu.be/9BHnP2c6t0A?si=CwpeZ8Jw2tzVJPgW>

Size: 10hp

Current draw: ~27mA on +/-12v

Front Panel and Other Diagrams



VMMF is a two pole state variable filter based on the LM13700 OTA.

10hp +/-27mA

Often strange and unstable, VMMF specialises in gritty and squishy sounds.

With no cable connected to in and the scaleable CV input, the Band output is normalised to these.

For the input, this results in self oscillation and can lead to the VMMF working nicely as an oscillator. 1 v/o is achievable, but does require some tweaking.

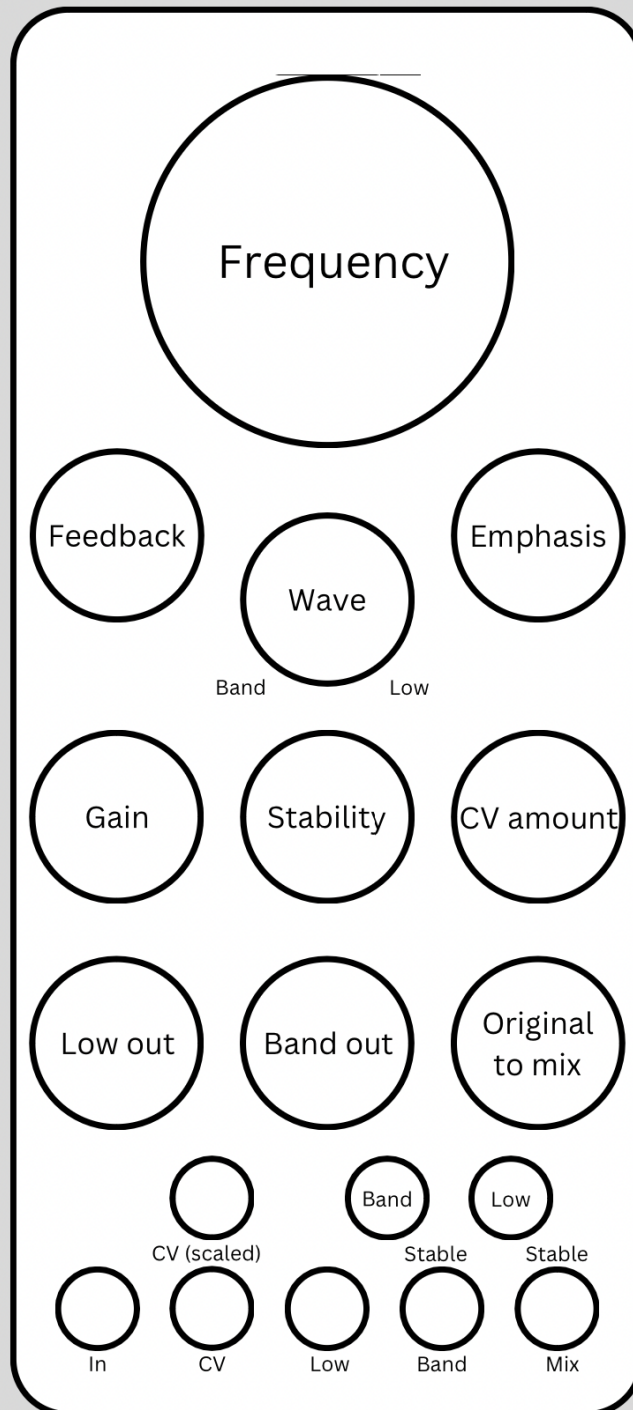
For CV, this leads to extra dirt and squish.

S will control the warbliness of the filter. Works best with minimal gain.

The frequency knob cuts off at an upper limit of about 2kHz, you can achieve about 5-6kHz with CV.

The switches select whether inverted or non-inverted versions of the low and bandpass outputs are sent to the feedback.

VMMF



Questions, feedback or sounds?
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The switches are as per the position on the W pot, which means they're opposite to the position of the outputs. Possibly counter-intuitive there, band switch is near the band out. See labels on the face of the pic in the instructions.

I thank you also for your enthusiasm re modulating all the things. I know from my own experience it's always preferential!! I'm still very much on the learning journey when it comes to designing; I'm definitely a lot closer to the point where that's a practical thing for me to achieve, but there'd be a fair bit of 'research and development' in adding more CV at the moment. I am working on a different filter design at the moment that has more CV, but it is a different topology.

The good news is, aside from the E knob, it's largely possible to accomplish adding CV with some external VCAs, mixing and inverters! As it's already doing things internally and is a bit wacky, it'd be a bit weird...I'm now realising after typing it out I need to try the feedback with an all pass filter / phase shifted....that'd probably make for a more interesting 'W'...You might even find some other cool ways to misuse the filter design doing this...

S= Split the input signal, one version to input, the other through a VCA to CV
W = take the low and band outputs, through attenuverters if possible, (or try one polarity then invert as preferred (also good to split and run into a mixer so you have gain control)) and into two VCAs (or a crossfader). Use an inverted version of the same CV you send to one to control the other, (or eg the 'inverted' output from one of the sloths), and mix that with the input signal. (Re: settings on the module to make this work well, I'd say keep switches to the right and W in the middle), and F down low.
F = send the W signal you're mixing with the in through a VCA, or the signal you're using to crossfade them. (Settings on the module as above).
E = can't think of a way to simulate this, CV over it feels most daunting to me at the moment... have thought of a couple of things that might work.

Anyways, hope the above and attached help, and aren't just more confusing, but feel free to let me know either way.

Thanks also for the feedback re: what's confusing, I'll add more clarification to the manual in near future and re-send to you.

Best,

Robert

