About the design

Vladimir Kuzmin's 1982-designed Polivoks 2-pole filter has become a classic reference design thanks to the sterling efforts of Marc Bareille and The Harvestman, bringing the idea of a capacitorless programmable-power opamp filter to a scene fixated on discrete ladders, vactrols and OTAs as filter building blocks. However this circuit technique has not been applied to other filter types or semiconductors outside of the old LM4250/UA776 chips (or their Soviet equivalents).

Enter the LM346. This chip has been hiding in plain sight for almost 40 years now and is a much improved quad version of the LM4250 chip used in many Polivoks VCF clones . Until now no-one had adapted it to synth use, despite a datasheet promoting its use in filters.

As the Polivoks was an adaptation of the classic OTA-based 2-pole State Variable Filter we thought we would go in the opposite direction and try the 4-pole cascading lowpass OTA design pioneered by Roland and the Elektor Formant in the late 1970s. A schematic quickly sketched in Eagle woorked on breadboard, and the circuit quickly took shape. Difficulty arose because the same mechanism that tunes the filter in a programmable power opamp also power-starves the rest of the chip resulting in some very unpleasant behaviour at the low end if left unaddressed. A bit of detective work and a bit of wisdom from the late Bob Pease helped us fix this.

This configuration of the filter was originally designed as a "playground" configuration to give access to every possible input and output on the "backpack" filter core circuit board, in order to work out which features to include in a more compact version. Reaction was so positive that we decided to launch the Steel Falcon series with this version.

 The result is a fully featured, rich-sounding lowpass filter which still has plenty of character and sizzle, and won't disappoint anyone looking for something new. We hope you like it like we do!

Specifications and Warranty

40mm flange depth, 60mm internal case depth recommended as a minimum. 15HP width.

Power requirements:+12V at 35mA, -12V at 35mA for cutoff frequency below 10kHz, rising to 45mA per rail as cutoff frequency is increased to maximum. Includes short-term reverse voltage protection. Connection to higher supply voltages (such as 15V) may cause the module to exceed safe operating limits and will void the warranty.

Input impedance (AUD 1, AUD 2, AUD 3): 50kohm unattenuated, 100kohm fully attenuated; logarithmic control response
Input impedance (CRTL 3, CTRL 4): 100kohm
Input impedance (CTRL 1, CTRL 2, LIN FM): 50kohm unattenuated, 100kohm fully attenuated; linear control response
Frequency tuning range: Approx 9 Hz to 22kHz
Resonance: self-oscillation around 3 o'clock position on control knob
Output impedance (each output): 1kohm

This module is warranted against manufacturing defects for 12 months from the date of purchase. Damage or malfunction due to: mistreatment; mechanical shock; disassembly; unauthorised modification, or repair; or exceeding safe operating limits is not covered by warranty. You MUST contact us for return authorisation before sending modules for repair.

Steel Falcon VCF Sidewinder Edition

FREQ   RESONANCE

CONTROL 1   CONTROL 2   LINEAR AC FM

AUDIO 1   AUDIO 2   AUDIO 3

AUD 1   AUD 2   AUD 3   LIN FM   1P OUT   2P OUT

CTRL 1   CTRL 2   CTRL 3   CTRL 4   3P OUT   4P OUT

Metro Modular
MM3461B
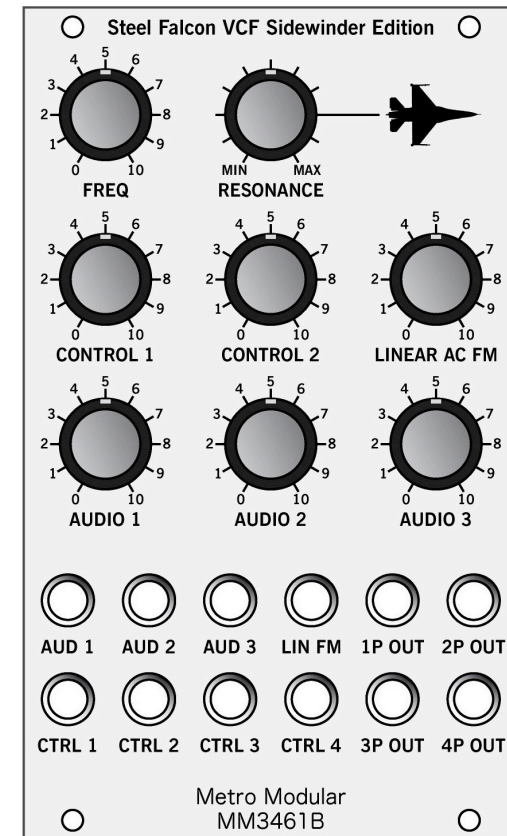
Metro Modular
"the sound your eyes can follow"

Welcome and Installation

Thank you for your purchase of the Metro Modular MM3461B.

The MM3461B is a versatile voltage-controlled filter module with a plethora of inputs and outputs to suit almost any need for timbral sculpting.

This module has been tested at the factory and should reach you in perfect condition. If it appears to have suffered damage in transit then please contact the seller immediately.

This module can be installed into any standard Eurorack system as follows.

1. Carefully remove the module and attached ribbon power cable from the shielded foil bag.

2. Plug the module into a standard Eurorack busboard (not Cwejman!) with power disconnected. Ensure that the red stripe on the power cable is aligned to the STRIPE or -12V marker on the busboard connector. If the busboard uses polarised headers (ie flying busboards or Elby) then the power ribbon cable should only connect in the right direction.

3. Turn on the busboard's power supply while watching any status lights on the power supply and other modules. If ANY status lights fail to turn on, disconnect power IMMEDIATELY and recheck the connection of the MM3461B's power cable to the busboard.

4. Once operation has been verified, screw it in!

What it can do

The range of controls and inputs can be confusing at first, but don't panic!

This follows in the tradition of the classic 4 pole filters that have been the backbone of nearly all pre-patched and many modular synths. What it does is cutoff the harmonics of a signal so the more fundamental frequencies are emphasised. Under control of an envelope generator this can be used to simulate the decay characteristic of an acoustic instrument, or simulate vocal phrasing, and under control of an oscillator it can give timbral vibrato.

The resonance control can change the character of the filter by feeding the 4-pole filter output back into the input. At low resonance the filter passes all frequencies below the cutoff frequency, and gradually rolls off all the frequencies above cutoff. As resonance increases the frequencies below and above cutoff are all reduced but the cutoff frequency itself is not affected, so the filter "empahsises" the cutoff frequency-great for juicy filter sweeps! At high resonance the filter will self-oscillate even without an audio input, so it can be used as an imperfectly tracking sinewave oscillator.

Each of the outputs taps into the filter after each of its 4 filter stages or "poles"-the lower the number of poles, the gentler the rolloff above the cutoff frequency and the emphasis of the cutoff frequency at high resonance. This can be useful for purposes other than mere subtlety, as outputs can be mixed together to give weird responses, and outputs can be fed back into audio inputs. For example-with a saw--wave oscillator fed into an audio input, try listening to the 1P output while feeding the 3P into another audio input and increasing the resonance control for a "resonator" effect!

Front Panel

FREQ and RESONANCE controls respectively vary the filter cutoff frequency, and change the filter's behaviour. Tweak slowly and see!

AUD jacks are used to input the audio signals to be filtered.

AUDIO controls are used to balance the levels of their corresponding AUD jack signals against each other and the filter's self-oscillation. When using multiple inputs we recommend backing off these controls to get the most out of the filter's sonic capabilities.

CTRL jacks are used to input control signals to modulate the unit's cutoff frequency. The unit is calibrated to respond to approximately 1 volt per octave on the unattenuated jacks (3 and 4), so they are best used for chromatic pitch control.

CONTROL controls attenuate their corresponding CTRL signal, so that modulation from LFOs or EGs can be varied to taste.

LIN AC FM jack receives a signal which can modulate filter cutoff proportionally to frequency rather than pitch, giving quite different response to audio rate and even LFO modulation. It can be attenuated through the **LINEAR AC FM control**.

OUT jacks give an individual output for each pole of the filter, allowing you to choose the filter's output character or construct stereo panning effects using a stereo mixer.