



ELEKTROAKUSTISCHE MANUFAKTUR

Action Filter 4

Bedienungsanleitung
User Guide

Foreword

The Action Filter 4 is a beastly thing that will rip out the best parts of your favorite tracks. Fat basses and silky highs will disappear with a single hand movement while the resonance being produced by the Action Filter 4 doesn't really compensate for that loss.

Well, why do we build the Action Filter 4 anyway and even in its fourth generation? The answer is easy: It is a great unit. With a single hand movement, you are free to remove fat basses and silky highs from a track and introduce resonance for brand new sounds.

No wonder that the predecessors of this intuitive mix tools find constant use in countless clubs, studios and setups. And now there is an even better Action Filter: Version 4!

Your VERMONA crew from the
Elektroakustischen Manufaktur, Erlbach

Table of Contents

Foreword	1
Important safety information.....	3
What you should generally know.....	5
Scope of delivery	5
Please read this!	5
Setup and Powering	6
What did you buy after all?.....	7
A filter - what's that?	7
Up with the lowpass	7
Can a band pass through the filter or will it be rejected?	9
Control elements	12
GAIN – make fit what doesn't fit	12
TRIGGER BYPASS - momentary or permanently	12
MODE - small switch, large pull.....	13
FILTER A and FILTER B - where is the high- and lowpass?	13
The filters in BAND-MODE	13
The filters in NOTCH-MODE.....	14
RESONANCE - nothing to boo	15
STYLE - do you like it hard or soft?.....	15
Connections	16
INPUT.....	16
OUTPUT	16
POWER - 12V DC / 1A	16

Important safety information

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings in this manual violates safety standards of design, manufacture and intended use of this equipment.

The manufacturer assumes no liability for the customer's failure to comply with these requirements!

Voltage peaks

The units are equipped to manage voltage peaks, which are often generated during live situations. When using the units with unstable voltage, please make sure that the device is grounded.

Cleaning

Please clean the units with a dry duster only. Do not use sharp cleaning fluids or water!

Dampness

The units should not be used in damp or wet places. Make sure the units are not used in humid atmospheres (walls, floors, ceilings etc.) because this could cause condensation within the units.

WARNING: Risk of electrical shock!

Use near explosive goods

The units should not be used near easy flammable or explosive goods.

Cooling System

The unit should not be used near heating systems, warm or hot fans etc. When using the unit in a rack, wall system or fixed installation, make sure the unit has enough space to let the generated heat dissolve.

Accessories

Do only use cables, plugs and adapters, which do not affect the normal use of the unit.

Spare parts or modifications

Modification instructions and schematic information should only be used from service departments of our officially authorized dealers. To prevent the risk of electrical shock, do not open any unit yourself. Due to the risk of injury, the manufacturer prohibits the installation of additional components or any modification to the existing circuits.

Always disconnect the power lead/AC adapter before opening the unit.

The manufacturer will not be liable for any claims in these cases! Opening the unit violates the warranty rules.

What you should generally know

Scope of delivery

To ensure top quality, we carefully inspected the Action Filter 4 before packaging. Nevertheless, the unit could have been damaged during transportation. Therefore, we ask you to take a serious look at the unit when unpacking. Do not hesitate to contact your dealer or us, should there be anything unusual with the unit or its packaging.

You should find the following items in the box:

- the Action Filter 4
- a DC-Power Supply (12 volts/1 A)
- this manual
- a cable holder

Please read this!

The Action Filter 4 is not an ordinary filter but a unit with unusual functionality intended for creative use. To make the most out of the Action Filter 4, we recommend taking the time to read this manual. Beside the details of operation, you will also find a couple of useful tips.

Setup and Powering

Presuming there were no issues while unpacking the unit (which we of course hope), the Action Filter 4 is ready to be setup:

1. Connect the provided 12 volts DC-power-supply to the Action Filter's **POWER** input.



When connecting the power supply, the polarity can be disregarded. The labeling on the unit's rear (minus = inner tip) refers to the provided power supply. It is important that the performance will not be under-run 1 A. It should not exceed 1 A as well. Make sure, you use a stabilized power supply!



Only use the provided power-supply! You may already own a 12-volts power supply that you may want to use with the Action Filter 4. Even if the connector and voltage match, that peripheral may deliver AC (alternating current) whereas the Action Filter 4 requires DC (direct current)! Using the wrong power-supply may damage the unit!

2. Connect the Action Filter 4's **INPUT** jacks to the audio source, e.g. a DJ-Mixer, groove box, synthesizer or CD-player.
3. Connect the Action Filter 4's **OUTPUT** jacks to the audio inputs of your mixing console, audio-interface or amplifier.
4. Press the **POWER** button on the front to power up the Action Filter 4. Next, switch on the other components, such as the mixer or the audio-interface.

The Action Filter 4 is now ready to use.



The cable holder that comes with the Action Filter 4 can be attached to the hole next to the **POWER** connector on the unit's rear. You can use it to fixate the PSU's cable.

What did you buy after all?

Action Filter 4 is an analog stereo filter designed to mainly process complex audio sources. This means, full tracks or loops will be processed entirely. Be it in a DJ-setup or during studio productions, the Action Filter 4 is a lot more effective and versatile than typical Kill-EQs. We chose the word “action” in the unit’s name because the filter is always operated manually. There is neither MIDI- nor control voltage (CV) automation. Thus, the Action Filter 4 demands and supports your intuition and creativity.

A filter - what’s that?

Before describing the functions of the Action Filter 4’s knobs and switches, let’s take a closer look at filters and what you could do with these.

A filter is an element that carves out specific portions of an original source. This deadpan theoretical explanation is true for every filter: coffee-filters, color-filters or audio-filters. While colors and coffee are sometimes topics during lunch break, we are, of course, interested in filtering audio sources.

Up with the lowpass

Filters are differentiated by two basic types: low- and highpass. These names self-explain the operation methods. A lowpass filter will only let *low* audio frequencies *pass*. The highpass does the opposite: It only lets *high* frequencies *pass*.

The question now is: Which high respectively low frequencies? Who’s in control? Good news - it’s you! The **CUTOFF** control allows setting the cutoff-frequency - the point from which the filter starts working. For a lowpass filter this means: the lower **CUTOFF** is set, the stronger the suppression of high frequencies, meaning that the sound gets more muffled. Ergo, the highpass filters works inversely: the higher **CUTOFF** is set, the stronger the suppression of lower frequencies, meaning that the sound loses bass.

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Figure 1: Left: lowpass filter; Right: highpass filter
The green area is being passed through the filter, whereas the red area is being rejected.

Now, **RESONANCE** comes into play. This parameter interacts with the **CUTOFF** control. It will produce an emphasis around the cutoff-frequency zone. The level here is boosted until the sound develops a characteristic enhancement. By moving **CUTOFF**, the working point of the resonance changes (and therefore its sound) because the focused frequencies will also change.

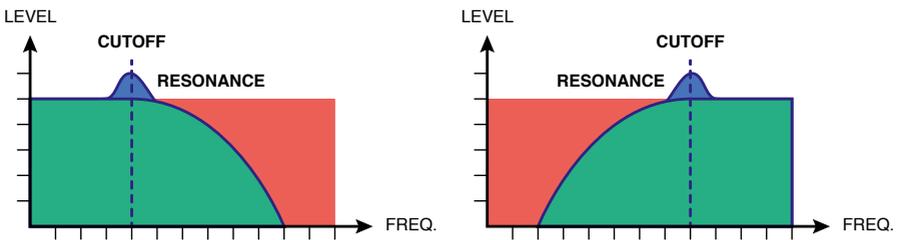


Figure 2: Left: lowpass filter with resonance, Right: highpass filter with resonance;



This is how it works in practice: A lowpass filter will cut the higher frequencies. This might sound profane but has developed into a characteristic element of house- and dance-tracks. Here, intros, breaks and build-ups are emphasized in their cumulative effect by slowly opening or closing the filter in sync with the beat.

A highpass filter is well-suited for mash-ups in order to suppress bass drums and basslines of a track, allowing it to be easier combined with a second track. Sometimes, you may want to alter this second track with a separate lowpass filter, too.

Can a band pass through the filter or will it be rejected?

What happens if you combine a high- and lowpass filter? There are two possibilities: a serial or a parallel routing - one after the other or both next to each other.

In series, high- and lowpass form a so-called bandpass. In the Action Filter 4, a highpass will first remove lower frequencies. From here the signal is send into a lowpass, where higher frequencies are processed.

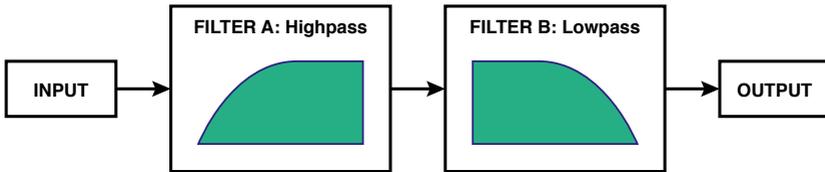


Figure 3: Serial combination of high- and lowpass filter

What remains is a frequency band of a certain width which is specified by both **CUTOFF** controls. By likewise moving both **CUTOFFS** to the left or right, this band is moved across the frequency spectrum.

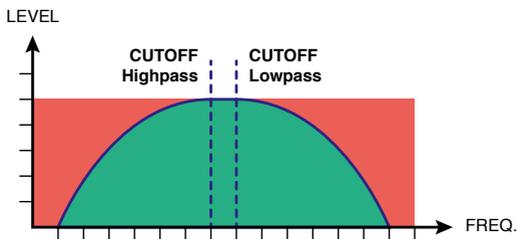


Figure 4: Bandpass filter: the green area is being passed through the filter whereas the red area is rejected.

The Action Filter 4 allows independent control for the high- and lowpass filter and therefore a free bandwidth by adjusting both **CUTOFF** controls to different values. In addition, the filters' resonance controls can be set individually and therefore create different enhancements at the lower and upper cutoff-frequencies. This particular feature of the Action Filter 4 allows creation of sounds not possible using typical bandpass filters with a fixed width.

Now what happens with both filters being interconnected in parallel? High- and lowpass filter work as always. When connected in series to create a bandpass, the spectrum is being cut from top AND below. In parallel connection, there is a highpass filtered signal AS WELL as a lowpass filtered signal in existence.

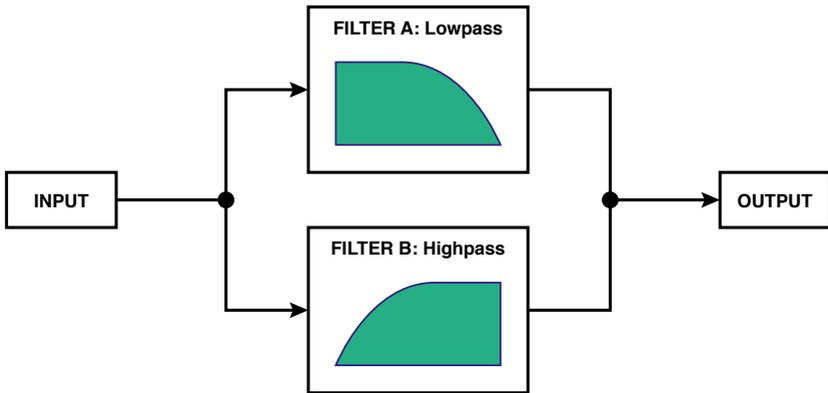


Figure 5: Parallel combination of low- and highpass filter

The highpass will remove lower frequencies and the lowpass eliminates high frequencies for their signal path. Both signals are being mixed and as result a section in the middle is missing. This is why this filter type is called a notch or band reject filter.

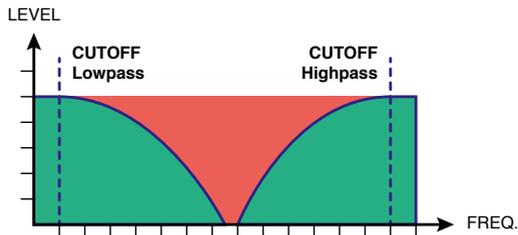


Figure 6: Notch filter: The green area is being passed through the filter whereas the red area is rejected.

Again, the Action Filter 4 is superior to typical notch filters because of its ability to freely adjust the cutoff-frequencies as well as the bandwidth for the notch.



Back to practice: a bandpass filter can emulate specific speaker types such as old single-chassis monitors or laptop-speakers by creating a frequency limited band and additional accents using resonances. Complex loops may be processed by a bandpass filter in order to isolate a certain frequency range - very useful for sampling.

The notch filter is a useful mixing tool that allows preserving the low and high frequencies of a track. You may now fill the mid spectrum with a second beat that was possibly processed by a bandpass - a nice reason to use a second Action Filter 4 for!

Control elements



Figure 7: The Action Filter 4's front panel

GAIN – make fit what doesn't fit

The **GAIN** control sets the input level in order to match the Action Filter 4's input to different output levels of connected units such as DJ-mixers, groove boxes, audio-interfaces etc. In case, the output level of the connected unit is pretty high by default, the Action Filter 4's inputs may clip. This is indicated by a red LED located top right of the **GAIN** control. Typically, the level should be set in a way that the LED only lights up shortly at absolute peak levels.



Overdrive created by high input gain settings can be used intended to create especially powerful sounds. This will not harm the Action Filter 4.

TRIGGER BYPASS - momentary or permanently

The **BYPASS** switch placed in the center of the unit toggles between the filtered and unfiltered audio signal. In **ON** position, **BYPASS** is active, meaning the filters are inactive, passing the source signal to the outputs. This is indicated by a blue LED.

With the switch set to **OFF**, the filter is active and the blue LED unlit.

Nearby the switch, you will find the **TRIGGER** button that works like a transformer function on a DJ-mixer. This button activates or deactivates the Action Filter 4's filters for the period of the button-pressing. **TRIGGER** functions contrarily to the **BYPASS** switch. With **BYPASS** set to **ON** (filters off, LED lit), **TRIGGER** button will activate the filters temporarily. With **BYPASS** set to **OFF** (filters active, LED off), **TRIGGER** button will temporarily bypass the filters.

MODE - small switch, large pull

Each of the Action Filter 4's channel houses a high- and lowpass filter with a slope of 24 dB per octave. As described in section "[Up with the lowpass](#)" on page 7, it is circuit-dependent whether both filters form a bandpass- or a band-reject-filter. With **MODE** switched to **BAND**, both filters are connected in series. In contrast, the **NOTCH** position offers parallel wiring.

The **MODE** switch has a larger effect than it may seem at first. By switching between **BAND** and **NOTCH**, the functions of both **CUTOFF** controls change. Let's take a closer look!

FILTER A and FILTER B - where is the high- and lowpass?

While describing high- and lowpass filters, the Action Filter 4 does not show any of these on the front panel. Previously, we labeled the **CUTOFF** knobs as High and Low. However, this indicated their position in the circuit. This sometimes led to misconceptions when changing between **BAND**- and **NOTCH**-modes. Therefore, we changed the knob labels to **FILTER A** (left) and **FILTER B** (right) on the Action Filter 4.

The filters in BAND-MODE

With **MODE** being set to **BAND**, **FILTER A**'s **CUTOFF** controls the highpass filter. From here, the audio signal is routed into **FILTER B** that is configured as lowpass (see figure "[Serial combination of high- and lowpass filter](#)" on page 9). To hear the full frequency spectrum **CUTOFF A** needs to be turned fully left and **CUTOFF B** fully to the right. Moving the control towards each other narrows the passing frequency range. Because the high- and lowpass filters both cover the full spectrum, the audio signal may disappear at certain overlapping **CUTOFF** settings.

Use the markers on the **CUTOFF** controls as aid to orientation. The further the distance of the marks, the wider the passing frequency range - very much like a fan being opened. Conversely, closing the "fan" will narrow the passing band.

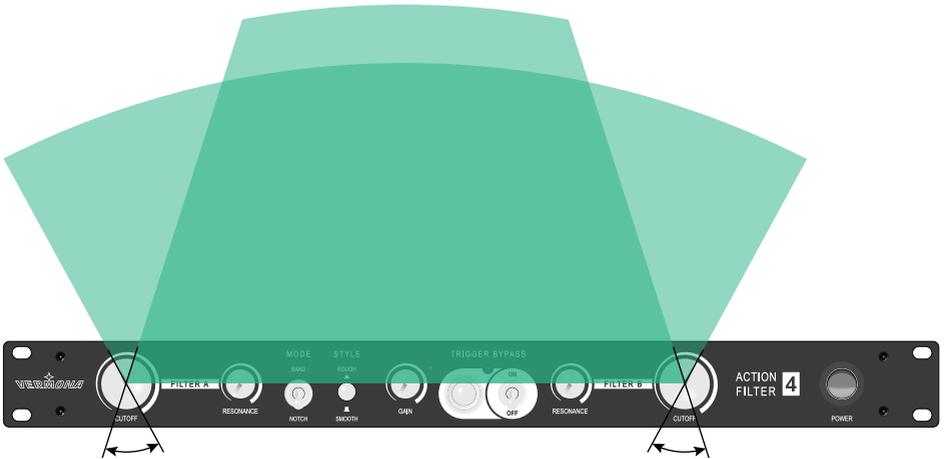


Figure 8: The frequency being passed through the filter, shown as “fan”.

- 👉 To use Action Filter 4 as a classic lowpass filter, select **BAND** mode and keep **FILTER A** fully open (**CUTOFF** set fully left). Use **FILTER B**'s **CUTOFF** to control the lowpass filter as desired. Do the opposite for getting a pure highpass filter.

The filters in NOTCH-MODE

The world upside down: With **MODE** set to **NOTCH**, the filters work inverted. **FILTER A** controls the lowpass while **FILTER B** adjusts the highpass (see figure "[Parallel combination of low- and highpass filter](#)" on page 10). This wasn't done to annoy you but for technical and practical reasons. Here too, the “fan” comparison might help you to understand the underlying principle: **FILTER A** cuts the higher, **FILTER B** the lower frequencies. This results in a V-shaped center-notch. The further the **CUTOFF** marks depart (fan opens), the wider the notch in the frequency spectrum that filters out a larger midrange section.

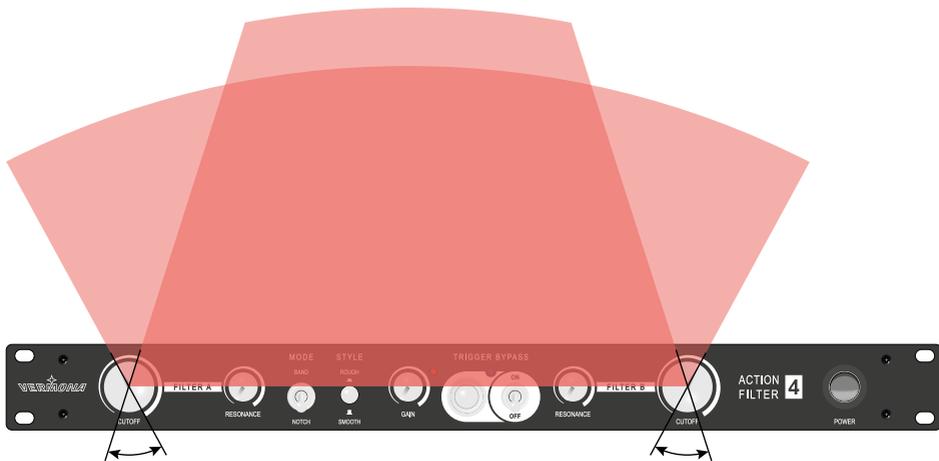


Figure 9: The frequency range being rejected by the notch filter shown as “fan”

With both **CUTOFF** controls pointing towards each other, both filter-signals overlap which results in a slight emphasis in the overlapping area.

RESONANCE - nothing to boo

Resonance in a filter is achieved by internal feedback. This leads to amplification of the frequencies around the **CUTOFF** value. Resonance generates a change of timbre that will sound synthetic with increasing intensity.

Unlike filters used in synthesizers, such as our PERfourMER MKII, the resonance in Action Filter 4 will not reach self-oscillation. The resonance has been restricted with intend to avoid uncontrollable feedback of the sound, especially during live performances. No matter how you set the Action Filter 4, it will not damage your gig.

STYLE - do you like it hard or soft?

The first Action Filter utilized a slightly raw sounding circuit. We optimized the sound in the next revision which lead to a smoother sound experience. It turned out that some users preferred the rawer, some the softer sounding Action Filter revisions. It is impossible to make everyone happy, isn't it? We guess we found a way! The **STYLE** switch allows toggling between **ROUGH**, which equals Action Filter 1 and the rounder sounding **SMOOTH** position. It's your choice!

Connections

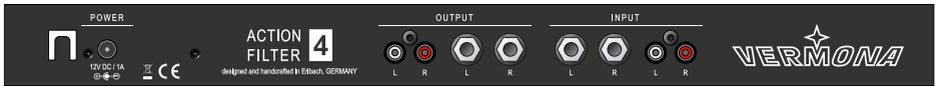


Figure 10: The Action Filter 4's rear

INPUT

Input jacks **L** and **R** serve to connect the audio source to be processed. The connections are available as 1/4"-TS- as well as RCA-connectors. Both inputs can be used at the same time but you won't be able listening to both input pair's signal simultaneously. Both types serve to facilitate connections in the corresponding setup so there is no need to use adapters which would introduce a possible source for problems. With both input types being connected, priority is given to the jack-inputs.

OUTPUT

Output jacks **L** and **R** serve to connect to a mixing console, an audio-interface or an amplifier. Unlike the inputs, the jack- and RCA-outputs can be used in parallel.

POWER - 12V DC / 1A

Connect the provided power-supply here. The cable may be fixed with the adjacent clip to avoid unwanted pulling out. A real LIVE-saver, isn't it!



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