

1. Introduction

Module **A-124 (WASP FILTER)** is a special **voltage-controlled multimode filter** with a **cut-off slope of -12dB / octave**.

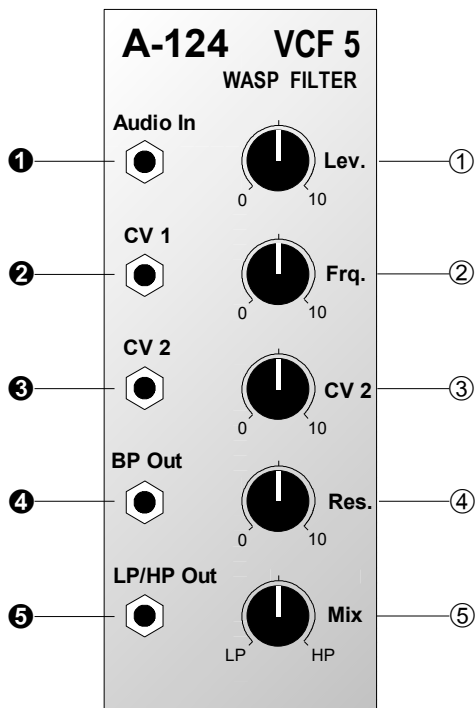
The **special feature** of the A-124 is the peculiar electronic circuitry of the **Wasp** synthesizer manufactured at the end of the seventies by the UK company EDP (Electronic Dream Plant). This synthesizer is well known for its eye-catching black/yellow wasp design and its distinctive filter. Its circuitry "abuses" digital inverters as analog operational amplifiers leading to distortions and other "dirty" effects that generate the specific sound of this filter.

Our version is equipped with a **band pass** output and a combined **low/notch/high pass** output. For this latter output a control knob defines the **relative amounts of low and high pass** signals. If both signals appear at the same level (i.e. middle position of the Mix knob) one obtains a **notch filter**. Otherwise the low or high pass signal predominates.

Resonance can be adjusted manually. The filter can't go into self oscillation, in contrast to most of the other VCFs in the A-100 system.

The **cut-off frequency** can be adjusted manually, or by voltage control. Two CV inputs are available.

2. VCF 5 - Overview



Controls:

- ① **Audio Level** : Input signal attenuator
- ② **Frq.** : Cut-off frequency control
- ③ **CV 2** : Attenuator for filter CV ②
- ④ **Res.** : Resonance control
- ⑤ **Mix** : Control for relative amounts of low and high pass signal

In / Outputs:

- ① **Audio In** : Audio input to the filter
- ② **CV 1** : Cut-off frequency CV input
- ③ **CV 2** : ditto, level controlled by ③
- ④ **BP Out** : Band-pass filter output
- ⑤ **LP/HP Out** : Mixed low-pass / high-pass filter output

3. Basics

Module A-124 contains three filter types: low-pass, high-pass and band-pass. Low-pass and high-pass signals are internally mixed and appear as the mixed LP/HP output ⑤. The mix control ⑤ governs the relative amounts of low-pass and high-pass.

With the mix control fully counterclockwise, at "LP", the mix output forms a *pure low-pass*. This is the most common type of filter in analogue sound production, which filters out the higher parts of the sound spectrum, and lets the lower frequencies pass unchanged. **Cut-off frequency f_c** determines the frequency at which this occurs (see Fig. 1).

With the mix control fully clockwise, at "HP", the mix output is a *pure high-pass*. The high-pass filter is a mirror-image of the low-pass filter: while it lets frequencies that are higher than the cut-off frequency f_c through, it attenuates frequencies below the cut-off point (see Fig. 1).

With the mix control in its middle position, the result is a *symmetrical notch* filter, letting through the upper and lower end of the frequency spectrum, but rejecting a band in the middle. If the mid-frequency is modulated by an LFO, the result sounds very similar to phasing.

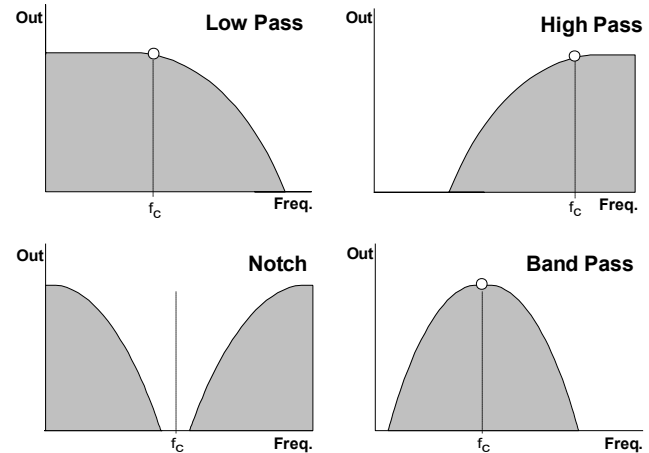


Fig. 1: Typical response curves of the four filter types.

When the mix control deviates from the middle position the **notch** is *asymmetrical*, i.e. the low-pass or high-pass share predominates.

In the band-pass filter, which has its own output, both ends of the frequency spectrum are attenuated (see Fig. 1), and the cut-off frequency f_c becomes the **mid frequency**. It gives you the ability to highlight a particular frequency band.

4. Controls

① Lev.

This attenuator controls the **input level** of the signal to be filtered, entering the module at input ① .

☞ If the filter's output signal is distorted, turn this control down, unless the distortion is wanted as a special effect.

② Freq.

The **filter frequency** is adjusted with this control.

③ CV 2

If you want to control or modulate the cut-off frequency by a voltage patched into input ③, use attenuator ③ **CV 2** to set **the level of voltage control**.

④ Res.

With this control you adjust the **resonance** of the filter (also known as **emphasis** or **Q**), which emphasises the frequencies around the cut-off frequency f_c . As the value for Q gets higher, the frequencies around the cut-off frequency f_c are emphasised. Fig. 2 shows this process using a low-pass filter as an example (a high-pass filter would produce a mirror-image). This way, you can make the frequencies around the cut-off point stand out more.

In band-pass mode, an increase in Q's value makes the bandwidth narrower. The same is true of notch mode, but of course in this case this narrower band will be rejected, instead of let through.

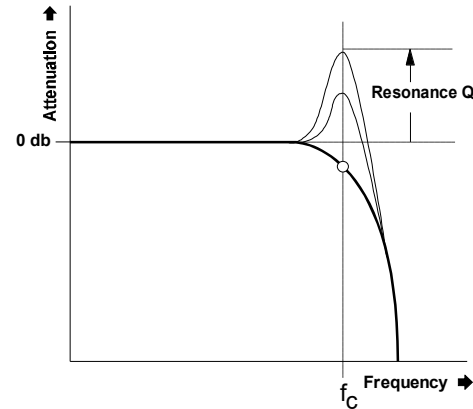


Fig. 2: How resonance affects the response of a low-pass filter around the cut-off frequency.

⑤ Mix

Mix control ⑤ adjusts the relative amounts of low-pass and high-pass signals appearing at the LP/HP mix output ⑥.

You can move from pure low pass (LP position on the control) via asymmetrical / symmetrical / asymmetrical notch to pure high pass (position HP).

5. In / Outputs

① Audio In

This socket is the filter's **audio input**. Patch the output of a sound source (such as a VCO, noise generator or mixer) into it.

② CV 1

Socket CV 1 is a **voltage control input for the filter frequency**. It works approximately to the 1 V / octave standard (like a VCO). Due to the simple Wasp filter design the control scale is not very precise.

If you patch a modulation source (eg LFO, ADSR) into this input, the cut-off frequency of the filter will be modulated by its voltage: ie, the sound color changes according to the voltage put out by the modulator.

③ CV 2

Socket CV 2 is another **voltage control input for the filter**. Unlike CV 1, you can control the level of voltage - the intensity of the modulation effect on the filter - with attenuator ③.

④ BP Out

This is the **band-pass** output.

⑥ LP/HP Out

This is the **mixed low-pass/high-pass** output.

6. User examples

The A-124's cut-off frequency can be modulated in a variety of ways (see table below).

Modulator	Result
LFO	cyclical changes of the sound spectrum (e.g. A-145, A-146, A-147, A-191)
ADSR	gradual change of the sound spectrum (e.g. A-140, A-141, A-142)
random	random sound changes (e.g. A-118, A-148)
pitch CV	pitch-related filter opening and closing
sequencer	rhythmical sound changes (e.g. A-155)
theremin	body controlled sound changes (e.g. A-178)
light CV	sound changes controlled by illumination intensity (e.g. A-179)
env. follower	sound changes controlled by the envelope of an audio signal (e.g. A-119)
foot control	sound changes controlled by foot controllers (e.g. A-177)
MIDI	sound changes controlled by MIDI events e.g. MIDI controllers (A-191)
...	

7. Patch-Sheet

The following diagrams of the module can help you recall your own **Patches**. They're designed so that a complete 19" rack of modules will fit onto an A4 sheet of paper.

Photocopy this page, and cut out the pictures of this and your other modules. You can then stick them onto another piece of paper, and create a diagram of your own system.

Make multiple copies of your composite diagram, and use them for remembering good patches and set-ups.



- Draw in patchleads with colored pens.
- Draw or write control settings in the little white circles.

