VERMONA

ELEKTROAKUSTISCHE MANUFAKTUR

twinVCFilter & tVCF-Extension

Bedienungsanleitung
User Guide

Foreword

Filters play a significant role in sound shaping within a modular system. Therefore we developed the twinVCFilter to accompany our series of modular synthesis products. Like with all VERMONA modules, we paid greatest attention to quality and musicality during development of this product. Extra care was taken to tailor the resonance scaling. This way, filtered signals can not only be colored or heavily processed, but twinVCFilter may additionally be used as a creative source for synthesizer-, drum- and effect-sounds or even as LFO.

The multiple routing- and CV-options make twinVCFilter an extraordinary versatile module. By using the optional tVCF-Extension module, the possibilities of both filter sections can be used in even more ways.

Enjoy twinFiltering!

Your VERMONA crew from the
Elektroakustischen Manufaktur, Erlbach

Scope of delivery, Setup

To ensure top quality, we carefully checked the twinVCFilter module before packaging. Nevertheless, we cannot fully exclude damage during transportation. Therefore, we kindly ask you to inspect twinVCFilter by yourself, once you receive the module. In case there is anything unusual about the unit or its packaging, do not hesitate to contact us, so that we can take care of the problem.

You should find the following items in the box:

- the twinVCFilter module
- a ribbon-cable (10-pole to 16-pole)
- four screws 3x6 mm with matching plastic washers
- this user guide

Installation, setup and powering

twinVCFilter was designed to work in modular synthesizer systems using the common Eurorack format. Its power supply, connectors and dimensions match the typical specifications (VERMONA Modular Case, Doepfer A-100 and compatible systems). The mounting process conforms with all regular modules:

1. **Switch off the power supply!** For safety reasons, also remove the detachable power cable from your frame before mounting the module!
2. Connect the supplied ribbon-cable with its 10-pole connector to the corresponding multi-pin-connector on the module's rear. (*see "Figure 1: Connecting twinVCFilter to the system bus" on page 4)*

⚠ **twinVCFilter's plug socket is protected against reverse polarity. Therefore, the 10-pole connector will only fit in one direction into the module. The supplied ribbon-cable is color-coded at the -12 volts position. Note, that this may differ from other manufacturers. Therefore, only use the supplied ribbon-cable to connect twinVCFilter to your frame's system bus!**

3. Connect the ribbon-cable's 16-pole connector to an empty plug-socket of your frame's system bus. Make sure the color-coded side of the cable points towards -12 volts! (*see "Figure 1: Connecting twinVCFilter to the system bus" on page 4*)

⚠ **Connecting the ribbon-cable with reverse polarity can lead to damage of your twinVCFilter module or other modules when powering the system! Double check the connections before continuing – safe is safe!**

4. Mount twinVCFilter to your modular frame using the supplied screws. To protect the unit's surface from scratches, use the supplied flat plastic washers.
5. Reconnect the power cord to your frame and switch on the power-supply. Your twinVCFilter is now ready to operate.

The following chapters will explain how to use the module's different connectors and how to use these within a modular system.

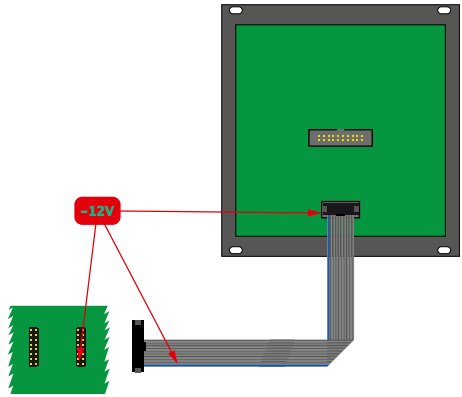


Figure 1: Connecting twinVCFilter to the system bus

Overview and functions

twinVCFilter consists of two independent but identical state-variable-filters. On the front panel as well as in this manual they are represented by the symbols ● and ◘.

First the input signal passes through a preamplifier stage before being processed by the resonance-capable filter . The modified signal can subsequently be picked up at individual outputs or the common mix-output to be passed on to further modules such as our twinVCAmp.

twinVCFilter offers a slope of 12 dB per octave in lowpass- and highpass-modes and a slope of 6 db per octave in bandpass-mode. If both filter sections are used in identical modes with serial routing, the slope will double with the cutoff frequencies being adjusted to identical values.

The resonance can be evenly adjusted and ranges from slight coloring to a stable self-oscillation within a range of < 2 Hz to approx. 16 kHz. Consequently, twinVCFilter can be used for sound generation and even as LFO.

Both filter sections ● and ◘ may be used independently or in combination. The routing allows for a serial, dual or parallel setup while the LINK-function allows to couple cutoff- and resonance parameters of the filter sections.

Both cutoff-frequencies and the mix-parameter for the mix-output may be modulated by control voltages such as envelopes, LFOs or sequencers.

By adding the optional tVCF-Extension module, twinVCFilter can be expanded with individual outputs for all filter modes plus a notch output and additional CV-inputs with polarizers.

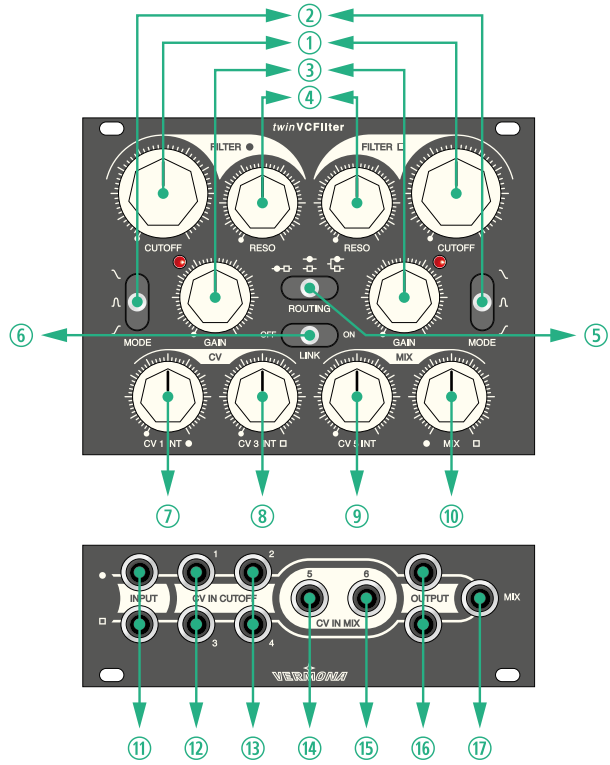


Figure 2: Control elements of twinVCFilter

Control elements

Both filter sections ● and □ are identical. The following explanations are therefore valid for the functions being available twice.

GAIN ③

The **GAIN** ③ control adjusts the signal level at the audio input **INPUT** ⑩. With the corresponding red clip-LED being lit, the filter input softly crosses into being overdriven, reaching from slight pleasant saturation up to powerful overdrive. Therefore, **GAIN** ③ may actively used to sculpt the sound.

MODE ②

The **MODE** ② switch selects the operational modes of the filter.

symbol	mode
⎣	lowpass with 12 dB/octave
⎍	bandpass with 6 dB/octave
⎷	highpass with 12 dB/octave

CUTOFF ①

Use the **CUTOFF** ① control to adjust the filter's cutoff-frequency.

RESO ④

Use the **RESO** ④ control to adjust the filter's resonance. When set to approx. 2 o' clock, the resonance reaches self-oscillation.

☛ **Amongst other applications, self-oscillation may be used to create drum- and percussive sounds. To do so, set the resonance to a position slightly before self-oscillation and use a trigger-signal, e.g. from a sequencer, envelope generator or LFO, to excite the filter at its audio input ⑪.**

☛ **By using the sine wave sounds at self-oscillation, twinVCFilter can be used as a simple FM-unit in parallel mode. With filter section ● creating a stable sound, it can be modulated by input CV IN CUTOFF 1 ⑫ of filter section □. At sub-audio frequencies, filter section □ works like a vibrato LFO. From its 10 o' clock position upwards, the CUTOFF ① control of filter section □ reaches the audible range and will create typical FM sidebands.**
To expand this FM-sound, the MIX ⑰ output may be patched to input CV IN CUTOFF 3 ⑫ and can be used as an additional modulator. The audio signal can be picked up from OUTPUT ● ⑯.

LINK ⑥

The **LINK** ⑥ switch allows coupling of both filters' cutoff and resonance parameters. With **LINK** ⑥ turned on, the **CUTOFF** ① and **RESO** ④ control of filter section ● will adjust both cutoff-frequencies and resonances with the same value.

The settings of the **CUTOFF** ① and **RESO** ④ controls of filter □ are ignored when in LINK-mode.

ROUTING ⑤

The **ROUTING** ⑤ switch defines how and if both filters are connected to each other. There are three configurations:

symbol	routing
	serial - The signal of **INPUT** ● ⑪ passes Filter ● at first. Its output will be passed on to Filter □. A signal that is fed into **INPUT** □ ⑪ will be ignored.
	dual - both filters are independent of each other.
	serial - Both filters ● and □ receive the signal fed into **INPUT** ● ⑪. A signal that is fed into **INPUT** □ ⑪ will be ignored.

Serial

With this routing, the slope of a filter mode can be doubled. Both filter sections need to be switched to the same **MODE** ②. In addition, it is recommended to enable the **LINK** ⑥ function (see previous section), in order to set the cutoff frequencies and resonances to identical values.

By combining highpass (⟋) in filter ● and lowpass (⟍) in filter ◘, a bandpass filter with variable width can be created. The upper and lower filter frequencies may be enhanced by different resonant peaks. The bandpass can be accessed by output jack ⑯ of filter ◘.

Dual

This mode allows the use of two fully independent filter sections. Each section is autarkical and can be modulated individually.

To process stereo signals, set both filter sections ● and ◘ to the same **MODE** ②. To ensure equal processing of both channels, it is recommended to enable the **LINK** ⑥ function (*see "LINK ⑥" on page 9*).

Parallel

This routing allows creating a notch filter of variable width, by combing a lowpass (⟍) on filter ● and a highpass (⟋) on filter ◘. The upper and lower filter frequencies may be enhanced by different resonant peaks. The notch can be accessed on the **MIX** ⑰ output with **MIX** ⑩ set to the center position. To keep the distance between the filter frequencies, **LINK** ⑥ has to be set to **OFF**.

☛ **Using tVCF-Extension (*see "tVCF-Extension" on page 13*) you can control or modulate both cutoff-frequencies ● and □ together. With that you are able to move the variable bandpass-filter (ROUTING ⊶) or notch-filter (ROUTING ⇳) through the frequency spectrum.**

☛ **When ROUTING is set to ⇳, the signal fed into INPUT ● ⑪ will also be forwarded to INPUT □ ⑪. This configuratin is very similar to routing ⇳ but you are able to use different GAIN ③ settings for each filter section.**

CV-Control

The parameters **CUTOFF ●**, **CUTOFF □** ① and **MIX** ⑩ can be modulated by external control voltages such as envelopes, LFOs or sequencers. There are two CV-inputs per function. One offers a variable attenuator, the second input always routes the full control voltage to the target:

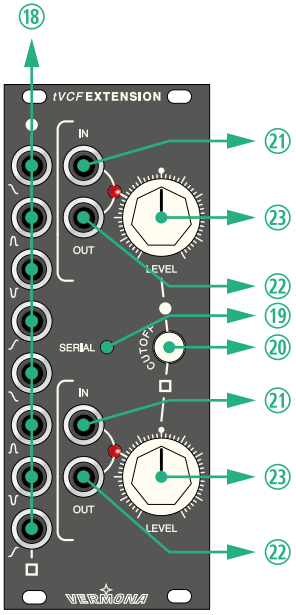
input	description
CV IN CUTOFF 1 ⑫	controls **CUTOFF ●** ① via the **CV 1 INT ●** ⑦ attenuator knob
CV IN CUTOFF 2 ⑬	controls **CUTOFF ●** ①
CV IN CUTOFF 3 ⑫	controls **CUTOFF □** ① via the **CV 3 INT □** ⑧ attenuatur knob
CV IN CUTOFF 4 ⑬	controls **CUTOFF □** ①
CV IN MIX 5 ⑭	controls **MIX** ⑩ via the **CV 5 INT** ⑨ attenuator knob
CV IN MIX 6 ⑮	controls **MIX** ⑩

Outputs

The output signals of the filter units ● and □ are available individually at their corresponding jacks **OUTPUT ●** and **□** ⑮. In addition, the **MIX** ⑯ jack, allows tapping the mixed output of both filter sections. The level of sections ● and □ is balanced by the **MIX** ⑩ control.

tVCF-Extension

Overview and functions



The tVCF-Extension module complements twinVCFilter with individual outputs for lowpass-, highpass- and bandpass-modes that can be used simultaneously. In addition, a notch mode with individual output is available, too. Furthermore, the extension module offers two additional CV-sections that modulate cutoff parameters ● and □. The inputs of these sections are equipped with polarizers, which allow to use the CV-signals at the input in positive or negative form to control the filter frequencies. In addition, the CV-sections generate control voltages between -5 and +5 volts when used standalone.

Figure 3: Control elements of tVCF-Extension

Installation

tVCF-Extension can only be used in combination with the twinVCFilter module. The setup is carried out by connecting the supplied ribbon-cable to a centrally placed 20-pin plug-socket on the twinVCFilter's circuit board. The plug-socket ensures a correct connection effectively avoiding reverse polarity.

⚠ **Only use the equipped ribbon cable!**
tVCF-Extension may not be connected directly to the system bus! For your own safety, the system must be switched off and removed from the mains during installation.

Filter Outputs

There are individual outputs ⑱ for all filter modes (⎿, ⎍, ⎾) and the additional notch modes (⋁) per filter section ● and ◘. All outputs ⑱ are fed at all times, no matter which filter modes have been selected using the two **MODE** ② switches on twinVCFilter.

The red **SERIAL** LED ⑲ will be lit with twinVCFilter's **ROUTING** ⑤ switch being set to the corresponding position (⚯). It indicates that the two individual outputs may deliver different filter types than printed on the front panel.

CV-sections

Both CV-sections ● and □ can be used in many different ways:

- as individual polarizers, independently of twinVCFilter
- as individual voltage source, independently of twinVCFilter
- to attenuate and invert incoming control voltages to modulate **CUTOFF** ● and □ ①
- as voltage sources to control **CUTOFF** ● and □ ①

CUTOFF ⑳

With activated **CUTOFF** ⑳ switch (pressed), the signals of both CV-sections are passed through to filter-section ● and □ of twinVCFilter. Their signals modulate **CUTOFF** ● and □ additionally to control inputs **CV IN CUTOFF 1** to **4** (⑫, ⑬). They are always available on the corresponding **OUT** ㉒ jack as well.

With deactivated **CUTOFF** ⑳ switch (not pressed), the CV-sections are detached from twinVCFilter. Their signals are solely available on the corresponding **OUT** ㉒ jack.

IN ㉑ and OUT ㉒

Signals that are feed to the **IN** ㉑ jack will be attenuated respectively inverted by the **LEVEL** ㉓ control and forwarded to the **OUT** ㉒ jack. As described in the previous section, they can also be used to modulate **CUTOFF** ● and □ ①.

If the **IN** ㉑ jack is not used, the CV-section itself generates a voltage in the range of -5 volts to +5 volts.

LEVEL ㉓

The **LEVEL** ㉓ control adjusts the intensity and polarity of the incoming control voltage:

- In its center position it completely turns off the incoming signal.
- Turning it to the right it will fade in the incoming signal until it reaches 100% on the far right position.
- Turning it to the left the signal will fade in with reversed polarity until it reaches 100% on the far left position.

If the CV-section is used to generate a voltage on its own, **LEVEL** ㉑ adjust the voltage between -5 volts on the fare left position to +5 volts on the far right position.

⚠ **By connecting OUT ● ㉒ to IN □ ㉑ with activated CUTOFF ⑳ switch you can control both cutoff frequencies ● and □ with LEVEL ●. Depending on the setting of LEVEL □ they will be modulated in parallel (LEVEL □ ㉓ set right of center position) or against each other (LEVEL □ ㉓ set left of center position). Of course you also can modulated this by any CV source by connecting it to IN ● ㉑.**

Technical Specification

Levels	
max signal input level	0 dBu
max CV input level	±5 V
max. output level	+20 dBu
Maximum Power Consumption	
+12 V	+75 mA (without tVCF-Extension) +105 mA (with tVCF-Extension)
-12 V	-55 mA (without tVCF-Extension) -75 mA (with tVCF-Extension)
+5 V	-
Dimensions / Weight	
Width / Height	twinVCFilter: 24 HP / 3 U tVCF-Extension: 10 HP / 3 U
Depth	twinVCFilter: 40 mm tVCF-Extension: 30 mm
Weight	twinVCFilter: 360 g tVCF-Extension: 110 g

VERMONA

ELEKTROAKUSTISCHE MANUFAKTUR

HDB electronic GmbH
Badesteig 20
08258 Markneukirchen
GERMANY

Phone **+49 (0) 37422 4027 - 0**
Email **info@vermona.com**
Web **www.vermona.com**