WALDORF DVCA1 USER MANUAL

Waldorf Music GmbH

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Introduction

Thank you for purchasing the dvca1 dual VCA Eurorack module.

Like any Waldorf product, the dvca1 has been developed and produced using milk from happy cows. We hope you enjoy it as much as we do.

Reading this user manual, you will discover all the device features, learn its basic use and benefits from tips & tricks we gathered during product development.

Your Waldorf Team

Disclaimer

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For additional information / sound demos / software downloads, please visit our website:

http://www.waldorf-music.info

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Contents

1 General Safety Guidelines

Please read the following safety guidelines carefully!
They include precautions you should always observe when dealing with electronic equipment.

- Use the device indoors only, in a dry atmosphere.
- Never use the device under too damp conditions such as in bathrooms or near swimming pools.
- Do not use the device in extremely dusty or dirty environments in order to preserve the device's surface finish.
- Make sure that adequate ventilation is available for the device to cool down. Do not place the device near heat sources such as radiators.
- Do not expose the device to extreme vibrations.
- Unplug the device when you are not using it for longer periods.
- Never place objects containing liquids on top or near the device.
- Make sure no foreign objects find their way into the unit. If this occurs, switch the power off, unplug the device and consult a qualified repair center.

This device, used with amplifiers, speakers or headphones, can generate volume levels that may result in **irreparable damage to human hearing.** For this reason, volume should be kept at moderate levels at all times.

This device is **designed exclusively** to generate low frequency audio signals for sound generation. Any other use is prohibited and voids the warranty extended by **Waldorf Music GmbH**. Damages due to incorrect use are not the responsability of **Waldorf Music GmbH**.

2 Device Maintenance

- Do not try to open the device or detach the frontpanel.
- Refer all service and repair tasks to qualified personnel.
- There are no user serviceable parts inside the chassis.
- Use only a soft cloth or brush to clean the device surface.
- **Never use cleaning chemicals** as they will damage the device surface.

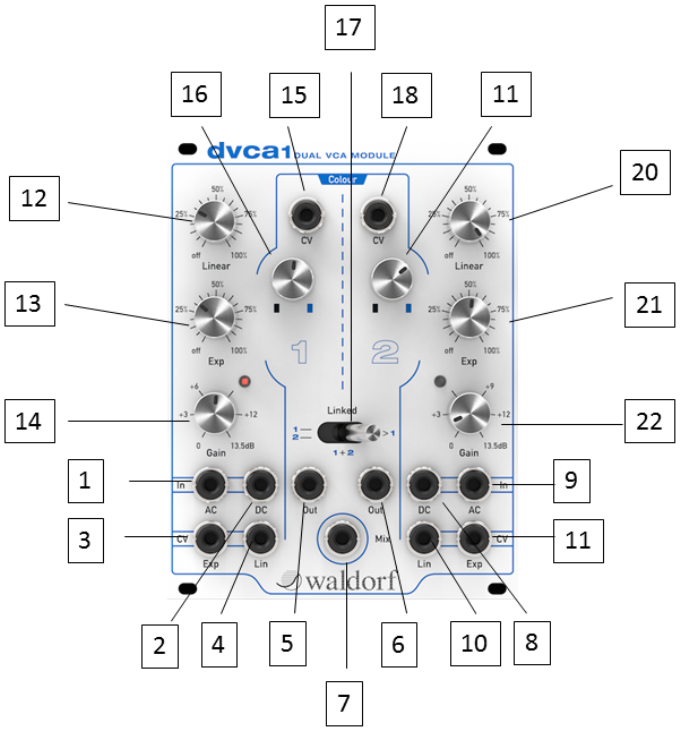
3 Package Contents

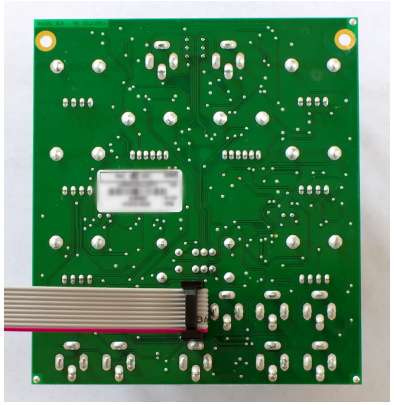
The dvca1 package contains the following parts:

- dvca1 Dual VCA Module
- 1 x 10-way 20cm ribbon cable
- 4 x M2.5 x 6 screws
- 4 x M3 washers

Only a Phillips head screwdriver #0 is needed to mount the module into your modular rack. No additional tools are needed.

4 Controls & Connectors





No	Id	Description
1, 9	AC input	For your audio signals
2, 8	DC input	Used for audio or control signals without the filtering option (Colour)
3, 11	Exp CV input	Used to modulate the Exponential parameter
4, 10	Lin CV input	Used to modulate the Linear parameter
5, 6	Audio output	Individual audio outputs
7	Mix output	Provides the sum of both output signals
12, 20	Linear knob	Controls the amount of VCA modulation
13, 21	Exponential knob	Controls the amount of VCA modulation
14, 22	Gain knob	Used for gain control (up to +13.5dB gain)
15, 18	Colour CV input	Used for controlling the two-pole low-pass filter, called ”Colour”
16, 19	Colour attenuator knob	Used for controlling the amount of ”colouring”
17	Linked switch	Used for choosing from 3 different modes

5 Device Connection

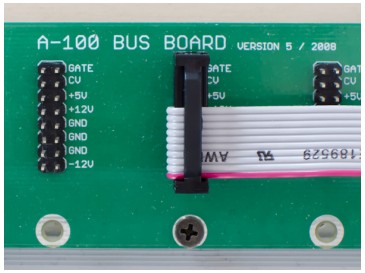
You now own a fantastic amplification module. It's time to integrate it in your modular system.

5.1 Power Connection

The first step is to supply your module with power. The module only requires regulated +12V and -12V voltages. These voltages should already be provided by your modular system's power supply.

Before connecting any module to the Eurorack bus, it is mandatory to switch the modular system power off. Otherwise you may severely damage your module or put yourself at risk.

Please connect the supplied ribbon cable with the smaller 10-way connector to the module's Eurorack bus connector and with the larger 16-way connector to your modular system bus board.



Eurorack connectors are usually orientated in a way that the -12V supply line is located at the bottom. The dvca1 module follows the same convention.
The red line of the ribbon cable should show to the bottom of your bus board and at the bottom of your module. Refer to the figure above.

Please make sure the ribbon cable does not swap the lines.

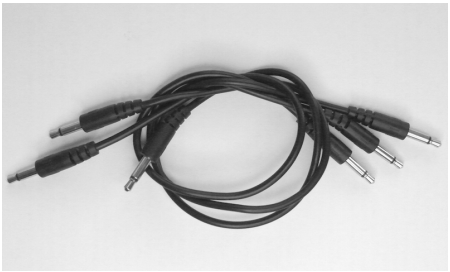
The module can now be installed in the rack using the provided screws, washers and a Phillips head screwdriver #0. With the module installed, switch the system power supply on.

5.2 Signal Connection

The second step is to integrate the dvca1 to your Eurorack system.

Connect an audio signal like a VCO, sound source or any other audio signal to one of the *AC* inputs and connect the *Mix*- or individual outputs to your studio system. Now begin to modulate the VCA level, panning and/or the filter called *Colour* for your pleasure.

Connections are made by using mini patch cables. These cables have standard mono male-male mini plugs (3.5mm) and can be bought from any audio store.



6 Device Overview

What is a VCA? VCA stands for Voltage Controlled Amplifier. Ok, and what is a VCA good for? It's a necessary module to amplify or attenuate audio or control signals in your system. Not the fanciest type of module in the world of Eurorack aficionados and not as exciting as a VCO, VCF or modulation module - until now!

Waldorf creates a remarkable new tool to make amplification real fun and satisfying. It's a new level of innovation and possibilities. The new design of the dvca1 supports your personal workflow in a fantastic way and gives you a smart instrument to develop your sound further on.

Built around two analog VCAs with a wide range of options including the most important one: the ability to musically colour the audio signal.

The Waldorf dvca1 comprises two identical VCAs which can be optionally linked together for stereo control or panning effects. Each VCA could be either fed by an audio signal via the AC input or control signal via the DC input.

For maximum flexibility, it offers linear and exponential control at the same time. An additional overall gain control makes the dvca1 a true amplifier by adding up to 13.5dB gain. This is an option not found in most VCAs.

Via the *Colour* control a two-pole low-pass filter is added to give the sound an extra timbre much like a traditional low-pass gate but with much quicker reaction times and smooth filtering for impressive and sharp sounds.

6.1 Inputs

Audio signals should be fed into the *AC* input which provides a DC blocking circuit. This is useful for example when connecting from external equipment.

Further, the *AC* input connects internally to the low-pass filter which is activated by opening the *Colour* knob. Alternatively audio signals could also connected to the *DC* input, but then lacking the mentioned filtering and DC blocking features.

Control signals like those from LFOs or envelope generators to be processed by the VCA should always connected via the *DC* input.

> Hint: It's not intended to have both *AC* and *DC* inputs of the same VCA used simultaneously, although it doesn't harm in any way.

6.2 Outputs

Each VCA has its individual output regardless if the VCA has been fed via *AC* or *DC* input. In addition the *Mix* output provides the sum of both output signals.

6.3 Level Control

Each VCA has two control inputs: Linear and Exponential. Both could be used simultaneously. In this case the amplification of both is simply added.

The linear control simply multiplies the amplitude of the input signal with the amount of the control signal.

The exponential control modifies the gain of the signal on a Decibel scale.

Linear mode is often used when processing control signals while exponential mode is used for audio signals modulated by linear controls like triangle LFOs etc. However, when the modulating signal itself is non-linear like from classic envelopes, using linear mode for modulating audio with these could be more appropriate. Let your ears decide!

Exponential mode gives much more sharp modulations compared to linear mode. And you could combine both of course for more complex and impressive scenarios.

Both controls work this way: when the CV input isn't used, the panel knob opened fully would forward the signal unchanged in level. When fully closed the signal is muted. When the CV input is used from a modulation source, the panel knob is used to attenuate the control signal from unchanged when fully opened to muted at fully left. Thus, inputting a 5V CV signal with fully opened panel knob relates to an unchanged signal (assuming the overall gain knob is closed).

6.4 Overall Gain

In addition to the linear and exponential level controls each VCA has an overall gain knob.

When fully closed the VCA works in the traditional way giving no true amplification of the input signal. However, by opening the gain knob the VCA becomes a true voltage controlled amplifier.

In full open position the VCA delivers 13.5dB gain when the VCA is fully opened (related to 5V CV input on either linear or linear inputs with respective knob fully opened).

This overall gain simply scales the level of the VCA including any applied modulation. Therefore this is different from classical 'initial gain' configuration which adds a constant level to the signal.

The latter could be simply realised with the dvca1 by using one of the linear / exponential control with the CV input and the other without which then would add constant gain by opening the respective panel knob.

Depending on the level of the input signal, the overall level could result in hard clipping distortion.

The red LED next to the *Gain* knob indicates that the input signal is closed to the clipping level, resulting in distortion. This could of course be used intentionally for shaping the sound.

6.5 Filtering

When using the *AC* input for audio, the signal is fed through a two-pole low-pass filter before it reaches the VCA.

When the *Colour* knob is fully left, the filter is opened and the signal is fed almost unchanged into the VCA. But turning the *Colour* knob clockwise, the filter cutoff frequency is bound increasingly to the VCA linear and exponential controls in the following way: The more the VCA is attenuating the signal, the more the cutoff frequency of the low-pass filter is reduced.

This results in a timbre variation in parallel to level variation. The amount of this parallel movement is increased by turning the *Colour* knob clockwise. You add

a warmer and more colourful timbre to the signal based on a finely-crafted OTA filtering circuit.

This effect is similar to a classic low-pass gate. However, while the classic low-pass gate is realised with a vactrol and therefore isn't able to be modulated quickly, the OTA-based low-pass filter in the dvca1 can be modulated at any speed up to audio rate for giving a rich and flexible timbre control.

The amount of colour filtering can be also controlled via the CV input. In this case the panel knob acts as an attenuator to the applied CV signal.

6.6 Link Modes

The level control section of the right VCA could be linked to the left VCA.

They are three link modes: independent, parallel and anti-parallel.

- Independent mode for every channel in left position of the switch.
- In parallel mode (switch is in middle position) the linear and exponential controls (i.e. panel knobs and its CV inputs) of the right VCA (2) are disabled and instead the controls of the left VCA (1) are used. In this configuration e.g. a stereo signal can be modulated by just using CV on the left section (1). However, the gain knob of the right VCA (2) is still active in order for overall level compensation or panning effects.
- In anti-parallel mode (switch is in right position) only the linear control section of the right VCA (2) is disabled. Instead the linear control of the left VCA (1) is used in reverse way: When the left VCA (1) is open by linear control, the right is closed and vice versa. The *Exponential* and *Gain* controls of the right VCA (2) are not affected and could be used in addition. This can be used for auto-panning effects e.g. when modulating volume by an LFO.

7 Tips & Tricks

In addition to classical modulations like LFOs or envelopes, the CV inputs could also be fed with audio signals. The resulting modulation can be very interesting much like - but not strictly identical to - ring modulation.

A typical use for anti-parallel mode would be panning effects by feeding a LFO signal into the left linear CV input.

Try to modulate the *Colour* parameter with a sample & hold or envelope signal to come up with some fundamental groovy patches.
Also the possibility to modulate the *Colour* in stereo setups with different amounts gives you some nice filter flavours.

8 Troubleshooting

8.1 Modules Power Fail

- Check the orientation of the pin headers on your modules
- Check if the total power consumption of your modules does not exceed the specifications of your case/frame power supply

9 Specifications

Power Supply:	+12V/100mA, -12V/100mA
Width:	20HP, 101.6mm
Height:	3U, 133.3mm
Depth:	25mm
Total Weight:	350g

Technical specifications and design are subject to change without notice.

10 Block Diagram