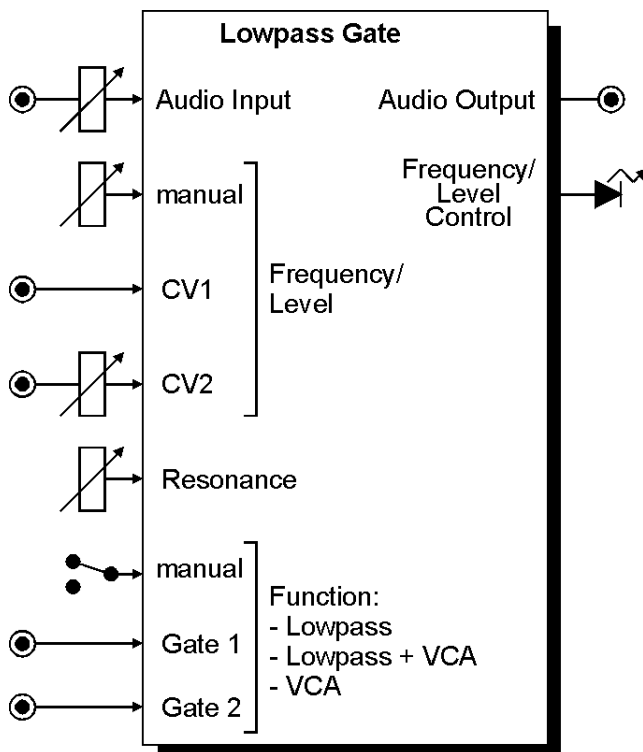# 1. Introduction

Module A-101-2 is a **vactrol based combination of Low Pass filter (LP) and VCA**. Additionally a combined mode LP+VCA is available. In this mode the sound becomes more dull as the loudness decreases. The A-101-2 was inspired by module 292 of Don Buchla. He also intruduced the term "**Low Pass Gate**" for this combination of functions.

The **function** of the module is controlled by a manual **switch** or by two **gate** inputs.

In principle the A-101-2 is a **12 dB low pass** that can be switched to VCA or a combination of Low Pass and VCA. The controlling elements for frequency resp. loudness are so-called **vactrols**. A vactrol is a **combination** of a **light depending resistor** (LDR) and a **light emitting diode** (LED) both put into a small light-proof case. Vactrol based circuits are known for their **soft low-distortion sound**. For details about vactrols please use the corresponding link in the A-101-2 info page on our web site www.doepfer.com.
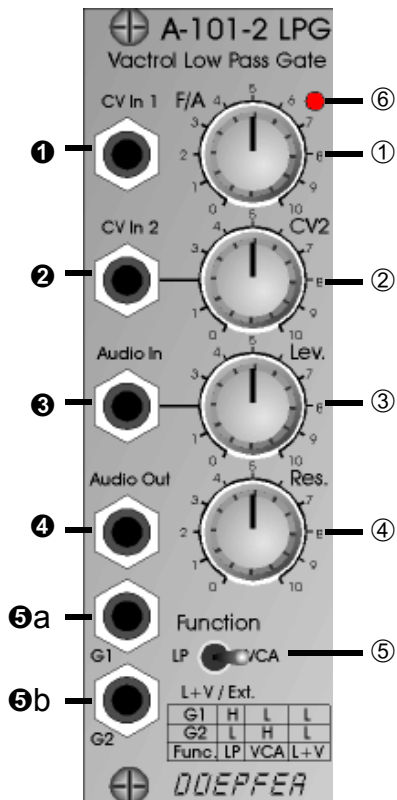
Frequency resp. **loudness** is controlled **manually** and by two **control inputs**.

The audio input is very sensitive in filter mode to obtain **distortion** effects if desired.

The **resonance** function "colors" to the sound and is adjustable all the way up to **self-oscillation**.

In contrast to the Buchla design the A-101-2 offers the resonance feature, attenuators for both CV and audio input, and two gate inputs to control the function of the module in addition to the manual toggle switch.

2. Overview

Controls:

①	**F/A**	manual frequency/loudness control
②	**CV2**	attenuator for CV input ❷
③	**Level**	attenuator for audio input ❸
④	**Resonance**	resonance control
⑤	**Function**	function toggel LP / LP+VCA / VCA
⑥		LED control for frequency/loudness

Inputs / Outputs:

❶	**CV In 1**	frequency/loudness CV input 1
❷	**CV In 2**	frequency/loudness CV input 2
❸	**Audio In**	audio input
❹	**Audio Out**	audio output
❺a	**G1**	function control input 1 (gate 1)
❺b	**G2**	function control input 2 (gate 2)

3. Controls / Inputs / Outputs

① **F/A** (control) / ❶ **CV In 1** (socket)
② **CV2** (control) / ❷ **CV In 2** (socket)

This group of elements is responsible for the filter frequency resp. loudness (audio level / amplitude) according to the selected function. Control ① **F/A** is used to adjust the frequency resp. loudness manually. The control voltage inputs ❶ **CV In 1** and ❷ **CV In 2** enable voltage control of the frequency resp. loudness by means of external voltages (e.g. ADSR, LFO, random voltage, S&H). The input ❷ **CV In 2** is equipped with the attenuator ② **CV2**. Input ❶ **CV In 1** has no attenuator available.

Remark: Module A-101-2 uses so-called vactrols to control frequency and resp. loudness. The light depending resistors inside the vactrols show a considerable slowness of the resistance variation. Consequently frequency resp. loudness changes are not as fast as for other A-100 filters or VCAs that do not use vactrols. Fast attacks or decays (CV = ADSR) or FM effects in audio range (CV = LFO or VCO) are not possible with vactrol based circuits. Please use one of the other A-100 filters or VCAs for these purposes. By means of a LFO with gradually increasing frequency one can discover the maximum modulation frequency that the vactrols are able to follow.

The LED near the frequency control ① is a rough measure of the current frequency resp. loudness. This LED is connected in series with the LEDs inside the vactrols and consequently shows the current illumination inside the vactrols.

Due to the"crooked" response of *vactrol*s the filter has not an exact control standard (like V/Oct or dB/V). The inevitable tolerances and tracking errors between different vactrols will also lead to an individual sound of each module and individual frequency and resonance behaviour.

③ **Level** (control) / ❸ **Audio In** (socket)

This is the audio input of the module with the corresponding level control (attenuator). At socket ❸ the audio signal to be processed by the module is fed in (e.g. VCO output).

The audio input is very sensitive in the low pass mode so that even distorted sounds can be obtained - especially for higher resonance settings. From about middle position (~ 5) distortion appears with A-100 standard audio signals (e.g. VCO output). Even in the VCA and combined LP+VCA mode distortions are possible. But they are distinctly smaller than in low pass mode.

④ **Resonance** (control)

In **low pass mode** this is the resonance control. The **resonance** function "colors" to the sound and is adjustable all the way up to **self-oscillation**. Due to the vactrol tolerances and tracking errors mentioned above resonance resp. self-oscillation deviations over the frequency range may occur.

In the VCA mode control ④ only changes the overall loudness.

In the combined LP+VCA mode control ④ affects both loudness and resonance.

The resonance function was not available for Buchla's low pass gate. To reproduce the original Buchla sound the resonance control simply has to be set fully counter-clockwise.

❹ **Audio Out** (socket)

This socket is the audio output of the module. According to the selected mode the low pass filtered resp. amplitude modulated input signal appears.

⑤ **Function** (toggle switch)
❺a **G1** (socket) / ❺b **G2** (socket)

This group of elements serves to select the desired function resp. mode. These three functions are available:

Function	Switch position	G1	G2
low pass	LP	high	low
low pass + VCA	L+V/Ext.	low	low
VCA	VCA	low	high

The function can be selected with the toggle switch ⑤ or the two gate inputs ❺a **G1** and ❺b **G2**. If the gate inputs are used to selected the function the toggle switch has to be in middle position L+V/Ext. (i.e. the grey shaded area in the above table).

For the gate inputs "low" corresponds to a control voltage range of about 0...+2V, "high" corresponds to about +3...+12V.

4. User Examples

not yet ready