1. Introduction

Module A-133 (Dual VC Polarizer) is a special dual voltage controlled amplifier that enables both positive and negative amplifications. Negative amplification means in this context that the signal is inverted.

The main application of the module is the processing of control voltages, e.g. ADSR or LFO. But even audio signals can be processed with this module.

The amplification range is about -2.5....0....+2.5. Amplification can be adjusted manually (Man control) or by an external control voltage.

The present amplification is displayed with two LEDs: one for positive and one for negative amplifications.
2. Overview

Controls and indicators:

1. **LEDs**: negative/positive amplification display (not a signal display!)
2. **CV**: attenuator for the control voltage at input ① that controls the amplification
3. **Man.**: manual amplification control

In-/ Outputs:

1. **CV**: control voltage input
2. **In**: signal input
3. **Out**: signal output
3. Controls and Indicators

1. LEDs

The two LEDs indicate the amplification of the polarizer in question (attention: in contrast to the LED displays of other modules they do not show the signal but the amplification factor!).

Tab. 1 shows the connection between LED display and amplification. At maximum negative amplification (about -2.5, signal inverted!) the left LED lights with maximum brightness. At maximum positive amplification (about +2.5, signal not inverted!) the right LED lights with maximum brightness. With amplification about zero (i.e. no output signal) both LEDs are off.

2. CV

The attenuator is used to adjust the effect of the external control voltage on the amplification.


This control is used to adjust the amplification manually. The range is about -2.5 to +2.5 (without external control voltage). The middle position corresponds to about zero amplification (but in any case the LEDs should be used to find out the current amplification).

<table>
<thead>
<tr>
<th>Man.</th>
<th>LEDs</th>
<th>a</th>
<th>In</th>
<th>Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5</td>
<td>☀</td>
<td>-2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td>☀</td>
<td>-1</td>
<td></td>
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<tr>
<td>0</td>
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<tr>
<td>2</td>
<td>☀</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>☀</td>
<td>2.5</td>
<td></td>
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</tbody>
</table>

Tab. 1: Connection between manual control (Man.), LED display, amplification (a) and effect on the output signal

It is possible to obtain other amplification ranges (e.g. -1 ...+1 or -5 ...+5). For this a resistor has to be replaced. Please look at the A-100 service manual or contact hardware@doepfer.de. We think that -2.5...+2.5 is a good compromise as higher amplification...
ons would cause clipping for all standard A-100 signals (like LFOs, ADSRs or VCOs).

If the amplification is negative the signal is inverted (see table above).

The effects of the manual control ③ and the external control voltage ① with attenuator ② are added up.

4. In-/Outputs

① CV
This jack socket is the control voltage input to control the amplification by an external control signal.

② In
The signal to be amplified/inverted (control voltage or audio) is fed into this signal input socket ②.

③ Out
Socket ③ is the signal output.

5. User examples

One application is the generation of new waveforms. For this two VCO outputs are connected to the signal and the control input of the A-133 (see fig.1).

Fig. 1: Generating new waveforms

Same applies for modulations (see fig. 2). Instead of LFOs even ADSRs or other CV sources can be used.

Fig. 2: Control voltage modulation, arrows indicate polarity changes

Additional examples:
- voltage controlled feedback of filters (e.g. A-108), phaser (A-101-3) or spring reverb (A-199)
- polarity change of envelope signals (frequency CV is used to control both filter frequency and polarizer amplification simultaneously)