

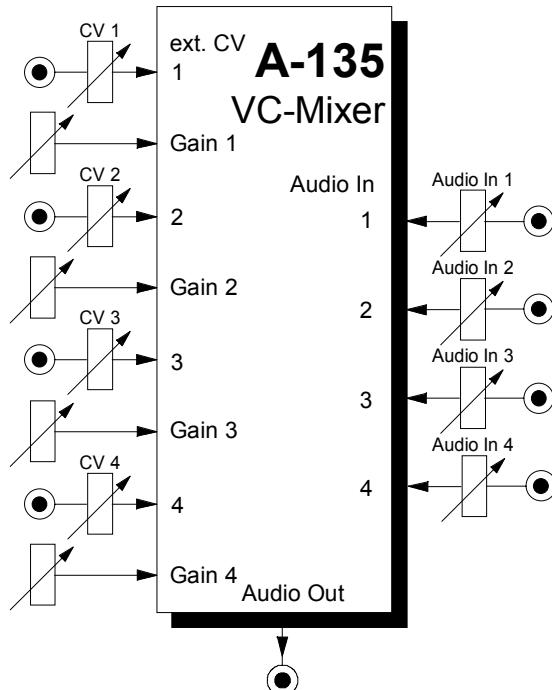
1. Introduction

Module **A-135 (VC-Mixer)** is a **four-channel voltage controlled mixer**, which is used to mix audio signals with four independent voltage controlled levels.

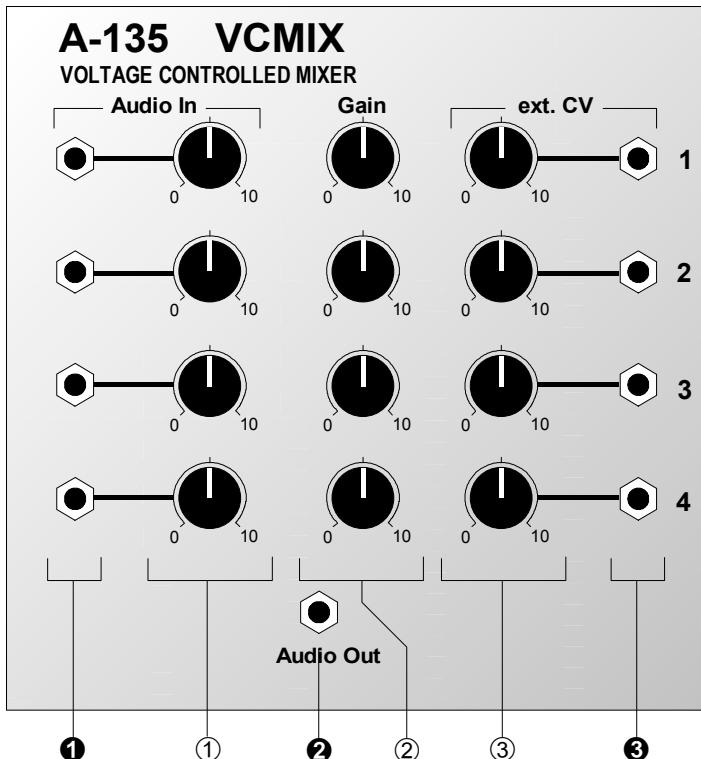
The module consists of 4 linear voltage controlled amplifiers (VCAs) mixed to one common output. High quality integrated VCAs (CEM3381) are used in the circuit.

Each VCA has the following:

- **Audio input with attenuator**
- **Control voltage input with attenuator**
- **Gain control (amplification offset).**



2. VC-Mix - Overview



Controls:

- ① **Audio In :** Attenuator for audio signal at input ①
- ② **Gain :** Control for amplification offset
- ③ **ext. CV :** Attenuator for control voltage at input ③

In / Outputs:

- ① **Audio In :** Audio input
- ② **Audio Out :** Audio output (mixed output of the four VCAs)
- ③ **CV 2 :** Control voltage input

3. Controls

① Audio In

The four attenuators ① control the levels of the audio inputs. Adjust these controls to the desired **input levels of the audio signals** at the inputs ①. Basically these controls serve to compensate for different audio levels in the original signals so that the same control voltage results in approximately the same audio level at the output.

② Gain

The gain control adjusts the **amplification offset** (overall gain) for the VCA in question.

Position "0" corresponds to no amplification offset. This means that the channel in question contributes no signal to the output - provided that no positive control voltage is applied to the external control voltage input.

Turning up the gain control increases the amplification proportional to the gain control setting - even if no voltage is applied to the external control voltage input.

With the gain control, amplification response is shifted up into the positive range (see Fig. 1).

The VCA's used in the **A-135** (CEM3381) have a **linear** control response. The amplification is in direct linear proportion to the control voltage input.

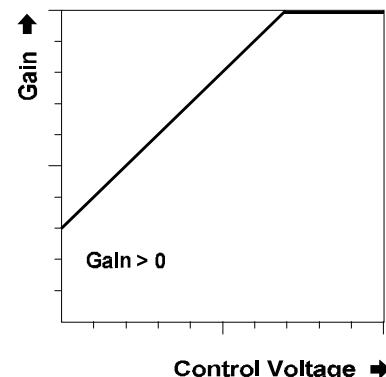


Fig. 1: Effect of gain control on VCA response



For pure **positive control voltages** (e.g. from an ADSR) the **gain control** is normally set to 0. For **bipolar control voltages** (i.e. positive and negative components, e.g. from LFO or random) the **gain control** is normally set to a value larger than 0 so that the negative part of the control signal is able to have an effect as well (see. Fig.2).

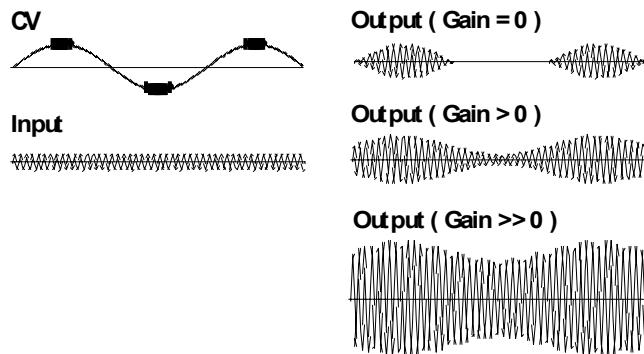


Fig. 2: Resulting amplification with bipolar control voltage (CV) and different gain settings

③ ext. CV

This **attenuator** affects the **level of voltage control** at socket ②. It controls the amount of effect the CV has on amplification.

4. In / Outputs

① Audio In

The signals you wish to amplify are input through the four audio inputs ①.

② Audio Out

The output signal ② is the sum of the four audio inputs amplified by the four VCAs.

③ ext. CV

Sockets ③ are the control voltage inputs.

The effective control voltage range of each VCA goes from 0 V (no amplification) to about +5 V (maximum amplification). The effective control voltage is the sum of the voltages coming from the gain control ② (about 0...+5V), and the external control voltage ③ that may be attenuated with control ④.

5. User examples

Module A-135 enables **voltage controlled mixing of up to 4 audio sources** with 4 different control voltages.

The control voltages can be generated by any voltage source or even by audio sources for special effects (similar to ring modulator or FM sound). Here are some examples of possible control voltage sources:

- LFOs (A-145, A-146, A-147)
- ADSRs (A-140, A-141, A-142, A-170)
- Random (A-118, A-148)
- Shepard-Generator (A-191)
- external audio signals in combination with an envelope follower (A-119)
- Analog sequencer (A-155, MAQ16/3)
- Theremins (A-178)
- Light controls (A-179)
- Foot controls (A-177)

It is also possible to use MIDI-controlled voltages in combination with a MIDI-CV-Interface (A-190, A-191, MCV4, MCV24):

- Pitch CV
- After touch
- Pitch bend
- Modulation
- Volume
- any MIDI Controller

For example, the combination of A-135 and A-191 can create a simple MIDI-controlled mixer.

One special application is using the **Morphing Controller A-144** to generate the control voltages for the A-135. This enables cross-fading (morphing) of 4 audio sources with only one controlling voltage. This single controlling voltage defines the fading or morphing position. For details refer to the A-144 user's guide.

6. 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.

