

1. Introduction

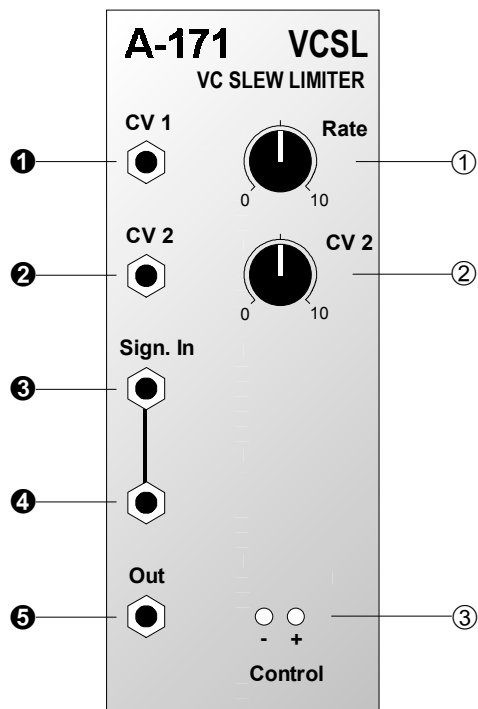
Module **A-171** is a **voltage controlled slew limiter**, otherwise known as a **portamento controller** or **integrator**.

Whenever there is an abrupt transition in the voltage present at the input, the Slew Limiter **works as an integrator**, slowing down the transitions in the output signal - so that abrupt transitions are **sloped**. The speed of the transition is governed by the rate control.

As well as manual setting of this slope, the A-171 also gives you the possibility of **voltage control of the slope's gradient** by patching in an appropriate voltage to two CV inputs, one of which has an attenuator for level adjustment.

Two LEDs serve as **status indicators** to show the relative amounts of positive and negative signals at the output.

2. VC Slew Limiter - Overview



Controls and indicators:

- ① **Rate** : control governing the transition speed of the modified signal
- ② **CV 2** : attenuator for control voltages at ②
- ③ **LEDs** : status indicators for voltages at output ⑤

In / Outputs:

- ① **CV 1** : input for voltages to control transition speed
- ② **CV 2** : ditto, but with level controlled by attenuator ②
- ③ **Sign. In** : signal input
- ④ **Sign. In** : ditto, interconnected with ③ (and so a "mini multiple")
- ⑤ **Out** : output

3. Controls and indicators

① Rate

With this control you adjust the transition speed of the slope created by the slew limiter (see Fig. 1). The speed can be adjusted to produce transitions from about 10 down to nearly 0 seconds.

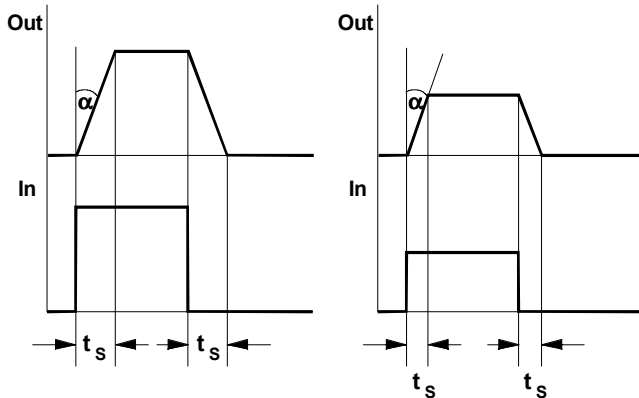


Fig. 1: How the A-171 transforms a signal.

When Rate = 10, the output signal is nearly identical to the input, i.e. the max. slew speed or min. slew time is selected. When Rate = 0 one obtains the minimum slew speed (= maximum slew time, i.e. ~ 10 seconds).

☞ Pay attention that the control behaviour of the A-171 is reverse that of the "normal" slew limiter A-170. The control of A-171 is controls the speed (rate), the controls of the A-170 control the time.

② CV 2

Use **Attenuator** ② to control the amount of CV input ② to affect the transient speed.

③ LEDs

The LEDs ③ are **status indicators** of the relative mix of positive ("+") and negative ("-") signals at the output. The brighter they are, the higher the voltage.

4. In / Outputs

① CV 1 • ② CV 2

The transition speed produced by the A-171 depends on a combination of the setting on the Rate control, and any voltages patched into the CV inputs ① and ②. The level of the voltage at CV input ② can be controlled by **attenuator** ②.

③ Sign. In • ④ Sign. In

These interconnected sockets are the signal **input** to the VC Slew Limiter. Whatever signal is patched in to these inputs will have any sudden voltage jumps smoothed into more gradual rises and falls, at a rate depending on the manual control and the CV inputs.

⑤ Out

The modified signal is available at **output** ⑤.

5. User examples

Voltage controlled slew limiting in a MIDI system

Unlike the A-170 Slew Limiter, the A-171 can have the rate of rise and fall voltage controlled.

In particular, there's the possibility of controlling the **Rate** parameter via a MIDI-CV interface (eg. A-190, A-191) as you **play in real time**. The next example makes use of this feature.

Adjustable portamento

The example in Fig. 2 uses the A-171 as a **portamento generator**. The portamento time is adjustable, and with this patch can be controlled from a MIDI keyboard. Simply set the A-191's CV2 output to your chosen MIDI controller (eg. Portamento Time). Pay attention that an increasing control voltage causes a shorter transition time. To obtain the opposite behaviour a voltage inverter A-175 can be used (A-191 CV output -> A-175 input, A-175 output -> A-171 control input).

Slew Limiter as VC AR generator

You can also use the A-171 as a simple **AR generator**, for instance with the percussive sound in the example in Fig. 3. The attack/release parameters can be controlled by MIDI, for instance by the voltage at the CV2 output on the A-190.

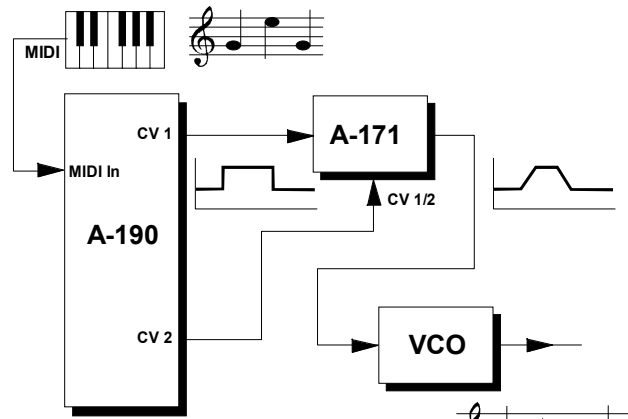


Fig. 2: A-171 as real-time controlled portamento generator.

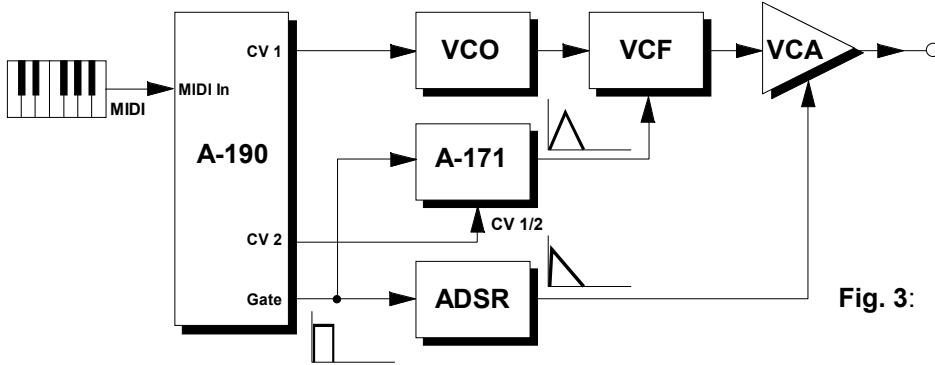


Fig. 3: A-171 as VC AR Generator.

Producing complex controllable modulations

With a combination of a Clock Divider / Sequencer (A-160 / A-161) and a series of A-171 VC Slew Limiters, complex modulation systems are possible (see Fig. 4).

The Clock Sequencer is patched into a series of Slew Limiters, each set to produce a different envelope. These envelopes are patched into an A-138 Mixer (the version with linear response).

The level of each of the envelopes is adjusted with the mixer.

With the help of an A-191 MIDI-CV converter and a suitable MIDI Controller, you can control the rise and fall rates of the envelopes in real time.

In the patch in Fig. 4, the clock sequencer is triggered by the internal MIDI-synced LFO in the A-191 converter. Alternatively, you can use a free-running LFO to trigger the sequencer.



Try expanding this patch by adding another control voltage ingredient into the inputs at the A-138 mixer, as well as the envelopes from the slew limiters - for instance:

- ADSR with a slowish envelope, triggered from the first of the A-161's outputs,
- the output from an LFO (with or without Reset),
- Random output from an A-118,
- Audio signals in connection with the A-119 Envelope Follower.

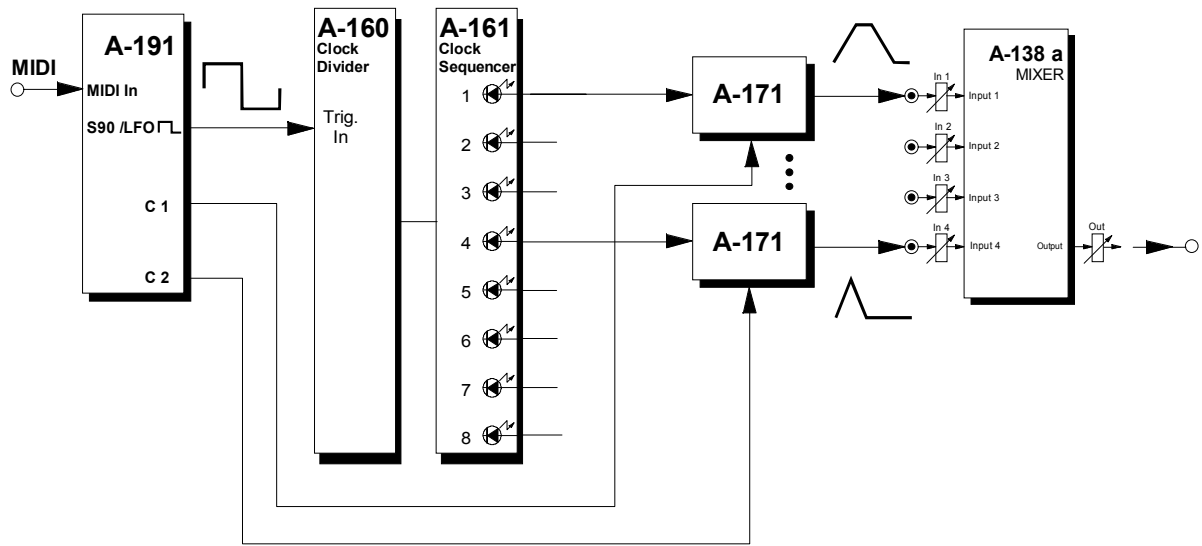


Fig. 5: Producing complex controllable modulations.

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.

