

1. Introduction

Module **A-119 (External Input / Envelope Follower)** is designed to allow external audio signals to be integrated into the System A-100. It comprises a **pre-amp**, **envelope follower**, and **comparator**.

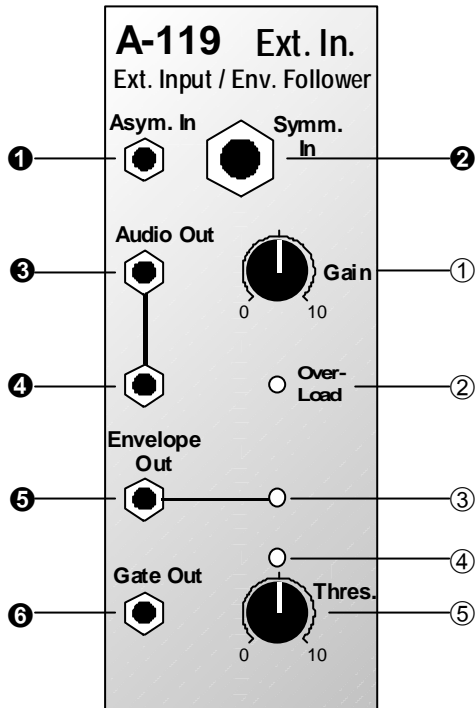
The pre-amp has two inputs: an **unbalanced input** for line level signals, with a gain factor of from 0 to 20, and a **balanced input** with a gain factor of from 0 to 500, for insertion of low level signals, for instance from a microphone or electric guitar.

The Envelope Follower reads the signal level of the input, and puts out a proportional voltage as an envelope at its own output (see chapter 3. How it works).

The comparator generates a gate signal whenever the input goes above an adjustable trigger threshold (see chapter 3. How it works).

Three LEDs help you keep track of overload, the envelope, and the gate signal.

2. A-119 - Overview



Controls and indicators:

- 1 **Gain** : Control for input signal level
- 2 **Over-Load** : LED overload warning
- 3 **LED** : Envelope level indicator at (output %)
- 4 **LED** : Gate indicator (output &)
- 5 **Thres.** : Trigger threshold control

In / Outputs:

- ! **Asym. In** : Unbalanced input for line-level audio
- " **Symm. In** : Balanced input for mic or instrument-level signals (6.3 mm jack socket)
- § **Audio Out** : Output for pre-amped audio signal
- \$ **Audio Out** : ditto, linked with output §
- % **Env. Out** : Envelope output
- & **Gate Out** : Gate output

3. The Envelope Follower: how it works

The external audio signal (see Fig. 1a) is patched into input ! or " , depending on its level. It is amplified by an amount set by the gain control 1, brought up to A-100 internal operating level, and can then be output from audio outs § and/or \$.

To produce envelope and gate signals, the amplified signal is put through a full-wave rectifier, so that the internal signal output has only positive voltages (see Fig. 1b).

Next, the rectified signal passes through a 50 Hz low pass filter, and is sent to envelope output %.

H With input frequencies of less than 50 Hz, patch the envelope output % into an A-170 slew limiter, set to a time constant of greater than 20 ms, to avoid remnants of the signal being audible in the envelope.

The signal at the envelope output is compared with the adjustable trigger threshold (T in Fig. 1c), to produce gate signals, available at output &.

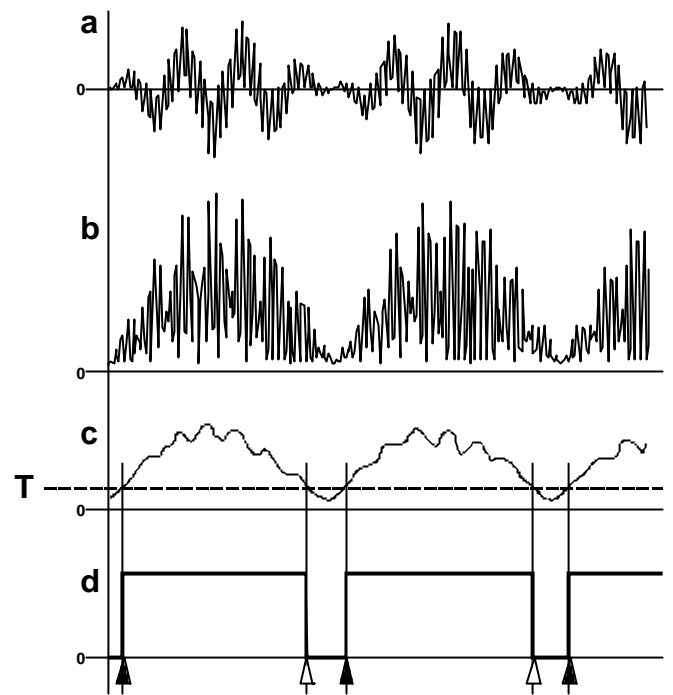


Fig. 1: The envelope follower: how it works

As soon as the envelope amplitude exceeds the trigger threshold T, the gate signal is output (see the black arrows in Fig. 1d on the previous page). When the signal drops below the threshold again, the gate signal stops (see the white arrows in Fig. 1d).

4. Controls and indicators

1 Gain

This knob controls the **amount of amplification** the external signal receives. This depends on the input chosen:

- unbalanced input ! : 0 ... 20
- balanced input " : 0 ... 500.

2 Overload

LED 2 lights when the circuit is overloaded - that is, when the amplified signal exceeds 10 V.

3 LED

The **voltage of the envelope** produced at output % can be monitored with LED 3.

4 LED

LED 4 monitors the **gate signal** at output &.

5 Threshold

Control 5 is used to set the **trigger threshold T**, above which a gate signal is generated (see Fig. 1c).

5. In / Outputs

! Asym. In

The 3.5 mm mono mini-jack socket ! is the A-119's **unbalanced input**, designed predominantly for line level external audio signals and/or audio generated within the A-100 system.

" Symm. In

The 6.3 mm stereo full-size jack socket " is the A-119's **balanced input**, for low level signals such as from a microphone, electric guitar, and so on.

H Because there's just one gain control for two inputs, only use one input at a time. If you use both at once, their signals will be mixed in a 1:25 ratio.

§ Audio Out • \$ Audio Out

The external audio signal, **amplified** by an amount set by the gain control, is available at audio output § and/or \$. These two sockets are simply linked as a "mini-multiple".

% Env. Out

The **envelope** generated by the A-119 is available at this output % (see Fig. 1c).

& Gate Out

The **gate signal** generated by the A-119 is available at this output (see Fig. 1d).

6. User examples

Manipulating external audio signals

The A-119 is what makes it possible for individual parts of the A-100 to manipulate external signals. In the patch in Fig. 2, an external audio signal is filtered by a VCF, whose cut-off frequency is controlled by an ADSR. In the patch in Fig. 2, an external audio signal is filtered by a VCF, whose cut-off frequency is controlled by an ADSR.

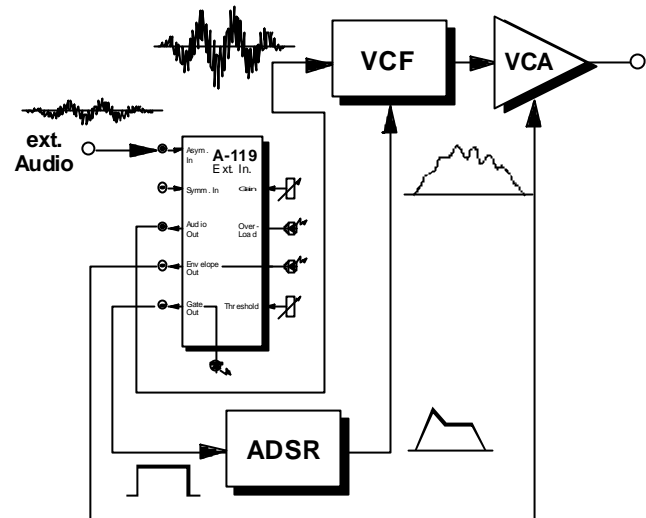


Fig. 2: Filtering an external audio signal

Ring modulator squelch patch

A ring modulator works particularly well with **external audio signals** such as voices, strings, or saxophone. In the patch in Fig. 3 a typical external audio signal is ring modulated with a sine wave.

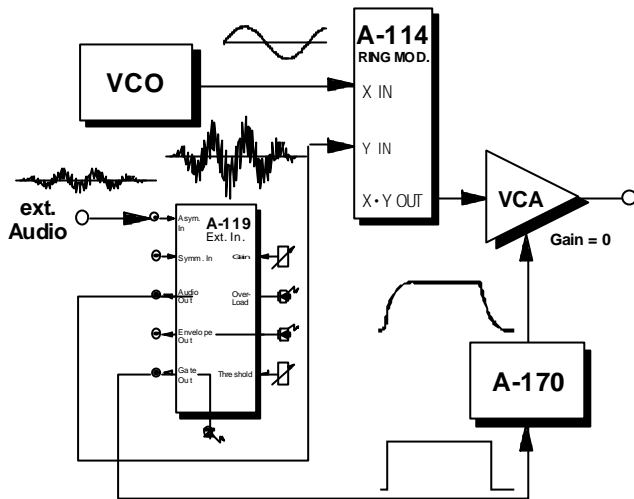


Fig. 3: Ring modulator squelch patch

In this patch, the A-119 has two functions. One is to bring the level of the signal output at $\text{\textcircled{S}}$ and/or $\text{\textcircled{S}}$ up to the operating level of the A-100 (c. 5 V). The other is to generate an envelope which can then control the ring modulator's output via a VCA.

This is necessary because the ring modulator doesn't shut down completely when there's a 0 V input. It goes to about -50 or -60 dB, and so traces of the VCO or external signal can still be heard.

The combination of the A-119 and VCA causes the ring modulator to shut down completely ('squelch') if there is no input present.

The A-170 slew limiter smooths out the gate signal generated by the A-119 a little, to avoid clicks in the VCA.

P Instead of gate signals, you can use the envelope generated by the A-119 to control the VCA, and thus maintain the loudness pattern of the original sound.

"Ducking", using an external signal

In the patch in Fig. 4 the amplitude of an external audio signal controls the loudness of an A-100 patch. Whenever an external audio signal is present, the internal A-100 sound is attenuated (set the gain of VCA 2 high).

Without the A-175 inverter, the opposite of this occurs (set the gain of VCA 2 to zero).

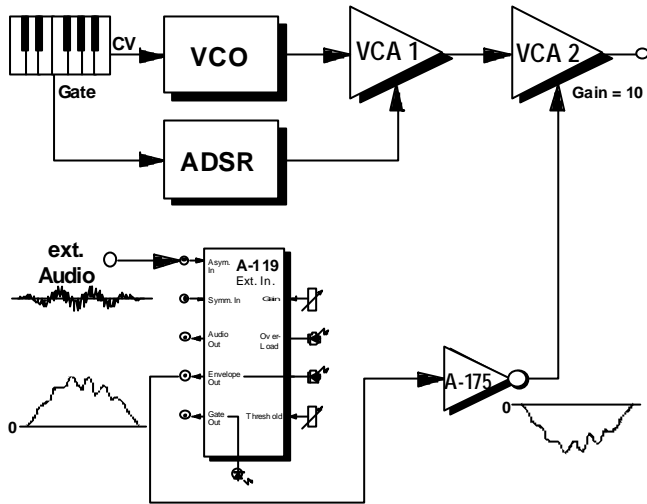


Fig. 4: "Ducking" by using an external signal

"Singing synth"

With the patch in Fig. 5, you can create a 'singing synth': when you sing into the microphone, out of the VCA comes a very interesting sound, distinctive but difficult to describe. Turn up the first and second sub-octaves on the A-115, and **turn the original sound right down**.

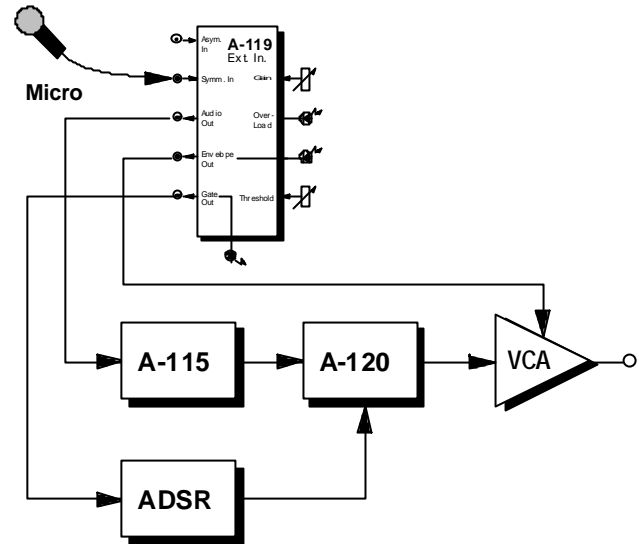


Fig. 5: "Singing synth"

7. 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.

- P
- Draw in patchleads with colored pens.
 - Draw or write control settings in the little white circles.

