VCS3

ENVELOPE SHAPER
NOISE GENERATOR

Users Guide

SOUNDFREAK LICENSED BY ELECTRONIC MUSIC STUDIOS (CORNWALL)

Important Notice

Turn your case's power off when installing or removing this module and when plugging or unplugging its connector.

The connector is keyed and must be used in the allowed direction only, otherwise, it may damage the module and the rest of the system.

Use the module only in a safe and controlled indoor environment, far from heat sources, liquids, moisture, and everything that can fall outside the definition of "common sense".

Specifications

All the inputs and outputs are buffered.

Voltage range I/O	0-10 V
Audio I/O	10 V_{pp} maximum, depending on the frequency.

I — Overview

This module merges two separate sections of the VCS3: the Envelope Shaper (upper part of the front panel) and the Noise Generator (lower part of the front panel).

The **Envelope Shaper** combines a VCA and a loopable envelope generator that can work as an LFO. The envelope both controls the VCA level and is available as control voltage.

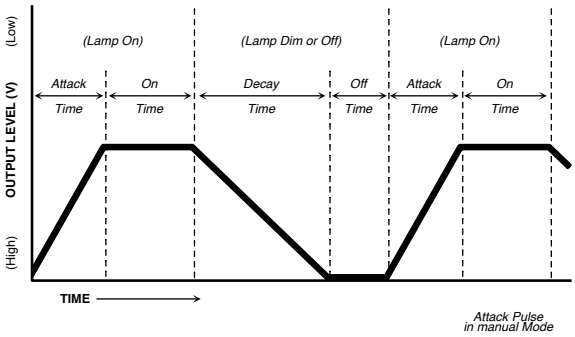
It can accept up to four distinct sounds thanks to four audio inputs.

The **Noise Generator** outputs a noise signal with controls over its amplitude and timbre.

ENVELOPE SHAPER

The envelope shaper has two purposes: it generates a control voltage, and it uses it to open and close an amplifier.

The control voltage it generates consists of four stages: **Attack** is a linear transition from 0 V to 10 V; **On** is a steady high voltage; **Decay** is a linear transition from 10 V back to 0 V; **Off** is a steady low voltage (0 V). It is possible to cycle through these four stages automatically (as a trapezoid LFO) or manually (as in an envelope that needs to be triggered). When operated manually, the first stage is the Attack.



Attack Pulse in manual Mode

In the VCS3, the unit had an input for the VCA and two outputs: one for the external sound routed through the internal amplifier, and one for the actual envelope's voltage. It was thus possible to use it as a modulation source to create control voltages, or as a treatment unit to modulate the amplitude of another audio signal.

We preserved this crucial feature by offering an audio signal path with Tini-Jax connectors for processing external sounds, and two CV outputs with banana connectors for outputting the envelope control signal.

Besides the expected Trapezoid signal with an attenuator, we chose to add a second CV output labelled Signal, which provides the exact CV used to control the internal VCA. Its magnitude is correlated to the external sounds' amplitude. This internal control signal also has a slightly smoother curve than the Trapezoid.

Whether you choose to use the Envelope Shaper as a VCA or as a control source, there are two main operating modes: envelope (where an external pulse trigs the Attack stage) or LFO (where the end of the Off stage retrigs the Attack stage and makes the whole trapezoid cycle).

It is possible to switch from one mode to another through the **Off** knob: every value between 0 and 5 implies an LFO, while every value from 5 onwards makes the Off time infinite and the trapezoid becomes an envelope.

It is possible to set the On and Off times to 0 and the Attack and Decay times to the same value to generate a triangle LFO.

As in the original VCS3 design, the Off time depends to some extent on the Decay setting: longer decay times require shorter Off times to keep cycling.

When the Attack time is longer than the On time, the Decay stage will start before the Attack has ended: as in the original EMS device, this will create a "gentle undulation of level".

NOISE GENERATOR

This section of the module generates an analogue noise signal with an adjustable timbre (or "colouration").

When the Colour knob is set to 5, the noise is pure white noise, with an equal distribution of energy per bandwidth. When the knob is set further left, the noise will become "darker", with progressively fewer high frequencies. When set to the right, on the other hand, it will become "brighter", with fewer low frequencies.

You may think of the knob as a low-pass filter from 0 to 5, and a high-pass filter from 5 to 10, with 5 being the harmonically richest available sound.

On the original VCS3, this parameter was not voltage controllable. While developing this unit, we chose to implement a Colour CV input to automatically change the noise colour

II — Inputs and Outputs

The inputs and outputs are described from left to right and from top to bottom.

ENVELOPE SHAPER I/O

Input (Tini-Jax) These are four semi-normalled audio inputs that allow you to patch up to four audio sources straight to its VCA.
The VCS3 used a matrix board to route the signal through its various sections: it was thus possible to feed any treatment unit with as many sound sources as needed. When translating the Envelope Shaper to the 4U format, we wanted to preserve this feature to a certain degree.

Attack (banana) A pulse input that trigs the envelope.

Decay (banana) This input allows an external voltage to control the decay.

Signal (Tini-Jax) This is the VCA output, which outputs the amplitude-modulated sum of the sounds patched to the input section.

Trapezoid (banana) This output provides the four-stage control voltage generated by the envelope shaper's circuit.

Signal (banana) This output is similar to the Trapezoid output but offers a copy of the actual signal that controls the external audio processing.

NOISE GENERATOR I/O

Colour input (banana) Accepts a CV to control the noise colour.

Output (Tini-Jax) It's the noise output.

III — Controls

ENVELOPE SHAPER CONTROLS

Attack Sets the time it takes for the Envelope Shaper to move from 0 to 10 V.

On Sets the duration of the "High" stage (10 V).

Decay Sets the duration of the transition from the "High" to the "Low" voltage (10 to 0 V).

Off Sets the duration of the "Low" voltage. When the knob is close to the Manual label, the Off time is infinite.

Trapezoid Level Sets the level of the control voltage outputted by the Trapezoid outputs.

Signal Level Sets the level of the audio signal outputted by the Signal outputs. Please note that it sets the maximum VCA level, but it does not regulate the signal gain at the input stage.

NOISE GENERATOR CONTROLS

Colour Changes the noise timbre.

Level defines the amplitude of the noise signal.