

ZVORK

VOLTSH-1



User Manual

version 1.0.0

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Introduction

The Volt SH-1 is a control voltage (CV) sampling and filtering unit. With it you can sample a signal at any rate, any resolution, hold the value for any duration, and even sample the signal asynchronously with a gate trigger input. The signal can also be low pass, high pass and band pass filtered before or after sampling.

Front Panel

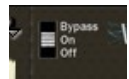


The functionalities of the front panel will be described here from left to right and top to bottom.

Bypass

The bypass switch behaves as normal. Here are the three states of the switch :

- On : The default position. The input signal is transformed and filtered and sent to the output.
- Off : No signal is sent to the output which is set to value 0.
- Bypass : The input signal is sent directly to the output without any processing.



Sample & Hold

This unit enables you to sample the input signal at a user defined rate, holding the CV value for a specified duration. The unit can be turned on / off by pressing the button at the left of the « Sample & Hold » label. When it is on, the button is lit.



Metering

The display meter lets you visualize the signal as it is output from the Sample & Hold stage : -1 is at the left and +1 at the right of the display.

Sync

When enabled, the rate (see below) can be specified in note durations, synced to the tempo and transport position. The phase (see below) is also quantized to 1/16th of the rate.

Rate

This is the sampling rate or period, adjustable in seconds or note durations when synced.

Phase

This offsets the sample instant for a percentage of the sample period. This is most notable when Sync is enabled. In this case, setting the phase to 0% or 100% puts the sample time precisely on a note. Setting it at 50% puts the sample time halfway between two notes.

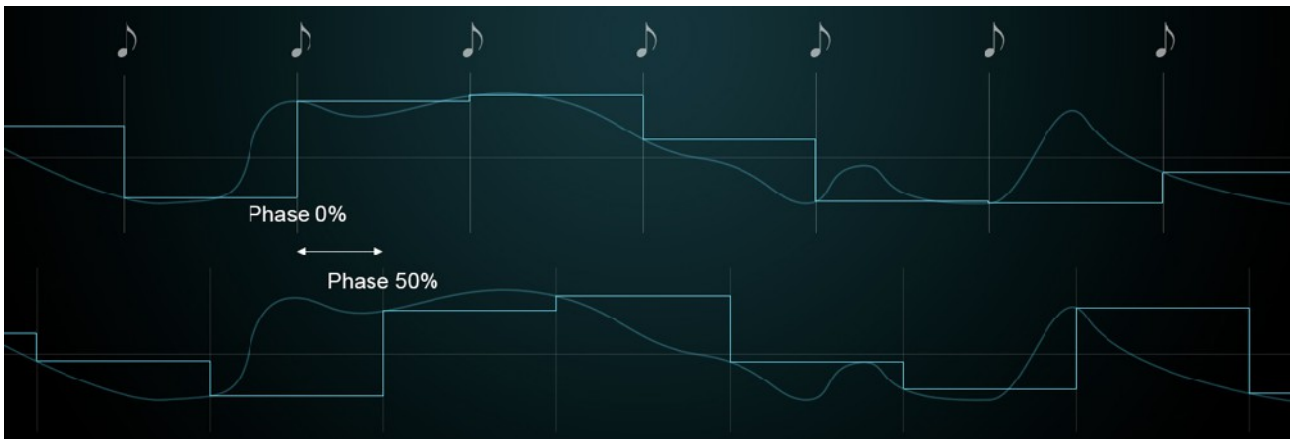


Illustration 1: Effect of setting the phase to 50% of the sampling period.

Duration

This sets the hold duration of the sample value as a percentage of the sample period. When the time exceeds the duration, the CV value is 0.

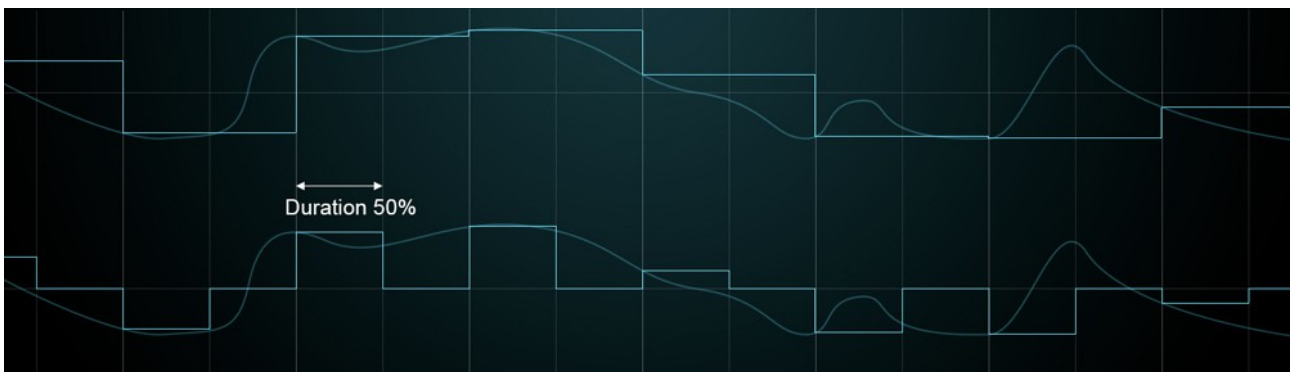


Illustration 2: Effect of setting the duration to 50% of the sampling period.

Resolution

You can specify the value resolution (or precision) at which the CV signal is sampled. When off, this is ignored. When set differently, this indicates the number of possible value steps between 0 and 1, excluding 0 which will always be output as 0. For instance, when set to 5, there will be five possible values for the sample value if it is between zero and one : 0.2, 0.4, 0.6, 0.8 and 1 ($1/5^{\text{th}}$, $2/5^{\text{th}}$, $3/5^{\text{th}}$, $4/5^{\text{th}}$ and 1). In the range -1 and +1, this gives 11 possible values (5 between -1 and 0, 0 and 5 others between 0 and +1). When set to 127, this gives you the equivalent of an 8 bit resolution.



Illustration 3: Effect of setting the resolution to 3.

Sample time lamp

This little lamp is lit when the SH-1 is sampling the input signal. This lets you visualize the sample times more clearly, especially in respect to the phase.

Processing order

By pressing one these two exclusive buttons, you determine the order in which the two Sample & Hold and Filter units are applied to the input signal. The arrow on the buttons indicate the signal flow. By default the Sample & Hold is applied first and the filter second.

Filter

This unit lets you filter the CV signal. It has the classic low pass, high pass and band pass filter types. Less classic is the possibility of having different filter settings between signal rises and signal falls. The « rise » filter settings are at the left of the lock button and the « fall » filter settings at the right. The unit can be turned on / off by pressing the button at the left of the «Filter» label. When it is on, the button is lit. The three parameters - Type, Frequency and Resonance - are duplicated for both « rise » and « fall » filters.



Metering

The display meter lets you visualize the signal as it is output from the Filter stage : -1 is at the left and +1 at the right of the display.

Type

There are three possible filter types :

- Low pass : filter out high frequencies above the cutoff frequency,
- High pass : filter out low frequencies under the cutoff frequency,
- Band pass : filter out high and low frequencies around a central frequency.

Frequency

This is the cutoff frequency of each filters, with values in the sub-audible range.

Resonance

The resonance of the filter. High values can give you interesting « bouncing » and « wobbling » effects on your CV's.

Lock

When enabled (which is the default), the filter settings are the same for both rise and fall of the input signal. If not, you can configure the filtering differently. You can, for instance, keep sharp rises by setting the « rise » filter cutoff to the maximum value, but create slow releases of the signal by setting the « fall » filter cutoff to low values.

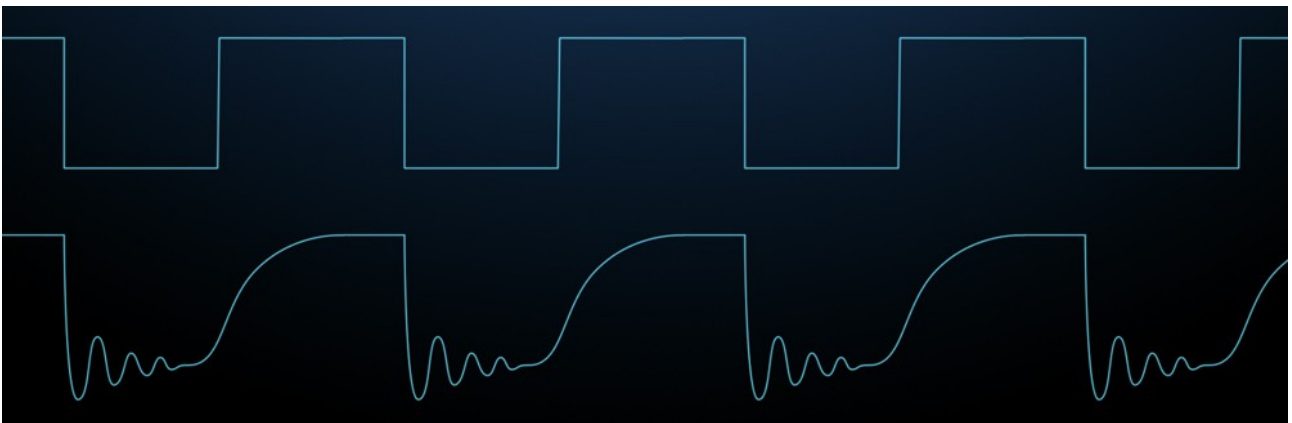


Illustration 4: A square signal processed by a low cutoff low pass for the rise and a mid cutoff high pass for the fall, with a slight resonance.

Back Panel



The back panel exposes the input and final output CV slots but also a number of CV sockets to modulate all the front panel knob-driven parameters.

Sample Trigger

When a CV cable is plugged in the «Gate» CV input, the sample time can be controlled externally. The sampling is triggered each time a gate signal is received. This overrides the internal sampling clock, controlled by the «Rate» and «Phase» knobs but the «Rate» setting will still be used to determine the duration of the hold.



Modulation CV inputs

All the front knobs can also have their values modulated by control voltage signals coming from other devices. Trim knobs let you control the amplitude of the modulation. These modulation signal can be seen as actually driving the knobs : a zero value indicates the knob is fully turned to the left while a one value indicates it is fully to the right.

Filter modulation

The modulation on the filter parameters will always be applied separately to the «rise» and «fall» states, even when the filter is locked. If it is locked, you can add a separate cutoff frequency modulation only to the «rise» state by plugging a CV signal to the rise cutoff frequency CV input. So if you want the filter to be modulated the same on the rise and fall, you must duplicate your CV signal, with a CV spider for instance, and plug it in both CV inputs.

MIDI Implementation Chart

MIDI Controller #	Parameter
12	Sample & Hold sync
13	Sample & Hold rate
14	Sample & Hold synced rate
15	Sample & Hold phase
16	Sample & Hold synced phase
17	Sample & Hold duration
18	Sample & Hold resolution
19	Filter lock
20	Filter locked type
21	Filter locked cutoff frequency
22	Filter locked resonance
23	Filter « rise » type
24	Filter «fall» type
25	Filter « rise » cutoff frequency
26	Filter « fall » cutoff frequency
27	Filter « rise » resonance
28	Filter « fall » resonance
29	Sample & Hold on / off
30	Filter on / off
31	Bypass
33	Sample & Hold / Filter order

More information at <http://www.zvork.fr/audio>

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