# 1.0.1 User Manual

Overview

Movement is an eight-stage arbitrary waveform generator that can act as an envelope, LFO, or high-frequency oscillator depending on how it is configured. The interactive graphical display lets you quickly adjust the waveform to your desired shape. Knobs for each parameter are available as well. Movement comes with patches that show how to create basic envelopes and LFOs. Many complex waveforms can easily be created once you have learned the basics of how to use Movement.

Patch Browser
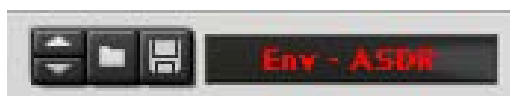
Use the patch browser to load factory patches or save or load your own custom patches.

Mode Switch

The mode switch sets the operating mode of the device and affects the meaning of all other knobs and buttons. LF (Low-Frequency), Sync, and Fit are all low-frequency modes while HF (High-Frequency) is for audio-rate operation.

Modes

- Low-Frequency - Timing is free running and adjusted in seconds.
- Sync – Timing is adjusted using beat divisions and synced to tempo.
- Fit - Timing is adjusted using seconds, but the waveform is fit to beat divisions and synced to tempo.
- High-Frequency - Timing is adjusted in seconds, but the waveform is fit to an audio-rate pitch.
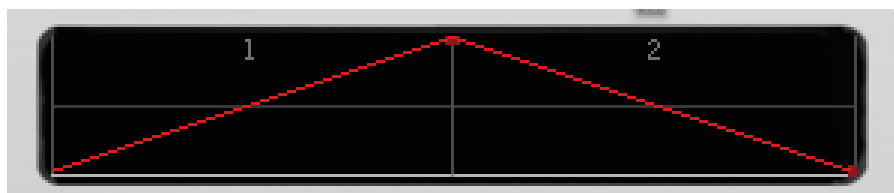
Examples

Envelope

In this example, three stages are used to create a classic ADSR envelope.


A   D   R
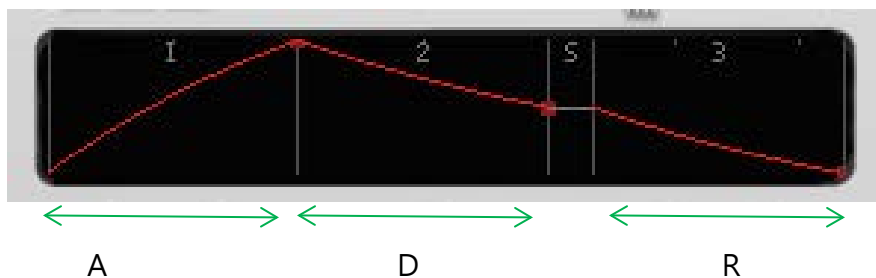
Periodic Waveforms

For periodic waveforms, the Trigger mode is set to Hold. Here two stages are used to create a triangle wave. This waveform can be used as an LFO or as an audio-rate oscillator. As an LFO, it can be free running or synced to tempo.

In this example, two stages are used to create a PWM. The pulse width can be adjusted by setting the length of stage 1 with respect to stage 3.
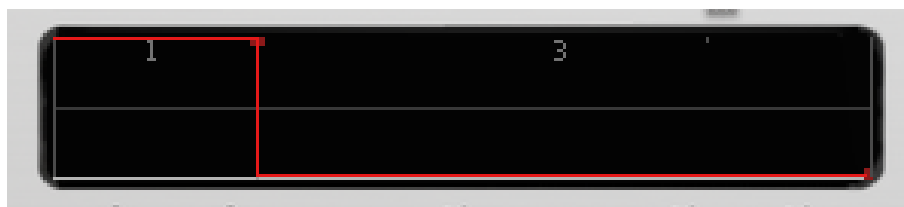
Display

The interactive display is the quickest way to get started using movement.

Click and drag a red node to adjust the time and end level of a stage.

Click and drag a gray divider to adjust the time of a stage.

Click and drag near the right edge of the display to adjust the time of that stage.

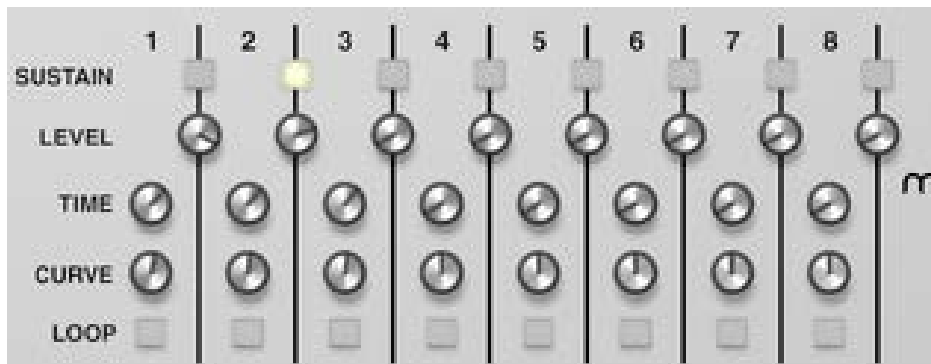Click and drag in the middle of a stage to adjust the curve of that stage.

Click and drag in the sustain area to adjust the sustain level.

Stages with zero time can often not be accessed from the display. In that case it is necessary to use the knobs.

Stage Controls

Sustain Buttons

The sustain buttons let you pick when the sustain portion of an envelope will take place. In the picture, the sustain phase takes place after stage 2.

Level Knobs

The level knobs allow you to control the end level of a stage in percent.

Time Knobs

The time knobs adjust the lengths of the stages. In Sync mode, the time is a beat division. In all other modes, it is a time in seconds. Note that in Fit and High-Frequency, the waveform time is adjusted to fit in one period of the beat division or audio pitch.

Curve Knobs

The curve knobs let you adjust the shape of an exponential curve.

Loop Buttons

These buttons select which stages of the waveform will loop. When there is a sustain phase, stages before and after the sustain phase will be grouped into two separate loops.

Modifiers

Coarse Knob

- Low-Frequency and Sync Modes – The time of the waveform is multiplied by the knob value to increase or decrease the total time by a large amount.
- Fit Mode – The waveform is fit to the specified beat division.
- High-Frequency Mode – The pitch is transposed in semitones.

Fine Knob

- Low-Frequency, Sync, and Fit Modes – The time of the waveform is multiplied by the knob value to increase or decrease the total time by a small amount.
- High-Frequency Mode – The pitch is transposed by a fraction of a semitone.

Trigger Switch

- Legato – If no keys are being held down, the waveform starts at stage 1 when a new key is pressed.
- Retrigger – The waveform starts at stage 1 whenever a new key is pressed.
- Hold – Looped stages are continuously looped.

Note Amount

This knob adjusts how the timing of the waveform is affected by the note input. When this is turned up, higher notes result in a shorter waveform time, while lower notes result in a longer waveform time.

Attack Switch

- Adaptive – This setting allows an envelope to act like an analog envelope. The start of the envelope will be the release tail of any previous envelope. In Trigger Hold mode, stage 1 will start at the last stage end level.
- Reset – With this setting, stage 1 will always start at zero.

In both modes, the release will start from any level in the beginning stages if the sustain phase has not been reached.

Smooth Knob

This knob smooths the waveform so it no longer has sharp corners. Note that the waveform will not exactly go through the level settings. It may take longer to reach the sustain phase or for the release to die out.

Velocity Amount Knob

This knob adjusts how the levels of the waveform are affected by the gate input. When this is turned up, higher velocities result in larger magnitude waveforms, and lower velocities result in smaller magnitude waveforms.

Amplitude Knob

This knob adjusts the amplitude level of the output in percent.

Inputs

Gate and Note

Gate and Note can be either PolyCV or monophonic CV. When the inputs are monophonic, the Mono output jacks have the output signal.

- Gate – When Movement is an envelope, gate triggers the beginning and release of the envelope. Gate also contains the velocity, which can be enabled by the Velocity Amount knob. When Movement is a high-frequency oscillator, gate can be used to save CPU by connecting the Gate out from the Amp envelope device.
- Note – Note is needed if the Note Amount knob is turned up. See the description of Note Amount.

Bend

The bend input is for the pitch wheel. Typically, it would be connected to Distributor's Pitch output.

FM

The FM input provides frequency modulation of the oscillator in High-Frequency mode.

Coarse and Fine

- Coarse – Coarse is used to control the timing of Movement in the same way as the Coarse knob. In high-frequency mode, Coarse is used as the pitch bend input.
- Fine – Fine controls the timing of Movement in the same way as the Fine knob. See the description of the Fine knob for details.

Amp

The Amp input controls the amplitude of the output signal. The input uses bipolar CV and is relative to the Amp knob position. To control the output with unipolar CV, turn the Amp knob all the way down.

High-Frequency Settings

Glide

Glide can be used to add portamento to the sound. This results in a slower transition between notes.

Drift

Drift adds a small amount of variation in the frequency of the oscillator, similar to an analog oscillator.

Outputs

Gate Thru and Note Thru

Gate Thru and Note Thru duplicate the gate and note inputs so you can chain another device.

Gate Out

Gate Out is velocity 127 when the envelope is running, and 0 when it is finished. This output can be used to save CPU when it is connected to the Gate input of an oscillator.

CV Out

The nine CV outs provide the envelope or LFO output from Movement. Each of the numbered outputs is for an individual voice, controlled by PolyCV. The Mono output is controlled by monophonic gate and note inputs.

CV Polarity Switch

The CV switch controls the polarity of the CV outputs. It can be +/-, which ranges from -1 to 1, or +, which ranges from 0 to 1.

Audio Outputs

The audio outputs are used when Movement is in high-frequency mode. Each of the numbered outputs is for an individual voice, controlled by PolyCV. The Mono output is controlled by monophonic gate and note inputs.

High-Frequency Tuning

The high-frequency tuning knobs allow for tuning of each individual voice in high-frequency operation. These can be used to add some interesting character to a synth.

Credits

Thanks to eXode for creating the factory patches.