

ZEROGRAVITY FILTER



The ZEROGRAVITY FILTER is a stereo analogue filterbank with two 4-pole (24 dB/oct) multimode filters.

Features

- ▲ 2 matched channels for stereo processing
- ▲ 6 filter modes: 2-pole (12 dB/oct) low pass, band pass, high pass and 4-pole (24 dB/oct) low pass, band pass, high pass
- ▲ Fast analog envelope generator with internal or external signal input
- ▲ Envelope modulation on all main filter controls
- ▲ Versatile LFO with tap tempo and MIDI clock sync
- ▲ Wet/dry mixer to create blend between unprocessed input signal and filter output
- ▲ MIDI control of main filter controls and LFO parameters
- ▲ Straightforward and intuitive user interface

REFERENCE MANUAL

Inputs & Outputs



The ZEROGRAVITY FILTER has 2 audio inputs and outputs and accepts line level signals. Input 1 will be routed to both channels if input 2 is left open.

If the input level exceeds +4dBu (0VU), the saturation LED will turn red. At this point distortion will occur, even with the saturation control fully down.

The EXT source input is routed to the envelope generator.

The MIDI INPUT can be used to synchronise the LFO with MIDI clock, and to control the filter externally.

All MIDI in data is sent out on the MIDI THRU.

A 15V AC adapter (at least 0.5A) must be connected to the POWER input.

Main Controls



SATURATION

This sets the level of signal current going into the filter core. Turning this knob up will gently increase saturation to the point of distortion, provided the input level is not too low.

The LED will change from green (clean) to orange (distortion).

The corresponding ENV control uses the output of the envelope generator to modulate the amount of saturation.

When the knob is in the middle, no change will occur. When turned to the right, the envelope signal

will increase the amount of saturation. When turned to the left, the amount of saturation will decrease.

CUTOFF

This controls the filter cutoff frequency. According to the selected filter mode, the frequencies below and/or above this point are attenuated by either 12dB/oct or 24dB/oct.

The corresponding ENV control uses the output of the envelope generator to modulate the frequency cutoff point.

When the knob is in the middle, no change will occur. When turned to the right, the envelope signal will increase the cutoff point. When turned to the left, the cutoff point will decrease.

The LFO control uses the output of the LFO to modulate the frequency cutoff point.

RESONANCE

This sets the amount of boost at the frequency cutoff point. The level of the unfiltered frequencies remains the same (no attenuation of the overall sound level).

The corresponding ENV control uses the output of the envelope generator to modulate the amount of resonance.

When the knob is in the middle, no change will occur. When turned to the right, the envelope signal will increase the amount of resonance. When turned to the right, the amount of resonance will decrease.

MIX

This control sets the balance between dry (unprocessed sound) and wet (processed sound).

Filter Mode



The switches on the right set the configuration of the filters.

The blue 2P/4P switch selects 12dB/oct (2-pole) or 24dB/oct (4-pole) filtering.

The green switch selects 'no filtering'. The signal still goes through the filter core – control over saturation remains – but no filtering takes place.

The red switches select low pass, band pass or high pass.

Envelope Generator



The audio signal is converted into a control signal (envelope) which can be used to modulate saturation, cutoff and resonance.

EXT SOURCE selects main inputs (both channels summed) or external input as signal source for generating the envelope.

SENS selects NORMAL or HI sensitivity (gain). When normal is selected, the circuit will generate a maximum envelope with 0dBu signal input on both channels (or ext input). If high is selected, levels of -12dBu will generate a maximum envelope.

FILTER selects a low or hipass filter (or none) on the input signal of the envelope generator. In lowpass, frequencies above 150Hz are attenuated, so the envelope generator will only respond to bass frequencies. In hipass, frequencies below 300Hz are attenuated, so the envelope will not respond to bass frequencies.

ATTACK sets the envelope rise time when the audio level increases.

RELEASE sets the envelope fall time when the audio level decreases.

The FAST A/R switch at the saturation control selects an envelope signal with fixed (fast) attack-release setting to modulate the amount of saturation. The attack and release controls now only affect the envelope used for modulating cutoff and resonance.

LFO



The Low Frequency Oscillator (LFO) generates a signal which can be used to modulate the frequency cutoff point.

RATE sets the basic speed (tempo) of oscillation.

MULTIPLIER sets the multiplication of the basic tempo – e.g. If the x1 setting corresponds to quarter note tempo, then x0.5 creates half note tempo, x1.5 quarter triplets, x2 eighth notes, x3 eighth triplets and x4 sixteenth notes.

SHAPE selects the waveform – square wave, ramp down, triangle, ramp up or random levels.

The TAP switch can be used to rhythmically tap the tempo and to restart the LFO cycle. The time between two taps will set the basic speed of the oscillator (maximum 1.2 sec between taps – for very low speeds the rate control must be used). Tapping only once will reset the start of the LFO.

When the SYNC switch is pressed, the LFO will synchronise to incoming MIDI clock messages on the MIDI input. If no MIDI clock data is detected, the sync switch LED will flash. From the moment MIDI clock is received, the LFO will synchronize and the LED will stay on. Pressing the SYNC switch again will turn off MIDI sync. Receiving a 'start' MIDI message will reset the start of the LFO cycle.

Envelope-LFO Link Switches



The envelope signal can be used to modulate various parameters of the LFO.

When the ENV-LFO switch is set, the envelope controls the output level of the LFO.

The LFO knob still controls the overall level to modulate the frequency cutoff.

When the ENV-RATE switch is set, the envelope controls the basic speed of the LFO.

When the ENV-MULTI switch is set, the envelope controls the multiplier value of the LFO.

MIDI Control

Besides MIDI clock data to sync the LFO, the unit also responds to program change data (PC) to select the filter mode, and controller change data (CC) to control various filter parameters.

At power up, the default receiving channel is #1. See below to change the channel.

IMPORTANT:

To have full range MIDI control of saturation, cutoff, resonance and mix, these 4 controls have to be turned fully counter clockwise.

Program Change:

00	No filtering
01	Low Pass (2P)
02	Band Pass (2P)
03	Hi Pass (2P)
04	Low Pass (4P)
05	Band Pass (4P)
06	Hi Pass (4P)
07 .. 127	No Filtering

Controller:

01	Cutoff
03	Resonance
08	Mix
09	Saturation
12	LFO Rate
13	LFO Multiplier
14	LFO Waveform
15	LFO Level
64	TAP
65	Sync ON/OFF

RESET

When the switch corresponding to the current filter mode is pressed 2 times rapidly, the MIDI control values for saturation, cutoff, resonance and mix are reset.

This can be useful when for example the MIDI connection is terminated (or lost), and the last data sent to the filter was not zero. Or there was some erroneous CC data on the filter channel.

This would cause the filter to stay at these values indefinitely and limit the range of the analog controls.

MIDI CHANNEL

To change the receive channel, hold down the SYNC switch for a couple of seconds until it starts to flash rapidly.

The filter is now in 'listen mode' – any MIDI data received next (PC or CC) will dictate the new channel number. The sync switch will stop flashing.

To cancel listen mode, just press the sync switch again.

Tips 'n Tricks

- ⤴ For optimal sonic performance, make sure the input level is high enough. This also makes the envelope generated from the input signal more useful.
- ⤴ If the saturation LED starts blinking red all the time, turn the input level down a notch so the filter core is not overloaded with the saturation control turned down – that way there will be maximum control over distortion.
- ⤴ Tapping only once resets the start of the LFO. This way the tempo can also be set by using the rate control and retriggering from time to time with the tap. Beware that if the tap is pressed again within 1.2 seconds of the previous tap, the tempo will jump to a new value defined by the time between those two taps.
- ⤴ When the cutoff is controlled by the LFO, the filter can create phaser-like effects when setting the MIX control somewhere between wet and dry.
- ⤴ If the saturation is turned up, the corresponding ENV control can be turned left to counter the distortion. This will create the unique effect of having less distortion when the input signal level rises.
- ⤴ This in combination with selecting the FAST A/R envelope can make percussive peaks in the audio no more distorted than the overall level.
- ⤴ The high sensitivity setting on the envelope generator can be very useful on more quiet audio tracks with rhythmic or percussive elements. This way a full envelope gets triggered on each peak which can be shaped with the attack/release controls.
- ⤴ The EXTERNAL SOURCE input on the envelope generator is a great way to control the filtering of an audio track with a completely different audio signal. For example filtering a synth track rhythmically with a drum track (or vocal track...)
- ⤴ Setting one or more of the ENV-LFO link switches can create very dynamic filter wobbles, especially when the envelope filter switch is set to low- or hipass. Setting the sensitivity to high may prove more effective in this setup.
- ⤴ When controlling the filter externally with MIDI, don't forget to turn the main filter controls to the left. Because these are all analog controls, the MIDI CC data is added to their values.
- ⤴ The LFO level knob always controls the final depth of cutoff modulation. To control the LFO level with MIDI, this means the knob has to be turned to the right ('full' setting). To reset the MIDI value of the LFO level, toggle the Env-LFO link switch.

For further information, contact ZeroGravity Audio at www.zerogravity-audio.com.