Needle

Rack Extension User Manual

dustydevices

Introduction

Needle is a Rack Extension effect device by Dusty Devices. It recreates the sound of vinyl by physically simulating a needle tracking a record's groove.

Front Panel

Bypass/On/Off Standard Reason feature. Bypass lets the signal through without applying any processing, On is the normal processing mode, Off doesn't process the signal and silences the outputs.

Patches Standard Reason interface for loading and saving patches.

Level Meter Displays the signal peak level.

Monitor Switch Located to the right of the level meter, this button cycles the Level Meter display between the signal peak level after the Input stage, the signal peak level after the Output stage, or display off, in case you are easily distracted by pretty flashing lights.

Dry/Wet Mix Controls the balance between the dry input signal and the processed signal. Needle automatically compensates for any processing latency when both signals are mixed. The strength of the pitch wow effect (from Record Spindle Hole setting) is scaled according to the Mix setting, and is applied to both dry and wet signals.

Input

Gain — Gain of the incoming signal before processing.

Auto Standby — When switched on, if there is no incoming signal from either channel, Needle will automatically perform a fade into standby mode to save on CPU. If you want to output any of the internal hiss/hum, crackle or pop noises through the simulation without feeding an input signal to the device, Auto Standby should be off.

The length of the fade is adjustable via the Standby Fade control on the rear panel.

Skip — The skip effect simulates a scratch on a vinyl record. When switched on, the needle will ”jump” to the previous adjacent groove from its current position and keep looping that section of the record. When Skip is switched off, the needle will ”jump” back to the current input.

Each jump is accompanied by an appropriate popping sound. The intensity of the skip pop sound is adjustable via the Skip Pop Intensity control on the rear panel.

The length of the skipping period is dependent on the RPM speed setting:

33 1/3 RPM	1.8 seconds
45 RPM	1.333… seconds

Record

Spindle Hole — Controls the record’s spindle hole offset from the center. An off-center spindle hole causes the pitch to wow. The minimum setting (”Centered”) disables this feature altogether.

Speed — RPM selection for the record. Note this only affects the pitch wow modulation speed and the Skip period. The LEDs indicating the selection turn off when the device is inactive.

Hiss & Hum

Hiss Volume — Volume of surface noise picked up by the needle.

Hum Volume — Volume of low rumble on the record and cartridge/tonearm resonance noise picked up by the needle.

Crackle

Volume — Volume of fine dust noise picked up by the needle.

Density — Average density of fine dust on the record.

Pop

Volume — Volume of coarse dust noise picked up by the needle.

Density — Average density of coarse dust on the record.

Tonearm

Position — Controls the position of the tonearm in relation to the record, thus changing the linear velocity of the groove. This affects the clarity of the signal picked up by the needle, with the outermost grooves being crisp or clear, and the innermost grooves being soft or muddy.

Anti-Skating — Controls the tonearm anti-skating force, which counteracts the tonearm's tendency to move inward as the record spins. The knob is set up such that the force is balanced in the middle position. With weaker settings (approaching "Minimum") the tonearm pushes toward the center of the record, and with stronger settings (approaching "Maximum") the tonearm pushes toward the outer edge of the record. Unbalanced settings result in more distortion in the signal as well as a weaker stereo channel balance.

Needle

Tracking — Controls how accurately the needle is able to track the groove, not unlike setting the tracking weight on a record player. Poor settings let the needle bounce around more in the groove, effectively missing the finer details of the signal and causing more distortion.

Condition — Controls the condition of the needle. New needles in good condition have more accurate high end response, whereas old, badly worn needles have more distortion and poor high end response.

Output

Gain — Gain of the outgoing signal after processing and dry/wet mixing.

Soft Clip — Toggles the soft clip applied on the output after the Output Gain. The ceiling is set to -0.1 dB.

Rear Panel

Modulation Input

CV inputs for modulating the device parameters. To the left of the standard trim knob is a 12 dB/oct lowpass with a cutoff range from 0.1 Hz to 100 Hz. When the knob is set to its maximum position, the filter is disabled. This can be used to smoothen a sample & hold LFO or a Matrix curve pattern, for example.

Skip Toggle switches the Skip on with a positive CV value, and off with a negative CV value. When the CV value is 0, the Skip adheres to the front panel setting.

Record Speed Toggle sets the Speed to 33 1/3 RPM with a negative CV value, and 45 RPM with a positive CV value. When the CV value is 0, the Speed adheres to the front panel setting.

Gate Input

Pop

Gate trigger input for generating a coarse dust particle on the record. Can be used, for example, to generate periodic popping noises such as those caused by a scratch going across a record. Any positive CV value after a value of 0 triggers the ”Pop” and determines its volume. The internal randomly generated ”Pops” are independent of the ones triggered with a gate and may be used simultaneously.

HFP Limiter

High frequency peak limiter. Due to the nature of the simulation, loud high frequencies that have their energy concentrated in a very narrow band may cause some unwanted aliasing distortion, especially with poor Needle Tracking and Condition settings. HFP Limiter uses a fast Fourier transform to detect and lower the level of these rogue peaks while not affecting the surrounding frequencies. This generally reduces the aliasing distortion.

Standby Fade

Controls the length of the standby fade from 0 to 20 seconds.

Skip Pop Intensity

Controls the intensity of the skip pop sounds from -80 to +12 dB.

Audio

Stereo input, stereo output. If only the left input is connected, the mono signal will be copied to the right channel to create a stereo output once it has been processed by the effect.

Latency

The following table lists the processing latencies of Needle in samples for the different sample rates. The latency is also reported to Reason for automatic delay compensation.

	HFP Limiter Off	HFP Limiter On
44 100 Hz	2	258
48 000 Hz	2	258
88 200 Hz	3	515
96 000 Hz	3	515
192 000 Hz	5	1029

Note: The pitch wow caused by the Record Spindle Hole setting introduces a variable amount of additional latency. The above values are measured with the Spindle Hole knob set to the minimum setting, which effectively disables it.

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