Phaser - DDL

Rack Extension User Manual

dustydevices

Introduction

Phaser-DDL is a Rack Extension effect device for Reason. It is a cycle-accurate emulation of the Phaser-DDL algorithm from the parallel effects processor Ensoniq DP/4, created by Jon Dattorro, Bill Mauchly, Dave Andreas, John O. Senior, Tom Metcalf and Bill McCutcheon.

Phaser-DDL combines a stereo 12-pole phaser with a delay, which feeds back into the input of the phaser.

Front Panel

All parameters (except for the Input and Output Gain) use the same range and units from the Ensoniq DP/4. Parameter settings between two integer values are interpolated for more adjustment freedom.

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. The emulation isn't being run while in Bypass or Off mode. The LFO phase and the delay buffers are only updated while the device is set to On.

Patches Standard Reason interface for loading and saving patches.

Level Meter Displays the signal level.

Monitor Switch Located to the right of the level meter, this button toggles whether the Level Meter displays the signal level after the Input stage, after the Output stage, or nothing at all, in case you are easily distracted by pretty flashing lights.

Input

Gain Gain of the incoming signal before the processing.

Note: Default is set to -12 dB to allow more headroom in the processing. Ensoniq DP/4 (and thus Phaser-DDL) uses 24-bit fixed-point arithmetic, so any input signal that exceeds 0 dBFS will clip. Eventhough the input signal might not exceed 0 dBFS, the effect algorithm can still cause peaks in the processed signal that exceed 0 dBFS.

LFO

Phase — Toggles whether the phaser modulation is in or out of phase.

S & H — Sample and hold rate. Controls the rate at which the LFO modulation is stepped. Range Off (minimum knob position) and continuous 0.1-100.

The LFO sample and hold rate can be synced to tempo by enabling the sync toggle below the rate knob. To the left of the toggle is a phase offset adjustment, range 0-360 degrees.

Rate — Controls the rate of the phaser notch modulation. Range 0-99.

The LFO rate can be synced to tempo by enabling the sync toggle below the rate knob. To the right of the toggle is a phase offset adjustment, range 0-360 degrees.

Width — Controls the excursion amount of the notch modulation. Range 0-99.

Center — Controls the center frequency of the notches. Range +/- 99.

Note: Originally in Ensoniq DP/4 the polarity of this parameter is reversed, higher values resulting in lower center frequency.

Phaser

Feedback — Controls the amount of feedback. The sign of the value determines the polarity. Range +/- 99.

Notch Depth — Controls the depth of the notches. Range +/- 99.

Delay

Left Time — Delay length of the left channel. Range 0-1600 ms.

Right Time — Delay length of the right channel. Range 0-1600 ms.

Delay times can be synced to tempo by enabling the toggles below the knobs.

Feedback — Delay feedback amount. Negative amount reverses the signal polarity. A setting of 0 disables the delay. Range +/- 99.

Output

Mix — Controls the dry/wet signal mix. A setting of 0 is 100% dry, a setting of 99 is 100% wet. Range 0-99.

Gain — Gain of the outgoing signal after the algorithm. Range +/- 24 dB.

Note: Default is set to +12 dB to compensate for the added headroom in the Input Gain stage.

Soft Clip — Limits the output to -0.1 dB after applying the output gain using a soft clip algorithm.

Rear Panel

Sample Rate

Simulates the different sample rates at which the effect algorithm can be run. Resampling causes characteristic aliasing in the frequency spectrum found in the original Ensoniq hardware. Different sample rates also have an effect on the resulting frequency extremes of the phaser notches and peaks, and the rates of the LFO and the LFO Sample & Hold.

Host Resampling is not applied. The algorithm runs at the sample rate of the host software.

44.1 kHz Resamples to 44100 Hz, used in Ensoniq ASR-10.

35.7 kHz Resamples to 35720.9 Hz, used in Ensoniq DP/4.

29.7 kHz Resamples to 29761.9 Hz, used in Ensoniq ASR-10.

Note: Resampling causes 13 samples of latency on the output. Both dry and processed signals are resampled, so using the Mix control will always result in a correct in-phase signal mix. It's a good idea to keep this in mind, since the host might not always compensate for the latency automatically when Phaser-DDL is used as a send effect, for example. When Sample Rate is set to Host, the latency is 1 sample.

CV Inputs

Modulation inputs for the effect parameters. All modulation is limited to their corresponding knob extremes except for the Input and Output Gain, which can be modulated beyond their range.

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.

Thanks

Jon Dattorro, Bill Mauchly, Dave Andreas, John O. Senior, Tom Metcalf and Bill McCutcheon for creating the Ensoniq DP/4 and all of its effect algorithms.

Markus Pyykkö / electrontu.be for reverse engineering, and writing a custom ES5510 emulator.

Max Huttunen for porting to VST3/AU and his initiative.

Pekka Kokkonen for alpha testing and all the beta testers.

Laatikko for being my rubber duck during development.