DRADD

DRADD is an experimental time-based audio processor intended as a tool for adding ambiance and colour to your synth patches. The project started as an attempt at porting aspects of my FABRIKAT pedal (granular synthesizer/sample playback) into the eurorack format but has since expanded with the inclusion of the tapped delay line algorithm. What binds this trio of algorithms together is their unnatural time-based audio manipulation. Though their methods are quite different they can all be tuned such that they appear in their own ways to stretch, bend and invert time.

PARAMETERS:

CLK: Sets the DSP (digital signal processor) system clock frequency from 12kHz to 48kHz. This parameter slows down or speeds up the internal processing of the DSP. Meaning it sets the sample rate, delay memory size as well as the rate of various other parameters (see algorithm section). Additionally adjusting CLK will pitch shift the audio currently stored in the delay memory. The full range yields approximately 2 octaves of pitch shifting. Note that low CLK settings will decreased the signal-to-noise ratio.

MOD: Random system clock modulation depth. This produces a random vibrato effect. The effect is similar to the old (mono) DRADD but has more depth available. Note that CLK does not affect the speed of the MOD function.

LOOP: Decay/feedback parameter. Turning the knob cw (clockwise) from noon adds looping feedback. This type of decay function controls how long incoming audio will be processed by the selected algorithm. Turning the knob ccw (counterclockwise) adds positive feedback across sections of the selected algorithm. The results from positive feedback will depend on the algorithm used as well as the setting of P1 and P2. See the algorithm section further down for more details. Note that positive feedback can result in runaway oscillation. A good tip is to avoid the minimum LOOP setting on startup as you might be surprised by a burst of feedback. Be careful!

MIX: Dry/wet mixer. Clean audio at min. Completely processed audio at max. This parameter affects all three outputs (left, right and sum).

Audio In/Out: IN L/R are the audio inputs. The inputs are linked such that a mono signal source can be sent to both channels by connecting to just one of the inputs. OUT L/R are the main audio output. Additionally there is a SUM (L+R) output that combines the processing of the two channels.

P1 and P2: Algorithm dependent parameters. See the algorithm section further down.

CV control: The parameters CLK, MOD, P1, P2 and LOOP can be controlled through cv. When cv is applied the associated knobs act as parameter offsets. With a knob set to noon adding a ±5v CV signal will access the parameters full range. Note that the P1, P2 and LOOP inputs are lowpass filtered meaning they won’t respond to rapid LFOs or audio rate signals. The CLK and MOD inputs are less filtered thus they somewhat respond to LFOs and sub/bass audio. MIX can <u>not</u> be controlled with cv.

Toggle switch: Algorithm selector. Chose between GRAIN, TDL and TAPE. P1 and P2 will have corresponding parameter functions.

GRAIN algorithm:
Granular synthesizer similar to algorithms found in the FABRIKAT pedal. Allows you to stretch, shuffle and scrub incoming audio. Note that granular timestretch/scrubbing does *not* inherently cause pitch shifting (unlike tape manipulation).

With MODE set in the range ccw from noon the algorithm performs continuous timestretching. In this mode the MOVE knob sets the timestretch speed and direction. The range ccw from noon yields reverse playback from regular speed at min. to freeze at noon. Similarly the range cw from noon yields forward playback from regular speed at max to freeze at noon.

With MODE set in the range cw from noon the algorithm performs manual sample scrubbing. In this mode the MOVE knob lets you manually “read” through the delay memory.

As well as letting you select between these two main modes of operation the MODE knob will add increasing amounts of grain shuffling/randomization when adjusted towards noon from either direction. At noon the grain positions are completely randomized (making the position of the MOVE knob insignificant). Added with restraint shuffling gives the synthesis a more fluid character while excessive usage yields chaos.

Adding looping feedback increases how long incoming audio will be processed before decaying. Adding positive feedback yields artificial sounding decay flavors, more or less fluid/metallic in timbre depending on the parameter settings. The delay memory size range is approximately 2500ms to 600ms dependent on the CLK setting. Additionally CLK will affect the grain size and grain generation rate.

TDL algorithm:
Tapped delay line (TDL) effect. In essence this is a delay with a whole bunch of outputs that lets you produces various unnatural reverb/delay effects including gated and reversed reverbs.

The SHAPE knob blends between three different TDL shapes. Minimum produces a fade-out delay shape (decaying reverb), noon produces a flat delay shape (gate reverb) and maximum produces a fade-in delay shape (reverse reverb).

The VERB knob adjusts the composition and processing of the TDL outputs. Turning the parameter ccw from noon doubles the tap density for added thickness. Turning the parameter cw from noon adds a smearing pseudo-reverb effect by feeding the TDL outputs through a chain of all-pass filters.

Adding looping feedback increases how long incoming audio will be repeated through the TDL shape before decaying. Adding positive feedback yields results similar to a reverb/delay decay function applied post-TDL. The delay memory size range allocated to the TDL “shape” is approximately 2300ms to 550ms dependent on the CLK setting. Additionally CLK will affect the tap spacing for the TDL.

TAPE algorithm:
Variable sample playback similar to algorithms found in FABRIKAT. Note that changing the playback speed *will* pitch shift the audio (similar to tape manipulation).

Assuming that the RAND knob is set to noon the OCT knob sets the playback speed and direction of incoming audio. The OCT parameter is divided into quantized steps. Three for reversed and three for forward playback:

[rev. 2x speed] - [rev. regular] - [rev. 1/2 speed] - [forw. 1/2 speed] - [forw. regular] - [forw. 2x speed]
Changing the playback speed causes the audio to be pitch shifted. 2x speed playback yields +1 octave while 1/2 speed yields -1 octave. This is similar to adjusting the playback speed of a tape deck. Note that slowing down the playback speed will decrease the audio fidelity.

Turning the RAND knob ccw causes the playback to randomly skip between forward and reverse playback while retaining the speed set by OCT. Turning RAND cw causes the playback to randomly skip between different directions and speeds. The random skipping rate increases the further the RAND knob is moved away from noon (both cw and ccw).

Adding looping feedback increases how long incoming audio will be processed before decaying. Adding positive feedback can yields recursive octaving and other unpredictable results. The delay memory size range is approximately 2500ms to 600ms dependent on the CLK setting. Additionally CLK will affect the rate of the RAND function.

Stereo processing: The two DPS channels are tuned differently for stereo width. The GRAIN and TAPE algorithms have independent random generators, meaning the outcome of functions such as granular shuffling and tape speed/direction skipping produce different results for the two channels. The TDL algorithm has independently randomized (pre-generated) tap spacings for the two channels.

TECHNICAL SPECIFICATIONS

Input Impedance	100kΩ
Output Impedance	1kΩ
Power supply	Eurorack ±12V DC (5x2 pin type)
Current Draw	200mA (+12V), 40mA (-12V)
Width	60.5mm : 12HP
Height	128mm : 3U
Interior depth	28 mm
Exterior depth	23 mm
Weight	150 g