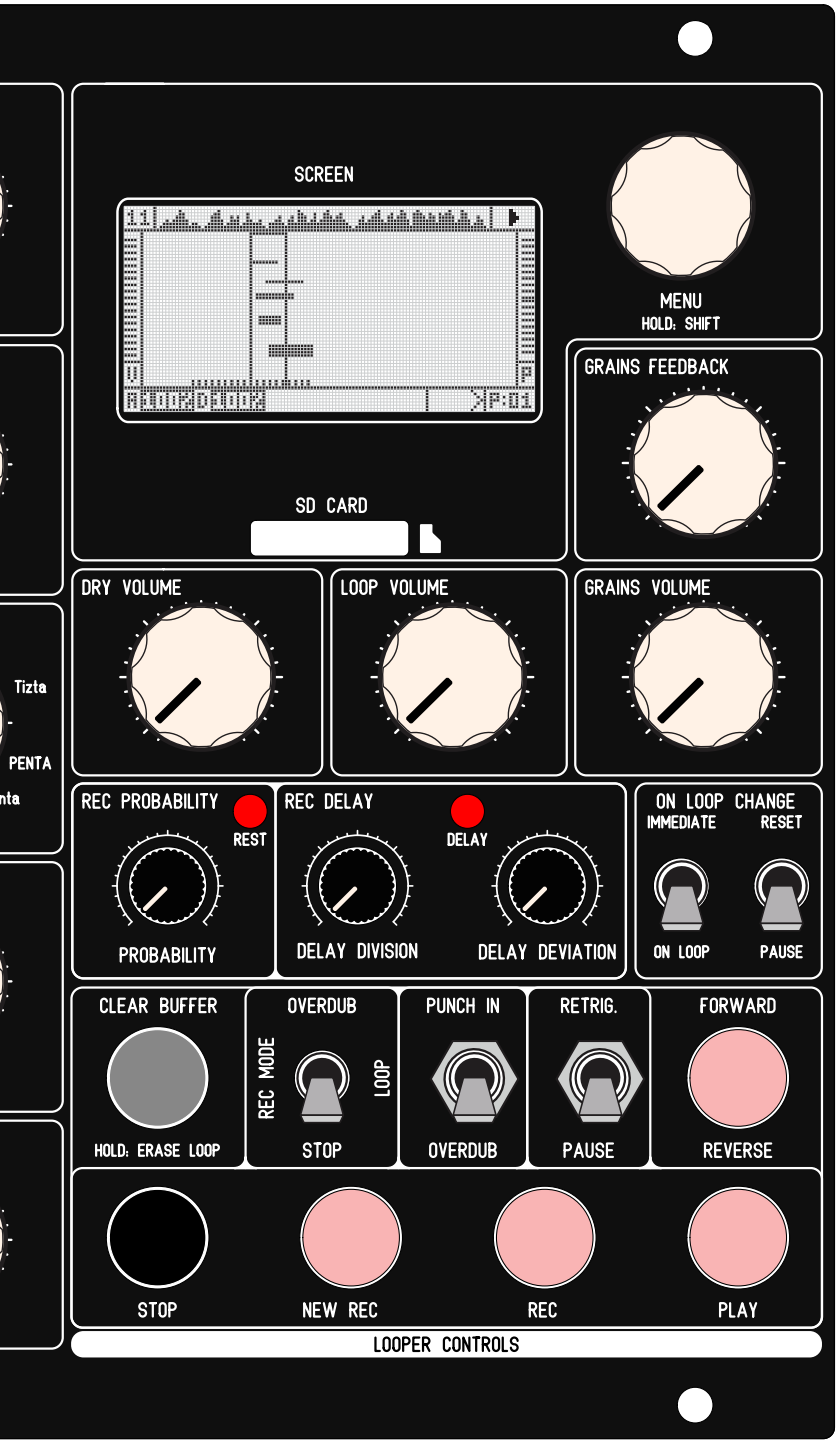
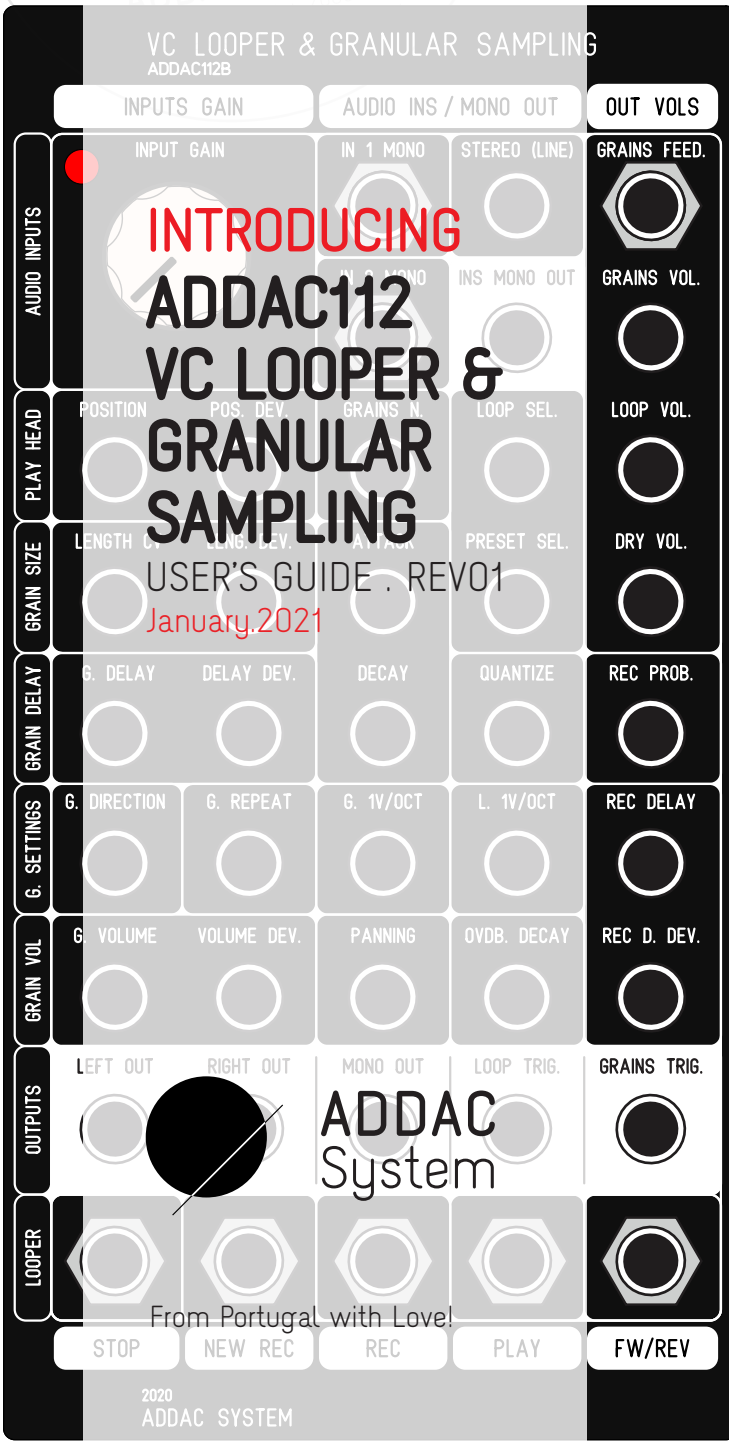
ADDAC System
Instruments for Sonic Expression
Est.2009





INTRODUCING ADDAC112 VC LOOPER & GRANULAR SAMPLING

USER'S GUIDE . REV01

January.2021

Welcome to:
ADDAC112 VC LOOPER & GRANULAR SAMPLING USER'S GUIDE

Revision.01 January.2021

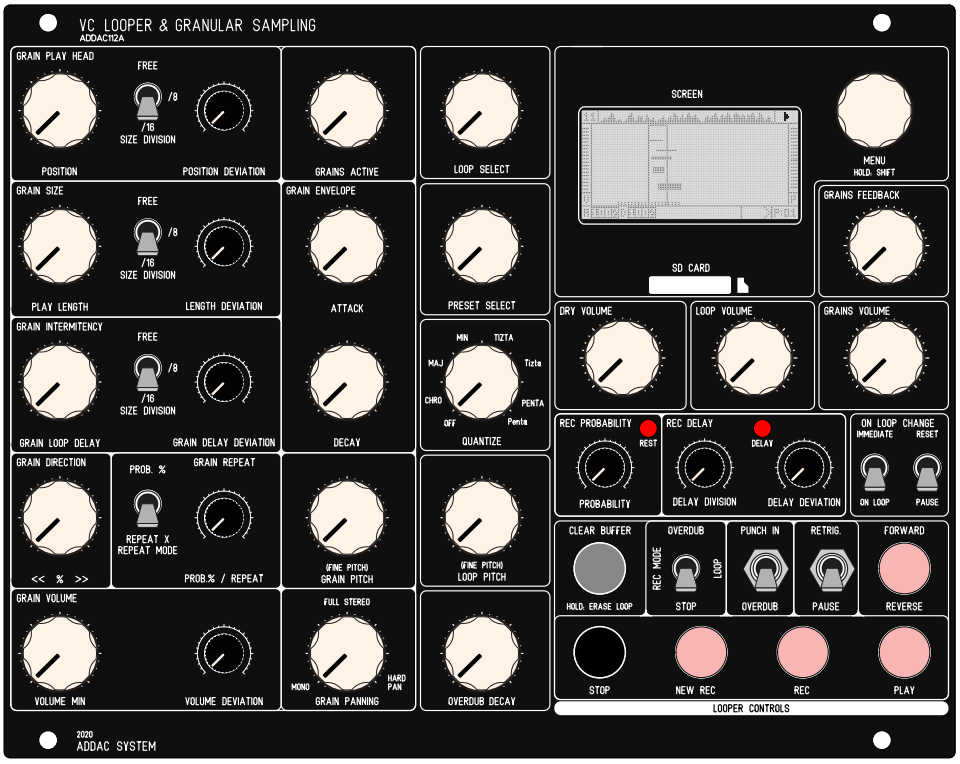
WELCOME

There's a long history behind the granular concept and many reinterpretations of it's core principles, this is our take on it.
In a loose description digital Granular refer to pieces of sound files being played at the same time with slight or completelly diferent parameters originating what is commonly refered to as granular clouds. Normally there's a buffer size from which the granular engine snips it's pieces from and plays them according to the parameters set. This buffer size is normally small in size where grains are so small that can reach the hearing spectrum and be heard as a sort of ever changing complex wavetable, this is the principle behind granular synthesis.
In our vision we added the possibility of long buffer sizes up to 5 minutes, allowing "softer" aproaches to the granular principle using it as an effect that can generate from "accidental" effects like slight "stutters" to extreme processing and transformation of any incoming audio signal.

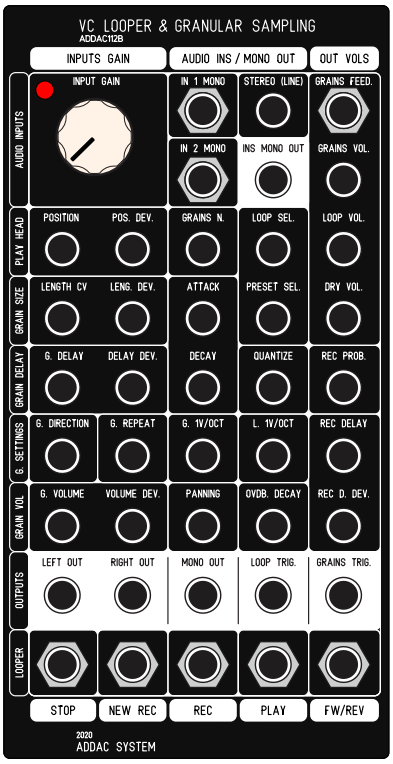
This module is conceptually deep but easy to grasp and operate as all controls are in it's dedicated panel, all jack inputs and outputs have it's own separate panel to allow no compromise when playing it's controls.

Some info stated in this document is still subject to change as last firmware is being developed.
More info will also be added in a future revision prior to shipping the modules.

32HP



13HP



For the first time we sacrificed the module width to leave more space between controls.

DESCRIPTION

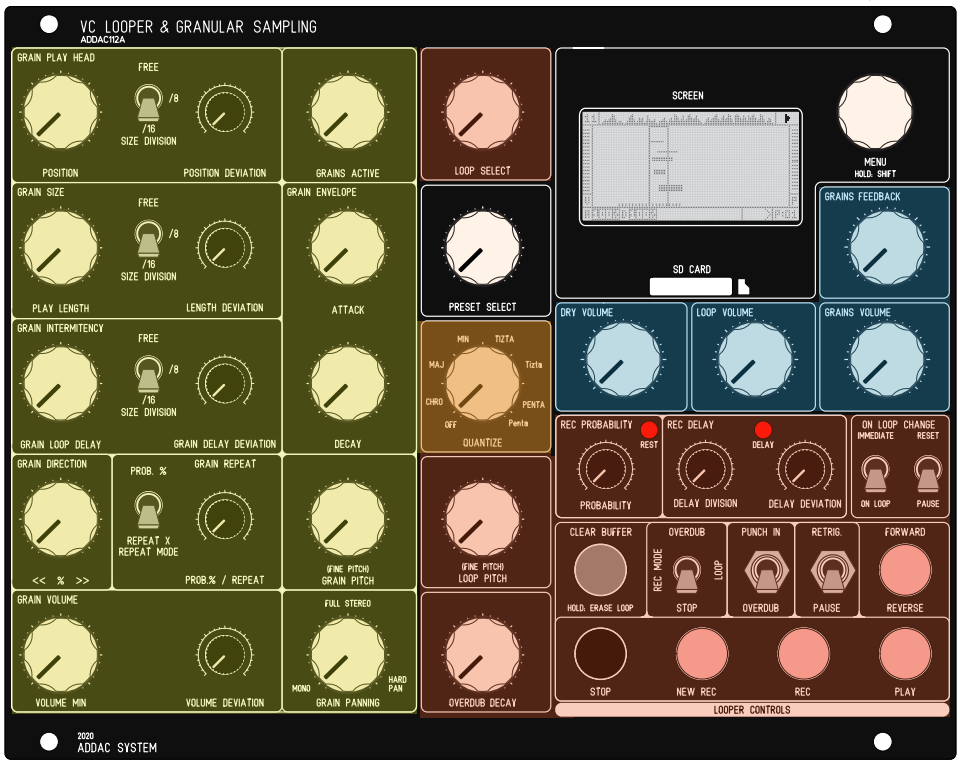
There are three main sections in this module:

Looper Engine:
The Looper is where all the Real-Time recording happens.
The audio input feeds the recording buffer, multiple controls allow to record and play loops into a list so that any sample in the list can be accessed at ay time
and more acting as a standard looper

Granular Engine:
The Granular acts upon the buffer of whatever LOOP is selected.

Output Mix
The output mix allow individual control for the Dry Input, Looper Volume and Grains Volume.

Besides these main sections there's also a simple strip down MENU mainly used to LOAD and SAVE Banks, no Menu diving guaranteed.



Audio Specs:
Audio input: Mono, 16bit 44.1Khz
Audio output: Stereo, 16bit 44.1Khz

Tech Specs:
32HP + 13HP
4.5cm deep
240mA +12V
70mA -12V

BANKS, PRESETS and LOOPS

BANKS:
In order to make the LOAD/SAVE process simple one can only LOAD BANKS from the SD Card.
BANKS contain a list of PRESETS
Each BANK is saved into a folder in the SD CARD, inside the folder, together with a document containing all presets configurations, the user will find a second folder with all LOOPS in separate Mono .WAV files, 16bit 44.1khz.
While Saving or Loading the audio processing will be suspended.
It takes about 1 second per 15Mb of Audio files saved/loaded.

A new BANK can be created at any time using the MENU: NEW BANK.
BANKS initialize with an empty list of PRESETS and LOOPS.
Each BANK stores a list of up to 99 PRESETS as well as all loops used by all these PRESETS.

PRESETS:
Each PRESET contains a list of LOOPS and all Granular Settings.
Each PRESET can have shared or unique samples.
PRESETS can be saved at any time using the MENU: SAVE PRESET
PRESETS can be added to the list using the MENU: NEW PRESET, this new PRESET will be created with the current Granular settings.

LOOPS:
A list of audio files up to 99 LOOPS per PRESET
5 minutes of maximum sampling time shared for all loops in a BANK
LOOPS can be added to a folder using a computer or recorded in real-time using the built-in LOOPER.
LOOPS can also be permanentelly deleted using the CLEAR button.

LOOPS & PRESETS Can be Accessed in real-time with the dedicated LOOP SELECT & PRESET SELECT knobs and CV inputs.

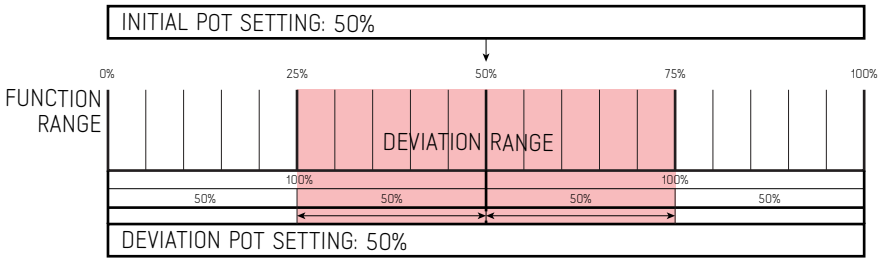
SD CARD STRUCTURE

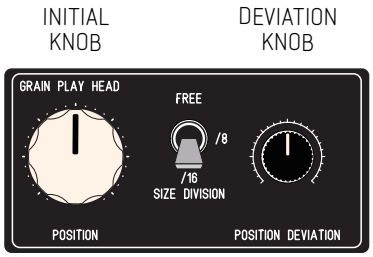
```
- BANK A
- BANK B
- BANK C
    - PRESET 1
    - PRESET 2
        - SETTINGS_FILE
        - LOOPS FOLDER
            - LOOP1.WAV
            - LOOP2.WAV
            - LOOP3.WAV
            - LOOP4.WAV
            - LOOP5.WAV
    - PRESET 3
    - PRESET 4
- BANK D
- ...
```

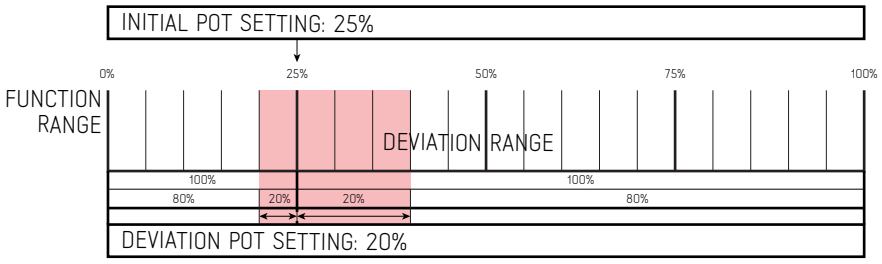
DEVIATION

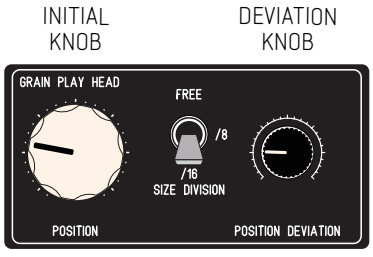
DEVIATION is used throughout this guide to refer to a deviation from the Initial knob. Deviation is a random function kept inside a range based on a percentage spread centered on the Initial knob setting. This keeps all random values inside the main range of the knob never going above or below the range limits eliminating "dead spots".

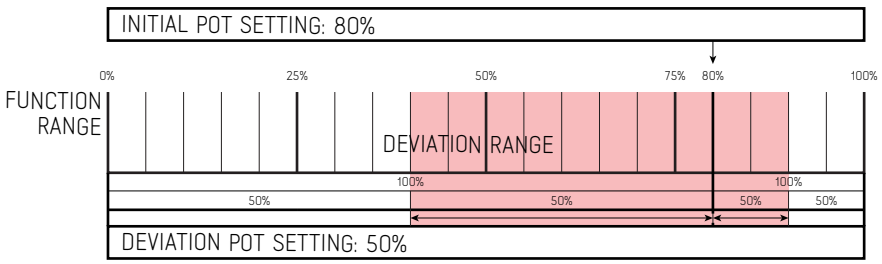
The examples below will graphically exemplify this concept:

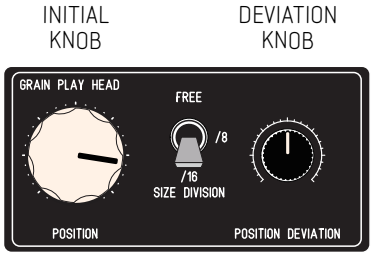




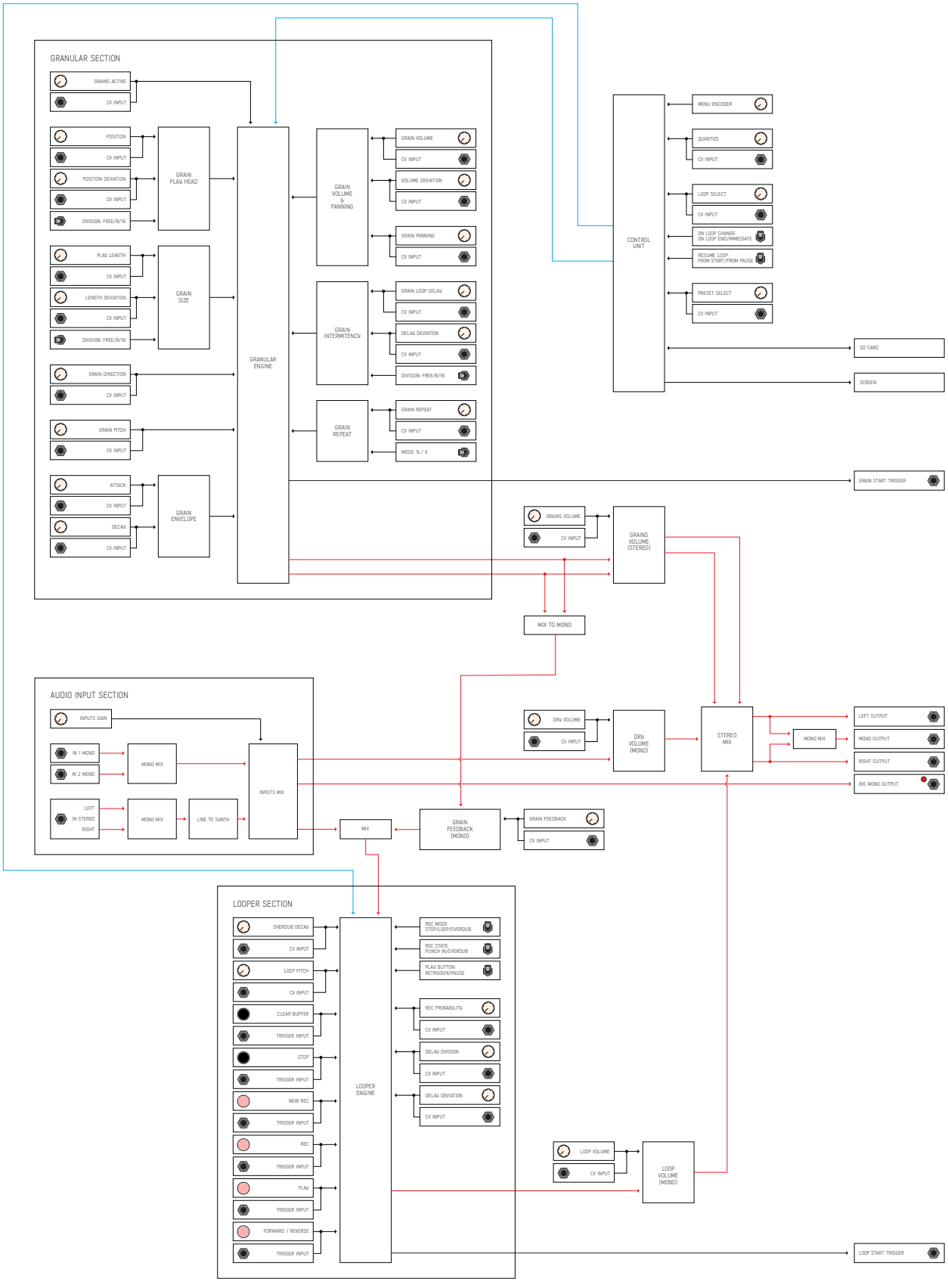








SIGNAL FLOW DIAGRAM



LOOPER ENGINE

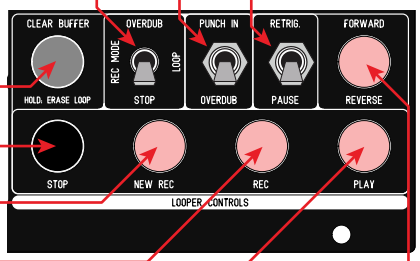
The Looper section is where all Recording action happens,
It can record up to 99 LOOPS per PRESET
LOOPS are recorded in a list and selectable with the [LOOP SELECT] Knob or CV input
The Looper playback volume is set using the [LOOP VOLUME] KNOB or CV input

SWITCHES SETTINGS:

[RETRIG. / PAUSE] determines how PLAY works while already playing the LOOP
[RETRIG.] Pressing PLAY while retrigger the LOOP from the start
[PAUSE] will toggle between Play and Pause states

[PUNCH IN / OVERDUB] determines how REC works
[PUNCH IN] Always erase previous buffer content
[OVERDUB] Always overdubs into the current buffer the OVERDUB DECAY knob controls the ammount of the previous buffer content to be kept in the new buffer.

[REC MODE] : [STOP / LOOP / OVERDUB] determines what happens when finishes recording
[STOP] finishes recording and stops playback
[LOOP] finishes recording and starts playback
[OVERDUB] records continuously in a loop



LOOPER PUSH-BUTTON CONTROLS:

[CLEAR] Clears the Entire LOOP buffer - Long Press erases LOOP from list.

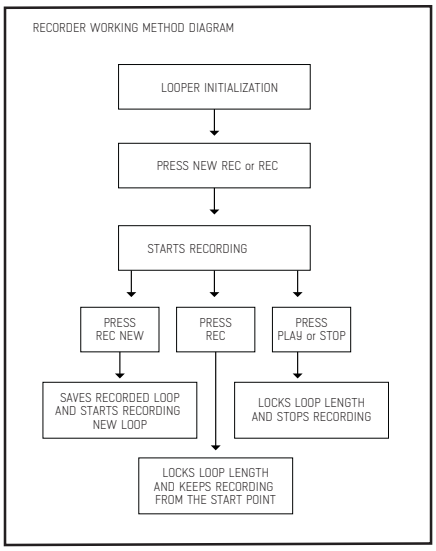
[STOP] Stops playback or recording

[REC NEW] Starts recording a new LOOP and adds it to the list.

[REC] Records on the current LOOP buffer.

[PLAY] Plays the current LOOP

[FORWARD/REVERSE] determines the playback direction



LOOPER ENGINE

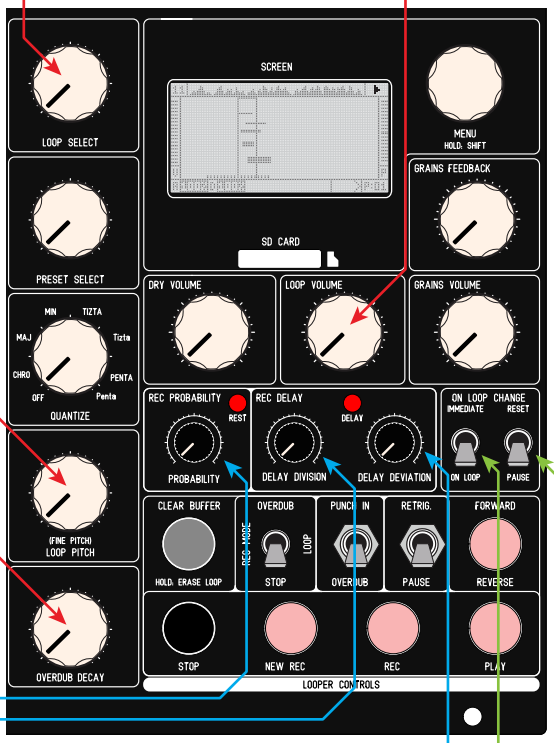
LOOPER CONTROLS:

[LOOP VOLUME] sets the LOOP playback overall volume.

[LOOP SELECT] Determines which LOOP to play from the list in the current PRESET.

[LOOP PITCH] Determines the buffer playback rate setting the Pitch of the Loop. The QUANTIZE Settings will influence this setting.

[OVERDUB DECAY] while recording in Overdub mode, determines the ammount of the previous buffer content to be kept in the new buffer.



CONTINUOUS RECORDING SETTINGS:

Continuous recording is vital to apply a granular effect to an incoming audio source, adding some indeterminancy to the recording timing can create very interesting results we added two methods for this, Probability and Delay.

RECORDING PROBABILITY:
[REC PROBABILITY] Determines the probability that the recording will happen.
Recording is happening in a loop depending on the probability set here it will either record through the buffer or will REST and go through the buffer without recording at the end of the buffer it will calculate the new probability and record or rest for the next buffer period.
RANGE: 0 to 100%

RECORDING DELAY:
[DELAY DIVISION] Determines the ammount of delay to pause for upon reaching the end of the buffer, meaning the continuous recording will pause at every recording loop for a multiple of 1/32 of the buffer length.
The DELAY led will light up while in this recording delay state
RANGE: 1 to 32

[DELAY DEVIATION] sets the ammount of deviation from the DELAY DIVISION setting.
RANGE: 0 to 100%

ON LOOP CHANGE SETTINGS:

These options defines what happens whenever a new LOOP is selected using the [LOOP SELECT] knob or CV input.

[IMMEDIATE / ON LOOP] Determines if the new selected LOOP plays immediately after being selected or if it waits for the current LOOP to reach the end point and then make the LOOP change.

[RESET / PAUSE] Determines if the new selected LOOP plays back from it's start point or resumes at the previous paused point

If a LOOP is changed while Recording the LOOP SELECT controls will be ignored.

GRANULAR ENGINE

Our Granular Engine features a deep set of controls to allow a wide range of results.
It was designed to be fully hands-on and have all controls available in the front panel.
Only minor settings were left in the menu alongside with Save/Load functions.

After the Grain is initialized (by adding a new grain or at startup) the engine will read and calculate all parameters. Once initiated grains play continuously calculating new settings every times it starts playing.

The Granular Engine feeds from whatever LOOP buffer is selected, hence the size of any grain is dependent of the LOOP size

GRAINS ACTIVE:

[GRAINS ACTIVE] Determines how many grains are being played at once
RANGE: 0-32

GRAIN PLAY HEAD:

[POSITION] will determine the grain Start Point:
RANGE: 0-32

[SIZE DIVISION] : [FREE/8/16] will add a time quantization to the LOOP Buffer
[16] will divide the LOOP by 16 playing only from these start points
[8] will divide the LOOP by 8 playing only from these start points
[FREE] will apply no division

[POSITION DEVIATION] will determine the deviation to the Start Point:
RANGE: 0-100%

GRAIN SIZE:

[PLAY LENGTH] will determine the length of the grain:
RANGE: 0-100%

[SIZE DIVISION] : [FREE/8/16] will add a time quantization to the Length
[16] the length will always be multiples of 1/16 of the LOOP Length
[8] the length will always be multiples of 1/8 of the LOOP Length
[FREE] will apply no division

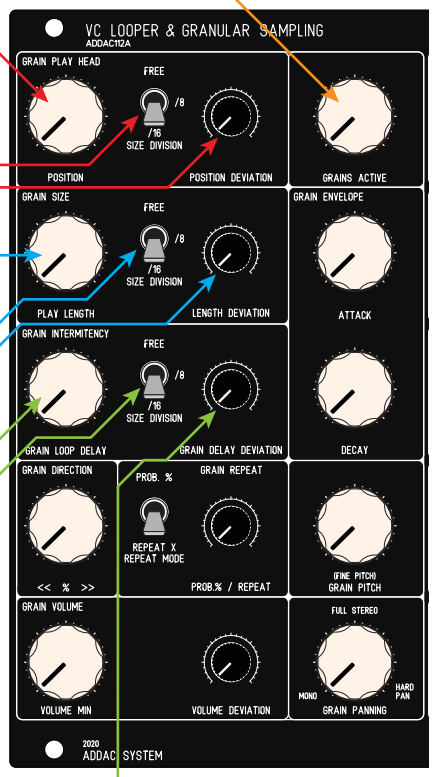
[LENGTH DEVIATION] will determine the deviation to the Play Length:
RANGE: 0-100%

GRAIN INTERMITENCY:

[GRAIN LOOP DELAY] will determine the length of the delay (wait in silence) after the grain finishes playing and before it plays again:

[SIZE DIVISION] : [FREE/8/16] will add a time quantization to the Delay
[16] the delay will always be multiples of 1/16 of the LOOP Length
[8] the delay will always be multiples of 1/8 of the LOOP Length
[FREE] will apply no division and set range from 0 to 5 seconds

[LENGTH DEVIATION] will determine the deviation to the Delay applied above:
RANGE: 0-100%



GRANULAR ENGINE

GRAIN DIRECTION:
[GRAIN DIRECTIONS] Sets the probability of the Grain Play Direction (Forward/Reverse)
Full Left only plays in Reverse, Full Right only plays Forward

GRAIN REPEAT:
Grain Repeat will determine if the sample plays with the exactly same setting as the previously time played or if it calculates new parameters.
There are 2 modes selected by the [REPEAT MODE] switch

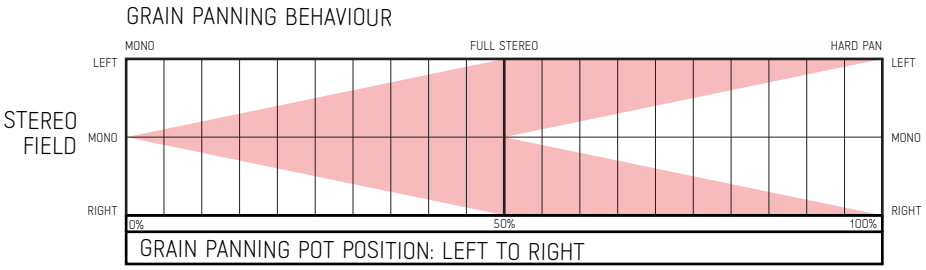
[REPEAT MODE] : [PROBABILITY / REPEAT X] there are 2 Modes for this feature
[PROBABILITY] sets the probability of repeat: 0 to 100%
[REPEAT X] repeats the grain for X times: 0 to 16

[PROB.% / REPEAT] sets the value for the Mode selected.

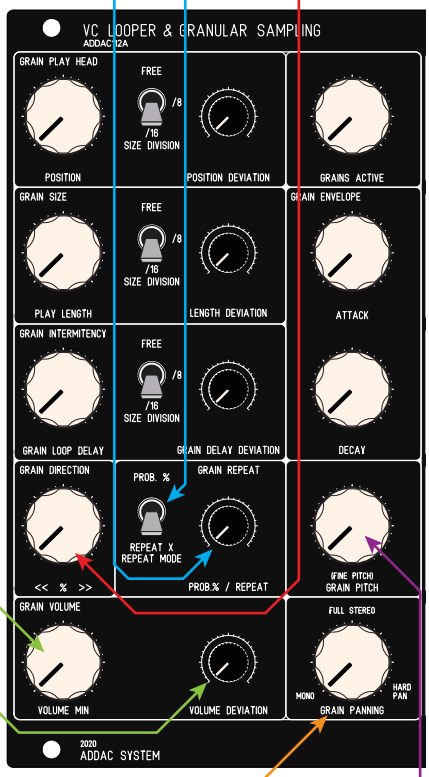
GRAIN VOLUME:
[VOLUME MIN] sets the Minimum Volume for the grains

[VOLUME DEVIATION] sets the ammount of deviation from the Minimum Volume.

GRAIN PANNING:
[GRAIN PANNING] sets the Panning Probability based on the behaviour pictured below



GRAIN PITCH:
[GRAIN PITCH] setting for the Grains Pitch: from -3 to +2 octaves



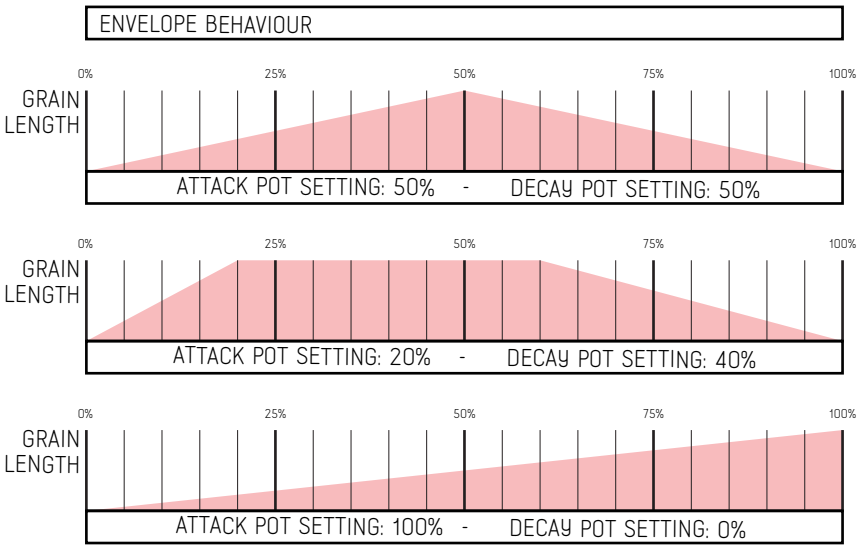
GRANULAR ENGINE

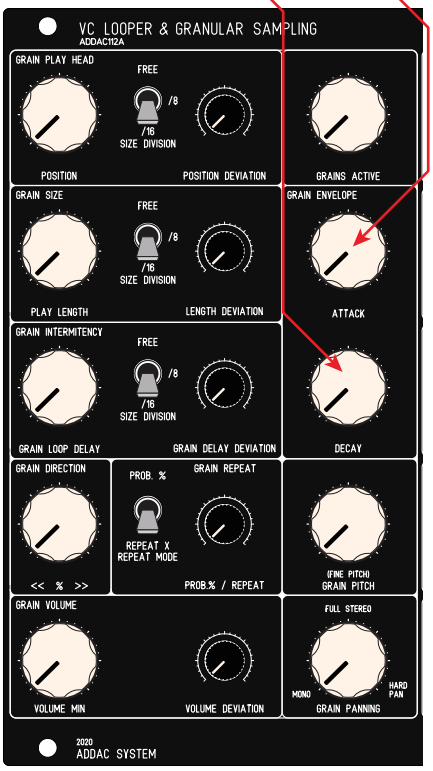
GRAIN ENVELOPE:

Envelope is applied throughout the full length of the grain to be played

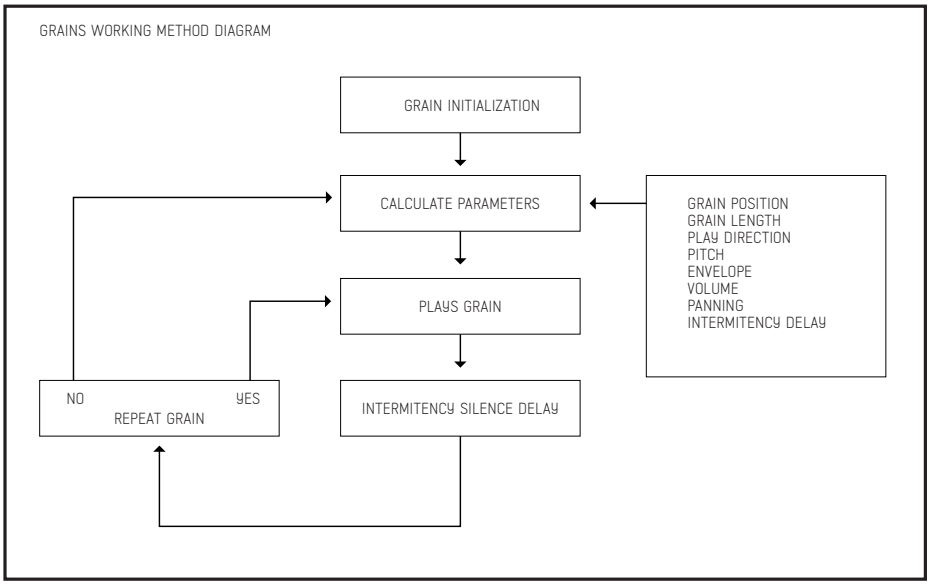
[ATTACK] sets the Attack percentage

[DECAY] sets the Decay percentage





To summarize here's a diagram showing the working method:



AUDIO INPUTS, OUTPUTS & FEEDBACK

INPUTS:

There are 2 input pairs on ADDAC112B:

- 2 Mono inputs at Synth Level
- 1 Stereo input at Line Level

All these inputs are mixed to a Mono signal after which the [INPUT GAIN] knob sets the final gain sent to the Looper Engine as well as the [INS MONO OUT] jack
An Led acts as a visual display for the level set.

MAIN OUTPUTS MIX:

The Master Outputs sums the Looper and Granular Engine together with the Dry signal into a Stereo Output.

[DRY VOLUME] Sets the volume for the DRY Input into the Outputs.

[LOOP VOLUME] sets the volume for the LOOPER Engine into the Outputs.

[GRAINS VOLUME] sets the volume for the Granular Engine into the Outputs.

[GRAINS FEEDBACK] Sets the volume for the Granular Engine into the Looper Audio Input

There are 3 physical outputs for this Mix:

- Left Output
- Right Output
- Mono Output (L+R)

CV & TRIGGER INPUTS

All of the front panel Control Knobs have their own CV Input

All Controls on the left block can be found in the same matrix configuration on the Inputs Module

All Controls on the right block can be found vertically from the top right corner
All Trigger inputs for the Looper controls can be found at the bottom of the module

The [CLEAR BUFFER] control is the only push button without a Trigger input.
Encoder and Toggle switches have no CV inputs.

For feedback, comments or problems please contact us at:
addac@addacsystem.com

ADDAC112 USER'S GUIDE

Revision.01 January.2021