source ..... mutable instruments docs
rev 2026.10

beads

_travelers guide
_for managing memory spells

30	4	32
grains at once	recording qualities	s longest buffer

[seed] press **[seed]** hold › then noon = 12 o'clock cw / ccw = clockwise / counter

no modes: grains · size ∞ = delay · no inputs = synth

always recording unless frozen · up to 30 grains · knobs are read once per grain

pink = hold

01 grains · seed

bds_01

[seed] 4 s	**latch** on: grains flow by themselves · seed pulses slowly · power-on default
[seed] + **[freeze]**	latch on, the quick way
[seed]	short press = unlatch: grains only while **[seed]** is held / its gate is high
[density] noon	no grains (latched or clocked)
latched **[density]**	ccw steady rate · cw random rate · far end = c3 period
+ seed in **[density]**	**clocked**: ccw divide 1/16 → 1 · cw chance 0 → 100%
unlatched **[density]**	repeat rate while **[seed]** is held · noon = one grain per **[seed]** press / trigger
[density] cv	at audio rates: exponential fm, 1 v/oct

02 grain playback

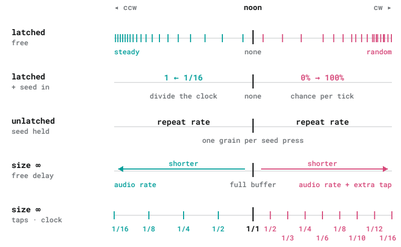
bds_02

read once	each grain reads the knobs as it starts: turning shapes the **next** grains, not the ones playing
[time]	where in the buffer · ccw newest · cw oldest
[pitch]	–24 to +24 semitones · notches at chosen intervals
[size]	length + direction (see below)
[shape]	grain envelope · ccw clicky · cw slow attack



_fig.01 : the density dial

one knob · five jobs



03 attenurandomizers

bds_03

cv in cw	more external cv on that parameter
cv in ccw	the cv sets the random **spread**
no cv ccw / cw	internal random: peaky / uniform
pitch fully cw	pitch cv tracks 1 v/oct
pan	random parameter or rate = random pan too



04 recording · input

bds_04

[quality]	cycle 4 recording qualities (LED colour, see panel)
in 1 / in r	l only = mono · l + r = stereo
on patching	**auto gain** +0 to +32 dB over 5 s · level LED blinks · limiter on big jumps
[quality] 1 s	restart auto gain
[quality] + turn **[feedback]**	**manual gain** · kept until the next long **[quality]** press
[freeze] / gate	stop recording · otherwise it always records
frozen > 10 s	buffer saved, back at the next power-on
while frozen	no quality or mono / stereo change

05 mix · output

bds_05

[feedback]	output back into the grains · each quality limits it its own way
[dry/wet] **[reverb]**	balance · reverb amount
[cv assign]	cv in › feedback / dry-wet / reverb · LED shows which
[cv assign] + turn	set each knob's own cv amount
[cv assign] + **[seed]**	grain triggers on the r out (on / off)
r out empty	l + r summed to l · the chain is always stereo

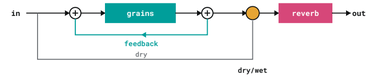
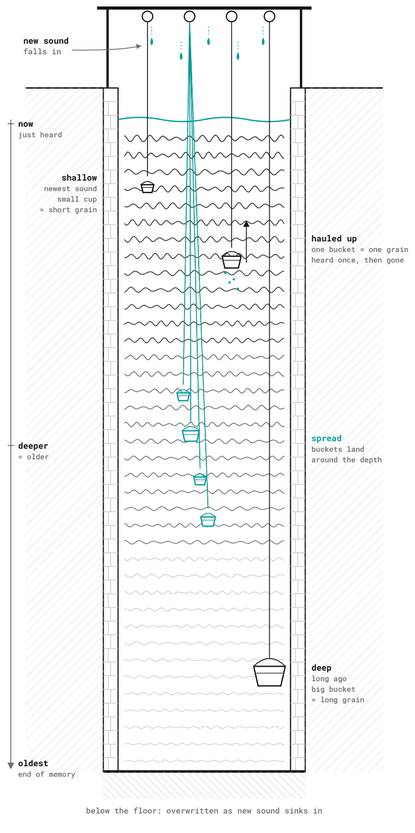
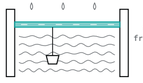


_fig.02 : the memory well

deeper = older



frozen
the surface ices over: nothing new falls in

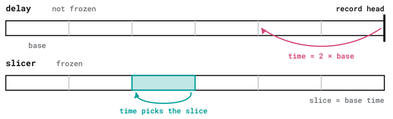


the buckets keep drawing from what is already there

06 delay · slicer

bds_06

[size] fully cw ∞	one endless grain = **delay** or beat slicer
latched, no clock **[density]**	noon = full buffer · turn = shorter, down to audio rate (comb, flange)
[density] cw half	adds an uneven extra tap
[seed] taps / clock	base time = the interval between taps or ticks
tapped **[density]**	subdivides it: ccw binary · cw wider ratios
[time]	delay time = a multiple of the base time
[freeze] + **[time]**	**slicer**: loops one slice · time picks which
[shape]	synced envelope on the repeats · ccw = plain
[pitch]	rotary-head pitch shift · noon = bypass
attenurandomizers	slow random lfos built in



08 patch ideas

bds_08

ramp-down lfo › time	**scrub** the buffer: time-stretch
sequencer › pitch	att fully cw: play melodies of grains
fast arpeggio › pitch	chords: each grain picks a note
seq cv › time gate › seed	sequence slices or phonemes
size ∞ density far	**comb filter**: density cv plays it in 1 v/oct

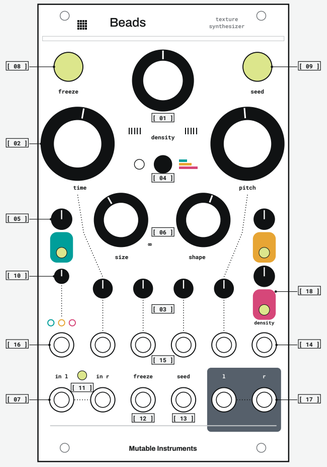
07 wavetable synth

bds_07

no inputs, 10 s	beads loses patience and granulates plaits' wavetables
[feedback]	pick one of 8 banks
[dry/wet]	steady oscillator ↔ grains
[freeze]	holds the grain envelopes · no new grains
[quality]	output resolution (see panel)
pitch cv · knob	always 1 v/oct root · always pitch randomness

_fig.03 : front panel

01–07 = sections · 08–18 = hardware



[01] _density : grain generation
[02] _time … shape : grain playback
[03] _attenurandomizers : cv · spread
[04] _quality : recording · gain
[05] _feedback dry/wet reverb : mix
[06] _size ∞ : delay · slicer
[07] _in 1 / r : audio in · empty = synth

[08] _freeze : latching button
[09] _seed : grain button · tap
[10] _cv assign : button
[11] _level LED : blinks = auto gain
[12] _freeze : gate in
[13] _seed : gate · clock in
[14] _density : cv in ±5 v
[15] _cv ins : time size shape pitch ±8 v
[16] _assign : cv in ±5 v
[17] _out 1 / r : r empty = sum to l
[18] _cv LEDs : assigned cv amount

_where things hide

no menus · held buttons · bds_10

held buttons

- **quality 1 s** restart auto gain
- **quality + feedback** manual input gain
- **seed 4 s** latch (or seed + freeze)
- **cv assign + knob** cv amount for feedback, dry/wet or reverb
- **cv assign + seed** grain triggers on r out

firmware update

only if needed

- **prep** unplug cv · audio file into in l · time mid
- **boot** power on holding freeze
- **play** quality LED = meter (yellow = good) · time = gain
- **all red** level wrong: press freeze, retry louder

specs

14 hp · 25 mm deep +12 v 100 ma · –12 v 10 ma inputs 100k

cv ±8 v grain · ±5 v density + assign seed + freeze read at audio rate · cv at 4 khz

latency 0.25 ms

LED colours

quality button · buffer = mono / stereo

	quality	rate	bits	mono	stereo	character	synth out
○	**bright digital**	48 khz	16-bit	8 s	4 s	pristine	16-bit
●	**cold digital**	32 khz	12-bit	16 s	8 s	like clouds	7-bit
●	**sunny tape**	24 khz	12-bit	20 s	10 s	48 khz dry path	16 dry / 4 wet
●	**scorched cassette**	24 khz	8-bit	32 s	16 s	wow + flutter	4-bit

seed slow pulse = latched **level** blinks = setting gain **cv LEDs** = how much cv each knob gets

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