

DOODOV DIGITAL DESIGN

KBN-P

Kinetic Bouncing Note Player

A physics-driven melodic Player for Reason. Drop it above any instrument and four bouncing balls play it for you — pitched notes in your chosen scale, up to four voices at once, with ratchet arpeggios and full CV control.



User Manual · Version 1.0 · Rack Extension Player

Device type: Note Player · 4U · Requires Reason 14 or later

Contents

1	What KBN-P Is	3
2	The Panel at a Glance	4
3	Using KBN-P as a Player	5
4	How the Engine Works	6
5	Pitch: Zones, Root, Octave & Scale	7
6	Front Panel — Controls Section	8
7	Front Panel — The Arena	9
8	Front Panel — The Balls Editor	10
9	Front Panel — The Pitch Strip	11
10	Ratchet Trip Lines	12
11	Timing: Free & Quantized Modes	13
12	Randomness & Probability	14
13	Back Panel — Outputs & Inputs	15
14	CV Modulation in Depth	17
15	Patch & Player Ideas	18
16	Parameter Reference	19
17	MIDI CC & Remote	20
18	Specifications	21

KBN-P, the Kinetic Bouncing Note Player, and the Doodov Digital Design name are products of Doodov Digital Design. Reason, Rack Extension, Player and Combinator are trademarks of Reason Studios. Manual for device version 1.0.

1 · What KBN-P Is

A Player that plays your instruments with bouncing balls.

KBN-P is a Reason **Player**: it sits in the Player slot above an instrument and generates the notes that instrument plays. Inside it, four balls fly around an arena, ricocheting off the walls and off each other — and every impact becomes a **pitched note**, sent straight into the device below. Each wall is divided into three zones, and the twelve zones climb the scale you choose, so however wild the bouncing gets, the result always lands in key.

Because it's a Player, there's nothing to patch to hear it — insert it, press play, and it performs the instrument for you. The four balls give you up to **four simultaneous voices**, and anything you play from your keyboard or from Players above passes straight through, so you can play *along* with the balls.

KBN-P is the Player edition of the KBN family. It shares the physics, scales, and ratchet engine of the KBN-G CV generator, but delivers its music as note events to the instrument beneath it — plus a full set of CV outputs and inputs on the back for advanced routing.

At a glance

- **Plays the instrument below** — up to four polyphonic voices of pitched, evolving melody, always in your scale.
- **Passes your playing through** — incoming notes are never swallowed.
- **Ratchet trip lines** — crossing a line fires a scale-run arpeggio.
- **Back-panel CV** — four gate+note voice pairs and eight ball-position CVs for driving other devices in parallel.

2 · The Panel at a Glance

The front panel has a Player **ON** button and four working areas.

ON — top left

The Player on/off switch (see Section 3).

CONTROLS — left

RUN and its indicator, **KICK**, the **MODE** switch (Free / Quant), and the **SYNC**, **RECOVERY** and **GATE** knobs.

ARENA — centre

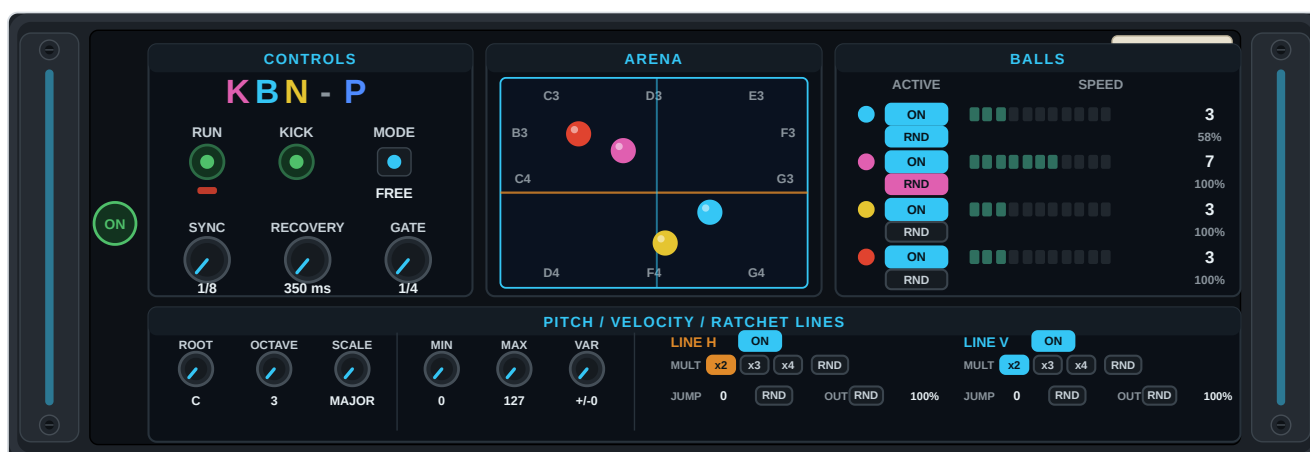
The live physics field, with each zone labelled by the note it plays. Drag the two trip-line tabs here.

BALLS — right

One editor row per ball: switch it on, set its **Speed**, and arm per-ball **Random** probability.

PITCH strip — bottom

Root, **Octave**, **Scale**; the velocity trio (**Min** / **Max** / **Var**); and the two **ratchet trip-line** blocks (Line H and Line V).



Front panel — Player ON (top left), Controls, Arena (with zone note labels), Balls, and the Pitch / Velocity / Ratchet-Lines strip. Illustration.

3 · Using KBN-P as a Player

KBN-P behaves like Reason's built-in Players (such as Scales & Chords or Arpeggio): it lives in the Player slot at the top of an instrument's track and feeds notes to that instrument.

Adding it

Create or select an instrument track, then add KBN-P to its **Player** area (right-click the instrument's Players, or use the browser). No cables are required — the balls immediately play the instrument below. You can stack it with other Players; KBN-P passes their notes through and adds its own.

Polyphony & pass-through

Each of the four balls holds one note at a time, so KBN-P can play **up to four voices** into the instrument simultaneously (make sure the instrument has enough polyphony to sound them). Separately, any notes arriving from your keyboard or from a Player above KBN-P are **passed straight through** — KBN-P never blocks your own playing, so you can perform over the generative part.

The ON button

The **ON** button is the Player's on/off switch. When **off**, KBN-P stops generating: it sends no notes to the instrument and holds nothing — but the balls freeze exactly where they are (they don't reset), and your pass-through playing still reaches the instrument. Switch back on and the simulation resumes from the frozen position.

Bypass All

Reason's Player header **Bypass All** has the same generative effect as switching ON off — no generated notes and the arena frozen — while keeping pass-through active. The difference is only on screen: Bypass All leaves the panel lit and editable and shows a bypassed indicator, whereas ON-off veils the display.

In both the ON-off and Bypass states the device is silent and the physics is paused in place; only notes you play (or Players above) continue through. Turning generation back on picks up exactly where the balls left off.

4 · How the Engine Works

Understanding the simulation makes every control obvious.

Balls, walls and collisions

Four balls travel around a rectangular field at the **Speed** you set for each. When two balls collide they exchange momentum like billiard balls, so one may briefly speed up while the other slows; each then **recovers** back toward its set speed over the **RECOVERY** time. Balls reflect off the four walls.

Impacts become notes

Every wall bounce plays a note whose pitch depends on *where* on the wall it landed (the zone — Section 5) and whose velocity depends on *how fast* the ball was moving. Ball-to-ball collisions play the **root** note. Trip-line crossings start a ratchet burst (Section 10). Three things shape each note:

- **Pitch** — the zone's scale step, from your Root / Octave / Scale.
- **Velocity** — proportional to impact speed (mapped 1–127), scaled into the **Min / Max** window with optional per-hit **Var** (Section 9).
- **Length** — a musical duration (1/8 ... 1/1) held at the project tempo, set by **GATE**.

One voice per ball

Each ball is a monophonic voice: a note-on is emitted into the instrument when the ball hits, and a note-off when the note's gate length elapses (retriggers send an off-then-on). Four balls therefore produce up to four-note polyphony.

Position outputs

Independently of the notes, KBN-P outputs each ball's X and Y position as a 0–1 CV on the back panel (Y inverted, so "up" reads as higher CV) — smooth modulation for other devices.

KICK gives every ball a new random heading without changing its speed — an instant way to reshuffle the melody.

5 · Pitch: Zones, Root, Octave & Scale

This is what keeps KBN-P musical rather than merely rhythmic.

The twelve zones

Each of the four walls is split into three equal portions, giving **twelve zones**. Zone k plays the k -th step of your scale, ascending from the root, so higher-numbered zones play higher notes:

Wall	Zones (in order)	Plays scale steps
Top (left → right)	0, 1, 2	Root, +1, +2
Right (top → bottom)	3, 4, 5	+3, +4, +5
Left (top → bottom)	6, 7, 8	+6, +7, +8
Bottom (left → right)	9, 10, 11	+9, +10, +11

The arena prints the actual note name in each zone, so you can always see what a bounce will play. Ball-to-ball **collisions** play the root note itself.

Root, Octave & Scale

- **Root** — the key, C through B.
- **Octave** — the base octave, 1–5 (default 3; C3 = MIDI note 60).
- **Scale** — one of ten: Chromatic, Major, Natural Minor, Harmonic Minor, Pentatonic Major, Pentatonic Minor, Blues, Dorian, Mixolydian, Whole Tone.

Change Root, Octave or Scale at any time — even while playing — and every future note is instantly re-mapped, moving the whole generative part to a new key or mood.

6 · Front Panel — Controls Section

RUN & indicator

RUN starts and stops the simulation and works with the Reason transport. With the transport **stopped**, press RUN to free-run the balls (notes play immediately); press again to stop. With the transport **playing**, Play starts KBN-P and Stop stops it; RUN toggles the device within a running transport. The **indicator** lights whenever the device is actually running. (The Player **ON** button is a separate, higher-level switch — Section 3.)

KICK

Re-randomises the direction of all four balls, keeping their speeds — an instant variation. Also available from the back-panel KIK input.

MODE — Free / Quant

Free plays notes the instant of impact. **Quant** snaps hits to the SYNC grid while the transport plays. See Section 11.

SYNC

The quantize grid (also the ratchet's total duration), 1/1 down to 1/32 including dotted and triplet values. Default 1/8.

RECOVERY

How long a ball takes to return to its set speed after a collision. Eight steps, 50 ms to 5 s. Default 350 ms.

GATE

The **musical** length of each note — 1/8, 1/4, 1/2 or 1/1 — held for that duration at the current project tempo. Default 1/4. (Ratchet notes are shortened automatically so they articulate.)

7 · Front Panel — The Arena

The central display is a live window into the simulation and a control surface.

- **The balls** in motion, each in its own colour (1 cyan, 2 magenta, 3 yellow, 4 red) so you can match a ball to its editor row and its outputs.
- **Zone note labels** around the edges — the note each of the twelve zones will play under the current Root / Octave / Scale.
- **Zone flashes** at the point of a bounce; collisions flash on the ball.
- **Trip lines** — the horizontal (H) and vertical (V) lines when enabled, plus faint **phantom** lines showing a CV-modulated position (on by default; can be switched off on the back).

Each enabled line has a tab you can grab and drag directly — the H line slides up and down, the V line left and right.

When generation is off or bypassed the arena freezes in place; it resumes from the same positions when you switch it back on.

8 · Front Panel — The Balls Editor

The right-hand **BALLS** display gives each ball a row of controls you can click or drag directly.

Active — ON

Switches the ball on or off. An inactive ball leaves the simulation — it stops moving and plays nothing; turning it back on gives it a fresh random heading. Run one to four balls at once (one voice each).

Speed

The ball's cruising speed on an 11-step scale (1 = slow drift, 11 = fast dart). Faster balls bounce more often and hit harder, so they play busier, louder lines. Default 3.

Random (RND) & Probability

Each ball has an **RND** toggle and a **Probability** value (0–100%). With RND armed, that ball's **wall** notes play only with the set probability — thinning a busy line into something sparser.

Probability affects wall notes only. Ball-to-ball collisions — the root notes — always play, so the harmonic anchor is never lost.

9 · Front Panel — The Pitch Strip

Root / Octave / Scale

Covered in Section 5 — the key, base octave and scale that map every zone to a note.

Velocity — MIN / MAX / VAR

- **MIN / MAX** (0–127 each) — the softest and loudest a note can be. A slow impact lands near MIN, a fast one near MAX. Set MIN above MAX and KBN-P swaps them. Defaults 0 and 127.
- **VAR** (0–20) — a per-hit random velocity variation for a humanised feel. Default 0.

Line H & Line V blocks

Each trip line has a compact block here: an **ON** enable, the **MULT** ratchet count (x2 / x3 / x4), a **JUMP** value, an **OUT** probability with its own RND, and RND toggles for the count and jump — explained next.

10 · Ratchet Trip Lines

The two trip lines turn motion into arpeggios. There is one **horizontal (H)** line, positioned up and down the field, and one **vertical (V)** line, positioned left and right. Enable a line, place it, and every time a ball crosses it, that ball fires a **ratchet**: a short run of notes.

How a ratchet plays

The burst is spread evenly across **one SYNC-grid duration**. The first note sounds immediately; each following note steps by the **JUMP** amount in scale degrees from the previous note, snapped to the current scale. The starting note is the ball's last-played note (or the root if it hasn't played yet). Ratchets play right away rather than waiting for the quantize grid.

Control	Range	What it does
ON	Off / On	Enables the line.
Position	0–100%	Where the line sits (drag in the arena or use Position CV).
MULT (ratchet)	x2 / x3 / x4	How many notes in the burst.
JUMP	–4 ... +4	Scale degrees stepped between notes (0 = repeat).
RND count	Off / On	Randomise the count (2 at 40%, 3 at 40%, 4 at 20%).
RND jump	Off / On	Randomise each step's jump (–4 ... +4).
OUT — RND	Off / On	Arm per-note output probability.
OUT — Prob	0–100%	Chance each note in the burst actually plays.

Because the run spans one grid step, higher counts pack the notes tighter — an x4 ratchet on a 1/8 SYNC is four 1/32-spaced notes. Positive JUMP rises, negative falls, and RND jump scatters.

11 · Timing: Free & Quantized Modes

Free mode

In Free mode a note plays the moment its bounce occurs — the rhythm is exactly the rhythm of the bouncing. Free is always in effect when the transport is stopped, whatever the MODE switch says.

Quant mode

With MODE set to Quant *and the transport playing*, wall and collision hits are held and released on the next **SYNC** grid boundary, snapping the physics into a tempo-locked rhythm.

- Hits landing on the same voice between two grid steps queue and play back **one per step** ("in turns"), spreading a flurry over the following steps.
- The queue is generous (16 deep per ball); on overflow the oldest hit is dropped.
- When the queue must collapse — you stop the transport or switch to Free — the **newest** pending note per voice is played and the rest cleared, so nothing hangs.

Ratchet bursts ignore Quant — they fire the instant a ball crosses the line, so arpeggios stay tight to the crossing regardless of mode.

12 · Randomness & Probability

Per-ball note probability

Arm a ball's **RND** and set its **Probability** (0–100%). Each of that ball's **wall** notes then plays only with that chance — 100% plays everything, 0% silences its wall notes while it keeps bouncing. Each wall of a corner double-hit is rolled independently.

Ratchet randomness

Per line, randomise the **count**, the **jump** each step, and gate each burst note with an **output probability** — from tight fixed arpeggios to loose runs.

Velocity variation

The **VAR** knob adds a per-hit random velocity wobble so repeated notes don't play at a machine-identical level.

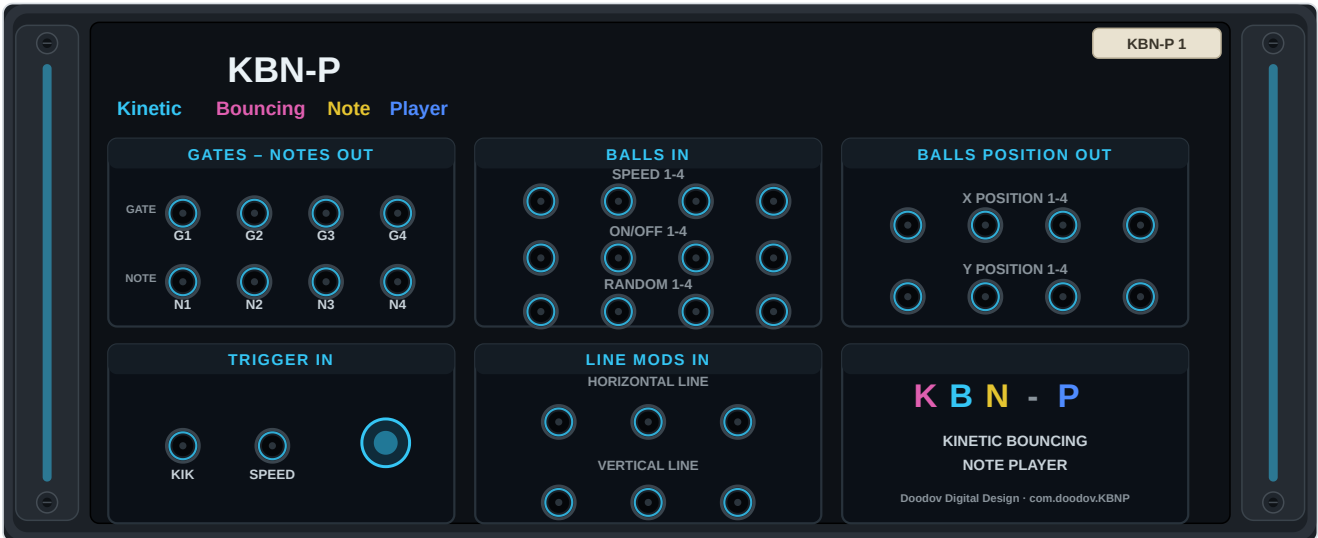
What always plays

Ball-to-ball **collisions** (the root notes) are never gated by probability.

Every randomness control is also a back-panel CV input. Patching a Randomness CV into a ball or line **arms its RND automatically** and sweeps the probability — drive it from an LFO or envelope to breathe density into a part.

13 · Back Panel — Outputs & Inputs

KBN-P's **main output is notes** to the instrument below — there is no note cable to patch. The back panel adds a full set of CV outputs (mirroring the voices and ball positions) and CV inputs, grouped by function. Printed socket names are shown in `THIS` style.



Back panel — voice CV pairs and ball-position outputs across the top, Trigger In and Line Mods inputs below, and the device plate. The notes themselves go to the instrument beneath KBN-P in the Player chain. Illustration.

GATES – NOTES OUT — voice CV pairs (auxiliary)

Socket(s)	Signal
G1–G4	Gate for ball 1–4 — pulses at the note's velocity while open.
N1–N4	Note (pitch CV) for ball 1–4 — holds the last note between gates.

These mirror the same voices KBN-P sends to the instrument, so you can drive additional CV-controlled devices in parallel. They are silent when the device is off or bypassed.

BALLS POSITION OUT — position outputs

Socket(s)	Signal
X POSITION 1–4	Horizontal position of each ball, 0–1.
Y POSITION 1–4	Vertical position, 0–1 (inverted: up = higher CV).

TRIGGER IN — global inputs

Socket	Effect
KIK	A rising CV edge re-randomises all ball directions — same as the front KICK.
SPEED	Global speed modulation for all balls at once (bipolar — Section 14).

BALLS IN — per-ball inputs (1–4)

Socket row	Effect
SPEED 1–4	Bipolar speed modulation around that ball's Speed.
ON/OFF 1–4	Overrides the ball's ON button (≥ 0.5 = on).
RANDOM 1–4	Modulates the ball's probability and arms its RND.

LINE MODS IN — trip-line inputs (H, V)

Socket	Effect
Position	Bipolar shift of the line's effective position (draws a phantom line).
On/Off	Overrides the line's enable button.
Random	Modulates the line's output probability and arms its RND.

A back-panel **Phantom** toggle (default on) enables the animated phantom-line drawing in the arena.

14 · CV Modulation in Depth

Speed CVs

The global **SPEED** and per-ball **SPEED** inputs are bipolar modulators that shift a ball across the speed table — a full-swing CV can reach from the slowest step to the fastest — and the global and per-ball amounts add together. To fully stop a ball, use its ON/OFF input.

On/off inputs

Patching a ball or line **ON/OFF** input takes over its front-panel toggle: a CV at or above 0.5 turns it on, below 0.5 off. Feed a gate pattern to make balls or lines appear and disappear in time.

Line position CV

A line's **Position** input sweeps its effective crossing point across the field while the solid line stays put and a phantom shows the modulated spot. A crossing registers whether the ball moved across the line or the line swept across the ball.

Randomness CVs

The ball and line **Random** inputs modulate probability around the slider and arm that randomness automatically.

Every CV input is safe to leave unpatched; each control simply falls back to its front-panel value.

15 · Patch & Player Ideas

Instant generative part

1. Add a synth or sampler, then add KBN-P to its Player slot.
2. Choose a **Scale** and **Root**, press Play, and set MODE to **Quant** at 1/8 or 1/16.
3. Ride each ball's **Speed** for density; hit **KICK** for a fresh phrase.

Play along

Because your keyboard notes pass through, hold chords or play a lead over the bouncing part — KBN-P adds its voices without stopping yours. Make sure the instrument has enough polyphony for four balls plus your notes.

Arpeggios on demand

Enable the H line across the middle with **MULT x4** and **JUMP +2** — every crossing throws a rising four-note run. Sweep the line with an LFO on its Position CV for arpeggios that drift.

Parallel CV rig

Take the back-panel **G/N** voice pairs into other CV instruments, or the **X/Y** position outputs into filters and pan, to build a whole moving texture from one KBN-P.

Arrangement dynamics

Sequence the ball **ON/OFF** inputs so a verse uses one ball and the chorus all four — density that follows your song.

16 · Parameter Reference

Controls section

Control	Range	Default	Notes
ON (Player)	Off / On	On	Player on/off; off freezes physics & silences output.
RUN	Momentary	—	Toggles run; follows transport.
KICK	Momentary	—	Re-randomises all headings.
MODE	Free / Quant	Free	Note timing.
SYNC	1/1 ... 1/32 (12 steps)	1/8	Quantize grid & ratchet span.
RECOVERY	50 ms ... 5 s (8 steps)	350 ms	Post-collision recovery.
GATE	1/8, 1/4, 1/2, 1/1	1/4	Musical note length at tempo.

Pitch & velocity

Control	Range	Default
Root	C ... B	C
Octave	1 – 5	3
Scale	10 scales	Major
VEL MIN / MAX / VAR	0–127 / 0–127 / 0–20	0 / 127 / 0

Per ball (× 4) & each trip line (H, V)

Control	Range	Default
Ball Active / Speed	Off·On / 1–11	On / 3
Ball Random / Probability	Off·On / 0–100%	Off / 100%
Line On / Position	Off·On / 0–100%	Off / 50%
Line MULT / Jump	x2·x3·x4 / –4...+4	x2 / 0
Line RND count/jump/out	Off / On	Off
Line Probability	0–100%	100%

Back panel: Phantom lines — Off / On, default On.

17 · MIDI CC & Remote

KBN-P's knobs and switches are Remote targets (grouped for the Combinator into Global, Balls State, Balls Random, Pitch, Line H and Line V) and respond to the MIDI CC messages below. RUN, KICK and the Player ON button are not automatable via CC.

CC	Parameter
13 / 14 / 15 / 16	Mode / Sync / Recovery / Gate length
17–20	Ball 1–4 Active
21–24	Ball 1–4 Speed
25 / 26 / 27	Root / Octave / Scale
28–31	Ball 1–4 Random
33–36	Ball 1–4 Probability

CC	Parameter
37 / 39 / 40	Vel Min / Max / Var
41–48	Line H: on, pos, ratchet, jump, rnd-cnt, rnd-jmp, rnd-out, prob
49–56	Line V: on, pos, ratchet, jump, rnd-cnt, rnd-jmp, rnd-out, prob

18 · Specifications

Item	Value
Device name	KBN-P — Kinetic Bouncing Note Player
Manufacturer	Doodov Digital Design
Type	Note Player — plays the instrument below; no audio of its own
Panel height	4U
Voices	Up to 4 (one per ball) into the instrument, plus note pass-through
Pitch	12 zones, 10 scales, selectable root & octave; collisions play root
Trip lines	2 (H, V) ratchet generators, x2–x4, jump ± 4
Back-panel CV	4 gate + 4 note voice pairs, 8 ball-position outs, extensive CV in
Timing	Free or transport-quantized; ratchets fire immediately
Host requirement	Reason 14 or later
Automation	MIDI CC + grouped Remote / Combinator targets

© Doodov Digital Design. KBN-P and the Kinetic Bouncing Note Player are products of Doodov Digital Design. Reason, Rack Extension, Player and Combinator are trademarks of Reason Studios. Specifications subject to change. Manual for device version 1.0.