# Balloooper

Kinetic Ball Looper

## Operation Manual




Four balls bounce around an arena. Each one carries a loop it recorded from your audio, and plays it at the speed it moves. Every wall can change what a loop does when a ball hits it.

# Contents


**1 Introduction . . . . . 4**

Main features . . . . . 4

About this manual . . . . . 4

**2 Getting started . . . . . 5**

Creating the device . . . . . 5

Connecting a source . . . . . 5

First sound in five steps . . . . . 5

**3 How Ballooper works . . . . . 6**

Balls, takes and loops . . . . . 6

The arena and the walls . . . . . 6

Speed is playback rate . . . . . 6

TAPE and LOCK . . . . . 7

ROLL and HIT . . . . . 7

HOLD and LIFE . . . . . 7

Which ball plays a note . . . . . 7

**4 Front panel reference . . . . . 8**

Header: name, ball lamps and patches . . . . . 8

LOOP . . . . . 8

MOTION . . . . . 9

KEY . . . . . 9

Wall knobs . . . . . 9

Output strip and MODE . . . . . 9

BALLS . . . . . 10

Folded panel . . . . . 10

**5 The arena display . . . . . 11**

**6 Wall functions . . . . . 12**

**7 Back panel reference . . . . . 13**

Audio . . . . . 13

CV inputs . . . . . 13

CV outputs . . . . . 14

**8 Signal flow . . . . . 15**

**9 Playing Ballooper . . . . . 16**

From the keyboard . . . . . 16

Velocity . . . . . 16

Transposing . . . 16
Playing from CV . . . 16
Recipes . . . 16

**10 Patches and automation . . . 17**

Patches . . . 17
Automation . . . 17
MIDI controllers . . . 17

**11 Troubleshooting . . . 18**

**12 Specifications . . . 18**

# 1 Introduction

Ballooper is a looper played like an instrument. Each note you play launches a ball into a square arena. The ball records a short take of the incoming audio, then plays it back in a loop while it bounces around. The loop's playback speed follows the ball's speed, so every collision and every change of motion is heard as a bend in pitch and timing. Each of the four walls can be given a function — reverse the loop, restart it, halve or double its speed, record a fresh take, and more — so the motion of the balls turns into a constantly evolving rhythm of loops.

## Main features

- Four balls (voices), each with its own loop of 0.1 to 5 seconds, recorded from one of two stereo inputs.
- Playback speed driven by the ball's motion: launch speed, velocity, collisions and the RATE knob.
- Two pitch modes: **TAPE** (speed changes pitch, like tape) and **LOCK** (granular, pitch stays put).
- Two playback modes: **ROLL** (loops play continuously) and **HIT** (a one-shot on each wall hit).
- Twelve wall functions, set independently for each of the four walls.
- Per-ball direction (forward, reverse, pendulum), input source, life time and on/off.
- **HOLD** and **LIFE** modes: balls that last as long as the note, or that live on their own for a set time.
- Keyboard transposition around a root note.
- Separate stereo output for every ball, and CV outputs for ball positions and wall hits.
- CV inputs for a sequencer, for triggering each ball directly (with its own note), and for kick, speed and rate.
- A live arena display, and factory patches organised by theme.

## About this manual

Chapter 2 gets you making sound in a couple of minutes. Chapter 3 explains how Ballooper thinks — read it once, and everything on the panel will make sense. Chapters 4 to 7 are the reference for every control, the display, the walls and the back panel. The last chapters cover playing techniques, automation, the factory patches and troubleshooting.

# 2 Getting started

## Creating the device

Create Ballooper from the Instruments section of the browser. Reason gives it its own sequencer track with a note lane, and connects its main **OUT** to the mixer. Ballooper makes no sound of its own: it needs audio to record.

## Connecting a source

Flip the rack (Tab) and connect a stereo audio source to **IN A** on the back panel — a drum machine, a synth, a loop player, an audio track's output, anything. Use **IN B** for a second source; each ball chooses A or B with its own switch. For a mono source, feed the same signal to both L and R (with a Spider Audio splitter, for example); otherwise the balls play on the left only.

> **Note.** The input meters A and B in the LOOP section light when a signal reaches the input. If they stay dark, the balls will record silence.

## First sound in five steps

1. Make sure the source is playing (start the transport if it is a sequenced device).
2. Load the patch *01 Basics / Init*, or keep the default settings.
3. Play and hold a note on your keyboard. A ball appears in the arena with a bright ring while it records, then starts to play its loop as it bounces.
4. Hold a few more notes: up to four balls, each with its own take of the input recorded at a different moment.
5. Turn the four wall knobs around the arena to give the walls functions (try FLIP, HALF, DBL and RSTA), and listen to the loops change each time a ball hits a wall.

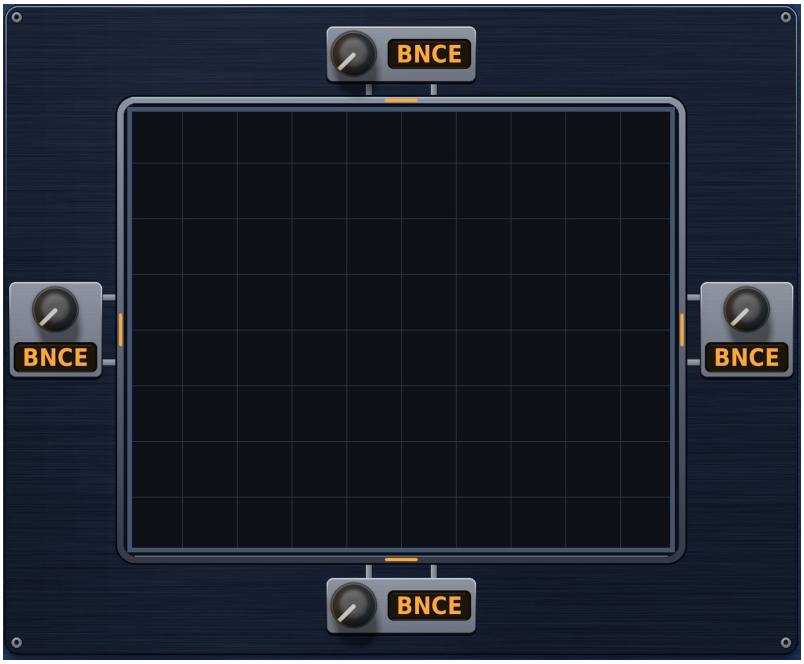
Release the keys and the balls fade out with the release time. Turn **LIFE MODE** to LIFE if you want the balls to carry on without holding the keys.

# 3 How Ballooper works

## Balls, takes and loops

Ballooper has four balls, numbered and coloured 1 (red), 2 (blue), 3 (green) and 4 (yellow). Each ball is a voice. When a note starts a ball:

- The ball is launched from its own starting point (one per quarter of the arena) in a random direction.
- It starts recording its **take**: the next LENGTH seconds of its input (A or B).
- About 30 milliseconds later it starts playing what has been recorded so far. The loop grows while the take is recording, and once the take is complete the ball loops the whole of it.
- It keeps playing until it is released — by the note ending (HOLD mode), by its life running out (LIFE mode), by a CHOK wall, or by being switched off or replaced.




*The arena, with a wall-function knob and readout on each side.*

## The arena and the walls

The arena is a square room with four walls: 1 top, 2 right, 3 left and 4 bottom. The balls bounce off the walls and off each other. Every time a ball touches a wall, that wall's **function** is applied to the ball's loop (chapter 6). The same wall numbering is used for the WALL GATES outputs on the back.

## Speed is playback rate

A ball plays its loop at a rate equal to its current speed divided by the speed it was launched at — multiplied by the **RATE** knob and by the rate changes from HALF and DOUBLE walls. A ball moving at its launch speed plays at exactly the RATE setting. When two balls collide, they exchange speed: one speeds up and the other slows down, and both drift back to their launch speed over the **RECOV** (recovery) time. The overall playback rate of a ball is limited to 8x.

The launch speed is set by the **SPEED** knob, and changed by velocity: with **VEL** up, a harder note launches a faster ball. SPEED only affects balls launched after you change it — turning it never changes the pitch of balls already in flight. To change the playback rate of everything at once, use RATE.

> **Note.** Velocity also sets the level of each ball. A soft note gives a quieter ball, whatever the VEL setting.

## TAPE and LOCK

**TAPE** plays the loop like a tape: faster is higher, slower is lower, and reverse is backwards. **LOCK** reads the loop with short overlapping grains, so the speed changes how fast the loop moves through its material but not its pitch. LOCK keeps melodic or vocal material in key; TAPE gives the classic varispeed sound.

## ROLL and HIT

- **ROLL**: each ball plays its loop continuously, wrapping smoothly from end to start.
- **HIT**: a ball is silent in flight. Every wall hit fires a *shot*: the loop plays once, from its start (or from its end when the ball plays in reverse), and fades out at the other end. A new hit during a shot restarts it. In pendulum direction a shot is one swing there and back.

You can switch between ROLL and HIT at any time; balls already playing follow the new mode.

## HOLD and LIFE

- **HOLD**: a ball lives as long as its key (or gate) is held. Releasing the key fades the ball out over the RELEASE time.
- **LIFE**: key releases are ignored. Each ball lives for the time set by its own LIFE knob, then fades out. The life clock only runs while the ball is playing, and turning a LIFE knob re-times the ball in flight. With the knob fully up the ball lives forever.

Switching from LIFE back to HOLD releases every ball whose key has already been released, and keeps the ones still held.

## Which ball plays a note

A new note takes the first free ball that is switched on. When all four are busy, it replaces a ball that is already releasing, or else the oldest ball. The replaced ball does not stop dead: it fades out quickly (in about 40 ms) while the new one starts. Switched-off balls never take notes; if all four are off, notes are ignored.

The four BALL GATE inputs on the back address a ball directly: gate 1 always plays ball 1, replacing whatever ball 1 was doing.

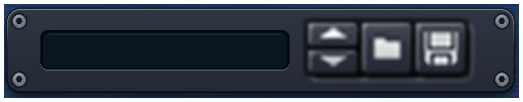
# 4 Front panel reference




*The front panel.*

## Header: name, ball lamps and patches



The four coloured lamps next to the name show the state of each ball: dark when the ball is free, and lit while it records, plays or fades out. The patch section on the right shows the current patch name, with buttons to step through patches, open the patch browser and save a patch (see chapter 10).

## LOOP



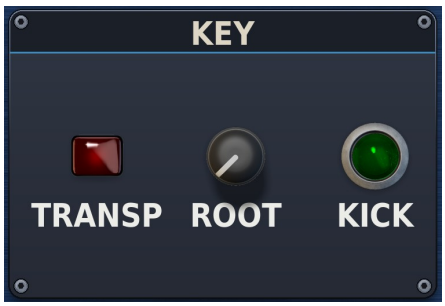

| | |
|---|---|
| **LENGTH** | The length of each take: 0.1 to 5 seconds (exponential knob, 0.7 s at the centre). It applies to takes started after the change; a ball already recording keeps the length it started with. |
| **TAPE / LOCK** | Pitch mode for new balls. TAPE: varispeed — speed changes pitch. LOCK: granular — pitch stays put. |
| **IN A / B** | Input level meters for the two stereo inputs. |

## MOTION




| | |
|---|---|
| **RATE** | Master playback rate for all balls: 0 to 8x, exponential above the centre (1x at the centre, 2x at about two thirds, 8x fully up) and linear below (0.5x at a quarter, stopped fully down). Acts immediately on every ball. |
| **SPEED** | Launch speed of new balls, in 11 steps from 0.10 to 2.50 arena crossings per second. A ball at its launch speed plays at the RATE setting, so SPEED changes how busy the arena is, not the pitch. |
| **VEL** | Velocity amount. At 0 every ball is launched at the SPEED setting. Turned up, harder notes launch faster balls (and play their loop faster) and softer notes slower ones: fully up, velocity 127 doubles the launch speed. |
| **RECOV** | Recovery: the time a ball takes to return to its launch speed after a collision — 50, 100, 200, 350, 500 ms, 1, 2 or 5 s. Short values give quick bends; long values let collisions leave long glides. |

## KEY




| | |
|---|---|
| **TRANSP** | Transpose (keytrack). Off: every note plays its loop at the original pitch. On: the note transposes the loop relative to ROOT, up to two octaves up or down. In TAPE mode transposing also changes the loop's speed; in LOCK mode only the pitch changes. |
| **ROOT** | The note that plays the loop untransposed (C3 by default). Also the note used by a BALL GATE without a note CV. |
| **KICK** | Sends every ball in flight off in a new random direction, keeping its speed. Also available as a CV input. |

## Wall knobs

Each wall has a knob and a readout next to it showing the selected function: BNCE, FLIP, FWD, REV, PEND, RSTA, HALF, DBL, RSET, RAND, CHOK or RCAP. The functions are described in chapter 6. The knob next to the top wall sets wall 1, the right one wall 2, the left one wall 3 and the bottom one wall 4.

## Output strip and MODE




| | |
|---|---|
| **ATK** | Attack time of each ball's envelope, 0 to 2 seconds (short times are at the lower part of the knob). |
| **REL** | Release time: 10 ms to 10 seconds. The time a ball takes to fade out when its key is released, when its life runs out, when a CHOK wall releases it, or when it is switched off. |
| **DRY** | Mixes the incoming audio (A and B together) into the main output, unprocessed. |
| **PAN** | Spreads the balls across the stereo field: ball 1 left, ball 4 right, balls 2 and 3 in between. At 0 every ball is centred. The pan also applies to the ball outputs. |
| **BALLS** | Level of the balls, on the main output and on the ball outputs (unity at about 70 %). Leaves DRY alone. |

| | |
|---|---|
| **VOL** | Master volume of the main output and the ball outputs (unity at about 70 %). |
| **MODE** | ROLL: continuous loops. HIT: one-shots on wall hits. The lit word shows the selected mode. |

## BALLS

The BALLS section has one row per ball, in the ball's colour, and the LIFE MODE switch at the bottom.




| | |
|---|---|
| **Ball lamp (1-4)** | Click the numbered coloured ball to switch that ball on or off. A switched-off ball takes no notes and no gates; if it is playing it fades out. Useful to play with fewer balls, or to keep a ball for the BALL GATE inputs. |
| **A/B** | The red button next to the ball lamp chooses the input this ball records from, IN A or IN B; the lit letter of the A/B legend under it shows which. Takes effect at the ball's next take. |
| **FWD / REV / PEND** | A three-position lever (FWD down, REV middle, PEND up; the selected word lights): forward, reverse, or pendulum (forward and back, slowing gently at each end). This is the direction the ball starts with and returns to on a RSET wall; FLIP, FWD, REV and PEND walls change it while the ball is in flight. |
| **LIFE** | How long the ball lives in LIFE mode. From 0.5 s (fully down) to about 37 s at 90 %; above that the clock slows right down (about 90 s at 95 %, ten minutes near the top), and fully up the ball lives until it is released some other way. Acts on the ball in flight. |
| **LIFE MODE** | HOLD: balls live while their key or gate is held. LIFE: key releases are ignored and each ball lives for its LIFE time. |

## Folded panel




*Folded front panel.*

Folded, Ballooper shows its name, the four ball lamps and the patch section.

# 5 The arena display

The display shows the arena as Ballooper sees it, live. Each ball is drawn in its colour at its position, with marks that tell you what its loop is doing:

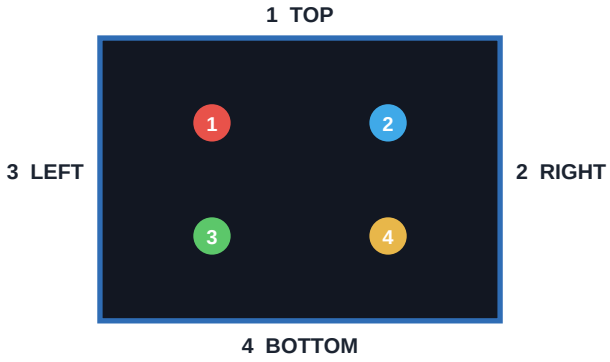



- **Recording**: a bright ring around the ball while its take is being recorded.
- **Loop position**: a small dark dot orbits inside the ball — one full turn is one pass through the loop. In reverse it turns the other way; in pendulum it swings back and forth.
- **Brightness**: in HIT mode a ball is dim in flight and lights up while a shot plays.
- **Octave rings**: one darker ring inside the ball for each octave its HALF / DOUBLE rate is away from normal (up to three). A RSET wall removes them.
- **Centre dot**: the ball is moving faster than its launch speed (after a collision).
- **Life dots**: in LIFE mode, a ring of dots around the ball empties clockwise as its life runs out.
- **Releasing**: a fading ball turns dim with a dull red ring.
- **Wall dust**: a short orange mark appears on a wall where a ball has just hit it, and settles away.
- **Flash**: a ball flashes briefly when it collides with another ball or fires a shot.

> **Note.** The display shows the state of the engine; it does not react to clicks. Use the ball lamps in the BALLS section to switch balls on and off.

# 6 Wall functions

Each wall applies its function to a ball's loop at the moment the ball hits it. Any function can be set on any wall, and the same function can be used on several walls. In HIT mode, every hit (except CHOK and RCAP) also fires a shot after the function is applied.




| Function | What it does | Typical use |
|---|---|---|
| **BNCE Bounce** | Nothing changes. The ball just bounces. In HIT mode the hit still fires a shot. | Neutral; the default. |
| **FLIP Reverse** | Reverses the loop's direction, with a short smooth turn rather than a jump. In pendulum, reverses the swing. | Back-and-forth movement on every hit. |
| **FWD Forward** | Sets the loop to play forward. | Use with REV on opposite walls. |
| **REV Reverse dir.** | Sets the loop to play backward. | |
| **PEND Pendulum** | Turns pendulum playback on; if the ball is already in pendulum, turns it off (the ball goes on in its current heading). | |
| **RSTA Restart** | Jumps back to the start of the loop (the end when playing in reverse), with a short crossfade. ROLL mode only. | Stutter and retrigger rhythms. |
| **HALF Half** | Halves the ball's playback rate (one octave down in TAPE). Accumulates: down to 1/8. | |
| **DBL Double** | Doubles the ball's playback rate (one octave up in TAPE). Accumulates: up to 8x. | HALF and DBL on opposite walls make octave jumps. |
| **RSET Reset** | Returns the ball's rate to normal and its direction to the one set in the BALLS row. | Undoes HALF/DBL and direction changes. |
| **RAND Random** | Jumps to a random point of the loop (ROLL), or starts the shot from a random point (HIT). | Glitchy, granular textures. |
| **CHOK Choke** | Releases the ball: it fades out with the release time. Works in HOLD and LIFE mode. | A wall that eats balls. |
| **RCAP Recapture** | The ball records a fresh take of its input and carries on with it; the old loop crossfades out. | Loops that follow a changing input. |

**Note.** Direction changes, restarts and jumps never cut the sound: they wait for a running crossfade or turn to finish (a few milliseconds) and then apply smoothly.

# 7 Back panel reference




*The back panel.*

## Audio




| | |
|---|---|
| **IN A (L/R)** | Stereo input A. Balls set to A record from it. |
| **IN B (L/R)** | Stereo input B. Balls set to B record from it. |
| **OUT (L/R)** | Main output: the four balls (panned, BALLS level) plus DRY, at the VOL level. Auto-routed to the mixer. |
| **BALL 1-4 (L/R)** | One stereo output per ball, with its pan, BALLS and VOL applied. Use them to process each ball separately; a ball still also plays on the main output. |

## CV inputs

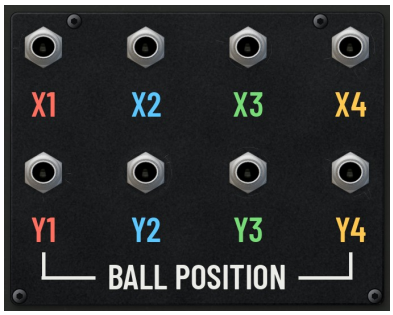



| | |
|---|---|
| **SEQUENCER NOTE / GATE** | Plays Ballooper from a CV sequencer exactly like MIDI notes. Any gate value above zero starts a note, and the gate value is the velocity. A note change while the gate stays high starts a new ball with the new note. The gate falling (or the cable being removed) is a note-off. |
| **BALL GATES 1-4** | Each gate plays its own ball directly. Any value above zero triggers, and the gate value is the ball's velocity. HOLD: the gate falling releases the ball. LIFE: the falling gate is ignored. A switched-off ball ignores its gate. |
| **BALL NOTES 1-4** | Optional note for each BALL GATE (standard Reason note CV), read when the gate rises. With TRANSP on, it transposes the ball like a played note. Not connected: the ball plays ROOT. |




| | |
|---|---|
| **KICK** | A rising CV (above 0.2) kicks every ball in a new direction, like the KICK button. |
| **SPEED** | Raises the launch speed of new balls: 0 = the SPEED knob, 1 = twice as fast. Negative values are ignored. |
| **RATE** | Added to the RATE knob: a CV of +1 moves the knob half its range up, -1 half its range down. |

## CV outputs



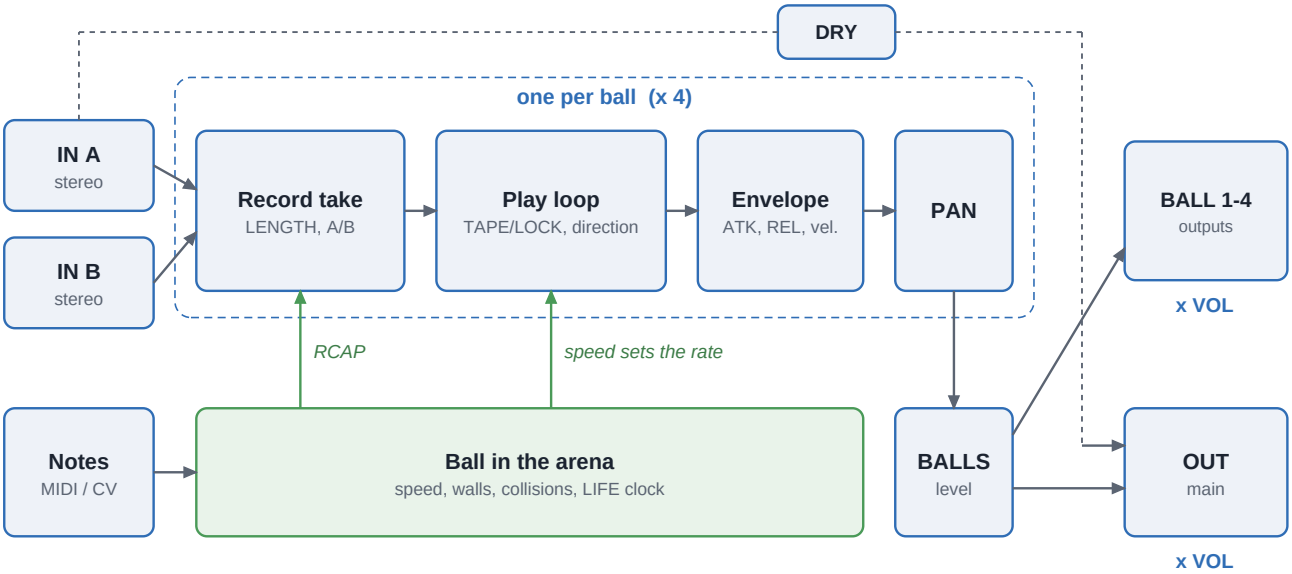

| | |
|---|---|
| **X1-4, Y1-4** | Each ball's position in the arena: X from 0 (left) to 1 (right), Y from 0 (bottom) to 1 (top). 0 when the ball is not playing. Use them to move filters, pans or effect parameters with the balls. |




| | |
|---|---|
| **WALL GATES** | TOP, RIGHT, LEFT, BTM: a 25 ms gate each time a ball hits that wall. The gate level follows the speed of the impact (a ball at 2 crossings per second or more gives a full-level gate). Use them to trigger drums or envelopes in time with the balls. |

# 8 Signal flow

The diagram below shows the path of the audio for one ball. The four balls work the same way, in parallel, and are mixed together on the main output.




- A ball records from IN A or IN B (its A/B switch) into its own take.
- The take is played in TAPE or LOCK mode, in the ball's direction, at a rate set by RATE, the ball's speed, HALF/DOUBLE walls and the transposition.
- The envelope (ATK, REL) and the note velocity set the ball's level; PAN places it in the stereo field.
- BALLS sets the level of all balls; the ball goes to its BALL output and to the main OUT, where DRY adds the input signal.
- VOL sets the final level of the main output and the ball outputs.

# 9 Playing Ballooper

## From the keyboard

Each key launches a ball; four keys at once fill the arena. Because each ball records a different moment of the input, playing notes at different times captures different parts of your source. Holding a chord of four notes over a drum loop gives four loops of the same bar, scattered by their own motion.

Play notes again to replace the oldest balls with fresh takes — playing in time with the music keeps the loops aligned with the beat. A fifth note replaces a ball that is already fading, or else the oldest one.

## Velocity

Velocity always sets the level of a ball. With VEL turned up, it also sets its launch speed — and so its playback rate: a hard note plays its loop faster (higher in TAPE), a soft one slower. With VEL at 0 all balls start at the same speed.

## Transposing

Switch TRANSP on and choose ROOT. Notes above ROOT play the loop higher, notes below lower, up to two octaves either way. In TAPE mode this works like a sampler (higher is faster); in LOCK mode the loop keeps its timing and only the pitch moves.

## Playing from CV

Connect a CV sequencer (for example a Matrix or any note/gate sequencer) to SEQUENCER NOTE and GATE to play Ballooper like a keyboard. To play the balls one by one — for instance from four gate tracks of a drum sequencer — use the BALL GATES; each gate always plays the same ball, and an optional BALL NOTE gives each one its own pitch.

## Recipes

### Bouncing drums

Drum loop into IN A, MODE on HIT, LENGTH short (0.2 to 0.4 s), SPEED high. Each wall hit fires a slice of the drums. Add RAND on two walls for variations.

### Tape choir

Pad or vocal into IN A, LOCK mode, ATK and REL long, SPEED low, walls on FLIP and PEND. Hold four notes of a chord with TRANSP on.

### Octave jumps

TAPE mode, HALF on the left wall and DBL on the right wall, RSET on the top. Balls climb and fall in octaves as they cross the arena.

### Ever-changing loops

LIFE MODE on LIFE with LIFE knobs fully up, RCAP on one wall: the balls play forever and refresh their takes from the live input every time they reach that wall.

### Generative triggers

Use the WALL GATES outputs to trigger a drum machine or envelopes, and the BALL POSITION outputs to move a filter cutoff or a pan: the arena becomes a modulation source as well as a looper.

# 10 Patches and automation

## Patches

A Ballooper patch stores every panel setting: knobs, switches, wall functions and the BALLS rows. The recorded takes are not stored — they are always recorded fresh from the input. Use the arrows in the patch section to step through patches in the current folder, the folder button to open the browser, and the disk button to save.

### Factory patches

| | |
|---|---|
| **01 Basics** | **Init** — the default settings. **Bouncer** — fast balls, velocity-sensitive, plain bounces. **Tape Spin** — FLIP on every wall, two balls in reverse. **Slow Drift** — slow balls, long envelope, HALF and DBL walls. |
| **02 Walls** | **Ping Pong** — HIT mode, short takes. **Pendulum** — every ball and wall in pendulum. **Glitch** — HIT, very short takes, RAND and RSTA walls. **Choke Box** — a CHOK wall and a RCAP wall. |
| **03 Balls** | **AB Split** — balls 2 and 4 record IN B, a little DRY. **Duo** — two balls only. **Mixed Dirs** — forward, reverse and pendulum balls with FWD/REV walls. |
| **04 Life** | **Fireflies** — LIFE mode, HIT, short lives. **Eternal** — LIFE mode, balls that never die. **Staggered** — LIFE mode, each ball with a longer life than the last. |

## Automation

The knobs and switches of the front panel can be automated in the sequencer, including performance automation in note clips. Right-click a control and choose *Edit Automation*, or simply move it while recording.

## MIDI controllers

Ballooper supports Reason's Remote for hardware control surfaces, and responds to these MIDI CC numbers on its sequencer track (every front-panel control except KICK):

| CC | Control | CC | Control | CC | Control |
|---|---|---|---|---|---|
| **13** | LENGTH | **25** | PAN | **39** | Ball 3 direction |
| **14** | TAPE / LOCK | **26** | VOL | **40** | Ball 4 direction |
| **15** | MODE | **27** | Wall 1 (top) | **41** | LIFE MODE |
| **16** | RATE | **28** | Wall 2 (right) | **42** | Ball 1 LIFE |
| **17** | SPEED | **29** | Wall 3 (left) | **43** | Ball 2 LIFE |
| **18** | VEL | **30** | Wall 4 (bottom) | **44** | Ball 3 LIFE |
| **19** | RECOV | **31** | Ball 1 A/B | **45** | Ball 4 LIFE |
| **20** | TRANSP | **33** | Ball 2 A/B | **46** | Ball 1 on/off |
| **21** | ROOT | **34** | Ball 3 A/B | **47** | Ball 2 on/off |
| **22** | ATK | **35** | Ball 4 A/B | **48** | Ball 3 on/off |
| **23** | REL | **36** | Ball 1 direction | **49** | Ball 4 on/off |
| **24** | DRY | **37** | Ball 2 direction | **50** | BALLS level |

# 11 Troubleshooting

| | |
|---|---|
| **No sound at all** | Check that a signal reaches IN A or IN B (the meters light) and that the balls you play are set to that input (A/B). Check that the balls are switched on (lamps in the BALLS section), and BALLS and VOL are up. |
| **Balls appear but are silent** | In HIT mode the balls are silent between walls — this is normal. In ROLL mode, the source may have been silent at the moment the take was recorded: play the note again, or use a RCAP wall to refresh the takes. |
| **Notes are ignored** | All four balls are switched off (click the ball lamps in the BALLS section). |
| **Balls stop on their own** | LIFE MODE is on LIFE with short LIFE settings, or a wall is set to CHOK. |
| **Balls never stop** | LIFE MODE is on LIFE with the LIFE knobs fully up. Switch to HOLD, or turn the LIFE knobs down. |
| **The pitch keeps going up or down** | HALF or DBL walls accumulate. Add a RSET wall, or set the walls back to BNCE. |
| **Turning SPEED does nothing to the sound** | SPEED sets the launch speed of new balls; balls in flight keep theirs. Use RATE to change the playback rate of all balls at once. |
| **Loops are too short at 192 kHz** | At 192 kHz the longest take is 2.5 seconds (5 seconds at every other sample rate). |
| **The loops are gone after reopening the song** | Takes are recorded live and are not saved with the song or the patch. |

# 12 Specifications

| | |
|---|---|
| **Device type** | Instrument, 5U, with note lane. Rack Extension for Reason (Jukebox SDK 5). |
| **Voices** | 4 balls, each with its own take and stereo output. |
| **Take length** | 0.1 to 5 s (2.5 s maximum at 192 kHz). |
| **Playback rate** | 0 to 8x (RATE x ball speed x HALF/DOUBLE), limited to 8x per ball. |
| **Transposition** | Plus or minus 24 semitones around ROOT. |
| **Launch speed** | 0.10 to 2.50 arena crossings per second, up to 2x more with the SPEED CV. |
| **Envelope** | Attack 0 to 2 s, release 10 ms to 10 s. |
| **Ball life (LIFE mode)** | 0.5 s to about 37 s, then slower clocks up to unlimited. |
| **Audio inputs** | 2 stereo (IN A, IN B). |
| **Audio outputs** | 1 stereo main + 4 stereo ball outputs. |
| **CV inputs** | Sequencer note + gate, 4 ball gates, 4 ball notes, kick, speed, rate. |
| **CV outputs** | 8 ball position (X, Y per ball), 4 wall gates. |
| **Sample rates** | All sample rates supported by Reason. |
| **Patches** | Reason patch format (.repatch), 14 factory patches in 4 folders. |

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