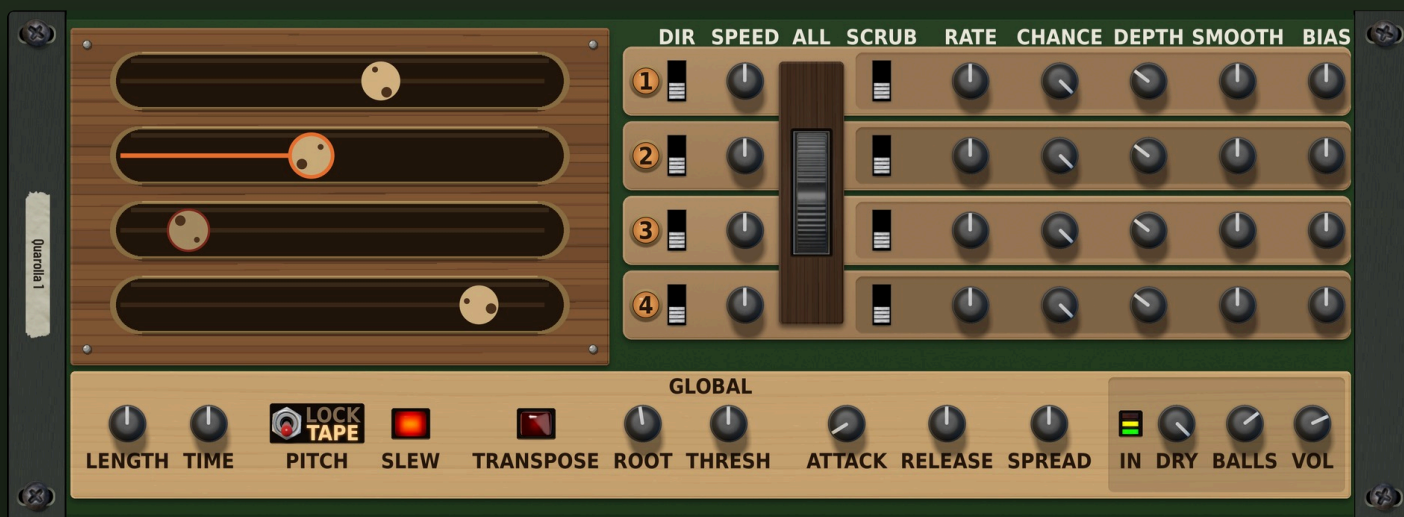


Quarolla

FOUR-VOICE MOTION LOOPER

OPERATION MANUAL



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Conventions used in this manual

Front panel labels are printed like this: **SPEED**, **SCRUB**. Back panel sockets are printed like this: **GATE 1**, **HEAD 1**.

Numbered amber circles such as **5** refer to the front panel picture in chapter 2. Lettered tags such as **F** refer to the back panel picture in chapter 3.

Knob positions are given as the value Reason shows in the tooltip while you turn the knob, from 0.00 (fully left) to 1.00 (fully right). Where a knob has a musical unit, the tables in this manual translate the tooltip value into that unit. **LENGTH** and **TIME** show seconds in the tooltip directly.

Note names follow Reason: C3 is MIDI note 60.

The four voices are called *balls*, because that is how the display draws them, and the four lanes they roll in are called *tubes*. Ball 1 always lives in tube 1, ball 2 in tube 2, and so on.

1 Introduction

Quarolla is a four-voice motion looper for Reason's rack. Every note you play catches a fresh piece of whatever is coming into its audio input and turns it into a ball: a short loop rolling in its own tube.

The moment a ball is caught it starts to move. It leaves at the original speed and glides, over a time you set, to a speed of its own: slower, faster, or all the way to a stop. It can run forwards, backwards, or swing to and fro like a pendulum. A scrub section can push it around inside its loop: sweeping, jumping to random places, following a CV, or following your hand on the display.

There are four balls, and each one has its own motion and scrub controls on its own row of the panel, and its own lamp to switch it on or off. Below them, the **GLOBAL** board sets what every ball shares: how much audio a note catches, how fast the motion settles, whether speed bends the pitch like tape or leaves it locked, transposition from the keyboard, the envelope, the stereo spread and the levels.

Quarolla is an instrument with an audio input. You play it from its sequencer track, from a MIDI keyboard, or from CV, and you feed it audio from any device in the rack: a synth you are playing, a drum loop, a vocal, the output of a mixer channel. The input can also pass straight through to the output, so Quarolla can sit in a signal chain and add its balls on top of the source.

On the back, each ball has its own stereo output, its own gate, note and scrub CV inputs, and a CV output that reports where it is in its loop.

What it is good at

Freezing and slowing moments of a performance into evolving loops. Tape stops and speed-ups that land on a chord. Four-part stacks built from one phrase, each part transposed from the keyboard. Granular-sounding pads from a few seconds of audio. Hand-scratching a loop on the display. Driving other devices from the four playhead CV outputs.

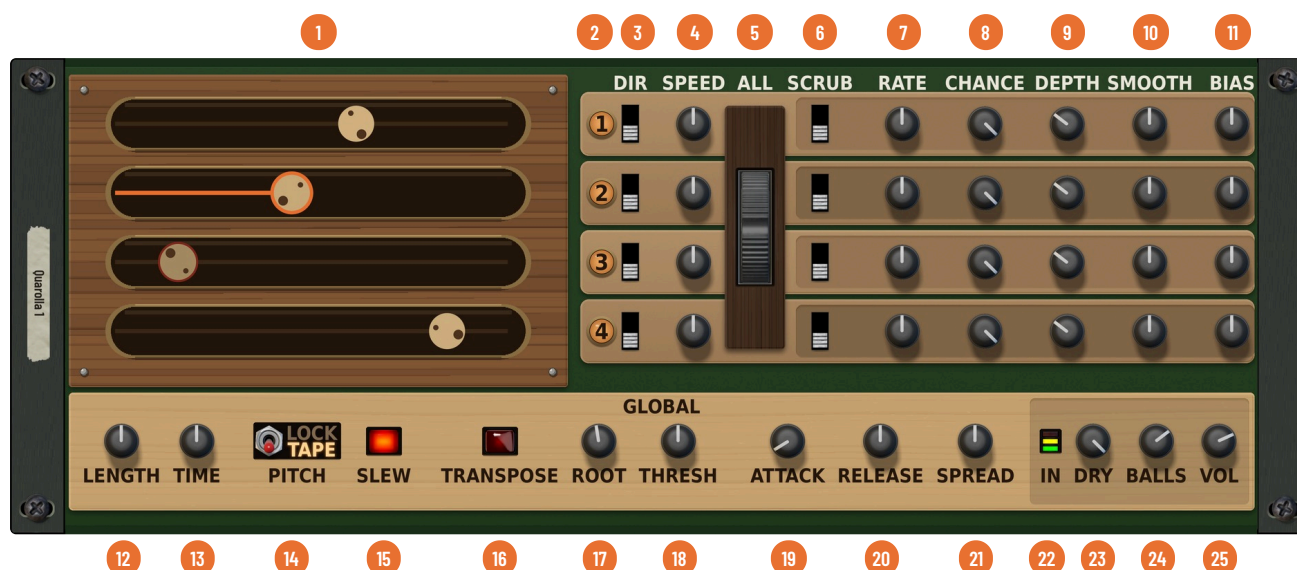
Not tempo-synced

Quarolla works in seconds, not in beats. Capture length, glide time and scrub rate are set in seconds and hertz, and the balls do not follow the transport. If you want a ball to start on the beat, trigger it on the beat.

IN A HURRY?

Create Quarolla, cable a sound source into **IN** on the back (both **L** and **R**), and play notes on Quarolla's track while the source is sounding. Each note catches about 0.7 seconds of the source into a ball. Turn a ball's **SPEED** knob to the left and play again: the new ball slides down to a slower speed over about one second.

2 Front Panel at a Glance



Numbers above the picture point at the columns of the four voice rows; numbers below point at the **GLOBAL** board. Every control in a voice column does the same job for its own ball.

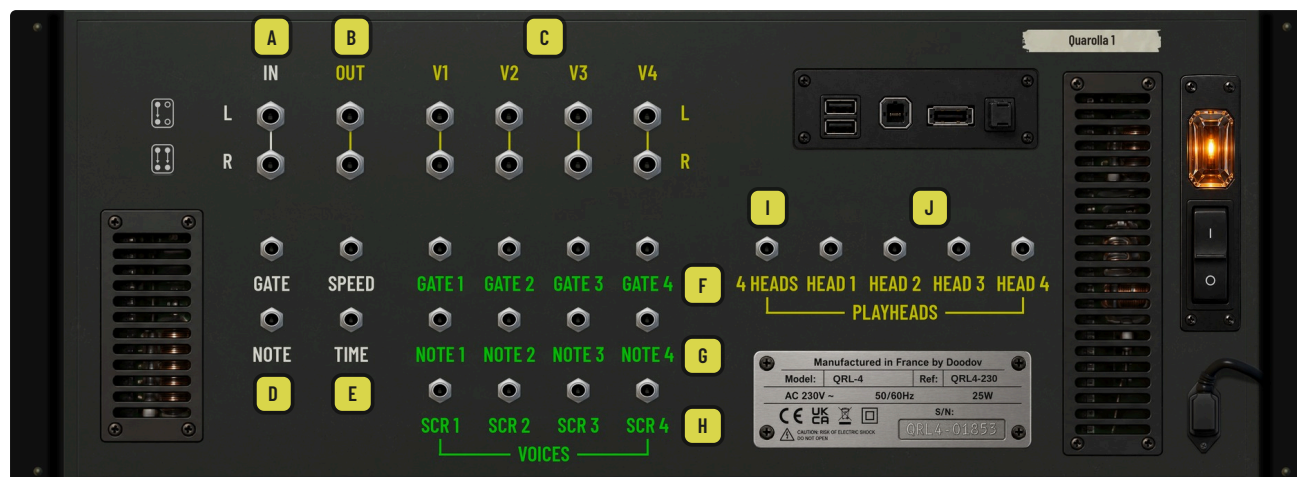
The balls and the voice rows

- 1 **Display**. Four tubes, one per ball. Shows what each ball is doing and where it is in its loop. Drag in a tube to scrub its ball; click a tube to release its ball. Chapter 6.
- 2 **Ball on/off, 1-4**. Click the numbered lamp to switch that ball on (lit, default) or off (dimmed). A ball switched off while it plays fades out. Section 5.7.
- 3 **DIR** Direction: Forward (down), Reverse (middle), Pendulum (up). Read when the ball is caught. Chapter 7.
- 4 **SPEED** The speed the ball glides to, from stopped to 8×. Centre is 1×, the original speed. Chapter 7.
- 5 **ALL** Spring-loaded wheel that scrubs all four balls together and springs back on release. Chapter 10.
- 6 **SCRUB** Scrub mode: Off (down), Auto (middle), Random (up). Chapter 9.
- 7 **RATE** How often the scrub moves: 0.05 to 10 Hz.
- 8 **CHANCE** Probability that the scrub happens in each period.
- 9 **DEPTH** How far the scrub reaches, up to the whole loop.
- 10 **SMOOTH** How quickly the ball may travel to its scrub target: left is a slow wind, right is tight.
- 11 **BIAS** Moves the centre of the scrub forwards or backwards in the loop.

The Global board

- 12 **LENGTH** How much audio each note catches: 0.10 to 5.00 s.
- 13 **TIME** How long the balls take to glide to their speed: 0.05 to 20 s.
- 14 **PITCH** Lever: TAPE (down), speed bends pitch; LOCK (up), pitch stays put. The lit word shows the mode. Chapter 8.
- 15 **SLEW** On (lit, default): scrub CV jumps and the **ALL** wheel's return are wound like tape. Off: they splice with a short crossfade. Section 9.6.
- 16 **TRANSPOSE** On (lit): each ball is pitched by its note, relative to **ROOT**. Off: every ball plays at the original pitch.
- 17 **ROOT** The note that plays at original pitch when **TRANSPOSE** is on. Default C3.
- 18 **THRESH** The level a **GATE 1** – **GATE 4** input must reach to catch a ball, 0 to 127. Default 63. Chapter 12.
- 19 **ATTACK** Fade-in of each ball, 0 to 2 s. Chapter 11.
- 20 **RELEASE** Fade-out after the note ends, 0.01 to 10 s.
- 21 **SPREAD** Spreads the four balls across the stereo field.
- 22 **IN** Input level meter.
- 23 **DRY** Level of the input passed straight to the main output.
- 24 **BALLS** Level of the four balls.
- 25 **VOL** Master level.

3 Back Panel at a Glance



White labels are the device's own connections, yellow ones are outputs, and green ones belong to one voice each.

- A** **IN** Audio input, L and R. Everything the balls catch comes in here. Connect both sockets; see 4.2 for mono sources.
- B** **OUT** Main output, L and R. The dry input plus all four balls, after **VOL**. Auto-routed to the mixer when you create Quarolla.
- C** **V1**–**V4** Voice outputs, L and R. Each carries one ball on its own. They are extra outputs: the ball still sounds on the main output too. See 11.5.
- D** **GATE** / **NOTE** Sequencer CV input. A gate and note pair that plays Quarolla exactly like MIDI notes. Reason connects it automatically when you create a pattern sequencer such as the Matrix with Quarolla selected.
- E** **SPEED** / **TIME** Modulation CV inputs. **SPEED** adds to all four **SPEED** knobs; **TIME** adds to the **TIME** knob.
- F** **GATE 1**–**GATE 4** Voice gate inputs. Gate *n* catches and releases ball *n* directly.
- G** **NOTE 1**–**NOTE 4** Voice note inputs. Note *n* transposes ball *n*, live, while it is connected.
- H** **SCR 1**–**SCR 4** Voice scrub inputs. A bipolar CV that moves ball *n* within its loop.
- I** **4 HEADS** Playhead output. The position of the most recently caught ball, 0 to 1.
- J** **HEAD 1**–**HEAD 4** Voice playhead outputs. Where ball *n* is in its loop, 0 to 1.

Every CV connection is described in detail in chapter 12.

4 Setting Up

4.1 Inserting Quarolla

Create Quarolla from the browser like any instrument. Reason gives it a sequencer track and a note lane, and connects its main **OUT** to the mixer. Quarolla makes no sound of its own: it needs audio at its input before a note can catch anything.

4.2 Feeding audio in

Press Tab to turn the rack around and connect a source to **IN** **A**. Typical sources:

- **An instrument you are playing.** Disconnect its outputs from its mixer channel and connect them to Quarolla's **IN**. With **DRY** at its default (fully right), you still hear the instrument through Quarolla's main output, with the balls added on top.
- **A loop or audio track.** Route an audio track's channel to Quarolla with a Spider Audio splitter, or use a mix channel's insert section.
- **A send.** Connect a mixer FX send to **IN** and return Quarolla to the mixer, then turn **DRY** fully left so Quarolla returns only its balls.

The **IN** meter **22** on the front lights when signal arrives. If it stays dark, notes will catch silence.

MONO SOURCES

Quarolla records the left and right inputs as they arrive. A mono source connected only to **IN L** gives balls that sound only on the left. Split a mono source with a Spider Audio splitter and feed both **L** and **R**.

4.3 Playing it

Select Quarolla's track and play: each note catches a ball. You can also record notes on the track, play it from the **GATE**/**NOTE** CV pair **D**, or catch each ball individually from **GATE 1**–**GATE 4** **F**. The way balls are given out is described in 5.5.

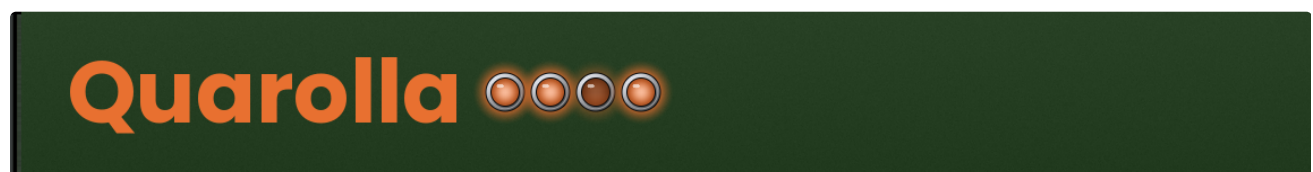
Hold a note for as long as you want its ball to keep playing. Let go and the ball fades out over the **RELEASE** time. If you caught several balls with the same key, releasing that key releases all of them.

The numbered lamps at the start of the voice rows switch each ball on or off. A note never goes to a ball that is off (5.7).

4.4 Where the sound comes out

The main **OUT** **B** carries the dry input (set by **DRY**) plus the four balls (set by **BALLS**), all through **VOL**. The voice outputs **V1**–**V4** **C** each carry one ball, for separate processing or mixing. See 11.4 and 11.5.

4.5 The folded panel



Folded, Quarolla shows one orange activity lamp per ball after its name. Here balls 1, 2 and 4 are sounding and ball 3 is fading out.

When you fold Quarolla, the four small lamps after its name show which balls are active, from 1 on the left to 4 on the right. A lamp is lit while its ball records or plays, glows at half strength while the ball fades out, and is dark when its tube is empty. On the unfolded panel the rolling balls show the same thing.

4.6 Saving settings

Quarolla has no patch browser of its own. All of its settings are saved with your song. To keep a setup for other songs, put Quarolla in a Combinator and save the Combinator patch. The audio in the balls is never saved: balls are always caught live.

5 How Quarolla Works: Balls

5.1 Catching

A note does not grab audio that has already gone by. It starts recording at the moment the note arrives and keeps recording for **LENGTH** seconds. That recording is the ball's loop.

The ball does not wait for the recording to finish. About 30 milliseconds after the note in TAPE (roughly 85 ms in LOCK, longer when the ball is transposed up), it starts playing back what it has caught so far, following just behind the recording. On the display, the tube fills with an orange line from the left while this happens. So at 1×, a freshly caught ball sounds like a slightly delayed copy of the input. It becomes something else as it starts to move.

The recording always runs for the full **LENGTH**, even if you let go of the note early. Only the sound fades; the loop is still completed.

5.2 The loop

When the recording is complete, the ball loops it end to end. The loop point is blended, so it does not click. In Forward the ball wraps from the end to the start; in Reverse from the start to the end; in Pendulum it turns round at each end. If a ball runs faster than 1× while it is still recording, it reaches the recording point and loops round the part caught so far.

5.3 Motion

Every ball leaves at 1× and glides to the speed set by its row's **SPEED** knob. **TIME** sets how long the glide takes. The glide is smooth in musical terms: halving the speed takes as long as doubling it. Near zero it becomes a straight ramp, so a **SPEED** of zero really comes to a stop, like a tape machine switched off.

SPEED and **TIME** are live. Turn a knob while a ball plays and the ball glides to the new speed.

5.4 Releasing

When its note ends, a ball fades out over the **RELEASE** time, still moving, and then its tube is empty. The display draws a red ring round a ball that is fading out. You can also release a ball by clicking its tube on the display (6.3).

5.5 Four tubes: who gets which ball

Notes from the track, a MIDI keyboard or the **GATE**/**NOTE** CV pair are given to the **first empty tube**, counting from 1, among the balls that are switched on. When they are all busy, a new note takes over the oldest of them that is fading out. If none is fading out, it takes over the oldest ball. A ball that is switched off is never used (5.7).

A ball that is taken over does not cut off. It fades out quickly (about 40 milliseconds at 48 kHz, shorter at higher sample rates) while the new ball starts recording into a different buffer, so the old sound does not leak into the new loop. The display shows the new ball straight away; the fading one is not drawn.

Up to two taken-over balls can fade out at the same time. If a third is taken over while two are still fading, the oldest of those is cut short, which can click. That only happens when you play three or more new notes at once while all four tubes are busy; giving the tubes a short **RELEASE** avoids it.

The voice gate inputs work differently. **GATE 3** always catches into tube 3, whatever is in it, as long as ball 3 is switched on. Use them when you want each ball to stay on its own row, its own settings and its own output.

THE ROW DECIDES THE BEHAVIOUR

A ball's motion and scrub come from the row of the tube it lands in, not from the note. If you play from the keyboard, a note lands in tube 1; a second note played while the first ball is still sounding lands in tube 2, and so on. Set up the four rows differently and successive notes take on four different characters.

5.6 What a ball keeps from its note

Some settings are read once, when the ball is caught, and stay with that ball for its life. Others act on balls that are already playing.

FIXED WHEN THE BALL IS CAUGHT	LIVE WHILE THE BALL PLAYS
LENGTH	SPEED and TIME (with their CV inputs)
DIR	SCRUB , RATE , CHANCE , DEPTH , SMOOTH , BIAS , ALL , SLEW
PITCH (TAPE or LOCK)	SPREAD , DRY , BALLS , VOL
ATTACK and RELEASE	Transposition from NOTE 1 – NOTE 4 while connected
Transposition from the note played, TRANPOSE and ROOT	

So if you flip a **DIR** switch or the **PITCH** lever and nothing happens, that is expected: the change applies to the next ball caught in that tube.

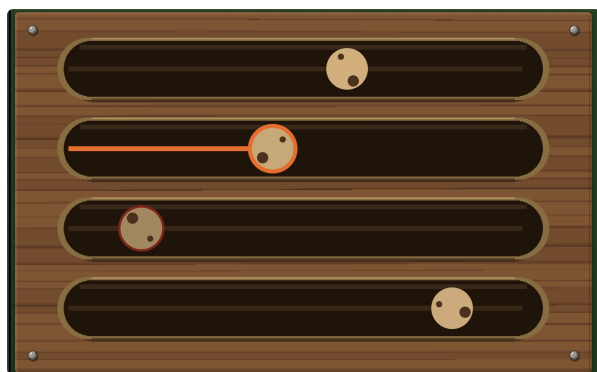
5.7 Switching balls on and off ²

The numbered lamp at the start of each voice row switches that ball on or off. Click it: lit means on (the default), dimmed means off.

WHILE A BALL IS OFF...	WHAT HAPPENS
If it was playing	It fades out over its RELEASE time, still moving, with the red ring on the display. It is never cut.
Notes from the keyboard, the track or the GATE / NOTE pair	Go to the balls that are on. Taking over a busy tube also happens only among them.
Its own GATE input	Is ignored.
All four balls off	Notes and gates are ignored.

Switching a ball back on makes its tube available again; nothing restarts on its own. A gate that is already high when you switch the ball on waits for its next rise. The lamps can be automated and have MIDI CCs 71–74, so you can thin a pattern out or bring balls in from the sequencer.

6 Reading the Display



From the top: a ball playing; a ball still recording (orange); a ball fading out (red ring); a ball playing near the end of its loop.

6.1 What the tubes show

YOU SEE	IT MEANS
An empty tube	No ball. The next note can use this tube.
Orange line and orange rim	The ball is still recording. The line shows how much of its loop is caught so far.
Plain ball on a dark line	Recording complete; the ball is looping its whole capture.
Red ring	The note has ended, or the ball was switched off, and it is fading out.
Ball brightness	Its current level: bright at full level, dim while fading in or out, or when it was caught with a low velocity.
The spots on the ball	It rolls with its motion: they spin faster at higher speeds, turn the other way in reverse, and stand still when the ball has stopped.

6.2 Position

The ball's position along the tube is its place in its loop: the left end is the start of the recording and the right end is the end. Scrubbing is included, so the ball is always drawn where you hear it. The same position is sent out of the **HEAD** outputs. In LOCK the ball stops a little short of the right end, because the last grain needs room to play; the shorter the loop and the higher the transposition, the more noticeable this is.

6.3 Using the display

GESTURE	WHAT IT DOES
Drag in a tube	Moves the ball through its loop: it follows the pointer. You can start the drag anywhere in the tube, not only on the ball. When you let go, the ball carries on with its motion from where you left it. See 10.2.
Click a tube without moving	Releases that ball, as if its note had ended: it fades out over the RELEASE time. Clicking an empty tube does nothing.

A click only counts as a click if the pointer moves less than a few pixels; anything more is a drag. The release happens when you let go of the mouse button, so you can start a drag without losing the ball.

7 Motion: Direction, Speed and Time



Voice row 1. **DIR** and **SPEED** set the ball's motion; the inset to the right is its scrub section (chapter 9).

7.1 **DIR** Direction 3

POSITION	THE BALL...
Forward (down)	plays from the start of its loop to the end, then wraps to the start.
Reverse (middle)	starts at the newest audio it has caught and plays backwards, wrapping from the start to the end.
Pendulum (up)	plays forwards to the end, turns, plays backwards to the start, turns, and so on. Like a real pendulum, it is fastest in the middle and slows towards each end, down to a tenth of its speed, before turning smoothly.

The direction is read when the ball is caught (5.6).

7.2 **SPEED** Target speed 4

The speed the ball glides to. The left half of the knob goes from stopped up to the original speed in an even ramp. The right half doubles the speed every sixth of the knob's travel, up to 8×.

TOOLTIP	0.00	0.25	0.50	0.67	0.83	1.00
Speed	stop	0.5×	1× (default)	2×	4×	8×

What a speed sounds like depends on **PITCH** (chapter 8). In TAPE, half speed is an octave down, and a speed of zero is a tape stop: the sound slides down to silence. In LOCK the pitch stays where it is: half speed stretches the sound to twice its length, and zero freezes the ball on one spot, holding a steady texture.

The **SPEED** CV input **E** adds to all four **SPEED** knobs at once (chapter 12).

7.3 **TIME** Glide time 13

How long a ball takes to settle at its target speed: from 0.05 s (almost immediate) to 20 s (a long, slow drift). The tooltip shows the time in seconds; it is the time the ball needs to cover about 95% of the way. **TIME** is shared by all four balls and acts on balls that are already moving.

TOOLTIP	0.05 S	0.22 S	1.00 S	4.47 S	20.00 S
Knob position	fully left	¼	centre (default)	¾	fully right

8 Pitch: Tape, Lock and Transpose

8.1 PITCH TAPE or LOCK 14

The lever sets how speed and pitch relate for the next balls you catch. The word lit beside it shows the current mode.

MODE	SPEED CHANGES...	SOUND
TAPE (lever down, default)	pitch and time together, like varispeed on a tape machine. 2× is an octave up and twice as fast.	Clean and direct. Glides and stops sound like tape.
LOCK (lever up)	only the speed of travel through the loop. The pitch stays put, and only transposition changes it.	The ball is read in small overlapping grains, which gives slow speeds a soft, smeared, granular quality.

8.2 TRANPOSE and ROOT 16 17

With **TRANPOSE** off (lamp dark, default), notes only trigger: every ball plays at the pitch it was caught at, whichever key you press.

With **TRANPOSE** on (lamp lit), each ball is transposed by the distance between its note and **ROOT**. With **ROOT** at C3, playing E3 transposes up four semitones and A2 down three. The range is two octaves either way; notes further out play at the limit.

In TAPE, transposition multiplies with speed: a ball transposed up an octave and running at 0.5× sounds just like the original. In LOCK, transposition is the only thing that sets the pitch.

NOTE 1 – **NOTE 4** on the back transpose their ball the same way, also relative to **ROOT** and only while **TRANPOSE** is on. Unlike a keyboard note, they keep working on a ball that is already playing, so a sequencer can re-pitch a held loop step by step (chapter 12).

LOCK AND VERY SHORT LOOPS

In LOCK, each grain spans a fixed stretch of audio, longer when the ball is transposed up. With a very short **LENGTH** and a high transposition, there is little room left for the grains to travel, and the ball holds a near-static texture instead of moving through its loop. Lengthen the capture if a LOCK ball sounds stuck.

9 Scrubbing

9.1 How scrubbing works

Scrubbing moves a ball's playhead within its loop on top of its motion. The motion keeps running underneath: the scrub pushes the playhead ahead of, or behind, the place where the motion would have put it. When the scrub returns to zero, the ball is back where it would have been without it.

Scrub distances are measured in loop lengths. An offset of 0.25 is a quarter of the ball's loop, whatever its **LENGTH**. Offsets wrap round the loop, as the ball does. All scrub sources together reach at most one loop either way.

A ball never jumps. When the scrub asks it to be somewhere else, it travels there, fast, through the audio in between, like tape wound by hand. In TAPE that travel is audible as a quick pitch sweep; in LOCK the pitch stays put and only the place in the loop moves. The one exception is a splice, chosen with **SLEW** (9.6).

There are four sources of scrub, and they add up: each ball's own scrub generator (9.2 to 9.5), its **SCR** CV input, the **ALL** wheel (10.1), and dragging the ball on the display (10.2).

9.2 **SCRUB** Mode 6

POSITION	THE GENERATOR...
Off (down, default)	does nothing. The ball can still be scrubbed by its SCR input, the ALL wheel and the display.
Auto (middle)	sweeps the ball ahead and behind in an even triangle: forward to + DEPTH , back through zero to - DEPTH , and back to zero, once per period. A ball caught into an empty tube starts its sweep at zero.
Random (up)	picks a new random offset between - DEPTH and + DEPTH once per period, and moves the ball there.

9.3 **RATE** and **CHANCE** 7 8

RATE sets how often the generator moves: one Auto sweep, or one new Random value, per period.

TOOLTIP	0.00	0.25	0.50	0.75	1.00
Rate	0.05 Hz (every 20 s)	0.19 Hz	0.71 Hz (default)	2.7 Hz	10 Hz

CHANCE is the probability that the generator does anything in a given period. At 1.00 (default) every period scrubs; at 0.50 about one in two; at 0.00 none. A period that loses the toss leaves the ball resting on its own motion, without scrub and without **BIAS**, until the next period tosses again. A change of **CHANCE** takes effect from the next period, so it never cuts a sweep short.

Two Quarollas side by side make different random choices.

9.4 **DEPTH** and **BIAS** 9 11

DEPTH is how far the generator reaches, in loop lengths, either side of the ball. At 0.30 (default) the ball scrubs up to 30% of its loop ahead and behind; at 1.00 it can reach anywhere.

BIAS shifts the centre of the scrub, from one whole loop back (-1.00) to one whole loop ahead (+1.00); the centre position is 0.00. With **BIAS** at +0.25, an Auto sweep runs round a point a quarter of the loop ahead of the ball. Because offsets wrap round the loop, ± 0.50 already reaches every point; beyond that the centre

comes round the other side, and ± 1.00 lands back on the ball itself after a full-loop wind. **BIAS** applies only while the ball is actually scrubbing; in periods the generator plays (mode on, **CHANCE** passed), or whenever its **SCR** input is connected.

9.5 SMOOTH 10

The fastest the ball may travel to reach its scrub target. Fully left, it winds slowly, at about 0.15× the original speed: a lazy tape wind that rounds off fast scrubs and may not reach every target before the next one arrives. Fully right, it follows tightly, at up to three times the original speed. The default, 0.50, is a quick but rounded move.

SMOOTH applies to every scrub source that winds: the generator, the **SCR** input, and the **ALL** wheel. Low settings make a fast Random or a CV LFO into gentle swells; high settings keep its shape.

9.6 SLEW 15

The lamp decides how a ball gets to a new place when its **SCR** CV jumps, and how the balls go back when you let go of the **ALL** wheel (10.1).

SLEW	A CV JUMP, OR THE WHEEL SPRINGING BACK...
On (lit, default)	is wound: the ball travels to the new place through the audio in between, at the speed SMOOTH allows.
Off (dark)	is spliced: the ball jumps straight there, with a short equal-power crossfade (about 20 ms) so the cut does not click. Very small steps, under 2% of the loop, are still wound.

Splicing applies to TAPE balls whose **SCRUB** switch is Off. The rest always winds, whatever **SLEW** says: LOCK balls, any ball whose Auto or Random generator is engaged, and the **ALL** wheel while you move it. They move in many small steps, and splicing every step would chop the sound.

With **SLEW** off, a stepped CV in a **SCR** input (a Matrix curve, a sample-and-hold) makes a ball jump around its loop like cut tape. With **SLEW** on, the same CV makes it wind from step to step. **SLEW** can be automated (MIDI CC 15).

10 The ALL Wheel and Scrubbing by Hand

10.1 ALL 5

The wheel in the dark wooden casing between the **SPEED** and **SCRUB** columns scrubs all four balls at once. Push it up to move every ball ahead in its loop, down to move it back. Full travel is half a loop either way, which reaches every point of the loop. The offset adds to each ball's own scrub, so balls that are already sweeping keep sweeping, around the shifted point.

The wheel is spring-loaded: let go and it returns to centre, and the balls go back to where they would have been. With **SLEW** on they wind back; with **SLEW** off, TAPE balls whose **SCRUB** switch is Off crossfade back (9.6). Each ball follows the wheel at the speed its own **SMOOTH** allows, so a ball with **SMOOTH** fully left trails the others.

The wheel sends MIDI CC 70 and can be mapped to a hardware control or recorded as automation like a pitch bend wheel. The centre value is 32.

10.2 Dragging a ball

Click in a ball's tube and drag along it: once the pointer has moved a few pixels, the ball heads for it and the playhead follows the pointer. In TAPE the pitch follows your hand, as when you move tape over a playback head: drag slowly for a low growl, fast for a squeal, back and forth to scratch. In LOCK the pitch stays put and only the position moves.

The ball does not teleport to the pointer. It travels there quickly (up to eight times the original speed), smoothed so that a jerky mouse still sounds like a continuous movement. If you grab a ball and pull it to the far end of the tube, you hear it zip there.

While you hold the mouse still, the ball keeps playing with its motion from where you left it. A drag is a move, not an offset: when you let go, the ball stays where you put it and carries on from there.

A ball can be dragged once its playback has started, a few tens of milliseconds after it is caught.

10.3 Clicking a tube

A short click on a tube, without dragging, releases its ball: the ball fades out over the **RELEASE** time as if its note had ended. It works on balls caught by notes and by gate CV alike.

COMBINING THE SOURCES

All the scrub sources work together. A ball can be sweeping on Auto, shifted by **BIAS**, wobbled by an LFO in its **SCR** input and pushed by the **ALL** wheel at the same time. The display always shows the sum.

11 Envelope, Levels and Outputs



The **GLOBAL** board. The darker inset on the right holds the levels, in signal order: input meter, dry, balls, master.

11.1 ATTACK and RELEASE 19 20

ATTACK fades each new ball in; **RELEASE** fades it out after its note ends (to -60 dB in the time shown). Both are read when the ball is caught. Even at an **ATTACK** of zero, every ball opens with a tiny fade of a few milliseconds so it never starts with a click.

TOOLTIP	0.00	0.05	0.25	0.50	0.75	1.00
ATTACK	0	5 ms (default)	0.13 s	0.5 s	1.1 s	2 s
RELEASE	10 ms	14 ms	56 ms	0.32 s (default)	1.8 s	10 s

11.2 Velocity

The velocity of the note sets the level of its ball: a soft note gives a quieter, dimmer ball. On the **GATE** / **NOTE** CV pair, the gate level is the velocity. Balls caught by **GATE 1** – **GATE 4** always play at full level.

11.3 SPREAD 21

Places the four balls in the stereo field (default 0.50), from all centred (0.00) to ball 1 hard left, ball 4 hard right and balls 2 and 3 a third of the way out on each side (1.00). The panning is equal-power, and live: you can sweep it while balls play. Each ball keeps its tube's position, whichever note caught it.

11.4 IN, DRY, BALLS and VOL 22 – 25

CONTROL	FUNCTION
IN	Input meter. Its three lights come on at about -60, -20 and -12 dBFS.
DRY	How much of the input goes straight to the main output, from none (fully left) to all of it (fully right, default). The dry signal does not go to the voice outputs.
BALLS	Level of the four balls against the dry signal. 0.70 (default) is unity gain; fully right is about +9 dB.
VOL	Master level of everything Quarolla sends out, main and voice outputs alike. 0.70 is unity gain; the default, 0.75, is about +2 dB.

11.5 The voice outputs

V1 – **V4** each carry one ball, panned by **SPREAD** and scaled by **BALLS** and **VOL**. They are copies: connecting them does not remove the ball from the main output. To mix the balls separately, use only the voice outputs, and take the dry signal from the source itself if you need it.

A ball that is being taken over fades out on its own tube's output while the new ball starts there.

12 CV Connections

SOCKET	TAG	TYPE	EFFECT
GATE	D	Gate in	Plays Quarolla like a MIDI note: a rising gate catches a ball in the first free tube (5.5), and its level is the velocity; a falling gate releases it. Connected automatically when you create a sequencer with Quarolla selected.
NOTE	D	Note in	The note for the GATE input. A note change while the gate stays high releases the old ball and catches a new one, at full level. Pitch matters only with TRANPOSE on.
SPEED	E	Bipolar mod	Added to all four SPEED knobs. Full-scale CV moves them by half their travel: +1 takes a knob at centre (1×) all the way to 8×, -1 takes it to a stop.
TIME	E	Bipolar mod	Added to the TIME knob, again by up to half its travel.
GATE 1-4	F	Gate in	A gate reaching the THRESH level catches a ball into that tube, replacing whatever is there; falling below it releases it. A ball that is switched off ignores its gate. Unplugging the cable also releases it. A ball caught this way plays at full level and ignores MIDI note-offs: only its own gate, or a click on its tube, releases it.
NOTE 1-4	G	Note in	Transposes that tube's ball relative to ROOT (with TRANPOSE on). Read when the gate rises, then followed live while connected, whatever caught the ball. In TAPE the pitch changes in place; in LOCK the ball keeps its position. Unconnected, a gate-caught ball plays at ROOT .
SCR 1-4	H	Bipolar mod	Scrub offset for that ball, in loop lengths (-1 to +1), added to its generator, BIAS and the ALL wheel. Relative: a steady value shifts the ball once and it plays on from there; you hear the scrub while the CV moves. SMOOTH sets how closely it follows (9.5); SLEW decides whether a jump is wound or spliced (9.6).
4 HEADS	I	CV out, 0 to 1	The position of the most recently caught ball still sounding, as drawn on the display. 0 when no ball is playing.
HEAD 1-4	J	CV out, 0 to 1	Where ball <i>n</i> is in its loop, scrub included: 0 at the start, 1 at the end. A pendulum ball gives a triangle, a forward ball a rising ramp. Reads 0 while the tube is empty.

THRESH : the gate level 18

THRESH on the **GLOBAL** board sets how strong a gate on **GATE 1**–**GATE 4** must be to catch a ball, in the same 0–127 steps as velocity. A sequencer gate carries the step's velocity, so **THRESH** lets soft steps through or keeps them out.

THRESH	GATES THAT CATCH A BALL
0	Any gate above zero, however small.
63 (default)	Velocity 63 and up.
100	Velocity 100 and up: accented steps only.
127	Full-level gates only (velocity 127).

THRESH affects only the four voice gate inputs. The **GATE**/**NOTE** pair plays like MIDI: any gate above zero, with its level as the velocity. **THRESH** has MIDI CC 17.

THE HEAD OUTPUTS AS MODULATORS

A **HEAD** output is an LFO whose speed and shape come from the ball: it slows down when the ball glides to a low speed, swings back and forth in Pendulum, and jumps when the ball is scrubbed. Patch it into a filter cutoff, a pan, or another Quarolla's **SCR** input. Positions are sent about a hundred times per second.

GATE-CAUGHT BALLS AND THE KEYBOARD

You can mix both ways of playing. The keyboard takes the first free tube, so if your sequencer keeps tubes 3 and 4 busy through **GATE 3** and **GATE 4**, the keyboard plays in tubes 1 and 2. When all four are busy, a keyboard note can still take over a gate-caught ball.

13 Recipes

Each recipe starts from a freshly created Quarolla with a sound source connected to **IN**. Only the settings that change are listed.

Tape stop on every note

PITCH TAPE · **SPEED** all rows 0.00 · **TIME** 1.5 s · **LENGTH** 1.0 s · **RELEASE** 0.6

Every note catches a second of the source and winds it down to a halt. Shorter **TIME** makes it a quick brake, longer a slow sag. Turn **SPEED** back up while a ball is held and it spins up again.

Four characters in a row

Row 1 SPEED 0.25 · **Row 2 SPEED** 0.67, **DIR Reverse** · **Row 3 DIR Pendulum** · **Row 4 SPEED** 0.83 · **SPREAD** 1.00

Play four notes in turn: the first falls to half speed, the second runs backwards at double speed, the third swings, the fourth races at 4×. Each sits in its own place across the stereo field.

Chord from one phrase

PITCH LOCK · **TRANPOSE** on · **ROOT C3** · **LENGTH** 2.0 s · **SPEED** all rows 0.25 · **ATTACK** 0.25 · **RELEASE** 0.75

Play a chord on the keyboard while a phrase is sounding: each note catches it and becomes a voice of the chord, all at half speed with the pitch locked, stretched into a slow, soft-edged stack.

Granular drift

PITCH LOCK · **LENGTH** 4.0 s · **SPEED** 0.10 · **SCRUB** Random · **RATE** 0.30 · **DEPTH** 0.40 · **SMOOTH** 0.15

A few seconds of audio becomes a slowly wandering texture. The ball crawls through its loop while the random scrub drifts it to new places, gently because of the low **SMOOTH**. Lower **CHANCE** to let it rest between moves.

Rolling echoes

LENGTH 0.35 s · **DIR Pendulum** on rows 2 and 4 · **SPEED** rows 0.50 / 0.42 / 0.50 / 0.58 · **SPREAD** 0.80 · **BALLS** 0.55

Short catches of the source with the dry signal at full, played on the beat, give echoes that keep rolling and swinging around the original part instead of repeating it exactly.

Hand scratching

PITCH TAPE · **LENGTH** 1.5 s · **SPEED** 0.50

Catch a drum hit or a vocal word, hold the note, and drag the ball back and forth on the display. For a gesture on all balls at once, ride the **ALL** wheel and let it spring back.

Wobble from an LFO

SCRUB Off · **SMOOTH** 0.50 · **LFO** (e.g. Pulsar) → **SCR** 1, small amount

The ball wobbles around its playing position at the LFO rate, warbling the pitch in TAPE. Turn **SMOOTH** down to round the wobble off, up to keep it sharp.

Four loops from a sequencer

Sequencer gates → **GATE** 1-4 · **notes** → **NOTE** 1-4 · **TRANPOSE** on · **HEAD** 1-4 → other devices

Each lane of a sequencer catches and re-pitches its own ball on its own row and its own output. The **HEAD** outputs follow each ball and can steer other devices in the rack.

14 Automation and MIDI CC

Every front panel control can be automated and controlled through Remote, including the four ball lamps. The table lists the MIDI CC numbers Quarolla responds to. Ball drags on the display are not automated: they are a performance gesture.

CC	PARAMETER
13	Capture Length
14	Pitch Mode
15	Scrub Slew
16	Motion Time
17	Voice Gate Threshold
18	Transpose
19	Root Note
20	Attack
21	Release
22	Dry Mix
23	Pan Spread
24	Volume
25–28	Voice 1–4 Direction
33–36	Voice 1–4 Target Speed
41–44	Voice 1–4 Scrub Mode
45–48	Voice 1–4 Scrub Rate
49–52	Voice 1–4 Scrub Depth

CC	PARAMETER
53–56	Voice 1–4 Scrub Chance
57	Ball Volume
58–61	Voice 1–4 Scrub Smooth
62	Voice 1 Scrub Bias
63	Voice 2 Scrub Bias
68	Voice 3 Scrub Bias
69	Voice 4 Scrub Bias
70	Scrub All (wheel)
71–74	Ball 1–4 On

15 Specifications

Device type	Instrument with audio input, 4U. Sequencer track and note lane created automatically.
Voices	4 balls, one per tube, each switchable on/off; taken-over balls fade out (up to two at a time).
Capture length	0.10 to 5.00 s per ball (up to 2.5 s at a 192 kHz sample rate).
Target speed	Stopped to 8×, per ball; centre = 1×.
Glide time	0.05 to 20 s.
Directions	Forward, Reverse, Pendulum, per ball.
Pitch modes	TAPE (varispeed), LOCK (granular, pitch independent of speed).
Transposition	±24 semitones from ROOT , by note or per-voice note CV.
Scrub	Per ball: Off / Auto / Random at 0.05 to 10 Hz, with chance, depth, smoothing and bias; scrub CV per ball; global spring-loaded wheel; drag on the display.
Envelope	Attack 0 to 2 s; release 10 ms to 10 s.
Audio	Stereo in; stereo main out; four stereo voice outs.
CV	16 inputs (gate, note, speed, time; gate, note and scrub per voice, voice gates with an adjustable threshold); 5 outputs (newest playhead, playhead per voice).
Indicators	Rolling balls on the display; four activity lamps on the folded panel.
Sample rates	22.05, 44.1, 48, 88.2, 96 and 192 kHz.

16 Troubleshooting

SYMPTOM	WHAT TO CHECK
Notes make no sound.	Is anything reaching IN ? The IN meter must light while you play. A note catches what arrives <i>after</i> it, so the source has to sound at the same time. Check BALLS and VOL .
I hear the source, but no change.	At 1× with DRY up, a new ball is a slightly delayed copy of the input. Move a SPEED knob away from centre, or turn DRY down to hear the balls alone.
Balls only sound on the left.	The source is mono and connected to IN L only. Feed both inputs (4.2).
Changing DIR , PITCH , LENGTH , ATTACK or RELEASE does nothing.	These are read when a ball is caught. Play a new note (5.6).
The keyboard plays every note at the same pitch.	TRANPOSE is off. Turn it on, and check ROOT .
A ball has stopped.	Its SPEED is fully left, or the SPEED CV pulls it down. In LOCK a stopped ball holds a steady texture; in TAPE it falls silent.
The scrub knobs do nothing.	The row's SCRUB switch is Off, or CHANCE or DEPTH is at zero. BIAS and SMOOTH act only while the ball is scrubbing.

SYMPTOM	WHAT TO CHECK
A fifth note cuts a ball short.	All four tubes were busy, so the oldest ball was taken over (5.5). Shorten RELEASE so tubes free up sooner.
A ball caught by GATE CV ignores the keyboard's note-offs.	By design: only its gate, or a click on its tube, releases it (chapter 12).
A per-voice gate does not trigger.	The gate is below the THRESH level (default 63). Lower THRESH , or raise the step velocity in the sequencer. Also check that the ball's lamp is lit.
A tube never gets a note.	Its ball is switched off: the numbered lamp is dimmed. Click it (5.7).
Every note is ignored.	All four balls are switched off, or nothing reaches IN .
SLEW seems to do nothing.	It acts on SCR CV jumps and the wheel's return, for TAPE balls whose SCRUB switch is Off (9.6).
A LOCK ball sounds stuck.	A very short LENGTH with a high transposition leaves the grains no room to move. Lengthen the capture (8.2).
Long captures are cut at 2.5 s.	At a 192 kHz sample rate each ball holds at most 2.5 s, whatever LENGTH shows.

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