FOUR INSTRUMENTS. PHYSICAL EXPRESSION.

Maremba

Player guide / 1.5.7f5

Maremba is a physically modelled percussion instrument by Protocodus. Its four instruments generate each note from vibrating bars or tines, their supports and resonators. There are no recorded samples. Quality, startup and output instructions below describe **1.5.7f5**, with Linear velocity and native 1x defaults. The Walnut & Champagne finish and factory sound bank are preserved from 1.5.7f2. Quality now reads **1x, 2x, 4x, 8x** clockwise; saved patches and songs retain their original Quality setting. The bank retains the 1.5.7d1 gentle factory refinement. The release notes describe this update and its validation status. The preset balance reference explains measured output levels separately from Reason's VU display. Create a fresh instance after installing an update so its factory patch loads.



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Start playing

1. Create Maremba and use its main stereo outputs. The default patch is **Concert Grand Rosewood**.
2. Play a short phrase at several velocities. Softer and harder strokes change the physical contact and tone as well as the level.
3. Choose an instrument, then a Striker. Adjust **Hardness** and **Position** while playing new notes to shape the attack.
4. Use **Close**, **Room** and **Piezo** to balance the sound. **Volume** is the overall level; the small **VOL** knobs beneath playing controls are velocity sensitivities.
5. Start with **16 Voices** and native **1x Quality**, the factory-bank settings. Use the native preset controls to explore and save sounds; the device-name label is editable.

The 20 factory presets all start with **Buzz and its VOL at zero**. Decay VOL starts at **zero** in the natural instruments and **10%** in the three extended ambient/roll presets. Hardness, Carving, Coupling and Tension VOL remain at **10%**; Position, Bloom, Sympathetic, Artifacts and Variance use **5%, 7.5% or 10%** according to the preset. The preset scope lists the groups. A preset's name can describe its inspiration: **Birifor Gyil Buzz** also starts clean, and its Buzz knob adds the membrane sound. Fresh initialized sounds also start with Buzz and its VOL at zero on every instrument. Raise Buzz to add membranes or board rattles. Loading a saved patch or song restores its stored Buzz setting; choosing another Model does not reset the current Buzz position.

Choose an instrument

Instrument	Character	Striker choices
Imperial Rosewood 5.0	Concert-marimba bars with a rounded attack and restrained tube/frame support	Yarn, Cord, Rubber, Wood, Shaft
Mayan Padauk 4.3	Shorter wooden bars and box resonators; Buzz adds charleo membranes	Yarn, Cord, Rubber, Wood, Shaft
Balafon Ancestral	Wooden keys and gourd resonators; Buzz adds mirliton membranes	Yarn, Cord, Rubber, Wood, Shaft
Kalimba Artisan	Plucked steel tines, a yielding bridge and shared wooden box; Buzz adds board rattles	Flesh, Thumb, Nail, Pick, Tap

These are voiced instrument families. All accept the full MIDI note range; playing far outside an acoustic instrument's register intentionally explores the model beyond that instrument's usual range.

Shape the strike

Control	What it changes
Striker	The contacting material or thumb technique. Shaft strikes with the mallet handle; Kalimba Tap uses a fingernail impact.
Hardness	Mallet stiffness, or the Kalimba thumb's release speed. Higher values generally produce a firmer attack.
Position	The contact point on a bar, or the thumb position near the tine tip. Passing a vibration node can remove particular overtones, so the change is not simply brighter or darker.
Decay	Logarithmic ring-time control from 0.1 to 8. The midpoint is 1, the instrument's natural decay rather than one second. Below halfway shortens the ring; above halfway extends it. Kalimba keeps short settings unchanged, then gradually increases from natural sustain at 1 to twice natural sustain at 8.
Variance	The spread of contact stiffness, speed, landing position and damping from stroke to stroke. Zero retains subtle natural variation; higher values make the differences more pronounced.
Artifacts	Subtle rebounds, brushes and support collisions. Their timing and shape vary continuously. Set Artifacts and its VOL to zero to disable these events; natural strike variation remains.

Repeated notes interact with the existing vibration. A re-struck bar is already moving when the mallet meets it; a Kalimba re-pluck first damps the tine. Equal note and velocity values therefore do not force identical strokes. Explicit audio Reset restarts the deterministic variation sequence for reproducible renders.

Resonance and character

Control	What it changes
Carving	At 100%, the voiced instrument geometry. Turning down approaches a plain bar on the wooden instruments and a stiffer tine/support profile on Kalimba. The fundamental remains tuned to the note.
Coupling	Interaction with the tube, box or gourd air. On Kalimba it also controls bridge loading and how strongly the tine drives the shared box.
Bloom	Frame/support resonance on the wooden instruments and shared box/soundboard radiation on Kalimba.
Sympathetic	Other bars or tines ringing through their shared support or bridge.
Buzz	Tube/box/gourd membranes on the wooden instruments; loose board buzzers on Kalimba. Set both Buzz and its VOL to zero to remove this layer.
Tension	Support damping even with Buzz at zero. Higher tension damps upper modes more strongly. With Buzz raised it also changes membrane threshold and tone, or Kalimba buzzer preload. The centre is the instrument's nominal tension.

Membranes and buzzers need enough excitation to sound. Firm nail/pick plucks bring out Kalimba board rattles; the Balafon's top keys from MIDI 84 have no membranes. These are physical response differences rather than inactive controls.

Velocity response

Velocity changes physical excitation even with every VOL at zero: mallet speed and contact force on wooden bars, or thumb force and tine deflection on Kalimba. Softer Kalimba strokes also release the tine more slowly.

The four **Velocity Response** switches select the following curves. **Linear** is the device default and is selected in all 20 factory presets.

Response	Playing feel
Soft	Light strokes reach stronger dynamics sooner.
Linear	The direct reference response.
Hard	Strong dynamics require a firmer touch.
Sigmoid	An S-shaped curve with gentler response near its ends and stronger contrast through its middle.

Sigmoid retains the former **Expressive** smoothstep curve and stored index 3. Older patches keep their saved curve.

Each of the eleven small **VOL** knobs adds velocity sensitivity to its control: Hardness, Position, Decay, Carving, Coupling, Bloom, Sympathetic, Buzz, Tension, Artifacts or Variance. These are not audio volume controls. The main knob sets the starting value, and VOL adds a fraction of that control's full range:

VOL	MIDI velocity 1	MIDI velocity 127
0%	No change	No change
50%	No change	Adds half the knob range
100%	No change	Adds the full knob range

The result stops at the main knob's maximum. The selected Velocity Response shapes the progression between these endpoints. For example, Hardness at 20% with VOL at 50% reaches 70% at velocity 127. Decay sensitivity adds knob travel before its logarithmic conversion: from the natural midpoint, 10% VOL reaches about 1.52 at maximum velocity. Kalimba applies its shorter range afterwards, so even full Decay VOL cannot exceed twice natural sustain. Buzz VOL can add buzz even when the main Buzz knob is zero; the factory presets keep both at zero. Variance VOL adds stroke variation on harder hits. For example, Variance at 15% with VOL at 10% reaches 25% at velocity 127. The amount applies when a new stroke begins; it does not alter a note already ringing.

Bloom and Sympathetic use each strike's sensitivity to drive shared resonances. Buzz and Tension retain that strike's sensitivity while their main knobs move. Other strike controls take effect on new strokes, including repeated notes. The device defaults to Hardness VOL at 20% and every other depth at zero; factory defaults are listed under Start playing. Variance VOL recall in older patches is described under Working with existing patches.

Playing techniques

On the wooden instruments, raise the **mod wheel** to roll held notes with alternating mallets. More wheel increases the roll rate. Release the notes or lower the wheel to end the roll; the sound can ring on. On Kalimba, the wheel covers the box's sound hole and changes its resonance. **Pitch bend** spans ±2 semitones and also bends ringing notes.

Rear **Note Off** offers **Ring**, **Damp** and **Dead**. Ring leaves the instrument sounding after key release. Damp brings a hand or thumb onto the released key. Dead keeps the mallet against the bar from the stroke, or brings the Kalimba thumb back shortly after its pluck. Stopping Reason's transport damps sounding keys and sympathetic ringing.

Capture and room

Close captures sound travelling through air from the vibrating instrument and its resonators. **Room** blends the far microphones and room return. **Piezo** senses local bending through a bonded contact pickup: on each wooden bar, or on the shared Kalimba soundboard. Its electrical response gives it a different attack and overtone balance, without a room return. It need not be brighter on every note.

Main aligns the pickup's arrival with the airborne sound to reduce thinning when Close and Piezo are combined. The two captures remain distinct, so some notes and settings can still interfere. Start with Close, then raise Piezo for more of the instrument's local vibration. To compare their tone, lower Room and alternate Close and Piezo at similar loudness.

Invert Piezo reverses the pickup polarity in the Main mix and the direct Piezo output. Compare both positions when blending Close and Piezo: the fuller balance can depend on the note and pickup levels. Close and Room keep their polarity. The switch defaults to Off, is saved with the patch and supports automation; changes while notes are ringing smooth over 5 ms. Main retains each instrument's natural note placement and Room image. Because Piezo is centered mono, reversing it can change the balance between center and sides as well as tone and level. These effects depend on the note, instrument and capture blend; identical behavior across instruments is not expected. Current factory patches store Invert Piezo Off. Older patches that omit this switch keep its current position when loaded into an existing device.

The **INVERT PIEZO** checkbox and label form a centered horizontal row below the microphone controls in the front panel's Capture section. Stereo Spread has been removed; Main retains the natural capture image and the Width control described below. Old patches still load, but their saved Spread setting and automation no longer affect the sound.

Room Space selects Wood, Chamber or Hall and is heard when Room is raised. The rooms have light, diffuse tails, with less lingering low and midrange resonance. Two independently timed diffuse fields reduce fixed ringing peaks; short scattering clusters soften individual wall echoes while retaining each room's sense of space. Slow internal variation keeps the diffuse tail moving subtly. The response still varies with pitch, as expected for a room. The capture knobs are independent: Close and Piezo use linear levels, while Room uses a squared taper (halfway gives one quarter of full Room level). Changing one does not rescale the others. Room's fixed voiced response and tail continue running behind its level knob. Lowering all three levels silences the main mix after smoothing; the direct stems remain available.

Output and protection

Drive colors the complete Close/Room/Piezo Main mix. All direct outputs bypass it. At the **10%** default, the Drive transfer is exactly linear and adds about **0.10 dB**. Turning it above 10% progressively adds rounded, mildly asymmetric saturation. Partial output-level compensation restrains the gain increase, but Drive can still change loudness. The antialiasing treatment reduces digital aliases from saturation without removing them completely. Live Drive changes smooth over 10 ms; settings apply immediately while idle.

The main mix passes through stereo **Width**, **Drive**, **Warmth**, smoothed **Volume**, the recording gain, **Limit**, then final headroom control. Width runs from mono at zero through the natural capture image at 1 to increased Close spread at 2. Room spread caps at its natural width; Piezo remains centered. Zero Width gives mono. Warmth tilts the Main mix's low/high balance.

Lowering **Volume** gives the main mix more headroom before limiting. **85% is the unity gain reference.** Below it, the squared response provides fine adjustment; above it, a smooth boost region reaches **+7.04 dB** at full Volume relative to 85%. At 50%, the level is about 9.2 dB below the reference. The direct outputs are independent of Volume. Strong attacks and dense, hard chords can briefly engage output protection. All factory patches start with **Drive at 10%** and **Limit at 5% or below**; Equipentatonic Log Keys uses **0% Limit**. Factory Volume positions balance the same velocity-100 single-note and two-note reference by RMS while preserving each sound's attack and natural sustain. The measured score targets −22.2 dBFS, with a −22.6 dBFS Direct Piezo reference; it is the equal-power mean of the maximum 300 ms RMS windows for the two performances, not Reason's exact VU response. Adjust Volume for the actual phrase and capture mix. Presets keep their individual VCA settings; the bank uses no automatic level matching or added musical compression.

Limit from 0-30% bypasses musical compression, including the 5% default: no musical gain reduction or makeup. Above 30%, the limiter fades in smoothly through 37%, then lowers its threshold further as you turn it up. Automatic makeup lifts quieter playing and ringing tails. Full Limit retains the earlier maximum effect. Rear **Attack** (1-50 ms) and **Release** (20-500 ms) shape its linked stereo gain reduction. Returning to 30% or below bypasses this stage and its envelope after a short transition; live engagement changes crossfade over 2 ms. The stage uses no instantaneous audio waveshaper.

Separate, always-active headroom control anticipates overloads by **2 ms** and changes gain smoothly. **Main stays below −1 dBFS sample peak**; Close, Room and Piezo keep their **0.94 sample-peak** ceiling. This retains headroom above ordinary playing for stronger expression. Main L/R, Close L/R, Room L/R and mono Piezo each have their own protection. Stereo pairs share gain to preserve their balance; an overloaded capture does not turn down the other outputs. Brief protection can act below 30% Limit too. Once overload recovery has settled, signals below its detector ceiling pass unchanged apart from the delay. All seven outputs receive the same delay, reported to Reason as `ceil(sample rate × 0.002)` samples, independently of Quality. The detector also estimates peaks between digital samples to reduce reconstruction overload. These are sample-peak limits; they are not a universal intersample/true-peak mastering guarantee. Neither stage removes saturation already produced by Main Drive or a physical buzz layer.

Rear connections and setup

Connection or control	Use
Main L/R	Complete processed mix. Connect both for stereo. A single connected main jack carries the mono average.
Close L/R	Close-microphone stems before the Close level knob.
Room (Far) L/R	Far microphones and the voiced room return, both before the Room level knob.
Piezo	Mono contact-pickup stem before the Piezo level knob; bypasses Main Drive.
Note / Gate CV	Play the instrument from CV. Gate amplitude supplies velocity.
Hardness / Position / Coupling / Sympathetic / Volume CV	Add modulation to the corresponding knob, within its range.
Tune	Global instrument offset, ±100 cents, added to Reason's master tuning.
Detune	Fixed per-key pitch offsets, up to ±100 cents at maximum. This differs from the contact variation between hits.
Scale	Equal temperament or the six traditional/measured keyboard choices described below.
Voices	8, 16 or 24 simultaneous voices. Voice stealing fades old voices briefly.
Quality	Native 1x is the device and factory default: the physical model runs at the host sample rate. The selector reads **1x, 2x, 4x, 8x** clockwise. Previously saved patches, songs and automation retain their original Quality settings. Native 1x reduces processing work but can expose more aliasing; higher factors trade more processing for reduced aliasing. Changing Quality briefly fades and restarts the engine.

All five direct stems bypass Drive, Volume, the Close/Room/Piezo levels, Width, Warmth, the main-output gain and musical Limit. Direct Piezo also bypasses Main's arrival alignment: it retains electrical timing, while Close and Room retain acoustic flight. An external blend of these sockets can therefore sound different from Main. Their physical capture character and independent overload protection remain active. The calibration is set separately for Close, Room and Piezo, with distinct bar and Kalimba trims. Dense maximum-velocity chords and increased controls can still invoke protection. Each capture has its own smooth overload protection and reports the same 2 ms latency as Main L/R. Changing a capture's front-panel level or the master Volume changes the main mix, while the direct outputs remain independent of them.

Scale's panel abbreviations are **Equal**, **Bala**, **Chopi**, **Penta**, **Sambla**, **Gyil** and **Sena**. They select equal temperament, Bala 7-equal, Chopi timbila, 5-equal pentatonic, Sambla, measured Birifor gyil and measured Sena valimba tunings. Their principal keys follow the respective keyboard layout; intervening MIDI keys are interpolated. New strikes take a changed scale, and sympathetic keys follow it immediately.

Working with existing patches

The factory bank includes 20 patches and the native preset loader remains functional. Stored parameter identities and automation are retained. The older beta's Bow choice plays as Shaft; its replacement factory patch is **Rosewood Roll Chorale**. The hidden legacy Resonator Tune parameter still affects resonator tuning; it is separate from the rear Tune control. The old Glide parameter is retained for compatibility but does not affect sound.

Version **1.5.0f2** changes Decay's knob response: natural sustain is now halfway. Factory Decay settings are migrated, but saved user patches keep their knob positions, so former low settings ring for less time. For example, the former natural setting near 11% now gives about 0.17× natural sustain; set it to 50% to recover the natural base decay. Decay VOL also follows the new knob response. Room is subtler at partial settings, and saved Limit settings through 30% now bypass musical reduction and makeup. Rebalance older patches by ear.

Version **1.5.0f3** moves Drive from Piezo to the complete Main mix and changes its saturation response. Existing songs keep their saved Drive positions, but can sound different: Close and Room now contribute to the saturation, and direct Piezo no longer includes it. Main also aligns Piezo's arrival with Close; the raw Piezo socket keeps its original timing. The wooden direct-Piezo level is 6.02 dB lower for more headroom, independently of Main's blend. The new 10% factory default does not replace saved user settings.

Version **1.5.0f4** reduces fixed ringing in Room and changes Volume's taper. Existing songs and custom patches retain their stored knob values. At unchanged settings through 85%, Main is about 4.52 dB quieter than f3; at full Volume it is about 4.70 dB louder. Volume CV and automation follow the new taper too. Rebalance older patches by ear; direct capture levels do not follow this change.

Version **1.5.0f5** scatters early Room reflections and balances factory capture levels with Volume. Above the clean 10% Drive default, the new capture levels can change saturation. User-saved mixer controls remain intact.

Version **1.5.0f7** adds Invert Piezo, optional Stereo Spread and Variance VOL. Older patches that omit them take Off, Off and 0% in a new device; in an existing device they retain those controls' current positions. All factory patches keep both switches Off and use 10% Variance VOL. Refined mallet contact, Kalimba buzzer rebounds, membrane-edge tail timing and sound-hole cover motion can change older sounds. Strong Kalimba Buzz can become louder as rebounds return; the factory bank keeps buzzers disabled.

Version **1.5.1f1** updates release metadata and artwork. DSP, controls and factory patch values are unchanged from 1.5.0f7.

Version **1.5.1f6** updates release metadata and documentation only. DSP, controls, defaults and every factory patch value remain unchanged from f5. The following f5 compatibility behavior is retained.

Version **1.5.1f5** preserves Damp-mode key release during a Quality change, including cancellation of that change. A queued strike remembers whether its key release requested damping, even if Note Off changes before it starts. Model voicing, tuning, natural stereo and factory control values remain as in 1.5.1f4. The current factory bank preserves each preset's intended dynamics; earlier loudness-matching figures are historical. Set Main Volume or the direct stems' mixer faders to fit your actual phrase and check the final blend in mono.

Compatibility notes continued

Version **1.5.1f4** centers the Invert Piezo checkbox and uppercase label as one horizontal row. Its caption matches the neighboring control lettering. Sound, control behavior, defaults and stored factory patch values are unchanged from 1.5.1f3; only version metadata, patch headers and artwork change.

Version **1.5.1f3** removes Stereo Spread. Saved Off states keep the same natural stereo processing; saved On states now use that processing too. Its old automation identity remains inactive for compatibility. Invert Piezo, Width and factory capture settings are unchanged. Kalimba also loses an added bridge harmonic layer that could give Piezo a driven tone. Its board resonances and pickup electronics remain, with cleaner tone at the same saved settings. Rosewood now emphasizes the bar, with a quieter tube, frame and sympathetic return and no added tube-rim harmonic layer. Its tube still loads the bar mechanically, and pitch calibration follows the new radiation balance. Coupling, Bloom, Sympathetic, Buzz and Artifacts remain available. Saved Rosewood settings are preserved, but their resulting tone and level change. Padauk's quieter box, frame and sympathetic return bring out the bar detail as notes overlap. Its pitch calibration follows this balance, and Bloom, Sympathetic, Buzz and Artifacts still work throughout their ranges. Saved Padauk settings are preserved, but their resulting tone and level change. Balafon likewise has a quieter gourd and frame balance, with a smaller frame reduction than Padauk. Its pitch calibration follows the gourd level, and Bloom and the optional membrane Buzz remain available. Saved Balafon sounds keep their settings but change tone and level. Balafon's sympathetic return is slightly quieter to suit the new balance. Pitch changes keep an active mallet's contact response consistent, and switching through Kalimba no longer freezes a previous bar-frame tail. Fresh initialized sounds now start with Buzz off across all four models. This new default does not overwrite the Buzz values stored in existing patches or songs; the factory bank already has Buzz and its VOL at zero.

Factory and saved control values stay unchanged, with no compensating gain. On the varied-velocity validation phrase, acoustic-heavy Rosewood presets are up to 9.2 dB quieter, Padauk presets 1.6-2.3 dB quieter and Balafon presets 1.1-4.7 dB quieter than their previous level references. These are phrase-specific measurements, not fixed gain reductions for every performance. The diagnostic listening clips were level-matched. See the measured phrase levels.

The inherited lighter bar and shaft voicing and revised output levels also change older patch sounds. Their stored capture levels, Drive, Limit and Volume are preserved. Factory defaults do not restrict automation or the control ranges of user patches. Keep an earlier bounce when preserving an exact historical performance matters. A release bundle's evidence report identifies the build, tests and host checks completed for that particular version.

Rear panel overview



Rear panel / Maremba 1.5.7f5