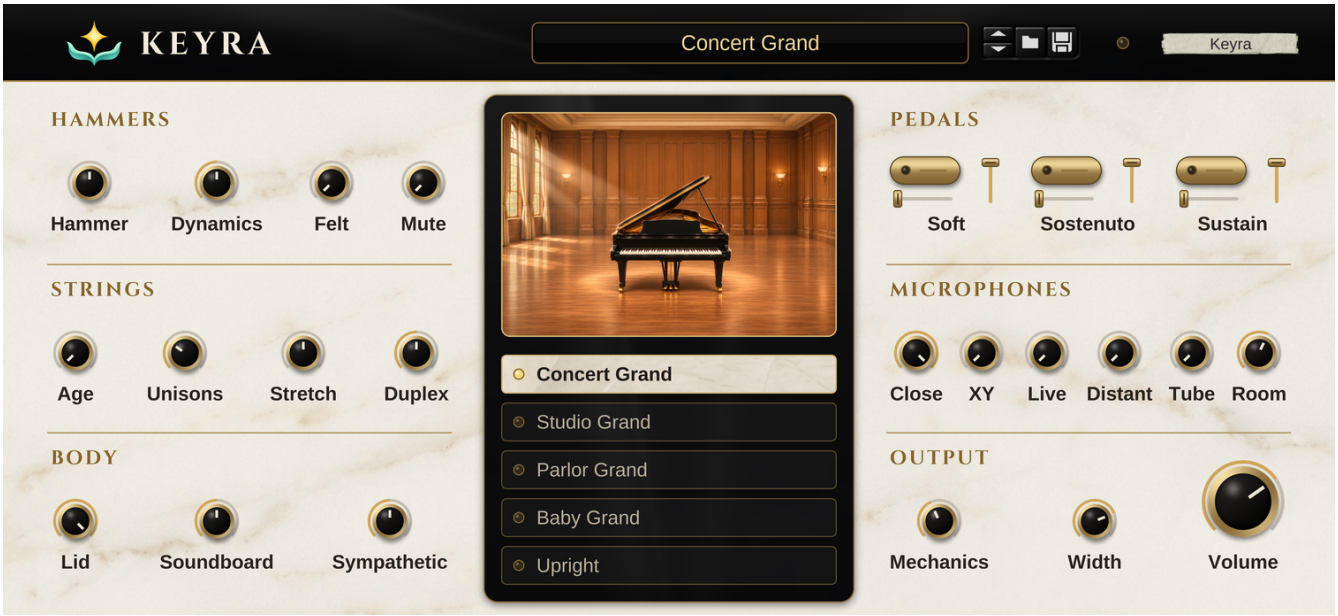
KEYRA

MODELLED PIANO · USER GUIDE · RACK EXTENSION 2.24.4f1

Keyra is a piano for Reason that plays no samples. A physical model throws felt hammers at stiff strings, couples the strings of each note at the bridge and lets a soundboard carry them to five microphones, four pairs and a valve microphone; the strings whose dampers are lifted ring with what you play. Five pianos are designed: a concert grand, a studio grand, a parlor grand, a baby grand and an upright. The front panel holds the piano and everything that changes its sound; the back holds concert pitch, each microphone's polarity and the sockets, with an output for every microphone.



Quick start

1. Create Keyra in a Reason rack. It opens on the **Concert Grand** patch.
2. Play. Velocity sets how fast each hammer is thrown: a faster hammer is louder and, because its felt stiffens under the blow, brighter.
3. Hold a sustain pedal (CC64) or switch the **Sustain** pedal on.
4. Browse the factory patches with the arrows beside the patch name, or click another piano under the picture.

The front panel

Piano

The picture shows the piano that plays, from the front, in a room of its kind. Click one of the five keys under it to choose another. Each piano is built to its size, a grand's length or the upright's height:

Piano	Size
Concert Grand	2.74 m long
Studio Grand	2.00 m long

Piano	Size
Parlor Grand	1.86 m long
Baby Grand	1.50 m long
Upright	1.25 m tall

Smaller pianos have shorter bass strings, a smaller soundboard and lighter, harder hammers. The sizes are typical of each kind of piano, not one maker's. Choosing a piano stops what sounds and plays the next note on the new one. The piano is saved with the patch and can be Remote-mapped, but it is not automated.

Hammers

Control	What it does
Hammer	The felt, from soft and worn-in at −100 % to hard and bright at +100 %; 0 is the piano as built. Applies from the next strike.
Dynamics	How far apart the softest and the hardest blow are, in loudness and in tone: a narrow, even touch at 0, the widest at 100 %. Applies from the next strike.
Felt	A practice felt between hammers and strings: a soft, muffled attack. Applies from the next strike.
Mute	Felt laid on the sounding strings, held notes included. The modulation wheel does the same; the deeper of the two plays.

Strings

Control	What it does
Age	0 is new strings. Towards 100 % the strings lose their upper partials' sustain, the wound bass strings most, and beat against themselves. Applies from the next strike.
Unisons	How far apart the two or three strings of a note are tuned: pure at 0, a well-kept piano at the default 30 %, a bar piano at 100 %.
Stretch	The tuner's stretch. At 100 % the octaves are tuned to the strings' own slightly sharp overtones, as a tuner does; 0 is equal temperament, 200 % twice the stretch.
Duplex	How strongly the short lengths of string beyond the bridge ring. The upright has none.

Body

Control	What it does
Lid	Closed at 0, the short stick at 50 %, open at 100 % (an upright's top). A closed lid keeps the high frequencies from the microphones outside the piano.
Soundboard	How long the soundboard rings: heavily damped at 0, lively at 100 %.
Sympathetic	How strongly the strings whose dampers are off answer the notes you play: held keys, everything under the sustain pedal, and the top keys, which have no dampers.

Pedals

Each pedal shows how far it is actually down, from all its sources together: the panel, MIDI controllers and the pedal keys. Click the pedal to switch it **On** or **Off**; the lamp above it lights while it is on. The fader beside it sets the **amount** the switch presses the pedal, from 0 at the bottom to 100 % at the top (100 % by default), so half-pedalling is available from the panel. Both are saved with the patch and can be automated and Remote-mapped.

The slim slider under each pedal is its **travel**: the depth automation, Remote and MIDI controllers give the pedal, which it shows and which you can drag, and it is saved with the patch. The pedal above it shows where the pedal actually is, the switch and the travel together.

- **Sustain** (CC64) lifts the dampers continuously. The half pedal is the upper middle of the travel: the strings ring on, shortened. At full travel the felt still grazes the strings, so a chord let go under it falls away in about ten seconds rather than ringing on for twenty.
- **Sostenuto** (CC66) holds only the keys that are down when the pedal crosses halfway; later notes release normally.
- **Soft** (CC67) on a grand is una corda: the hammers shift off one string of each note and strike with softer felt. On the upright the hammers start closer to the strings and arrive slower.

Pedal keys. The three keys below the piano's range play the pedals: hold **C0** (MIDI note 12) for Soft, **C♯0** (13) for Sostenuto and **D0** (14) for Sustain, and release the key to let the pedal up. They play no string. Each pedal plays the deepest of its switch, its MIDI controller and its key, and releasing one source never lifts a pedal another source still holds. Octave names here use MIDI note 60 = C4.

Microphones

Four pairs and a valve microphone hear the piano, each with its own level and each the kind of microphone an engineer would put there. At the same level each plays the piano as loud as the close pair, so the levels are a balance. Each is wired so the soundboard's bass reaches it in the same polarity, so they add up when mixed.

Control	What it does
Close	A spaced pair of flat pressure omnis inside the piano over the strings by the hammers (behind an upright's soundboard): the direct, percussive pop sound.
XY	A coincident pair of small cardioids at the open lid, about a metre off: a focused, natural image.
Live	A spaced pair of valve omnis on spheres in the room beside a grand, or over the player's head at an upright: the piano with some of its room.
Distant	A wide pair of diffuse-field omnis across the room: mostly room.
Tube	One valve cardioid over the strings, mono: a warm, full centre under the pairs. Off by default.
Room	The size of the room each microphone hears, from where it stands and at its own share by its distance: a small room ringing 0.3 s at 0, 0.8 s in the middle, a concert hall's 2.2 s at the top. A larger room rings longer, not louder; the close pair hears little of it, the distant pair most. With every microphone down nothing sounds.

Output

Mechanics sets how loud the action plays: the keys landing and coming back, the dampers falling and the sustain pedal's knocks. Silent at 0; 40 % by default.

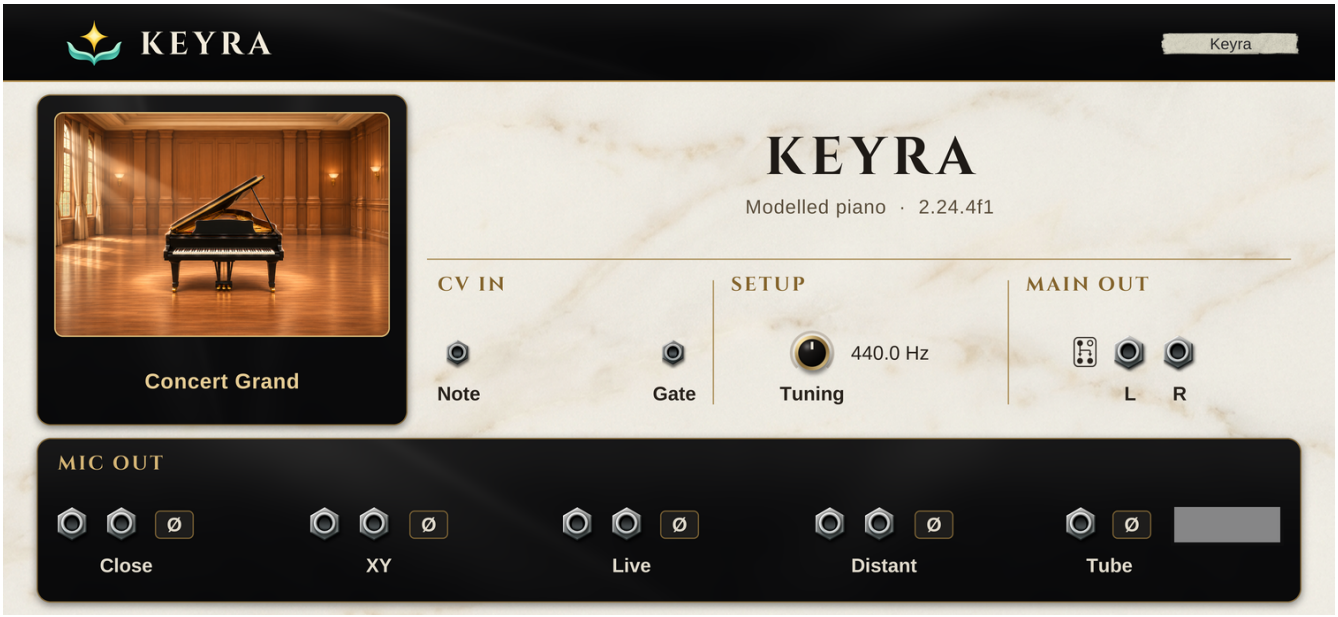
Width sets the stereo image: the microphones' own at 75 %, mono at 0.

The large knob sets the level of the main L and R outputs (70 % by default). Typical playing at that setting reads about −9 VU on Reason's channel meter. The main limiter caps sample peaks at −1.5 dBFS. Keyra reports its 2.5 ms latency to Reason.

Wheels

The panel has no wheels, as a piano needs none, but a keyboard's wheels still work: the pitch wheel bends ±2 semitones and the modulation wheel lays felt on the strings like the Mute knob. Patches save the modulation wheel's position and each pedal's switch, so return the wheel and Mute to zero and switch the pedals off before saving a patch meant for normal playing.

The back panel



The back shows the piano that plays and its name, the version under Keyra's name, CV in, Setup and the main outputs under it, and every microphone's outputs along the bottom.

Tuning

Control	What it does
Tuning	Concert pitch, A4 = 400 to 480 Hz (440 Hz by default). Reason's master tuning applies on top.

CV and audio

- **Note** and **Gate** CV inputs play Keyra from Reason's sequencers: note CV sets the pitch, gate CV the velocity. Releasing the gate, or disconnecting it, releases only the note CV started; changing the note while the gate is high strikes the new note.
- **L** and **R** are the stereo outputs: the mix the front panel sets.

Microphone outputs and polarity

Each microphone has sockets of its own under **Mic out**: Close, XY, Live and Distant as left and right, Tube as one mono socket. A socket carries its microphone at full level, whatever its knob on the front, with its room and in its polarity, and stays in time with L and R. Use them to mix and process the microphones on Reason's own mixer channels; turn a microphone's knob down on the front if it should not also be in L and R. A microphone is worked out for its sockets only while a cable is in one of them, so unused sockets cost nothing.

The **Mic out** sockets bypass the main level knob and limiter. A loud chord can exceed 0 dBFS here by more than 14 dB. When recording an individual mic, start with 16 dB of attenuation on its mixer input, play the loudest passage and check the peak before recording or exporting. Adjust the input gain to leave headroom for later processing.

The **Ø** key beside each microphone's sockets flips its polarity, in L and R and at its sockets; it lights when inverted. The microphones are already wired to add up, so leave them as they are unless a blend sounds thin and flipping one fills it out.

Factory patches

Each patch sets the piano, its hammers, strings and body, the microphones, Room (the size of a room that piano would be played in), Width and the practice felt; Output, Tuning, Mechanics, the mute and the pedals are the same in every patch. Every patch plays at about the same level. The five pianos as built sit at the top of the browser; the special versions are in the **Variations** folder.

Patch	What it is
Concert Grand (default)	The concert grand as built, close pair, lid open, in a recital room
Studio Grand	The studio grand with harder hammers, close and XY, in a studio's live room
Parlor Grand	The parlor grand as built, close pair, lid open, in a parlor
Baby Grand	The baby grand, close and XY, in a living room
Upright	The upright as kept at home: slightly aged strings, a little more detune
Felt Nocturne (Variations)	The concert grand under the practice felt
Open Strings (Variations)	The concert grand with the soundboard, sympathetic strings and duplex scales turned up, mostly from the room
Distant Hall (Variations)	The concert grand from across a large hall
Warm Walnut (Variations)	The parlor grand with soft hammers on the short stick, three pairs
Old Parlor (Variations)	The parlor grand with old strings and wide unisons
Felt Upright (Variations)	The upright under the practice felt, top half open
Pop Upright (Variations)	The upright with hard hammers, close and dry
Bar Piano (Variations)	The upright with old strings, hard hammers and unisons far apart

MIDI and Remote

Input	Controls
Note on, velocity	strikes a key, A0 to C8
Notes 12, 13, 14	Soft, Sostenuto and Sustain pedal keys
CC1 (modulation wheel)	Mute
CC64	Sustain, continuous
CC66	Sostenuto
CC67	Soft
Pitch bend	±2 semitones

Every knob, each pedal's switch and amount, and each pedal's MIDI travel (the Soft, Sostenuto and Sustain Pedal lanes) can be automated and Remote-mapped. The piano can be Remote-mapped; it is not automated.