

Aurum

An algorithmic reverb with a decay you can draw



Version 0.3.0

CLAP and VST3 effect for Linux and Windows

Part of the Audio Plugins

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Aurum — manual

An algorithmic reverb with three engines, a per-frequency decay and a tone EQ. Linux and Windows, CLAP and VST3.

Version 0.3.0

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1. What it is



The whole window: the Room ruler across the top, Character and Output under it, the Decay Contour and the Tone EQ at the bottom.

Aurum is an algorithmic reverb. Nothing in it is a recording of a space: every tail is computed, from a choice of three reverb engines, eleven room models and a handful of controls that each change one thing you can hear.

What sets it apart is that the reverb time is not one number. The **Decay Contour** lets you draw how long the reverb rings at every frequency — a hall whose lows hang on, a room whose highs die early, a plate with a long sparkle on top — and the bars show the result in seconds, third octave by third octave. A separate **Tone EQ** then shapes what the reverb sounds like, without touching how long it lasts.

The window reads from top to bottom the way the sound flows:

1. **Room** — the size and the length of the reverb, the engine, the pre-delay.
2. **Character** — modulation, brightness, distance and density.
3. **Output** — stereo width, ducking, the gate, freeze and the dry/wet mix.
4. **Decay Contour** — the reverb time per frequency.
5. **Tone EQ** — the colour of the reverb.

All of it works on the reverb only; the dry signal passes through untouched except for the input and output level and pan, and the Mix.

Aurum also brings thirty factory presets with folders, tags, favourites and search, undo and redo, an A/B comparison, MIDI learn for every control, and an **impulse response import** that listens to a recording of a real space and sets the controls to approximate it.

2. Getting started

INSTALLING

Copy the plugin into your host's plugin folder and rescan:

	CLAP	VST3
Linux	<code>~/ .clap/</code>	<code>~/ .vst3/</code>
Windows	<code>C:\Program Files\Common Files\CLAP\</code>	<code>C:\Program Files\Common Files\VST3\</code>

The CLAP and the VST3 are the same plugin with the same sound and the same window; install whichever your host prefers. A `.vst3` is a folder — copy it whole.

Aurum needs a processor with AVX2 and FMA: any Intel Core from the 4th generation (2013) on and any AMD Ryzen. Some low-cost Pentium, Celeron and Atom models lack it; on those, the host will refuse to load the plugin.

CHANNELS

Aurum is a stereo effect that also runs as **mono** and as **mono to stereo**; the host picks the layout from the track it is put on. A mono input still gets a full stereo reverb in the mono-to-stereo layout.

ON A SEND OR ON THE TRACK

On an **effect send**, set **Mix** to 100 %, so only the reverb comes back. On the track itself, **Mix** sets the balance; the lock button in the Output panel keeps your Mix when you step through presets (§6).

WHERE AURUM KEEPS ITS FILES

	LINUX	WINDOWS
Presets	<code>~/ .local/share/Aurum/Presets</code>	<code>%APPDATA%\Aurum\Presets</code>
Settings	<code>~/ .config/Aurum/settings.ini</code>	<code>%APPDATA%\Aurum\settings.ini</code>

The factory presets are written into the preset folder the first time Aurum opens. The settings file holds what applies to every instance: window size and scaling, the MIDI map, favourites, Lock Mix and the preset folder.

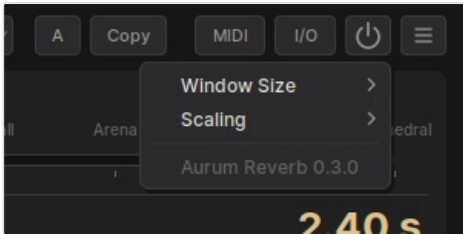
3. The window



The top bar: preset arrows and name, undo and redo, A/B and Copy, MIDI, I/O, bypass and the options menu.

Across the top, from left to right:

- **< and >** step to the previous and next preset; the **preset name** opens the preset browser (§9). A ***** after the name means the sound has been changed since the preset was loaded. Right-click the name to mark the preset as a favourite, save it, or save it under a new name.
- **Undo and redo** step through the last 200 changes. **Ctrl+Z** and **Ctrl+Shift+Z** do the same.
- **A** switches between two complete settings, A and B, and shows which one is active. **Copy** copies the active one into the other slot. Set up a variation, switch, compare.
- **MIDI** switches MIDI learn on and off (§11).
- **I/O** opens the input and output level and pan (§12).
- **The power button** bypasses Aurum. The bypass fades instead of cutting, so switching it is click-free.
- **≡** is the options menu.



The options menu: window size and scaling.

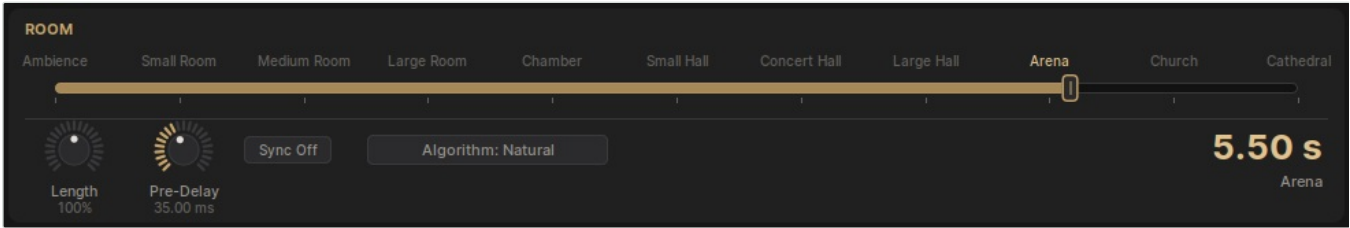
Window Size offers three sizes, Medium, Large and Extra Large; the panels grow with it and the graphs gain room. **Scaling** zooms the whole window from 75 % to 200 %, on top of the scaling your desktop asks for. The window can also be dragged to any size in hosts that allow it. Window Size and Scaling are remembered for every instance.

WORKING WITH THE CONTROLS

TO	DO
Turn a knob	Drag up or down. Slow movements are finer than fast ones.
Turn it finely	Hold Shift while dragging, or while using the wheel.
Step it	Use the mouse wheel over it.
Reset it	Ctrl +click.
Type a value	Double-click it, type, press Return . Esc cancels.
Read it	Hover: the name and value appear above it.
Pick from a list	Click a selector (Algorithm, Sync, a band's Shape); the wheel steps through it.

Typed values understand their units: **1.5 s** or **1500** for a time in milliseconds, **2.5k** for a frequency in kHz, a plain number of seconds for the Room. **Esc** also closes any open menu or panel.

4. Room



The Room panel: the ruler of room models, Length, Pre-Delay with its Sync, the Algorithm, and the resulting decay time on the right.

THE RULER

Room chooses the size of the space and, with it, the reverb time. The ruler names eleven room models, each one a complete set of proportions — reflection pattern, density, how fast the highs die away — and not just a time:

ROOM	TIME	ROOM	TIME
Ambience	0.20 s	Small Hall	2.50 s
Small Room	0.40 s	Concert Hall	3.20 s
Medium Room	0.75 s	Large Hall	4.00 s
Large Room	1.25 s	Arena	5.20 s
Chamber	1.85 s	Church	7.00 s
		Cathedral	10.00 s

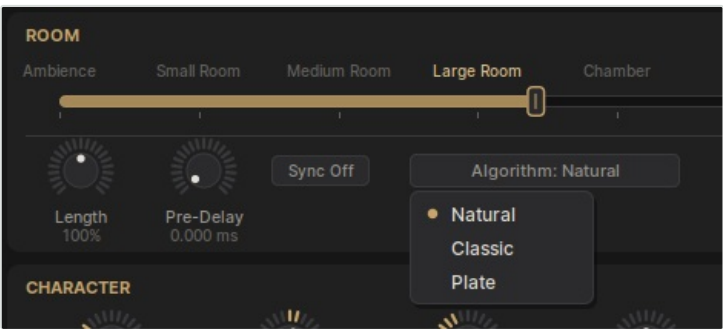
Click a name to jump to it, or drag the handle anywhere between two: the room blends smoothly from one model into the next. Double-click the handle to type a reverb time in seconds; Aurum finds the room that has it.

LENGTH

Length stretches or shortens the tail of the room, from 25 % to 400 %, without changing its size. A small room with a long Length is a small, hard room that rings; a hall with a short Length is a big space that has been damped.

The large readout on the right is the result: the room’s time multiplied by Length, with the room’s name underneath, and the two factors when Length is not 100 %.

ALGORITHM



The Algorithm selector open.

Three reverb engines, each with its own sound:

- **Natural** — a dense, smooth, realistic reverb, built from two networks of sixteen delay lines that mix into each other. The choice for rooms and halls that should sound like rooms and halls.
- **Classic** — a ring of allpass filters and delays in the manner of the early digital reverbs: a little grainier, with a gently wandering tail. Good for pads, vocals and anything that wants a familiar studio sound.
- **Plate** — a model of a reverb plate: an immediate, bright, dense onset and a smooth, even tail. Room sets the size of the

plate.

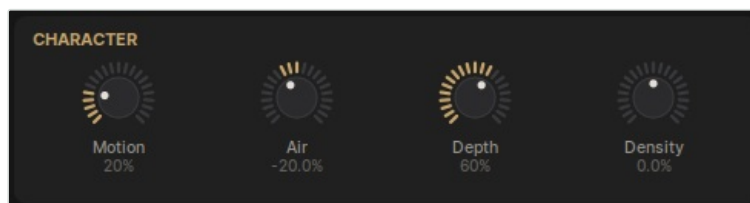
Every other control works with all three engines.

PRE-DELAY

Pre-Delay delays the reverb by up to 500 ms, which keeps the start of a note or a word clear before the space opens up behind it. A few milliseconds already separate the source from the room; 30 to 80 ms is the classic vocal setting.

Sync ties the pre-delay to the host's tempo instead: 1/4, 1/8, 1/16 or 1/32 of a note. The knob then becomes **Pre-Delay Offset**, which shortens or lengthens that note value from 50 % to 200 % — 150 % on an 1/8 is a dotted eighth. A synced pre-delay is never longer than 500 ms.

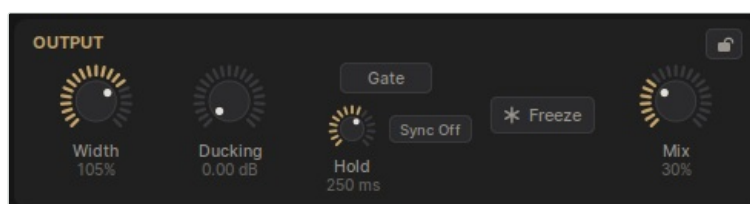
5. Character



The Character panel: Motion, Air, Depth and Density.

- **Motion** brings the reverb to life. Up to about half way it emphasises the early reflections, lets single late echoes stand out and adds a slow, gentle modulation that keeps a long tail from sounding static. Beyond half way the modulation grows into a chorus: lush, wide and clearly moving — at 100 % it is a reverb and a chorus in one.
- **Air** is the brightness of the space. Turned down, the reverb loses its highs — gently at first, then down to a dark, muffled room — and the highs also die away sooner, much more so in a long tail than in a short one, as air and soft surfaces absorb them. Turned up, the reverb opens up: the top becomes airy and glassy, the low end lighter, and the highs last a little longer. The Decay Contour shows what Air does to the decay.
- **Depth** is how far away the listener stands. Near, the early reflections are strong, bright and immediate; far, they arrive later, are more diffuse and blend into a tail that builds up slowly.
- **Density** is how thick the reverb is, and with it how much reverb there is. Turned down, the reflections thin out into distinct echoes and the reverb steps back — good for a lively, airy space that stays out of the way; at the bottom it is about 14 dB quieter. Turned up, the reverb becomes denser, smoother and fuller, up to about 8 dB louder at the top, and above the middle a subtle saturation adds a little warmth.

6. Output



The Output panel: Width, Ducking, the Gate with its Hold and Sync, Freeze, Mix, and the Lock Mix button.

WIDTH

Width sets the stereo image of the reverb:

- **0 %** is mono.
- **Up to 50 %** it opens from mono into a full, enveloping stereo reverb in which both input channels feed both sides.
- **From 50 to 100 %** the two sides separate, until at 100 % the left input reverberates on the left and the right input on the right — the stereo picture of the source is kept.
- **Above 100 %**, up to 150 %, it is wider than the room: the difference between the sides is boosted.

DUCKING

Ducking turns the reverb down while the input is loud and lets it back up in the gaps, by up to the number of decibels shown. A vocal stays clear on top of a big reverb, which then blooms between the phrases. It reacts to the input relative to its recent loudness, so it works the same on a quiet track and a loud one.

GATE

The **Gate** cuts the reverb off a set time after the input stops — the gated reverb of the eighties drum sound, or simply a big space that does not smear into the next beat. Switch it on with **Gate**; **Hold** is how long it stays open after the input falls, from 10 ms to 2 s, and the closing fade grows with it. **Sync** sets Hold in note values from the host’s tempo; the knob then becomes **Offset**, as with the pre-delay.

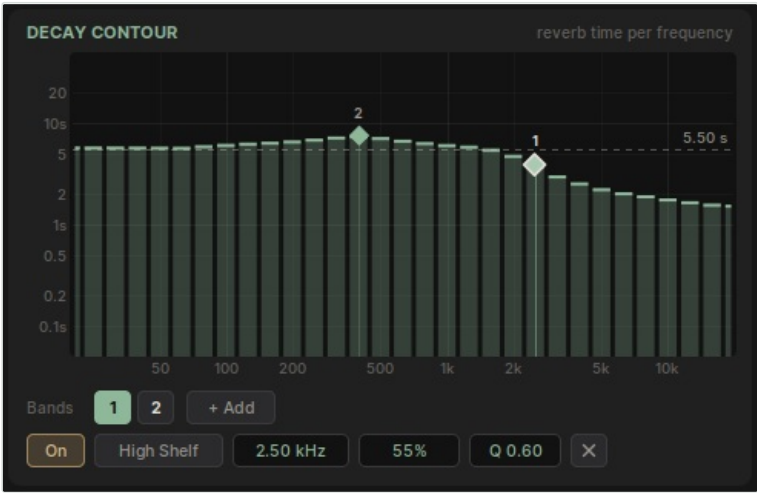
FREEZE

Freeze closes the reverb’s input and holds the tail as it is, for as long as Freeze is on. Click to switch it on and off; click and hold to freeze only while the button is held. Freeze a chord into a pad, then play over it.

MIX AND LOCK MIX

Mix is the balance between the dry signal and the reverb. The lock above it is **Lock Mix**: while it is closed, loading a preset leaves Mix where it is — on a send at 100 %, for example. Lock Mix applies to every instance.

7. Decay Contour



The Decay Contour of the Stone Church preset: a high shelf shortening the highs and a bell lengthening the low mids, with band 1 selected in the inspector row.

The graph shows **how long the reverb lasts at each frequency**. Each bar is one third of an octave, from 20 Hz to 20 kHz, and its height is the reverb time there, in seconds, on the scale on the left. The dashed line is the time in the Room readout.

Even with no bands the bars are not flat: every room model lets its highs die faster than its lows, as real rooms do, and Air moves the top end. The bands then change that, up to six of them:

SHAPE	WHAT IT DOES
Bell	Lengthens or shortens the reverb around one frequency.
Low Shelf	Lengthens or shortens everything below a frequency.
High Shelf	Lengthens or shortens everything above a frequency.
Notch	Cuts the reverb time sharply in a narrow range — a ringing frequency, a boomy room mode.

Each band's **Rate** multiplies the reverb time where it acts: 100 % leaves it alone, 200 % doubles it, 50 % halves it, from 12.5 % to 800 %. A longer decay also carries more energy, as it does in a real room: lengthening a band makes the reverb fuller there, shortening it makes it lighter. **Q** sets how wide a bell or a notch is, and how steep a shelf.

EDITING BANDS

- **Double-click the graph** to add a bell where you clicked.
- **+ Add** adds a band of the shape you pick from its menu.
- **Drag a handle**: left and right moves the frequency, up and down the Rate. Hold **Shift** for fine moves.
- **The wheel over a handle** changes its Q.
- **Double-click a handle** to type its frequency.
- **The numbered chips** under the graph select a band. The row under them is the band's **inspector**: on/off, shape, then frequency, Rate and Q — fields that can be dragged, scrolled, Ctrl+clicked and double-clicked like a knob — and **x**, which deletes the band.
- **Right-click a handle or a chip** to switch the band off or delete it. **Delete** or **Backspace** deletes the selected band while the pointer is over the panel.

What the bars show is what you hear: the engine is built so that the measured reverb time follows the drawn curve closely, band by band.

8. Tone EQ



The Tone EQ of the Vocal Hall preset: a low cut, a dip in the low mids and a high cut.

The **Tone EQ** colours the reverb: how bright, how warm, how much low end it returns. It acts on the reverb's output, so unlike the Decay Contour it does not change how long anything lasts — a low cut here thins the reverb's bass without shortening it. It never touches the dry signal.

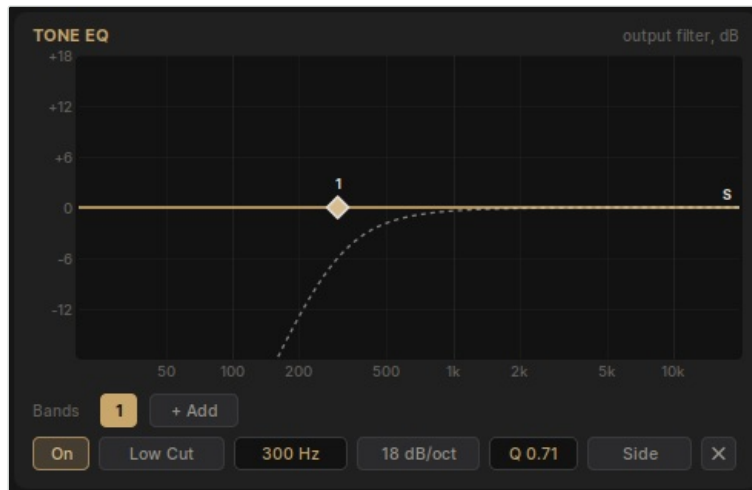
Up to six bands:

SHAPE	PARAMETERS
Bell	frequency, gain (±30 dB), Q
Low Shelf, High Shelf	frequency, gain, Q
Low Cut, High Cut	frequency, slope from 6 to 96 dB per octave, Q (resonance at the corner)

The bands are edited exactly like the Decay Contour's: double-click the graph, **+ Add**, drag the handles (up and down is the gain), the wheel for Q, the chips and the inspector row.

Aurum keeps the level of the reverb steady while you equalise it: cutting the lows or the highs does not make the reverb quieter overall, it changes its colour.

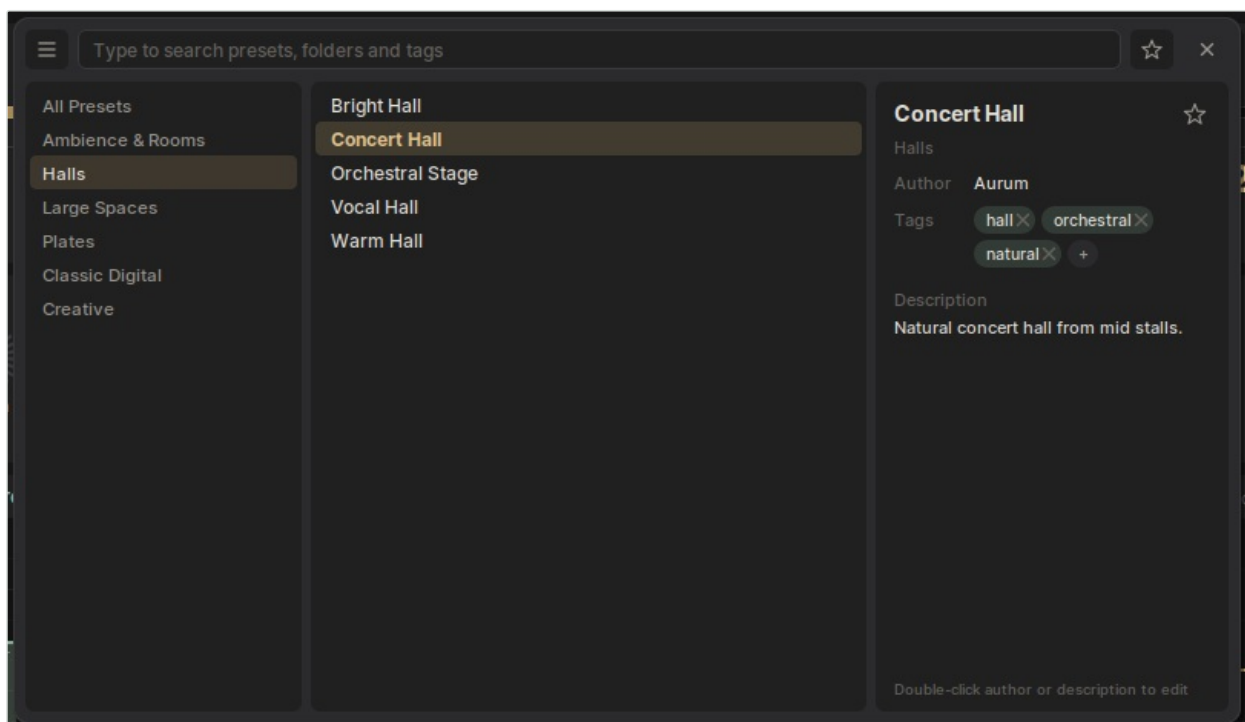
PLACEMENT



A low cut on the side signal only: the dashed curve marked S.

Each band also has a **placement**: **Stereo** (both sides), **Left**, **Right**, **Mid** (what the sides have in common) or **Side** (the difference between them). A band that works on one part only is drawn as a dashed curve with its letter. A low cut on the side signal, for example, keeps the reverb's low end in the middle where it belongs, while the highs stay wide.

9. Presets



The preset browser: folders on the left, presets in the middle, the selected preset's details on the right.

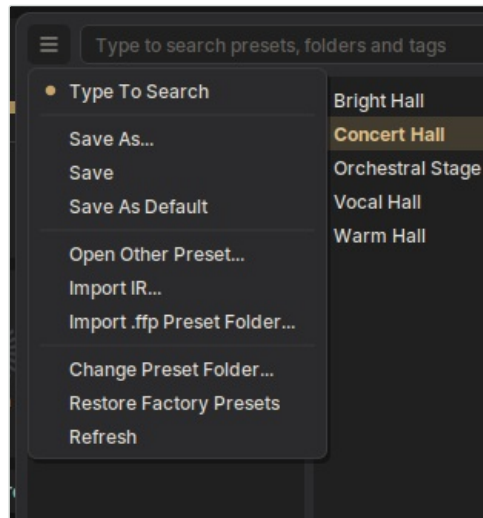
Click the preset name to open the browser.

Loading a preset starts it from silence: the reverb that was still ringing fades out within 10 ms instead of carrying over into the new sound. The dry signal plays on undisturbed. Undo, redo and A/B, by contrast, change the settings under the running tail.

- **Folders** on the left; **All Presets** shows everything.
- **Search**: just start typing. The list narrows to presets whose name, folder or tags match. **Backspace** removes a letter.
- **Click** a preset to hear it with the browser still open; **double-click** it, or press **Return**, to load it and close the browser. **Up** and **Down** move through the list, **Right** loads without closing, **[** and **]** step to the previous and next preset while the

search is empty, **Esc** closes.

- **Favourites:** the star in the details panel marks the preset; the star next to the search field shows favourites only.
- **Details:** author, tags and description. Double-click the author or the description to edit it; + adds a tag, ✕ removes one.



The browser's menu.

The ☰ menu at the top left of the browser:

- **Type To Search** — when off, the browser takes typing only after a click into the search field.
- **Save As...** — saves under a new name. Type `Folder/Name` to save into a folder; new folders are created as needed.
- **Save** — overwrites the current preset.
- **Save As Default** — makes the current sound the one every new instance of Aurum starts with. It replaces the **Init** preset.
- **Open Other Preset...** — loads a preset file from anywhere on disk.
- **Import IR...** — see §10.
- **Import .ffp Preset Folder...** — converts a folder of `.ffp` text presets from another reverb into Aurum presets, in a folder called **Imported**. The engines differ, so a converted preset is a starting point that matches the original's size, decay, tone and settings as closely as Aurum's controls allow, not a copy of its sound.
- **Change Preset Folder...** — keeps your presets somewhere else, a synced folder for example.
- **Restore Factory Presets** — writes the factory presets back, undoing any changes made to them, including to **Init**. Your own presets are not touched.
- **Refresh** — rereads the folder after you have changed files outside Aurum.

Presets are small text files with the extension `.aurum`, and can be copied, shared and kept in folders of your own.

THE FACTORY LIBRARY

30 factory presets come with Aurum, in the folders the browser shows them in.

Init

Neutral concert hall, a good starting point. *(default)*

Ambience & Rooms

Tight Ambience

Short, dense early field. Adds space without an audible tail. (*ambience, drums, small*)

Vocal Booth

Small treated room, keeps vocals upfront. (*vocal, small, dry*)

Drum Room

Live drum room with pronounced reflections. (*drums, room, punchy*)

Wooden Room

Warm wooden walls, soft highs. (*room, warm, acoustic*)

Bright Studio

Live studio floor with a lively top end. (*room, bright, studio*)

Small Chamber

Echo chamber character, dense and smooth. (*chamber, vocal, snare*)

Halls

Concert Hall

Natural concert hall from mid stalls. (*hall, orchestral, natural*)

Warm Hall

Dark, enveloping hall for pads and strings. (*hall, warm, dark*)

Vocal Hall

Predelayed hall that ducks under the voice. (*vocal, hall, ducking*)

Bright Hall

Open, airy hall with extended highs. (*hall, bright, airy*)

Orchestral Stage

Large stage heard from the back of the hall. (*orchestral, hall, distant*)

Large Spaces

Stone Church

Stone church with long, warm low mids. (*church, large, choir*)

Cathedral

Vast cathedral, slow build-up and endless decay. (*cathedral, huge, ambient*)

Arena

Big arena with discrete late echoes. (*arena, live, large*)

Endless Space

Very long modulated tail for ambient textures. (*ambient, pad, huge*)

Plates

Classic Plate

Studio plate, quick build-up and smooth tail. *(plate, vocal, classic)*

Vocal Plate

Bright vocal plate with predelay and light ducking. *(plate, vocal, ducking)*

Snare Plate

Short, splashy plate for snares. *(plate, drums, snare)*

Dark Plate

Damped plate for warm mixes. *(plate, dark, warm)*

Classic Digital

Classic Digital Hall

Early digital hall with gentle shimmer. *(classic, hall, lush)*

Digital Chamber

Bright, grainy chamber of the early digital era. *(vintage, chamber, 80s)*

Shimmer Wash

Long, heavily modulated tail for pads. *(vintage, ambient, modulated)*

Lo-Fi Room

Band-limited, saturated small room. *(vintage, lofi, dirty)*

Creative

Gated Drums

Big room cut off by the auto gate. *(gate, drums, 80s)*

Ducked Delay Space

Long predelay with strong ducking: reverb blooms in the gaps. *(ducking, vocal, creative)*

Chorus Cloud

Maximum Motion: chorus-like reverb for synths. *(chorus, synth, modulated)*

Freeze Pad

Long pad. Play a chord, then hold the Freeze button to sustain it. *(freeze, pad, drone)*

Mono Ambience

Mono reverb for centred sources. *(mono, ambience, utility)*

Wide Space

Extra wide tail with a side-only low cut. *(wide, stereo, utility)*

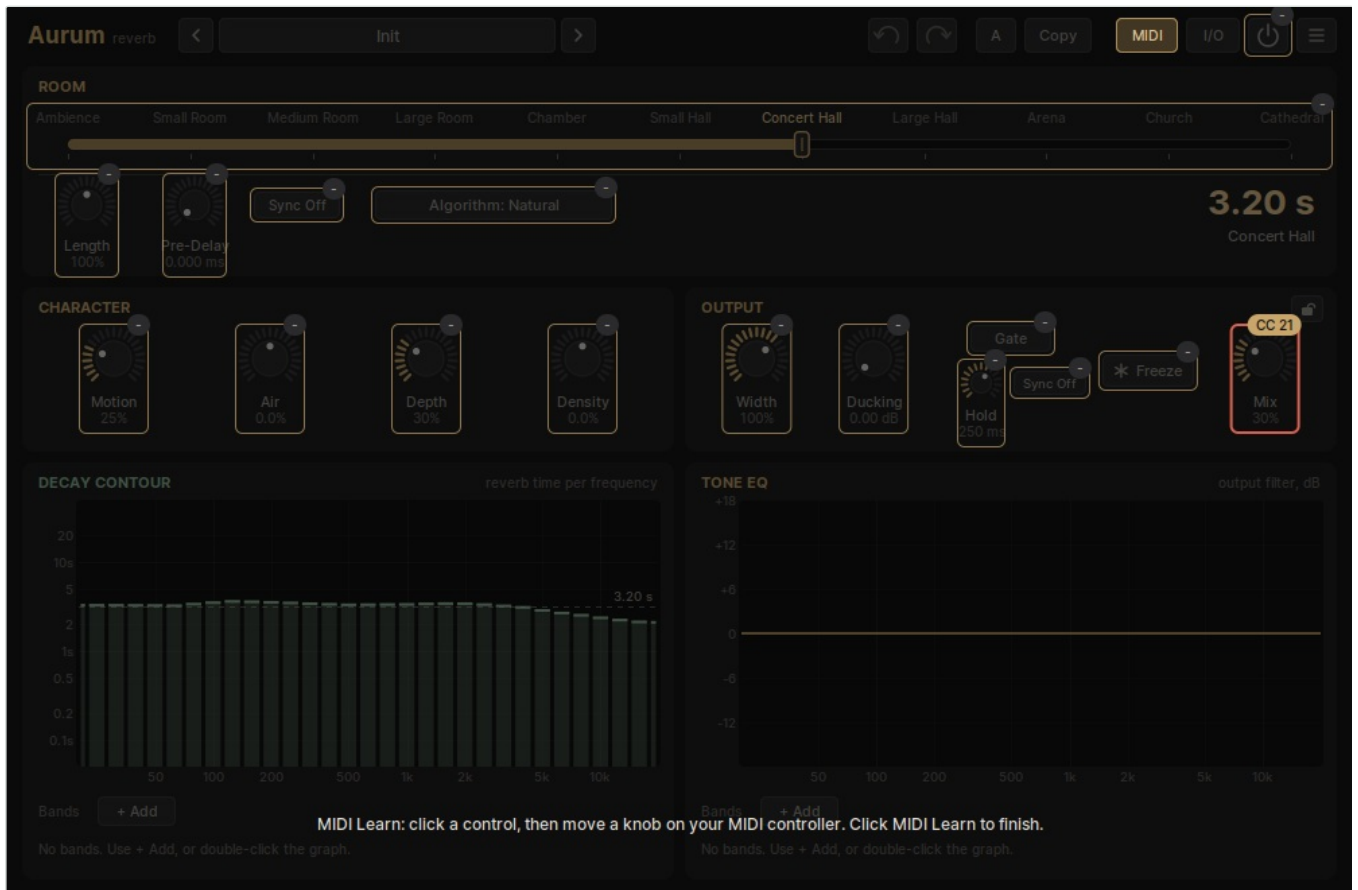
10. Importing an impulse response

An impulse response is a recording of a space answering a short sound: a clap, a starter pistol, a balloon, or a sine sweep already turned into an impulse. Aurum can listen to one and set itself up to resemble that space.

Choose **Import IR...** in the browser's menu, or drag a WAV or AIFF file onto the window. Aurum measures how long the recording rings in each band, its spectrum, how wide it is, how its early energy compares to its tail and how long it takes to start, and sets Room, Length, the Decay Contour, the Tone EQ, Width, Depth and Pre-Delay to match. Mix and the I/O settings are left as they were. The preset name becomes **IR:** and the file's name, and a message shows the measured reverb time.

Aurum is not a convolution reverb: the import gives you an algorithmic reverb with the same proportions — length, colour, width — that you can then change like any other preset. It needs a real impulse response; a raw sine sweep or a piece of music is recognised and refused.

11. MIDI learn



MIDI learn: every control that can be learned is outlined; the red one is waiting for a controller, and Mix already answers to CC 21.

Every control in the window can be moved from a MIDI controller. Route the controller to Aurum's MIDI input in your host — Aurum has a MIDI input port for this, even though it is an effect — then:

1. Click **MIDI**. Every learnable control is outlined, with a bubble showing its controller number, or - if it has none.
2. Click a control. Its outline turns red.
3. Move a knob or fader on the controller. The control now follows it.
4. Repeat for other controls, and click **MIDI** again to finish.

The mappings are saved when you finish, and they belong to Aurum rather than to a project: every instance and every project uses the same map. Right-click **MIDI** for:

- **Enable MIDI** — switches MIDI control off without forgetting the map.
- **Clear** — removes one mapping, or all of them.
- **Revert** — goes back to the last saved map.
- **Save** — saves the map now.

Aurum listens to control change messages on every MIDI channel.

12. Input, output and bypass



The I/O panel: input level and pan, output level and pan.

I/O opens four controls that sit outside the reverb: **In Level** and **In Pan** before it, **Out Level** and **Out Pan** after it, each level from -36 dB to +36 dB. The input controls change what the reverb hears — and what the ducking and the gate react to — while the output controls change everything that leaves Aurum, dry and wet together.

The **power button** in the top bar is Aurum’s bypass, which the host can also automate. It fades between the processed and the untouched signal over 20 milliseconds, so it can be switched while the music plays.

Appendix. Every parameter

Every parameter with its range and starting value, generated from the plugin itself when this manual was built, under the names the host shows for automation.

Aurum has 95 automatable parameters: 23 main controls and 72 for the twelve EQ bands. They are listed here the way the window groups them.

ROOM

PARAMETER	RANGE	DEFAULT
Room	Ambience (0.20 s) to Cathedral (10 s)	Concert Hall, 3.20 s
Length	25% to 400%	100%
Algorithm	Natural, Classic, Plate	Natural
Pre-Delay	0.000 ms to 500.0 ms	0.000 ms
Pre-Delay Sync	Off, 1/4, 1/8, 1/16, 1/32	Off
Pre-Delay Offset	50% to 200%	100%

CHARACTER

PARAMETER	RANGE	DEFAULT
Motion	0.0% to 100%	25%
Air	-100.0% to 100.0%	0.0%
Depth	0.0% to 100%	30%
Density	-100.0% to 100.0%	0.0%

OUTPUT

PARAMETER	RANGE	DEFAULT
Width	0% to 150%	100%
Ducking	0.00 dB to 24.00 dB	0.00 dB
Gate	Off, On	Off
Gate Hold	10 ms to 2.00 s	250 ms
Gate Sync	Off, 1/4, 1/8, 1/16, 1/32	Off
Gate Offset	50% to 200%	100%
Freeze	Off, On	Off
Mix	0.0% to 100%	30%

INPUT / OUTPUT

PARAMETER	RANGE	DEFAULT
Input Level	-36.0 dB to +36.0 dB	+0.0 dB
Input Pan	L100 to R100	C
Output Level	-36.0 dB to +36.0 dB	+0.0 dB
Output Pan	L100 to R100	C
Bypass	Off, On	Off

DECAY CONTOUR BANDS

Six bands, each with these. **Rate** multiplies the reverb time around the band's frequency.

PARAMETER	RANGE	DEFAULT
Enabled	Off, On	On
Shape	Bell, Low Shelf, High Shelf, Notch	Bell
Frequency	10.0 Hz to 30.00 kHz	1.00 kHz
Rate	12% to 800%	100%
Q	0.03 to 40.00	1.00

STONE EQ BANDS

Six bands, each with these. **Slope** is for the cuts, **Gain** for the bells and shelves.

PARAMETER	RANGE	DEFAULT
Enabled	Off, On	On
Shape	Bell, Low Shelf, High Shelf, Low Cut, High Cut	Bell
Frequency	10.0 Hz to 30.00 kHz	1.00 kHz
Gain	-30.0 dB to +30.0 dB	+0.0 dB
Q	0.03 to 40.00	1.00
Slope	6 dB/oct to 96 dB/oct, 9 steps	24 dB/oct
Placement	Stereo, Left, Right, Mid, Side	Stereo