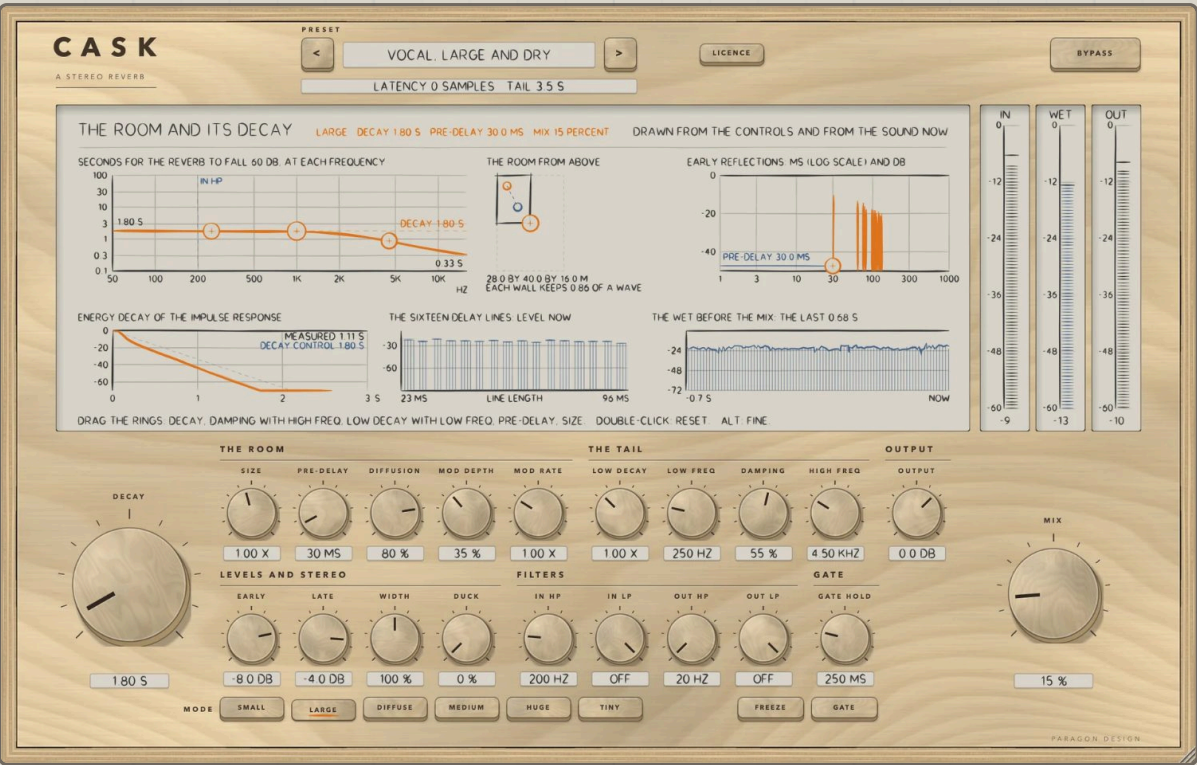


PARAGON WORKSHOP

CASK

OWNER'S MANUAL

A reverb with six modes.



CONTENTS

CASK owner's manual

CASK is a stereo reverb with six modes, a decay you set at 1 kHz and shape with two corners, early reflections from a box-shaped room, a gate, a freeze and a ducking control, and a display that draws what the reverb is doing.

01 What it is

02 Setting it up

03 A first session

04 How it works

05 Control reference

06 Recipes

07 Presets

08 Measured

09 Limits and what is not verified

10 Troubleshooting

Every figure in this manual was measured on synthetic test signals by the plug-in's own tests. Nothing in it says how the plug-in will sound on your session.

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What it is

CASK is a stereo reverb. The sound goes through a pre-delay and two filters, then three ways at once: the early reflections of a box-shaped room (the first 36 arrivals of a model of the room), four allpass filters on each side that spread the sound out, and the late field, sixteen delay lines that feed one another through a mixing matrix. DECAY sets how long the late field takes to fall by 60 dB at 1 kHz, from 0.1 to 30 seconds. LOW DECAY and DAMPING, with the corners LOW FREQ and HIGH FREQ, make the lows and the highs decay for a different time, and the display draws the decay at every frequency.

Six modes set the size and the shape of the room: SMALL, LARGE, DIFFUSE, MEDIUM, HUGE and TINY. SIZE scales the room and the delay lines, and the modes' own sizes are in the table under How it works. DIFFUSE has no early reflections. EARLY and LATE set the level of the two parts, and filters before and behind the reverb (IN HP, IN LP, OUT HP and OUT LP) keep the lows or the highs out of it. WIDTH sets the difference between the two sides, DUCK turns the reverb down while the input is loud, GATE cuts it off after the input falls quiet, and FREEZE stops the input feeding the reverb and holds what is in it. MIX is the share of reverb in the output and OUTPUT is the level.

With MIX at 0 and OUTPUT at 0 dB the output is the input itself, bit for bit, in every mode and every layout, and CASK has no delay at any setting. It has 25 host parameters and 26 presets in six categories, and it is the reverb engine that LATHE uses for its reverb send, used here unchanged.

CASK is a premium plug-in: it works for 14 days and then needs a licence, as the Getting started manual describes. The name CASK is a working name.

Setting it up

Formats and channels

CASK is an effect, in Audio Unit and VST3 formats. The VST3 is built from the same code, but no test loads it in a host. A host lists the Audio Unit as Cask Reverb, from Paragon Design. It takes one channel in and gives one out, takes one in and gives two out, or takes two in and gives two out. One in and two out sends the one input to both sides of the reverb. Two in and one out is refused. CASK has no sidechain and no MIDI. The bundle declares macOS 11.0 as the minimum, and the panel is 1200 by 760 pixels, resizable from 70 to 170 percent.

Latency

CASK adds no delay. The processor told the host 0 samples at 44.1, 48, 88.2, 96, 176.4 and 192 kHz, at every setting the test tried, and the line under the preset name reads LATENCY 0 SAMPLES. BYPASS does not change it.

The tail is the time the host should keep playing after the input stops. CASK tells the host 1.4 times DECAY plus 1 second, at most 30 seconds, while MIX is above 0, and the line under the preset name shows it, for example TAIL 3.5 S. It tells the host 0 with MIX at 0, and 30 seconds while FREEZE is on, because a frozen tail does not end by itself. The figures are worked out from the controls on a 10 Hz timer and when playback starts, so a host that is stopped is told too.

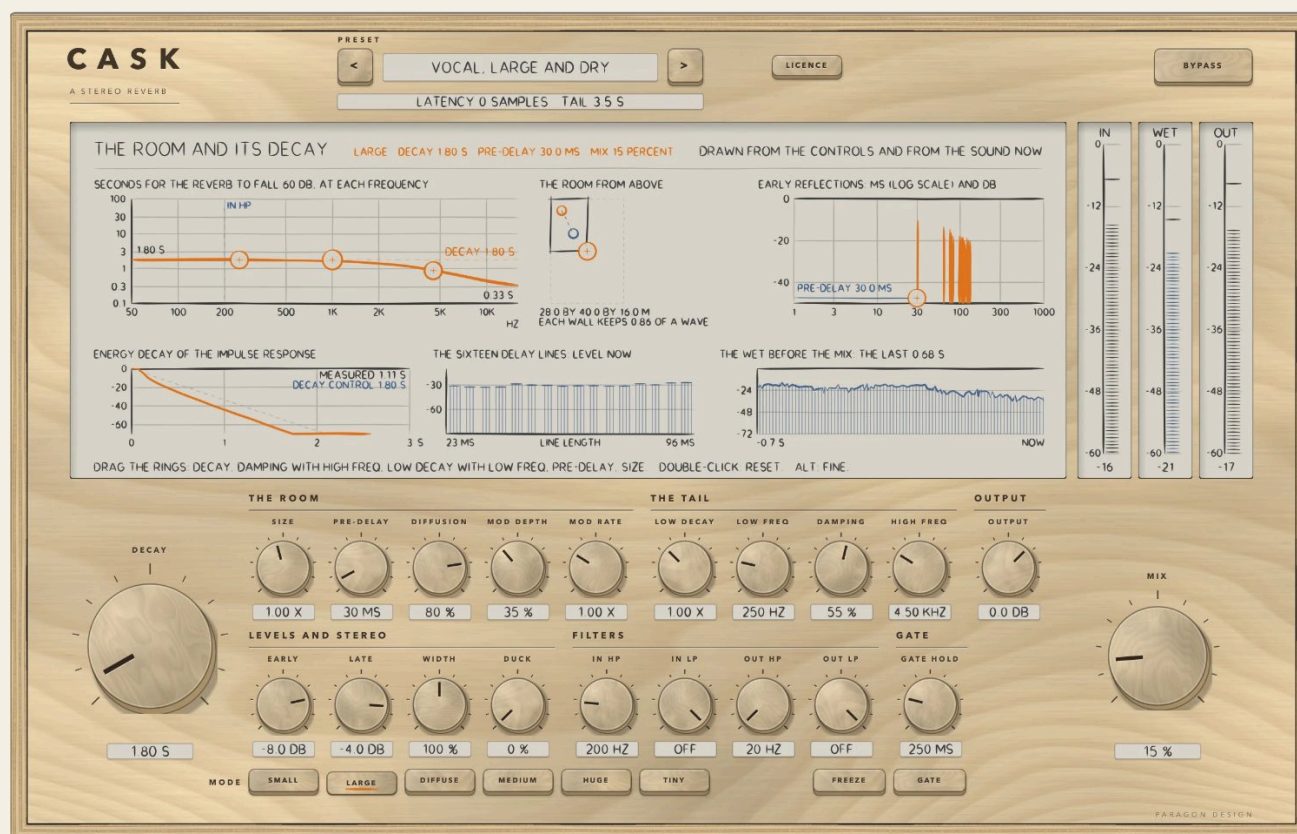
DECAY	TAIL TOLD TO THE HOST
0.1 s	1.14 s
1 s	2.4 s
2.2 s (default)	4.08 s
5 s	8 s
10 s	15 s
20 s	29 s
20.8 s or more	30 s

In Logic Pro

1. Click an Audio Effect slot in the channel strip, then choose Cask Reverb from the pop-up menu. Audio Units plug-ins appear in the Audio Units submenu.
2. On a mono channel strip the Mono plug-in format loads a mono plug-in, and on a stereo one the Stereo format loads a stereo plug-in. Mono->Stereo takes the mono strip into the plug-in's mono input and gives a stereo output from that point.
3. Audio effects can go in audio, instrument, aux and output channel strips. To use CASK as a send reverb, put it on an aux channel strip and set MIX to 100 percent, so that the reverb alone comes out and the input does not.
4. To see that CASK adds no delay, hold the pointer over the plug-in slot: a help tag shows the latency in samples and seconds.

Not verified in any digital audio workstation: what one does with a tail length of 30 seconds while FREEZE is on, with one channel in and two out, or with the bypass parameter. An Audio Unit host's treatment of an infinite tail was not checked, which is why FREEZE reports 30 seconds and not an unending tail.

A first session



- A vocal preset with the voice just after a phrase: the decay at every frequency, the room, the early reflections, the energy decay, the sixteen delay lines and the wet, with the meters
1. Put CASK on a vocal or a snare. The panel opens with the preset Flat Start: MIX is 0, so you hear the input and nothing else.
 2. Click the preset's name to see the menu and choose Vocal, Large and Dry. It sets the LARGE mode, DECAY 1.8 s, PRE-DELAY 30 ms, DAMPING 55 percent and a low MIX, and keeps the lows out of the reverb with IN HP.
 3. Play the track. The display's head line says what CASK is doing, in orange: the mode, DECAY, PRE-DELAY and MIX.
 4. Turn MIX up or down. 100 percent is the reverb alone, at 1.5 times its own level.
 5. Turn DECAY. The curve at the top left of the display moves, and its two ends are written out in seconds.
 6. Press HUGE, then MEDIUM. The room drawn in the middle of the display changes to the box of each mode.
 7. Raise DUCK to turn the reverb down while the voice is loud, or press GATE to cut it off a little after the voice stops.
 8. Press BYPASS and press it again to compare. The reverb goes on running while BYPASS is on, so its tail is there when you switch it off.

9. Choose Flat Start again to return to the plug-in's own default state.

How it works

Top bar and presets

The top bar has CASK etched on it, the preset bar (the previous and next keys and the name, with a star once a control has moved), the line for the delay and the tail, the LICENCE key and BYPASS.

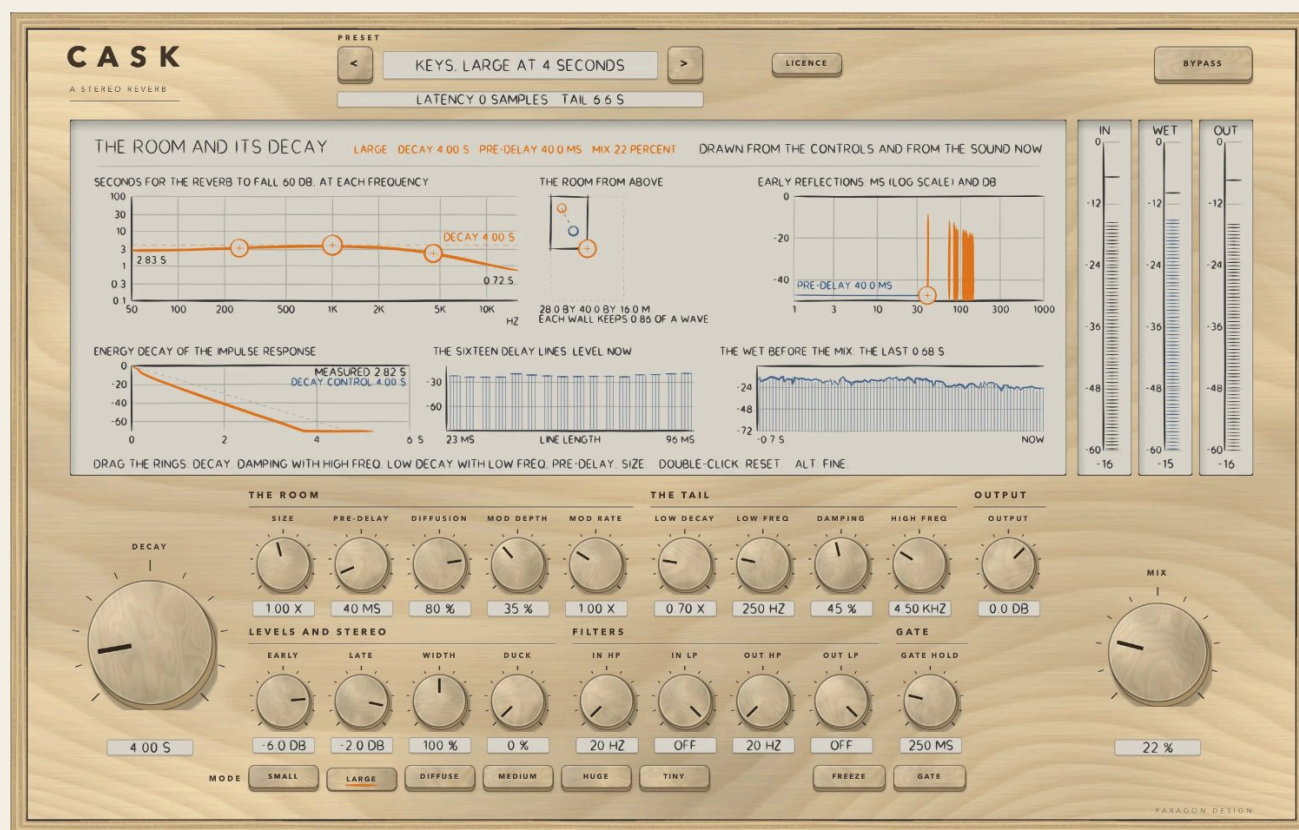
Choosing a preset sets every sound control: FREEZE and GATE are sound controls, so a preset loaded after a frozen one lets the tail go. BYPASS is not part of a preset.

The display

The display is one picture of six parts, and every part is drawn from numbers the engine computed. Its head line says in orange what CASK is doing, or that MIX is at 0 and the output is the input, or that BYPASS is on, or that the trial is over.

1. The seconds for the reverb to fall 60 dB at each frequency, a curve of the decay the engine's design gives at every frequency, with the decay you asked for as a dashed line, the corners of the four filters in blue and the two ends of the curve written out. It is the design, not a measurement of the output.
2. The room from above: the box of the mode at the SIZE you set, the source and the listener, the box at SIZE 2 dashed, and its three sides in metres and what a wall keeps of a wave.
3. The early reflections: the first 36 arrivals of the box as stems against milliseconds on a log axis, shifted by PRE-DELAY. In DIFFUSE, or with EARLY off, a note stands in its place.
4. The energy decay of the impulse response the room makes, rendered by the plug-in and reduced to a measured decay time. It says MEASURED for that time and DECAY CONTROL for the number on the knob, because they are two numbers: with DAMPING at its default of 45 percent the measured time is shorter than the knob's.
5. The sixteen delay lines and the level of each now.
6. The last part of the wet signal before the mix, drawn as a history.

Five rings on the display can be dragged: DECAY, the low decay with LOW FREQ, the damping with HIGH FREQ, PRE-DELAY and SIZE. A double-click on a ring resets it and ALT held while dragging gives fine steps. The energy decay is rendered for at most 8 seconds, so a decay too long for its time to be found in 8 seconds says TOO SHORT A RENDER TO MEASURE.



— The LARGE mode: a box of 28 by 40 by 16 m, delay lines from 23 to 96 ms

The six modes

A mode sets the box used for the early reflections, the walls' reflectivity and the lengths of the sixteen delay lines, all at SIZE 1.

MODE	BOX	A WALL KEEPS	DELAY LINES
TINY	4 by 5 by 2.6 m	0.72 of a wave	6 to 24 ms
SMALL	5 by 7 by 3 m	0.80	11 to 47 ms
MEDIUM	9 by 12 by 5 m	0.82	17 to 66 ms
LARGE	28 by 40 by 16 m	0.86	23 to 96 ms
HUGE	45 by 80 by 30 m	0.90	41 to 171 ms
DIFFUSE	none (no early reflections)	not applicable	9 to 38 ms

Changing the mode ducks the reverb for 60 ms while the lines change.

DECAY, LOW DECAY, DAMPING and the two corners

DECAY is the time for the reverb to fall by 60 dB at 1 kHz, but only with DAMPING at 0 and LOW DECAY at 1. DAMPING makes the highs decay for less time: at HIGH FREQ the decay is about DECAY times 1 minus 0.93 times DAMPING, and with DAMPING up the decay at 1 kHz is a little shorter than DECAY as well. HIGH FREQ is where the low-pass in each loop reaches that shorter decay, from 1.5 to 12 kHz. LOW DECAY, from 0.25 to 2.5, is the decay of the lowest frequencies as a multiple of DECAY, with the change coming in around LOW FREQ (100 to 800 Hz). The engine holds the lows to 4 times the middle's time at the most. The curve on the display draws all four.

SIZE, PRE-DELAY and DIFFUSION

SIZE, from 0.2 to 2, scales the box and the lengths of the sixteen delay lines. A change glides for about a second, and DECAY stays as it is set. PRE-DELAY is the time before the reverb starts, from 0 to 500 ms, and moving it fast bends what the reverb hears for a moment. DIFFUSION, from 0 to 100 percent, sets the feedback of the four allpass filters on each side in front of the delay lines: 0.75 times DIFFUSION as a fraction of 1, and 0.83 times that for the last two.

MOD DEPTH and MOD RATE

Each of the sixteen delay lines is read at a position that a slow sine wave moves. MOD DEPTH, from 0 to 100 percent, sets how far, up to 2.2 ms at 100 percent and less below it. MOD RATE is a multiplier, from 0.2 to 3, on the speeds of those slow movements, which are 0.07 to 0.40 Hz at 1x.

EARLY, LATE and the four filters

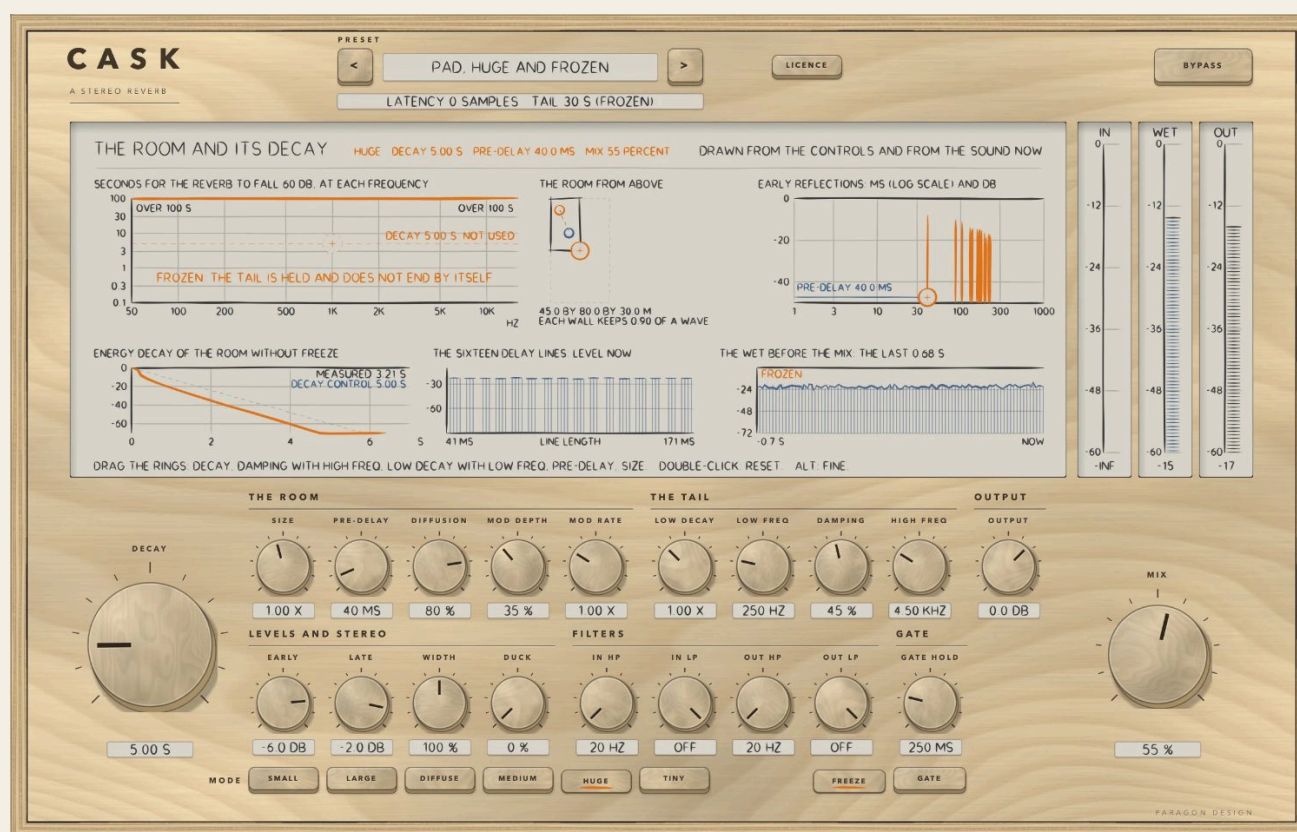
EARLY is the level of the first 36 arrivals from the box, and LATE is the level of the late field, each from -60 to +6 dB, and each switched off at -59 dB or lower. IN HP and IN LP are one-pole filters in front of the reverb. IN HP, from 20 to 1000 Hz, is never off: at 20 Hz it takes 3 dB off at 20 Hz. IN LP, from 1 to 20 kHz, is off at its highest setting. OUT HP and OUT LP are the same filters behind the reverb, on the reverb only, so the dry sound is not filtered.

WIDTH and DUCK

WIDTH, from 0 to 200 percent, works on the middle and the side of the reverb. At 0 the reverb is the same on both sides, exactly; at 100 it is left as it is; at 200 the side is multiplied by 2, so the difference between the sides is doubled. DUCK, from 0 to 100 percent, turns the reverb down while the input is loud, by up to 90 percent of it (20 dB). It follows the signal it is given, so a quiet input ducks it less.

GATE and FREEZE

GATE cuts the reverb off a while after the input falls under 0.02 (about -34 dBFS). GATE HOLD, from 40 to 1000 ms, is how long the gate keeps the reverb going after that. FREEZE stops the input feeding the early reflections and the delay network and holds the loops at a gain of 0.99996 or less. What a frozen reverb holds is whatever is in it when FREEZE goes on: a preset with FREEZE on, loaded into an empty reverb, holds silence. The held tail does not end by itself, and its level drifts, by up to 3 dB in a minute in the measurements made.



- FREEZE on, holding what the noise left in the reverb, with a tail told to the host of 30 s

MIX and OUTPUT

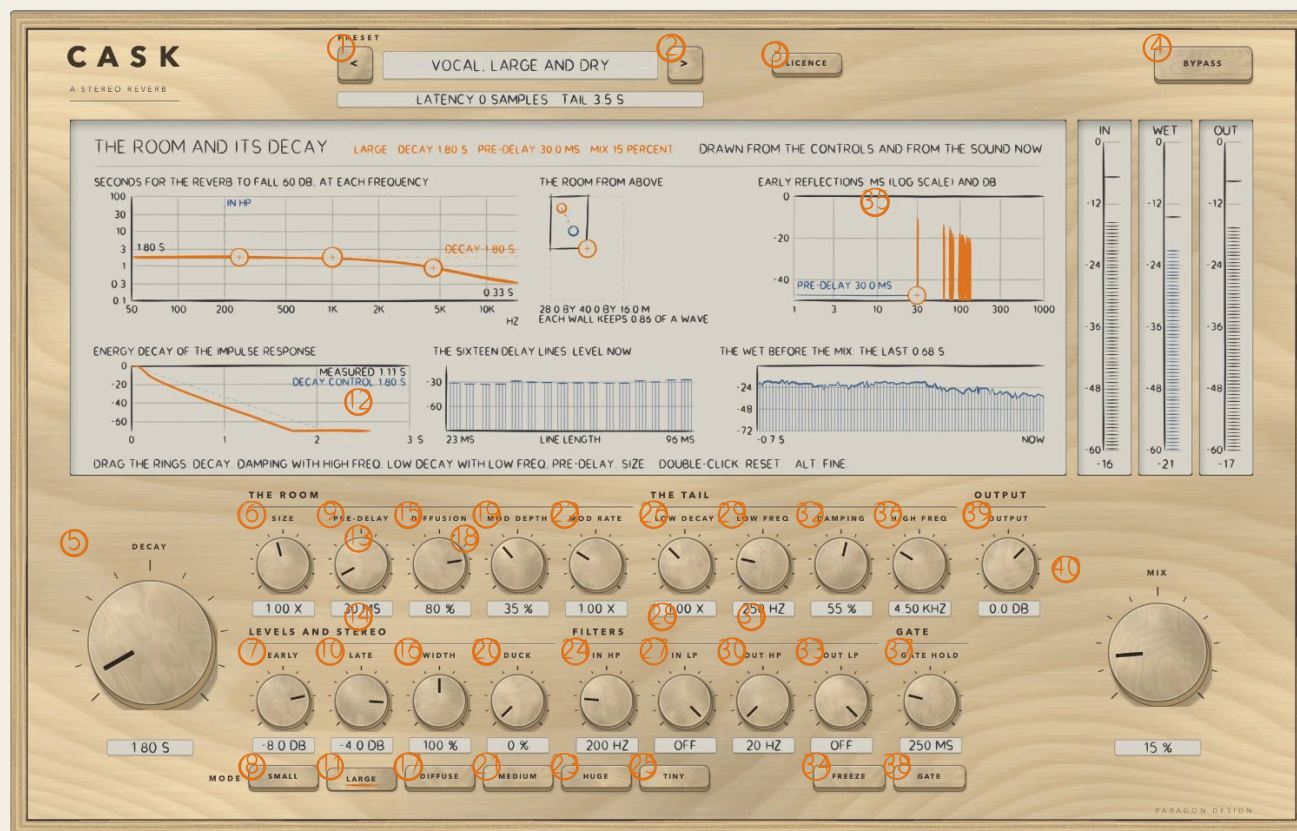
The output is the input times 1 minus MIX, plus the reverb times MIX times 1.5, all times OUTPUT. MIX goes from 0 to 100 percent and starts at 0. OUTPUT goes from -24 to +12 dB and acts on the input and the reverb alike, so only at 0 dB is the output at rest the input itself. A value of OUTPUT within 0.001 dB of 0 is read as exactly 0 dB.

BYPASS and the licence

BYPASS crossfades to the input over 5 ms. CASK has no delay, so the bypassed sound is the input itself, and the reverb goes on running inside. While the trial is over BYPASS is forced on and the controls are drawn dimmed, as the Getting started manual describes.

Control reference

Every control on the panel, as the plug-in itself labels it. The description is the tooltip the plug-in shows when you rest the pointer on the control.



— CASK, with each control numbered. The numbers match the lists below.

Top bar

NO.	CONTROL	WHAT IT DOES	RANGE	DEFAULT
1	< KEY	Previous preset		
2	> KEY	Next preset		
3	LICENCE KEY	Shows who the plug-in is licensed to. Click to see the licence.		
4	BYPASS KEY	Hear the input unchanged, after a 5 ms crossfade. The reverb goes on running inside, so its tail is there when BYPASS is switched off.		

Controls

NO.	CONTROL	WHAT IT DOES	RANGE	DEFAULT
5	DECAY KNOB	The time for the reverb to fall by 60 dB at 1 kHz, in seconds, with DAMPING at 0 and LOW DECAY at 1. The curve on the display shows the decay at every frequency.	0.1 to 30	2.2
6	SIZE KNOB	Scales the box and the lengths of the sixteen delay lines. A change glides for about a second, and DECAY stays as it is set.	0.2 to 2	1
7	EARLY KNOB	The level of the early reflections (the first 36 arrivals from the box), in dB. At its lowest setting they are off. The DIFFUSE mode has none.	-60 to 6	-6
8	SMALL KEY	A box of 5 by 7 by 3 m with walls that keep 0.80 of a wave, and delay lines from 11 to 47 ms at SIZE 1.		
9	PRE-DELAY KNOB	The time before the reverb starts, in milliseconds. Moving it fast bends what the reverb hears for a moment.	0 to 500	20
10	LATE KNOB	The level of the late field (the sixteen delay lines), in dB. At its lowest setting it is off.	-60 to 6	-2
11	LARGE KEY	A box of 28 by 40 by 16 m with walls that keep 0.86, and delay lines from 23 to 96 ms at SIZE 1.		
12	CHOOSE FILE KEY	Choose the licence file you were sent, a .pwlicense file.		
13	PASTE KEY	Put the text on the clipboard in the field below.		
14	REMOVE LICENCE KEY	Take this plug-in's licence off this computer. Press twice.		
15	DIFFUSION KNOB	In front of the delay lines, four allpass filters on each side have a feedback gain of 0.75 times this setting as a fraction of 1 (the last two, 0.83 times that).		

NO.	CONTROL	WHAT IT DOES	RANGE	DEFAULT
16	WIDTH KNOB	0 makes the reverb the same on both sides, exactly. 100 percent leaves it as it is and 200 percent doubles the difference between the sides.	0 to 200	100
17	DIFFUSE KEY	No early reflections: the late field alone, with delay lines from 9 to 38 ms at SIZE 1.		
18	ACTIVATE KEY	Use the licence in the field below: a key, or the whole text of a licence file.		
19	MOD DEPTH KNOB	How far a slow sine wave moves each of the sixteen delay lines: up to 2.2 ms at 100 percent, less below it.	0 to 100	35
20	DUCK KNOB	Turns the reverb down while the input is loud, by up to 90 percent of it (20 dB). It follows the signal it is given, so a quiet input ducks it less.	0 to 100	0
21	MEDIUM KEY	A box of 9 by 12 by 5 m with walls that keep 0.82, and delay lines from 17 to 66 ms at SIZE 1.		
22	MOD RATE KNOB	A multiplier on the speeds of those sine movements, which are 0.07 to 0.40 Hz at 1x.	0.2 to 3	1
23	HUGE KEY	A box of 45 by 80 by 30 m with walls that keep 0.90, and delay lines from 41 to 171 ms at SIZE 1.		
24	IN HP KNOB	A one-pole high-pass in front of the reverb, in Hz. It is never off: at 20 Hz it takes 3 dB off at 20 Hz.	20 to 1000	20
25	TINY KEY	A box of 4 by 5 by 2.6 m with walls that keep 0.72, and delay lines from 6 to 24 ms at SIZE 1.		
26	LOW DECAY KNOB	The decay of the lowest frequencies as a multiple of DECAY, the change coming in around LOW FREQ. The curve on the display shows it.	0.25 to 2.5	1
27	IN LP KNOB	A one-pole low-pass in front of the reverb, in Hz. At its highest setting it is off.	1000 to 20000	20000
28	BUY KEY	Open the shop in your browser.		

NO.	CONTROL	WHAT IT DOES	RANGE	DEFAULT
29	LOW FREQ KNOB	Where the low shelf in each loop acts, in Hz: the corner for LOW DECAY.	100 to 800	250
30	OUT HP KNOB	A one-pole high-pass behind the reverb, on the reverb only, in Hz. It is never off: at 20 Hz it takes 3 dB off at 20 Hz.	20 to 1000	20
31	GET YOUR LICENCE AGAIN KEY	Open the page that sends you your licence again, in your browser.		
32	DAMPING KNOB	How much shorter the highs decay: at HIGH FREQ the decay is about DECAY times (1 minus 0.93 times DAMPING). With DAMPING up, the decay at 1 kHz is a little shorter than DECAY too.	0 to 100	45
33	OUT LP KNOB	A one-pole low-pass behind the reverb, on the reverb only. At its highest setting it is off.	1000 to 20000	20000
34	FREEZE KEY	Stops the input feeding the reverb and holds what is in it. The held tail does not end by itself, and its level drifts: by up to 3 dB in a minute in the measurements made.		
35	CLOSE KEY	Close this panel (or press Escape).		
36	HIGH FREQ KNOB	Where the low-pass in each loop reaches the shorter decay that DAMPING asks for, in Hz.	1500 to 12000	4500
37	GATE HOLD KNOB	How long the gate stays open after the input falls under 0.02 (about -34 dBFS), in ms.	40 to 1000	250
38	GATE KEY	Cuts the reverb off a while after the input falls under 0.02 (about -34 dBFS): see GATE HOLD.		
39	OUTPUT KNOB	The level of the output, the input and the reverb alike, in dB. Only at 0 dB is the output at rest the input itself.	-24 to 12	0

NO.	CONTROL	WHAT IT DOES	RANGE	DEFAULT
40	MIX KNOB	0 is the input alone, bit for bit. The output is the input times (1 minus MIX) plus the reverb times MIX times 1.5, so 100 percent is the reverb alone at 1.5 times its level.	0 to 100	0

Recipes

A vocal that stays clear

Choose Vocal, Large and Dry. IN HP keeps the lows out of the reverb, DAMPING shortens the highs and a pre-delay of 30 ms leaves a gap before the reverb starts. Raise IN HP, or lower the MIX, until the reverb stays behind the voice.

Drums that stop

Choose Drums, Medium and Gated. It has GATE on with GATE HOLD at 120 ms, so the reverb is cut off 120 ms after the input falls under -34 dBFS. Lower GATE HOLD for a shorter reverb after each hit, or press GATE to switch the gate off.

A send reverb

Put CASK on an aux channel strip, choose Send, Large at 100 Percent, and send to it from the tracks. MIX at 100 percent means the input does not come out of CASK at all.

A reverb that gets out of the way

Choose Vocal, Large and Ducked or Guitar, Diffuse and Ducked. DUCK turns the reverb down while the input is loud and lets it come back in the gaps. Lower DUCK to hear more of the reverb during loud parts.

A frozen pad

Play something into CASK with a long preset, press FREEZE while it rings, and stop the input. The preset Pad, Huge and Frozen holds what the reverb contains when it is loaded, so it holds silence from an empty reverb: load it while something is playing through CASK, or press FREEZE yourself.

Presets

CASK has 26 presets in six categories. Flat Start is the plug-in's default state, so choosing it returns every control to its default. Every other preset is written as only what it changes from the defaults and is expanded to all 24 sound controls. Each is held to two to five measurements, 112 in all, of programmes and measures that the tests define: the level of the reverb under the dry input, the

output's change, the peak, the level 0.5 s after the first burst or phrase, the reverb against the reverb ducked, the decay of the impulse response against its designed value, the first arrival, and the delay. For the frozen presets the held level and its change are measured instead.

CATEGORY PRESETS

Start	Flat Start; Large at 25 Percent
Vocal	Vocal, Large and Dry; Vocal, Medium at 1 Second; Vocal, Small and Short; Vocal, Huge and Long; Vocal, Diffuse at 2 Seconds; Vocal, Large and Ducked
Drums	Drums, Tiny and Short; Drums, Small at 1 Second; Drums, Medium and Gated; Drums, Large and Gated; Snare, Diffuse and Gated
Keys and Guitar	Keys, Medium at 1.6 Seconds; Keys, Large at 4 Seconds; Guitar, Small and Wide; Guitar, Diffuse and Ducked
Strings and Pads	Strings, Huge at 5 Seconds; Pad, Large and Long Lows; Pad, Huge and Frozen; Pad, Large and Frozen
Special	Effect, Huge at 30 Seconds; Effect, Diffuse and Mono; Effect, Large and Long Gate; Send, Large at 100 Percent; Send, Tiny at 100 Percent

None of the presets has been listened to. Their names say the job and the mode's name or the decay, and each preset's intent, in words, is kept with its measurements in the plug-in's tests.

Measured

Everything here was run on one Intel Mac (Intel Core i9-10910, macOS 14, x86_64, Release), shared with other work, on 16 October 2026.

- CASK's own test group ran 301 checks (the processor 136, the presets 35, the editor 130) and none failed. The reverb engine's own group, which LATHE shares, ran 275 and none failed.
- The checks of the real editor, made with real mouse events and drawn at 70, 100 and 170 percent, ran 94, 13, 359, 274, 97, 9 and 3 (the control map, overlaps, every word, the fit of every word, the interaction, the cost and the leaks), and none failed.
- Apple's auval tool passes with 25 parameters and main bus layouts of one in one out, one in two out and two in two out. It prints three warnings, all the same one: DECAY, LOW FREQ and LOW DECAY have skewed scales, and the value that comes back from the host's 0 to 1 scale is not their default bit for bit.
- The host test on the installed, signed release build of the Audio Unit ran 43 checks and none failed.
- A run of the whole project's tests, 22 minutes long, ran 13341 checks and none failed.

WHAT WAS MEASURED	RESULT	CONDITION	KIND
Rest	The output is the input bit for bit in 36 runs (six modes, three layouts, with FREEZE, GATE, DUCK and DECAY 30 s on and off) and at six sample rates. A denormal input number comes out as 0 and a minus zero as plus zero	MIX 0, OUTPUT 0 dB	bound
Delay	0 samples	six settings at six sample rates, and read back from the Audio Unit	bound
The processor against the engine	equal bit for bit, also with the controls given at every block	the synthetic voice	bound
Block size	blocks of 1, 7, 64, 512 and 4096 samples give the same output, with changes of control at nine sample positions		bound
Hostile input	only numbers come out; the largest sample is 5.36 against a bound of 64	not-a-number, infinity, 1e30, denormals, a full-scale square wave, noise and silence	bound
Memory use	no allocation on the audio thread	three layouts	bound
BYPASS	the input bit for bit; the reverb runs on inside, and 300 samples after BYPASS goes off the output is the engine's own, sample for sample		bound
Presets	112 measurements, two to five for each of the 26 presets, all inside their bounds in 106 runs of the engine (21.9 s on 16 October)	five named programmes	measured against bounds
A preset through the Audio Unit	the Audio Unit and the engine differ by less than 3e-5 of full scale	the vocal preset on the synthetic voice	bound
Paint	the display takes 4.86, 4.72 and 5.86 ms at 2x with sound running (budget 8 ms: met) at a load average of 6.6 to 8.5, and 4.18 to 11.10 ms in five runs at heavier loads (two of them over the budget); at 1x 2.63 to 6.47 ms; dragging a ring, which redraws everything, takes 43 to 112 ms at 2x (reported, not held to the budget); an idle editor paints 0 times in 1.5 s	upper bounds, including the snapshot	measured

WHAT WAS MEASURED	RESULT	CONDITION	KIND
Memory over 30 editors	the allocator's bytes in use went from 337.5 to 334.3 MB. The count wanders by about 10 MB between readings with no slope: over 30 rounds it changed by -8.5 to +10.3 MB in 15 runs, and over 150 rounds by +4.0, +1.8 and +3.5 MB	the editor opened and closed 30 times after 30 rounds to settle first	measured
Cost	the whole plug-in at its defaults 2.04, 2.20 and 2.19 percent of one core in three runs on a quiet machine; 1.82 to 2.10 across the six modes; 2.06 to 2.16 at a heavy setting (DECAY 30 s, SIZE 2, DAMPING 100, both levels +6 dB, the gate, DUCK and WIDTH 200); BYPASS on 2.17 to 2.24; one in two out 2.04 to 2.18. At load averages of 10 to 13 the same tests read 2.56 to 2.99. The budget is 3.0	thread CPU time, stereo, 48 kHz, 512-sample blocks, 10 s of the synthetic voice	measured

The processor adds nothing the readings resolve: the whole plug-in against the engine alone differed by -0.23 to +0.23 points of one core, in both directions. The cost moves with the machine's load: at a load average of 102 falling to 23 the same tests read 2.94 to 5.13 and the budget was not met, which is the load and not the code, so a figure is good to about 20 percent.

Limits and what is not verified

- Nothing has been listened to: the modes, the presets and the defaults are described by what they were measured to do, not by how they sound.
- The decay curve on the display is the engine's design, not a measurement of the output. The engine's own tests set the design against the decay measured in octave bands: the worst deviations were 17.7 percent for a damped LARGE, 1.9 for a LARGE with long lows, 3.8 for one SMALL setting and 12.5 for one HUGE setting, against a limit of 20 percent.
- The early reflections' heights on the display are the box's table plus EARLY, not measured at the output.
- A real host: the checks are the processor's, JUCE's own Audio Unit host and Apple's auval tool, not a digital audio workstation, so what a workstation does with a tail of 30 seconds, with one channel in and two out, or with the bypass parameter is not verified.
- Apple silicon: the Mac the tests ran on is Intel. The release packages are built for both, and the Apple silicon half was compiled and never run.
- The VST3 was built and was not opened in a host.
- The real editor in a real host: the panel has been drawn and exercised in the test tools and opened, resized and closed in JUCE's own Audio Unit host, and nobody has used it with a hand.
- A frozen tail for longer than the 56 seconds of the engine's check: no run of hours was made.
- WIDTH at 200 percent doubles the difference between the sides by the engine's arithmetic, and no test measured it at 200.

- CASK used as a send, with MIX at 100 percent, is covered by two presets and nothing else.
- A denormal input number comes out as itself or as 0, and a minus zero comes out as plus zero. These are the two exceptions to a bit-for-bit rest.
- The name CASK is a working name.

Troubleshooting

I hear no reverb. MIX starts at 0, and Flat Start leaves it there. Raise MIX, or choose a preset. Check that BYPASS is off and that the line under the preset name does not say the trial is over.

The reverb is cut off. GATE is on and the input fell under -34 dBFS; raise GATE HOLD or press GATE again to switch it off. A host may end the tail when a track stops playing; not verified here.

The tail is longer than I set. DECAY is the time at 1 kHz with DAMPING at 0 and LOW DECAY at 1. A low DAMPING or a LOW DECAY above 1 lengthens the highs or the lows, and the line under the preset name shows the time told to the host, 1.4 times DECAY plus 1 second.

FREEZE holds nothing. FREEZE holds what is in the reverb when it goes on. With nothing in it there is nothing to hold: play something through CASK first.

The numbers on the display do not match the knob. The display's decay curve is the design and the energy decay is a measurement of the impulse response. DECAY CONTROL is the knob's number and MEASURED is the time found, which is shorter with the default DAMPING.

CASK uses more CPU on a busy Mac. The figures in Measured were taken on a quiet machine, and read higher on a busier one: that is the load, not the code.

The panel looks small or large. Drag a corner of the window: it keeps its proportions from 70 to 170 percent of 1200 by 760 pixels, and the width is saved with the project.