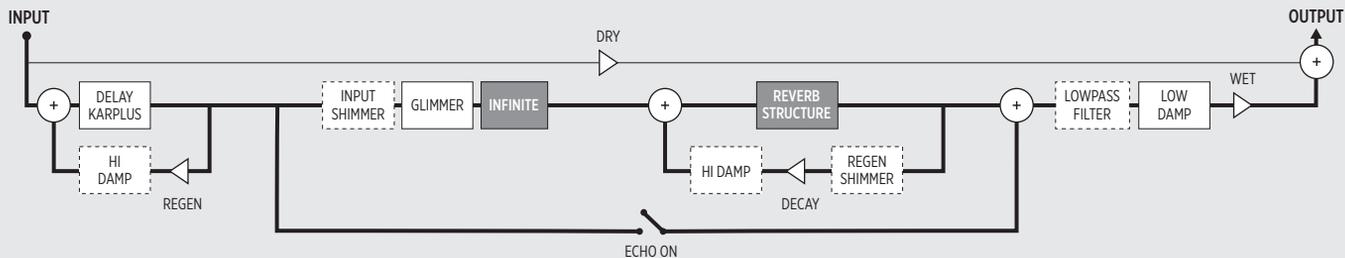


# STARLAB

— time-warped reverberator —

# SIGNAL FLOW AND FEATURES

STARLAB expands the sound of your Eurorack rig with lush reverbs as well as chorus, flanging, and modulated delays. STARLAB is also a full-featured Karplus-Strong string synthesis voice module that allows freely alternating bowing and plucking as well as dynamic string damping. Complete with LFO with multiple waveforms and targets, STARLAB is packed with powerful features and extensive CV I/O all while maintaining intuitive playability.



## FEATURES

- Three selectable reverb types for a wide variety of ambient textures
- DELAY/KARPLUS section with feedback
  - Delay assignable to output for mod/verb and delay/verb effects
  - Four-octave Karplus-Strong string synthesis mode with damping control for string/verb full voice capability
- LFO section with various waveforms to modulate delay time, reverb size, or tone filters
- FILTER section to sculpt the high and low EQ of the reverb and DELAY/KARPLUS section
- HARMONICS section to enhance the aural spectrum of the reverb
  - Adjustable SHIMMER for adding pitch shifting of up to +/- 1 octave to the reverb
  - GLIMMER for dynamic enhancement of harmonics
- Adjustable reverb core size to increase or decrease the space for reflections, allowing for pitch control of the regenerating reverb content
- Extensive CV control of parameters
- 4-pole 24dB/octave variable resonance low pass filter
- INFINITE freezes the input audio prior to the reverb tank
- Access to four presets from the front panel
- Independent WET and DRY level controls
- Analog dry path for a zero latency dry signal that is never converted to digital
- Ultra low noise, high performance 24-bit 96kHz A/D and D/A converters provide uncompromising audio quality
- Super high performance SHARC DSP
- 32-bit floating point processing
- Designed and built in the USA

>> [Download the complete manual at strymon.net/support/starlab](https://strymon.net/support/starlab) <<

# REVERB CONTROLS

## DRY

Sets the level of unprocessed input signal sent to the output.

## INPUT GAIN

Controls the gain of the input signal fed to the reverb structure through a soft clipping input stage. LED indicates signal level from **GREEN** for clean reverb to **RED** for soft-clipping distortion.

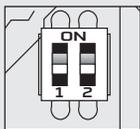
## INFINITE

**PRESS:** Holds the current audio input to the reverb while allowing new audio to continue being processed by the reverb. Great for generating ambient pads.

**HOLD:** Press and hold for 2 seconds to enter PITCH QUANTIZE mode. **SIZE/PITCH** values are restricted to the selected scale. Scales can be selected via the **SIZE/PITCH** Quantize Scale secondary function. See complete manual for in-depth detail.

## FAVORITE

Recalls the currently selected Favorite preset. [See **PRESET FUNCTIONS** section for additional information.]



**Spillover:** Enables effect spillover between the Favorite presets and the manual setting of the module by setting rear dip switch 1 to **ON**.

## SIZE / PITCH

Changes the process rate and size of the reverb structure while maintaining the integrity of the reverb audio. Turning clockwise increases the size and lowers the pitch of any regenerating audio in the reverb structure. Pitch ranges from -1 octave at minimum to +1 octave at maximum. Size ranges from one-half size at minimum to double the size at maximum.

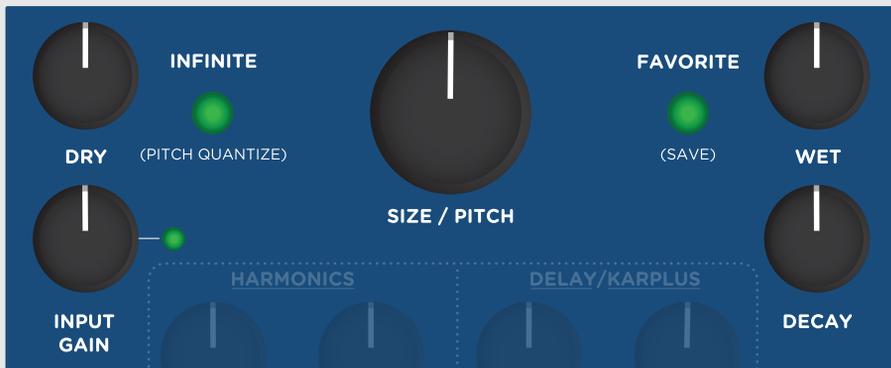
**TIP:** You can “play” the **SIZE/PITCH** knob by sending 1V/octave to the **SIZE/PITCH CV**.

## WET

Sets the overall reverberated signal level sent to the output.

## DECAY

Adjusts the amount of time for the reverb to fade out. At higher **DECAY** settings, decay time may be impacted by the **FILTER** settings.



## TEXTURE

Selects one of three different reverb structures.

**sparse:** Granular-sounding reverb that can create interesting effects with staccato inputs, or produce a clean reverb with sustained inputs.

**dense:** Plate-like reverb with a fast response and dense reflections that can venture into ambient territory at high decay times.

**diffuse:** Slow-building, atmospheric wash that excels at ambient, swell, and even reverse-like textures.

# DELAY AND HARMONICS CONTROLS



## HARMONICS

**SHIMMER:** Adds pitch shifting to the reverberated signal. Effect is off when **SHIMMER** knob is fully counterclockwise.

**REGEN:** Selects regenerative shimmer which applies the pitch shifting within the reverb structure (**REGEN LED GREEN**) or input shimmer which applies the pitch shifting at the input before the reverb structure (**REGEN LED off**).

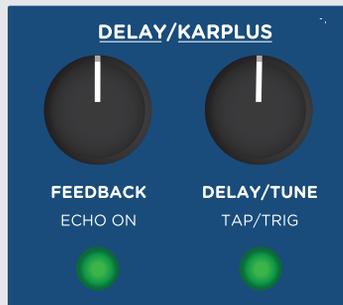
**SHIMMER INTERVAL:** Secondary function on the **SHIMMER** knob to select the interval of the pitch shifting effect.

**To select the SHIMMER INTERVAL:** Turn the **SHIMMER** knob while holding down the **REGEN** button.

Provides two octaves of total range from -1 octave at minimum to +1 octave at maximum. Two additional interval options (-detune and +detune) are available around the 12 o'clock position of the **SHIMMER** knob.

**GLIMMER:** Dynamically enhances aspects of the input signal's harmonic spectrum. Effect is off when **GLIMMER** knob is fully counterclockwise.

**HIGH BAND:** Selects between the high band (**HIGH BAND LED GREEN**) or low band (**HIGH BAND LED off**) harmonics to be enhanced by the glimmer effect.



## DELAY/KARPLUS

**FEEDBACK:** Applies regeneration to the delay, resulting in more repeats with longer delays, or more resonance with shorter delays. When in Karplus-Strong mode, **FEEDBACK** affects string decay and structure resonance.

**ECHO ON:** Busses the delay output to the **WET** output to mix with the reverb signal. For a 'delay only' experience, set **DECAY** to minimum.

**DELAY/TUNE:** In delay mode, applies pre-delay from 0 to 1.5 seconds max. Control is log taper for finer resolution at lower **DELAY/TUNE** settings.

When **TAP/TRIG** clock CV input is detected, **DELAY/TUNE** knob acts as a clock mult/div with the following ratios around the knob (min to max):

- 1/4, 1/3, 1/2, 2/3, 3/4, 1/1, 3/2, 5/3, 7/4, 2/1, 5/2
- Max delay time is 7.5s (3s clock input with 5/2 multiplier)

**TAP:** Allows the delay time to be set by tapping in a tempo.

See **KARPLUS-STRONG CONTROLS** for additional functions of the **DELAY/KARPLUS** section.

**NOTE:** When the echo is off and the feedback is at minimum, the **DELAY/TUNE** knob functions as a traditional pre-delay, adjusting the time between the **DRY** signal and the onset of the reverb. Turning the knob counterclockwise = shorter, clockwise = longer.

# FILTER AND LFO CONTROLS

## FILTER

**LOW DAMP:** Removes low end content both at the output and in the regenerating core portion of the reverb as the knob is turned clockwise. In Karplus-Strong mode, removes low frequency content of the string.

**HIGH DAMP:** Removes high frequency content from the regenerating reverb structure as the knob is turned clockwise. In Karplus-Strong mode, dampens the high end harmonics as the string decays.

**LOW PASS:** Changes the **HIGH DAMP** function to a 24dB/octave low pass filter applied at the output of the reverb.

**LOW PASS Resonance:** To adjust the resonance (Q) of the low pass filter, press and hold the **LOW PASS** button and turn the **HIGH DAMP** knob. Turning the knob clockwise increases the sharpness of the resonant frequency resulting in a peaking response. Lower values create a gradual roll-off.



## LFO



**LFO TARGET:** Selects the parameter that will be modified by the LFO.

**delay:** Modulates the delay time. Press the **ECHO ON** button for prominent delay mod effects. In Karplus-Strong mode, the tuning of the string is modulated.

**pitch:** Modulates the **SIZE/PITCH** setting of the reverb.

**filter:** Modulates the filter cutoff frequency. Press the **LOW PASS** button for dramatic filter sweep. The effect is subtle when you are not in low pass mode.

**SPEED:** Controls the period of the LFO waveform from 15 seconds to 1/15th second (15Hz).

When Envelope (**env**) is the selected waveform, **SPEED** controls the decay rate of the envelope.

When **LFO CLK IN CV** is detected, **SPEED** knob acts as a clock divider/multiplier with division by 8, 6, 5, 4, 3, and 2 on the first half of the knob range, and multiplication by 2, 3, 4, 5, 6, 8 on the second half of the knob range. No change when set to the 12 o'clock position.

**SHAPE:** Selects from six different waveshapes for the LFO, including **triangle**, **square**, **ramp**, **saw**, **random**, and **envelope** which responds to input dynamics with the input sensitivity set by the **DEPTH** knob.

**DEPTH:** With the exception of the **env** shape, adjusts the amount of modulation. Modulation is off at the fully counterclockwise position. When **env** is selected, modulation is off at 12 o'clock.

When Envelope (**env**) is the selected waveform:

- No modulation at 12 o'clock
- Turn counterclockwise for increasing negative envelope depth
- Turn clockwise for increasing positive envelope depth



When **EXT LFO IN** is detected:

- **DEPTH** knob acts as an attenuator and inverter of the incoming signal (attenuverter)
- Minimum gain is at 12 o'clock
- Turn counterclockwise for increasing negative gain
- Turn clockwise for increasing positive gain



# ADDITIONAL FUNCTIONS

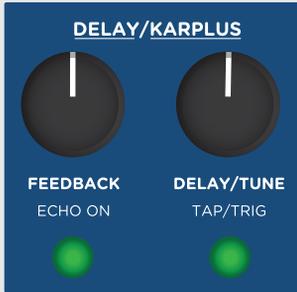
## PRESET FUNCTIONS

There are four onboard presets that are accessible using the **FAVORITE** button.

**SWITCHING BETWEEN PRESETS:** To switch between presets, press and hold **FAVORITE**, then press one of the four center buttons. The currently selected preset will illuminate **RED** while holding down the **FAVORITE** button.

**SAVING A PRESET:** Press and hold **FAVORITE** until the button flashes **GREEN**, then:

- Press **FAVORITE** to save to the current location
- OR
- Press one of the four center buttons to save to another preset location



## KARPLUS-STRONG CONTROLS

Karplus-Strong mode gives you access to a monophonic, delay-based string synthesizer. To enter Karplus-Strong mode, hold the **ECHO ON** button and turn the **DELAY/TUNE** knob clockwise until the **TAP/TRIG** button turns **RED**. For normal delay operation, hold the **ECHO ON** button and turn **DELAY/TUNE** knob counterclockwise until the **TAP/TRIG** button blinks **GREEN**.

**FEEDBACK:** Affects string decay and structure resonance.

**ECHO ON:** Mixes in the dry string signal with the wet output. If **ECHO ON** is not selected, only the reverberated string will be heard at the wet output.

**DELAY/TUNE:** Sets string tuning over a continuous 4 octave range. When **SIZE/PITCH CV** is detected, sets fine tuning of 12 semitones.

**TAP/TRIG (quick press):** Triggers or 'plucks' string.

**TAP/TRIG (hold):** Continuously excites or 'bows' the string.

**FEEDBACK CV:** Affects string decay and structure resonance. **FEEDBACK** knob position acts as an offset.

**SIZE/PITCH CV:** Controls the string pitch interval at 1V/octave over a 4 octave range. Input range is 0-4V.

**TAP/TRIG CV:** Triggers or 'plucks' the string.

**IN GATE CV:** Continuously excites or 'bows' the string in latching or momentary operation. See complete manual for in-depth detail.

## Power Up Modes and Secondary Functions

In addition to the functions directly controlled by the knobs and switches on the UI, it is possible to configure global setup modes and access additional functions via power up modes and secondary functions. See [complete manual for in-depth detail](#).

## AUDIO AND CV INPUTS (QUICK REFERENCE)

JACK NAME	VOLTAGE RANGE	DESCRIPTION
LEFT IN / RIGHT IN	+/-10V (20Vpp)	Left and Right audio inputs. Use <b>LEFT IN</b> for mono input.
LEFT OUT / RIGHT OUT	+/-10V (20Vpp)	Left and Right audio outputs. Use <b>LEFT OUT</b> for mono output.
INFINITE	0-5V	Engages the infinite effect to hold the input signal going into the reverb. Rising edge trigger will toggle the state. Can be set to momentary response by pressing and holding <b>HIGH BAND</b> button at power-up. Set to latching response by default.
IN GATE	0-5V	Gates the input to the reverb when CV is high. Blue <b>INPUT GAIN</b> LED indicates audio input is gated and not sent to the reverb. Can be set to latching response by pressing and holding <b>REGEN</b> button at power-up. Set to momentary response by default.
IN GATE (Karplus-Strong)	0-5V	Continuously excites or 'bows' the string in latching or momentary operation. <a href="#">See complete manual for in-depth detail.</a>
FAVORITE	0-5V	Toggles between the physical knob/switch settings of the module and the selected Favorite preset setting on rising edge.
SHIMMER	+/-5V	Sets shimmer gain. Knob position acts as an offset.
INTERVAL	+/-5V	Sets pitch interval for shimmer. Quantized to 1/2 steps over +/- 1 octave range.
HIGH DAMP	+/-5V	Affects the wet signal high end filtering. Positive voltage opens filter. Knob position acts as an offset.
GLIMMER	+/-5V	Sets glimmer gain. Knob position acts as offset.
LFO CLK IN	Rising edge triggered	Sets the LFO speed to sync with phase-alignment to the clock input. <b>SPEED</b> knob acts as clock div/mult.
SPEED	+/-5V	Sets LFO speed. Knob position acts as offset.
DEPTH	+/-5V	Sets LFO depth. Knob position acts as offset.
EXT LFO IN	+/-5V	External LFO input. <b>DEPTH</b> knob acts as attenuverter.
TAP/TRIG	Rising edge triggered	Sets the delay time with clock CV input. <b>DELAY/TUNE</b> knob acts as clock mult/div. Clock min 25ms, clock max 3s.
TAP/TRIG (Karplus-Strong)	Rising edge triggered	Triggers or 'plucks' the string on rising edge transition.
ECHO ON	0-5V	Busses the delay output to the <b>WET</b> output to mix with the reverb signal.
FEEDBACK	+/-5V	Affects delay feedback or Karplus-Strong string decay/resonance. Knob position acts as offset.
CLEAR	Rising edge triggered	Clears audio data from reverb buffer when rising edge detected.
DECAY	+/-5V	Affects reverb decay length. Knob position acts as offset.
WET	+/-5V	Affects wet output signal level. Knob position acts as offset.
SIZE/PITCH	+/-2V	1V/octave 0V = No size/pitch change. -2V = 2 octaves down. +2V = 2 octaves up. <b>SIZE/PITCH</b> knob acts as offset.
SIZE/PITCH (Karplus-Strong)	0-4V	Tunes string to a range of 4 octaves over 4V at 1V/octave. <b>DELAY/TUNE</b> knob acts as fine tune control over 1 octave range.

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