

# STARLAB

— time-warped reverberator —

USER MANUAL

**strymon**<sup>®</sup>

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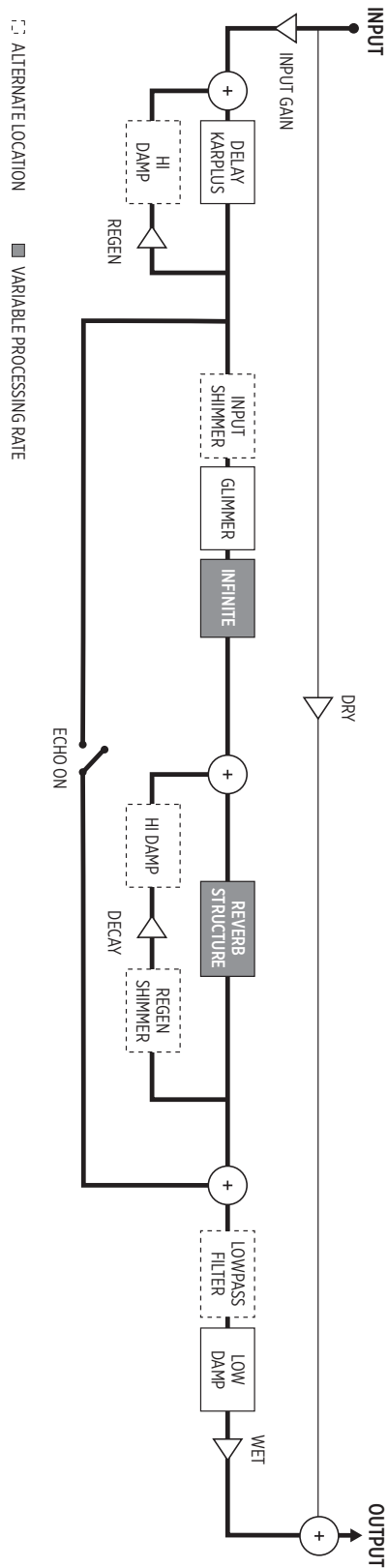
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## Introduction

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.

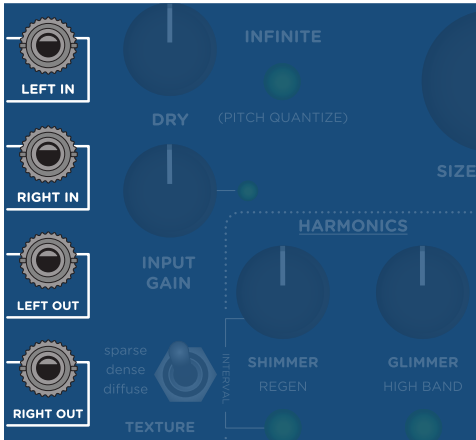


# Signal Flow Diagram



## Audio Inputs and Outputs

StarLab's full stereo I/O allows for both mono or stereo operation.



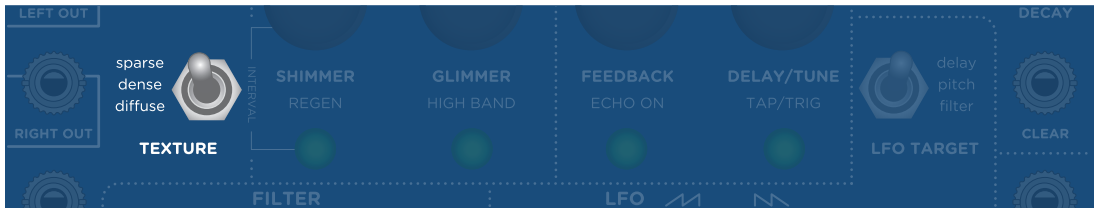
**LEFT/RIGHT IN:** Left and right audio inputs. Use **LEFT IN** for mono input.

**LEFT/RIGHT OUT:** Left and right audio outputs.

**TIP:** With mono input (**LEFT IN**), output can be mono (**LEFT OUT**) or stereo (**LEFT OUT, RIGHT OUT**).

## Reverb Controls and Connections

StarLab features a multi-textural, highly configurable, variable process rate stereo reverb with adjustable tail characteristics.



### TEXTURE Switch

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.

## Reverb Controls and Connections (cont.)

### DRY

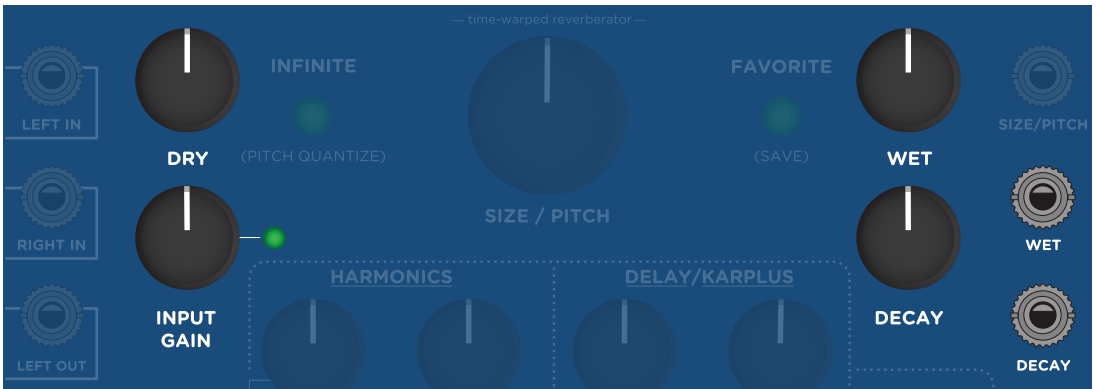
Sets the output level of the dry signal. Dry signal is an analog path throughout. No dry signal at minimum, unity gain at 12 o'clock, and +3dB boost of the dry signal at maximum.

### WET

Sets the overall reverberated signal level sent to the output.

**WET CV:** Modifies the **WET** level. **WET** knob position acts as an offset.

- CV range: +/-5V



### INPUT GAIN

Controls the gain of the input signal fed to the reverb through a soft clipping input stage. LED indicates signal level from **GREEN** for clean reverb to **RED** for soft-clipping distortion. **BLUE** LED indicates the input signal to the reverb is muted via the **IN GATE CV**.

*(See page 9 for details.)*

### 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.

**DECAY CV:** Modifies the **DECAY** level. **DECAY** knob position acts as an offset.

- CV range: +/-5V

## Reverb Controls and Connections (cont.)

### SIZE / PITCH

Changes the process rate and size of the reverb structure while maintaining the integrity of the reverb audio. This allows for 'pitching' of the regenerating reverberated signal as well changing the dynamic response of the reverb. Turning clockwise increases the size and lowers the pitch of any regenerating audio in the reverb structure. Range from center is +/-1 octave (1/2x size at minimum to 2x size at maximum).

**NOTE:** -1 octave = one-half size at minimum  
+1 octave = double the size at the maximum



**SIZE/PITCH CV:** Modifies the **SIZE/PITCH** setting at 1V/octave. **SIZE/PITCH** knob acts as an offset.

CV range: +/-2V

- -2V = 2 octaves down
- 0V = No **SIZE/PITCH** change
- +2V = 2 octaves up

In Karplus-Strong Mode, **SIZE/PITCH CV** tunes the string to a range of 4 octaves at 1V/octave. **DELAY/TUNE** knob acts as fine tune control over 1 octave range. (See [page 15](#) for details.)

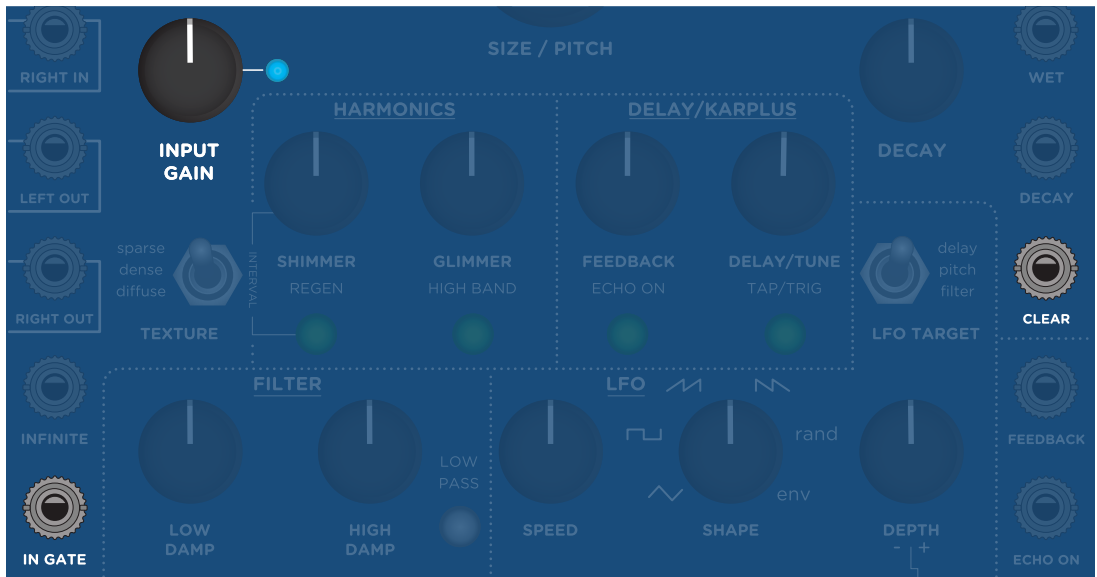
- CV range: 0-4V



## Reverb Controls and Connections (cont.)

**CLEAR CV:** Clears audio data from reverb buffer when rising edge detected.

- CV range: 0-5V Rising edge triggered



**IN GATE CV:** Gates the input to the reverb when CV is high. **BLUE INPUT GAIN LED** indicates audio input is gated and not sent to the reverb.

- CV range: 0-5V Rising edge triggered
- Can be set to latching response by pressing and holding the **REGEN** button at power up. Set to momentary response by default.

*(See [page 31](#) for Power Up Functions.)*

In Karplus-Strong Mode, **IN GATE CV** continuously excites or 'bows' the string in latching or momentary operation.

*(See [page 15](#) for details.)*

## Reverb Controls and Connections (cont.)

### INFINITE

Holds the current audio input to the reverb while allowing new audio to continue to be processed by the reverb when the button is pressed or **INFINITE CV** is triggered. Great for generating ambient pads.



**INFINITE CV:** Engages the infinite effect to hold the input signal going into the reverb.

- CV range: 0-5V Rising edge triggered
- Can be set to latching momentary response by pressing and holding the **REGEN** button at power up. Set to latching response by default.

*(See page 31 for Power Up Functions.)*

**PITCH QUANTIZE** mode changes the response of the **SIZE/PITCH** knob to values that are restricted to the selected scale. Scales can be selected via the **SIZE/PITCH Scale Quantize** secondary function.

- Press and hold the **INFINITE** button until it blinks **AMBER** to enable **PITCH QUANTIZE** mode.
- Press and hold the **INFINITE** button again until it blinks **GREEN** to exit **PITCH QUANTIZE** mode.

**SIZE/PITCH Scale Quantize:** Changes the response of the **SIZE/PITCH** knob to be quantized to one of 15 available scales (see next page). To change the selected scale:

- Turn the **SIZE/PITCH** knob while holding the **INFINITE** button to select from 15 different scales. The selected scale is shown through the 4 center button LEDs in binary. The following binary sequence corresponds to the scale list:

## Reverb Controls and Connections (cont.)

SHIMMER REGEN	GLIMMER HIGH BAND	FEEDBACK ECHO ON	DELAY/TUNE TAP/TRIG
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> octave
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/> root, 5th
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/> pentatonic
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/> minor blues
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> Major
<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/> Dorian
<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/> Phrygian
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> Lydian
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> Mixolydian
<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/> Aeolian
<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/> harmonic minor
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/> whole-tone
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> minor chords extending top down with monotone input
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/> Major chords extending top down with monotone input
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/> chromatic

**Scale Portamento:** Sets the amount of portamento when using the **SIZE/PITCH** knob to scroll through the notes of the selected scale while **PITCH QUANTIZE** is enabled.

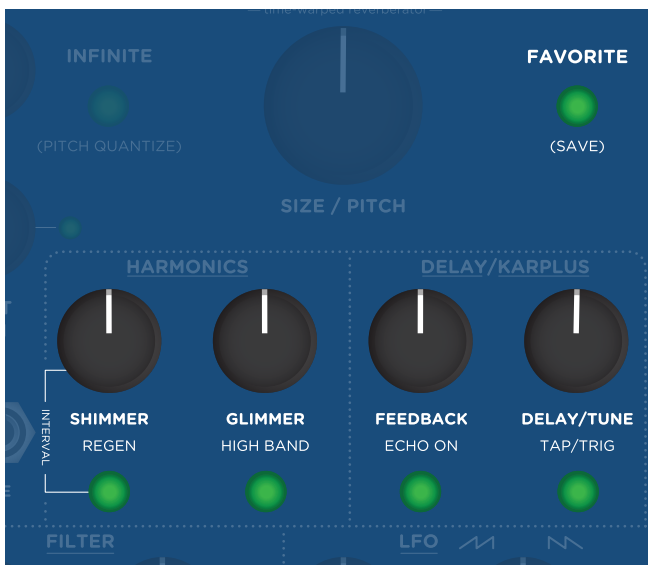
- Hold **LOW PASS** button while turning **SIZE/PITCH** to adjust **Scale Portamento**.

## Reverb Controls and Connections (cont.)

### FAVORITE

There are four onboard presets that are accessible using the **FAVORITE** button. Press **FAVORITE** to recall the currently selected Favorite preset.

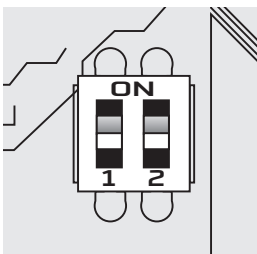
- **SWITCHING PRESETS:** To switch between presets, press and hold **FAVORITE**, then, press one of the four center buttons. The currently selected preset will illuminate **RED** while holding down the **FAVORITE** button.



### FAVORITE CV:

Toggles between the physical knob/switch settings of the module and the selected Favorite preset setting.

- CV range: 0-5V  
Rising edge triggered



**Spillover:** Effect spillover between the Favorite presets and the manual setting of the module can be enabled by setting DIP switch 1 located on the back of the module to **ON**.

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

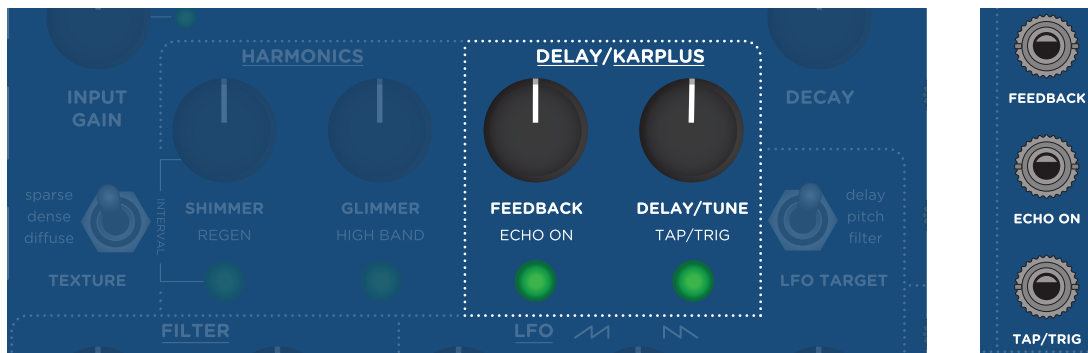
Press **FAVORITE** to save to the current location.

OR

Press one of the four center buttons to save to a different preset location.

## DELAY/KARPLUS Controls and Connections

StarLab features a DELAY/KARPLUS section that provides pre-delay and traditional digital delay effects along with a Karplus-Strong mode which provides a delay-based monophonic string synthesizer.



### DELAY/TUNE

Adjusts pre-delay (or delay when **ECHO ON** is engaged) from 0 to 1.5 seconds max. The control is logarithmic taper for finer resolution at lower **DELAY/TUNE** setting.

When **TAP/TRIG** clock CV is detected, **DELAY/TUNE** acts as a clock divider/multiplier 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.

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

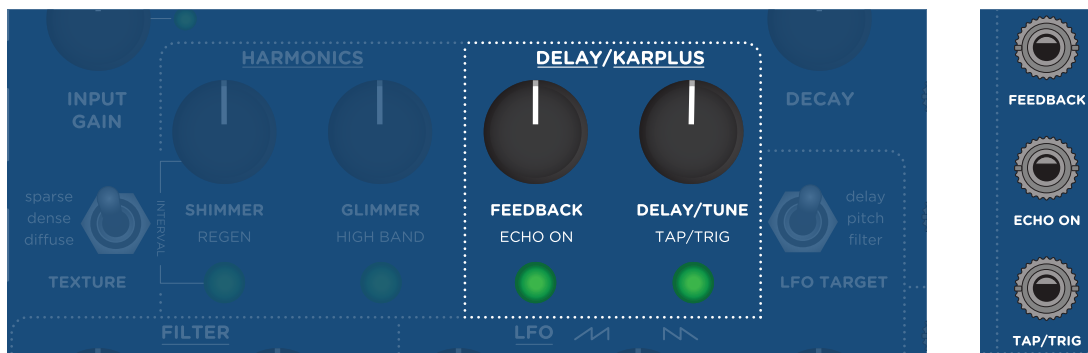
**TAP/TRIG CV:** Sets the delay time with clock CV input. **DELAY/TUNE** knob acts as a clock divider/multiplier.

- Clock minimum - 25 milliseconds, clock maximum - 3 seconds
- CV range: 0-5V Rising edge triggered

**TIP:** Maximum delay time is 7.5 seconds with **TAP/TRIG** CV receiving a 3 second clock input and **DELAY/TUNE** set for 5/2 multiplier.

**NOTE:** When **ECHO ON** is bypassed 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.

## DELAY/KARPLUS Controls and Connections (cont.)



**FEEDBACK:** Applies regeneration to the delay, resulting in more repeats with longer delays, or more resonance with shorter delays.

**FEEDBACK CV:** Modifies the **FEEDBACK** level. Knob position acts as an offset.

- CV range: +/-5V

**ECHO ON:** Busses the delay output to the **WET** output to mix with the reverb signal. When **ECHO ON** is bypassed, delay section operates as a pre-delay for the reverb.

*(Refer to Signal Flow Diagram on [page 4](#).)*

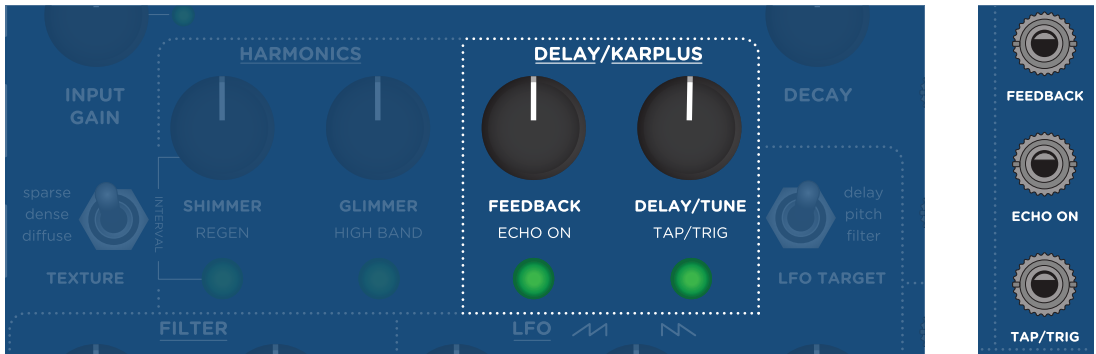
**TIP:** For 'delay only' without any reverb effect at the **WET** output, set **DECAY** to minimum with **DELAY ON** enabled.

**ECHO ON CV:** Toggles the **ECHO ON** button on and off.

- CV range: +/-5V
- Can be set to momentary response by pressing and holding the **ECHO ON** button at power up. Set to latching response by default.

*(See [page 31](#) for Power Up Functions.)*

## DELAY/KARPLUS Controls and Connections (cont.)



### Karplus-Strong Mode

Karplus-Strong mode provides a monophonic, delay-based string synthesizer which can be plucked or bowed like a stringed instrument. When in Karplus-Strong mode, the DELAY/KARPLUS controls have a different functionality set than in delay mode.

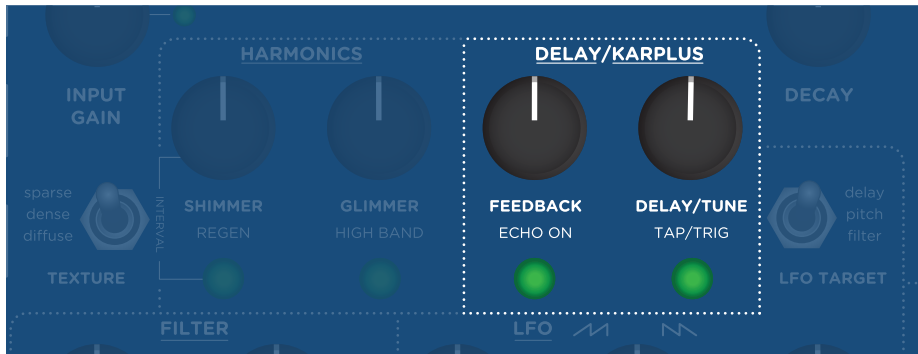
**To enter Karplus-Strong mode:** Hold the **ECHO ON** button and turn the **DELAY/TUNE** knob clockwise until the **TAP/TRIG** button turns **RED**.

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/KARPLUS Controls and Connections (cont.)



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

**Karplus-Strong Pitch Tracking Adjustment:** Adjusts the V/oct tracking to compensate for calibration errors in external control module voltages.

- Press and hold **LOW PASS** and turn the **INPUT GAIN** knob to adjust.
- Default tracking for accurately calibrated signals is at 12 o'clock. Pitches track flatter at lower settings and sharper at higher settings.

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

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

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



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

- CV range: 0-4V



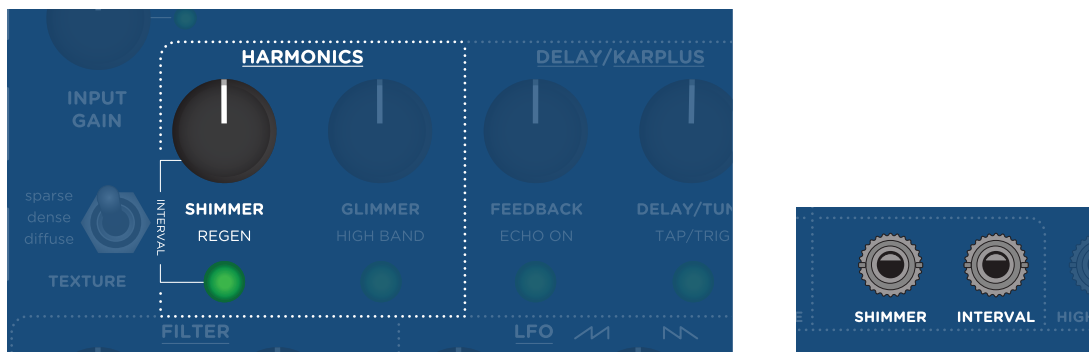
**IN GATE CV:** Continuously excites or 'bows' the string in latching or momentary operation. (See [page 31](#) for *Power Up Functions*.)

- CV range: 0-5V



## HARMONICS Controls and Connections

StarLab's HARMONICS section includes pitch shifting shimmer and harmonic accentuating glimmer effects.



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

**SHIMMER CV:** Sets shimmer level. Knob position acts as an offset.

- CV range: +/-5V

**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. Provides two octaves of total range from -1 octave at minimum to +1 octave at maximum. Two additional interval options of -detune (-10 cents) and +detune (+10 cents) are available around the 12 o'clock position of the **SHIMMER** knob.

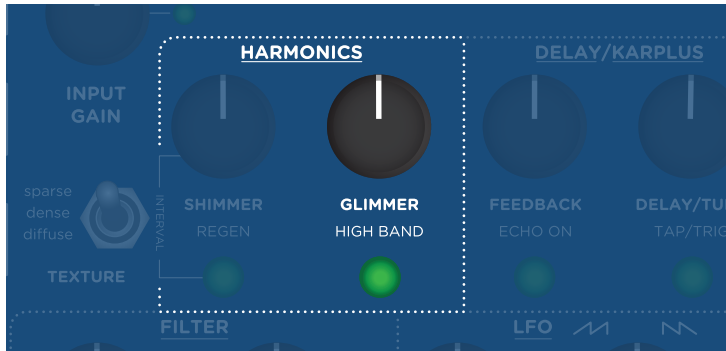


- To select the **SHIMMER INTERVAL**: Turn the **SHIMMER** knob while holding down the **REGEN** button.

**INTERVAL CV:** Sets pitch interval for the shimmer effect. Quantized to 1/2 steps over +/- 1 octave range.

- CV range: +/-5V

## HARMONICS Controls and Connections (cont.)



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

**HIGH BAND:** Selects the harmonics to be enhanced by the glimmer effect. When engaged (**HIGH BAND LED GREEN**), the high band harmonics are enhanced. When bypassed (**HIGH BAND LED OFF**), the low band harmonics are enhanced.

## FILTER Controls and Connections

StarLab's filter section targets the signals going into the reverb tank applying filtering to the high and low frequency content of the reverb. Includes a variable resonance (Q) low pass 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, **LOW DAMP** removes the low frequency content of the string.

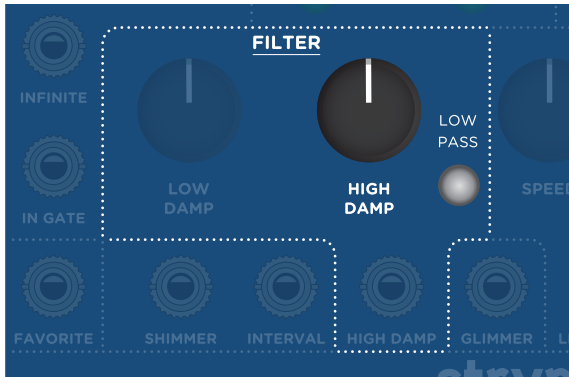
**HIGH DAMP:** Removes high frequency content from the regenerating reverb structure as the knob is turned clockwise.

In Karplus-Strong Mode, **HIGH DAMP** is used to dampen the high end harmonics as the string decays.

**HIGH DAMP CV:** Affects the high end filtering of the wet signal. Positive voltage opens the filter. Knob position acts as an offset.

- CV range: +/-5V

## FILTER Controls and Connections (cont.)



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

**LOW PASS Resonance:** Secondary function for the **HIGH DAMP** knob to adjust the resonance (Q) of the low pass filter.

To adjust the **LOW PASS Resonance:**

- 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 Controls and Connections

StarLab's LFO section provides modulation which can be assigned to one of three different targets. Targeting the delay modulates the delay time, allowing for chorus, flange and other delay effects. Targeting the pitch modulates the **SIZE/PITCH** control position. Targeting the filter modulates the **HIGH DAMP** control. It can also be enhanced with the use of an external LFO in the **EXT LFO IN** jack located nearby.



**LFO TARGET:** Selects one of three parameters that can be modified by the LFO.

**delay:** Modulates the delay time. Press the **ECHO ON** button for prominent delay modulation effects.

In Karplus-Strong mode, the **delay** target modulates the tuning of the string.

**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 **LOW PASS** is disabled.

**LFO CLK IN:** Sets the LFO speed to sync with phase-alignment to the clock input. **SPEED** knob acts as clock divider/multiplier.

- CV range: 0-5V Rising edge triggered

## LFO Controls and Connections (cont.)



**SPEED:** Controls the period of the LFO waveform from 15 seconds (0.067Hz) to 1/15th of a 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.

- Clock divisions by 8, 6, 5, 4, 3, and 2 are available on the first half of the knob range.
- Clock multiplication by 2, 3, 4, 5, 6, 8 are available on the second half of the knob range.
- There is no change to the clock when **SPEED** is set to the 12 o'clock position.

**SPEED CV:** Sets the LFO speed. Knob position acts as an offset.

- CV range: +/-5V

## LFO Controls and Connections (cont.)



**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 the 12 o'clock position.

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

- No modulation at the 12 o'clock position.
- Turn counterclockwise to increase negative envelope depth.
- Turn clockwise to increase positive envelope depth.

**DEPTH CV:** Sets LFO depth. Knob position acts as an offset.

- CV range: +/-5V

**EXT LFO IN CV:** Input can be sent an external LFO signal to modulate the desired LFO target. When **EXT LFO IN CV** is detected, the **DEPTH** knob acts as an attenuverter of the incoming external LFO signal.

- Minimum gain is at the 12 o'clock position.
- Turn clockwise for increasing positive gain.
- Turn counterclockwise for increasing negative gain.

## Features

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- 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



## Specifications

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### Power

+12V rail:	210mA	210mA
-12V rail:	210mA	210mA
+5V rail:	0mA	0mA

**Rack Width** 28hp

**Rack Depth** 41mm, 1.61"

**Sampling Rate** 96 kHz

**Input Impedance** 22 kOhm

**Maximum Audio Input Level** 20 Vpp

**Output Impedance** 1 kOhm

**Maximum Audio Output Level** 20 Vpp

**Signal/Noise** 114 dB typical

Appendix 1

# Secondary Functions Quick Reference

## Secondary Functions

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In addition to the functions directly controlled by the knobs and switches on the UI, StarLab has secondary functions that are accessed with a combination of two controls.

**Karplus-Strong mode:** Provides a monophonic, delay-based string synthesizer which can be plucked or bowed like a stringed instrument.

- Hold the **ECHO ON** button and turn the **DELAY/TUNE** knob clockwise until the **TAP/TRIG** button turns **RED** to engage **Karplus-Strong** mode.
- For normal delay operation, hold the **ECHO ON** button and turn **DELAY/TUNE** knob counterclockwise until the **TAP/TRIG** button blinks **GREEN**.

































































**Karplus-Strong Pitch Tracking Adjustment:** Adjusts the V/oct tracking to compensate for calibration errors in external control module voltages.

- Press and hold **LOW PASS** and turn the **INPUT GAIN** knob to adjust.
- Default tracking for accurately calibrated signals is at 12 o'clock. Pitches track flatter at lower settings and sharper at higher settings.

## Secondary Functions (cont.)

**SIZE/PITCH Scale Quantize:** Changes the response of the **SIZE/PITCH** knob to be quantized to one of 15 available scales. To change the selected scale:

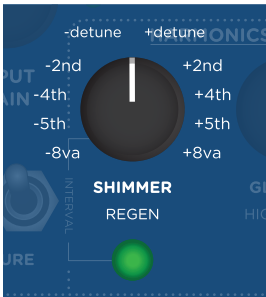
- Turn the **SIZE/PITCH** knob while holding the **INFINITE** button to select from 15 different scales. The selected scale is shown through the 4 center button LEDs in binary.
- The following binary sequence corresponds to the scale list:

				
SHIMMER REGEN	GLIMMER HIGH BAND	FEEDBACK ECHO ON	DELAY/TUNE TAP/TRIG	
				octave
				root, 5th
				pentatonic
				minor blues
				Major
				Dorian
				Phrygian
				Lydian
				Mixolydian
				Aeolian
				harmonic minor
				whole-tone
				minor chords extending top down with monotone input
				Major chords extending top down with monotone input
				chromatic

## Secondary Functions (cont.)

**Scale Portamento:** Sets the amount of portamento when using the **SIZE/PITCH** knob to scroll through the notes of the selected scale while **PITCH QUANTIZE** is enabled.

- Turn **SIZE/PITCH** clockwise to increase the amount of portamento between the notes of the selected scale. No portamento is applied at minimum.



**SHIMMER INTERVAL:** Selects the interval of the pitch shifting shimmer effect. 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 of -detune (-10 cents) and +detune (+10 cents) are available around the 12 o'clock position of the **SHIMMER** knob.

**LOW PASS Resonance (Q):** Adjusts the sharpness of the resonant frequency.

- While holding the **LOW PASS** button, turn the **HIGH DAMP** knob.
- Turning clockwise results in a peaking response. Lower values create a gradual roll-off.

Appendix 2

**Power Up Functions  
Quick Reference**

## Power Up Functions

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StarLab allows for changing the response of some of the CV jacks to either a latching or a momentary response.

**INFINITE CV Response:** Press and hold the **REGEN** button at power up to toggle the latching or momentary response. Response is latching by default.

**IN GATE CV Response:** Press and hold the **HIGH BAND** button at power up to toggle the latching or momentary response. Response is momentary by default.

**ECHO ON CV Response:** Press and hold the **ECHO ON** button at power up to toggle the latching or momentary response. Response is latching by default.

Appendix 3

**Control Voltage Inputs  
Quick Reference**



## INFINITE

*Voltage range: 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 **REGEN** button at power up. Set to latching response by default.

## IN GATE

*Voltage range: 0-5V*

Gates the input to the reverb when CV is high. Blue **INPUT GAIN** LED indicates audio input is gated and not sent to the reverb. Can be set to latching response by pressing and holding **HIGH BAND** button at power up. Set to momentary response by default.

## IN GATE (Karplus-Strong)

*Voltage range: 0-5V*

Continuously excites or 'bows' the string in latching or momentary operation.

## FAVORITE

*Voltage range: 0-5V*

Toggles between the physical knob/switch settings of the module and the selected Favorite preset setting on rising edge.

## SHIMMER

*Voltage range: +/-5V*

Sets shimmer level. Knob position acts as an offset.

## INTERVAL

*Voltage range: +/-5V*

Sets pitch interval for shimmer. Quantized to 1/2 steps over +/- 1 octave range.

## HIGH DAMP

*Voltage range: +/-5V*

Affects the wet signal high end filtering. Positive voltage opens the filter. Knob position acts as an offset.

## GLIMMER

*Voltage range: +/-5V*

Sets glimmer gain. Knob position acts as an offset.

## LFO CLK IN

*Voltage range: Rising edge triggered*

Sets the LFO speed to sync with phase-alignment to the clock input.

**SPEED** knob acts as clock divider/multiplier.

## SPEED

*Voltage range: +/-5V*

Sets LFO speed. Knob position acts as an offset.

## DEPTH

*Voltage range: +/-5V*

Sets LFO depth. Knob position acts as an offset.

## EXT LFO IN

*Voltage range: +/-5V*

External LFO input. **DEPTH** knob acts as an attenuverter.

## TAP/TRIG

*Voltage range: Rising edge triggered*

Sets the delay time with clock CV input. **DELAY/TUNE** knob acts as clock divider/multiplier. Clock min 25ms, clock max 3s.

### TAP/TRIG (Karplus-Strong)

*Voltage range:* Rising edge triggered

Triggers or 'plucks' the string on rising edge transition.

### ECHO ON

*Voltage range:* 0-5V

Busses the delay output to the **WET** output to mix with the reverb signal. Can be set to momentary response by pressing and holding **ECHO ON** button at power up. Set to latching response by default.

### FEEDBACK

*Voltage range:* +/-5V

Affects delay feedback. Knob position acts as an offset.

### FEEDBACK (Karplus-Strong)

*Voltage range:* +/-5V

Affects Karplus-Strong string decay and resonance. Knob position acts as an offset.

### CLEAR

*Voltage range:* Rising edge triggered

Clears audio data from reverb buffer when rising edge detected.

### DECAY

*Voltage range:* +/-5V

Affects reverb decay length. Knob position acts as an offset.

### WET

*Voltage range:* +/-5V

Affects wet output signal level. Knob position acts as an offset.

## SIZE/PITCH

*Voltage range: +/-2V*

1V/octave 0V = No size/pitch change. -2V = 2 octaves down. +2V = 2 octaves up. **SIZE/PITCH** knob acts as an offset.

## SIZE/PITCH (Karplus-Strong)

*Voltage range: 0-4V*

Tunes string to a range of 4 octaves over 4V at 1V/octave. **DELAY/TUNE** knob acts as fine tune control over 1 octave range.

## **Strymon Non-Transferrable Limited Warranty**

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### **Warranty**

Strymon warrants the product to be free from defects in material and workmanship for a period of two (2) years from the original date of purchase when bought new from an authorized dealer in the United States of America or Canada. If the product fails within the warranty period, Strymon will repair or, at our discretion, replace the product at no cost to the original purchaser. Please contact your dealer for information on warranty and service outside of the USA and Canada.

### **Exclusions**

This warranty covers defects in manufacturing discovered while using this product as recommended by Strymon. This warranty does not cover loss or theft, nor does the coverage extend to damage caused by misuse, abuse, unauthorized modification, improper storage, lightning, or natural disasters.

### **Limits of Liability**

In the case of malfunction, the purchaser's sole recourse shall be repair or replacement, as described in the preceding paragraphs. Strymon will not be held liable to any party for damages that result from the failure of this product. Damages excluded include, but are not limited to, the following: lost profits, lost savings, damage to other equipment, and incidental or consequential damages arising from the use, or inability to use this product. In no event will Strymon be liable for more than the amount of the purchase price, not to exceed the current retail price of the product. Strymon disclaims any other warranties, expressed or implied. By using the product, the user accepts all terms herein.

### **How to Obtain Service Under this Warranty**

For North American customers: Contact Strymon through our website at [strymon.net/support](https://strymon.net/support) for Return Authorization and information. Proof of original ownership may be required in the form of a purchase receipt. For International Customers: Contact the Strymon dealer from which the product was purchased from in order to arrange warranty repair service. Strymon® is a division of Damage Control Engineering®, LLC.