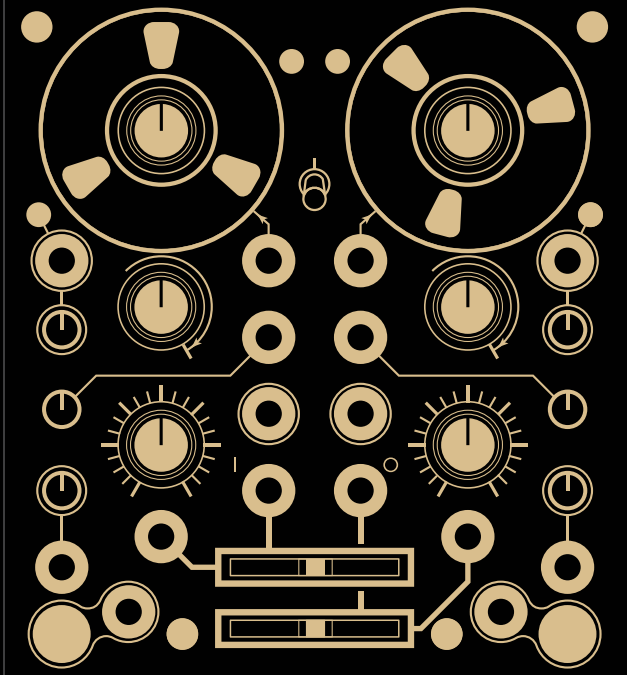
INSTRUO | SPECIALIST SYNTHESIZERS



Lúbadh

Dual Looper

User Manual

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Description

Consisting of two identical channels **Lúbadh** allows you to instantly record, playback, overdub, trim down, scan through and pitch up or down any audio signal.

Inspired by the aesthetics and mechanics of early tape techniques each channel features an analogue input circuit which adds slight compression, filtering and saturation. On the first recording, the sound may appear slightly fuller and warmer, re-recording audio back and forth will compound this effect over time allowing you to create dense tape-like textures.

Features

- 9 minutes of recording time per loop
- Dual recording, looping, and overdubbing capabilities
- One-shot play and one-shot record modes
- Delay and reverb diffusion networks
- Tape decay mode
- Feedback functionality
- Capacitive front panel for flange and stall effects
- Includes 2 HP passive CV expansion module & 4GB USB flash drive

Installation

1. Confirm that the Eurorack synthesizer system is powered off.
2. Locate 20 HP of space in your Eurorack synthesizer case for the module.
3. Locate an additional 2 HP of space in your Eurorack synthesizer case for the optional CV expansion module.
4. Connect the 10 pin side of the IDC power cable to the 2x5 pin header on the back of the module, confirming that the red stripe on the power cable is connected to -12V.
5. Connect the 16 pin side of the IDC power cable to the 2x8 pin header on your Eurorack power supply, confirming that the red stripe on the power cable is connected to -12V.
6. Optional: To install the CV Expander module, connect the included 12 pin IDC cable to both modules. Ensure that the red strip of the IDC cable matches the white stripe on each module.
7. Mount the Instruō **Lúbadh** in your Eurorack synthesizer case.
8. Power your Eurorack synthesizer system on.

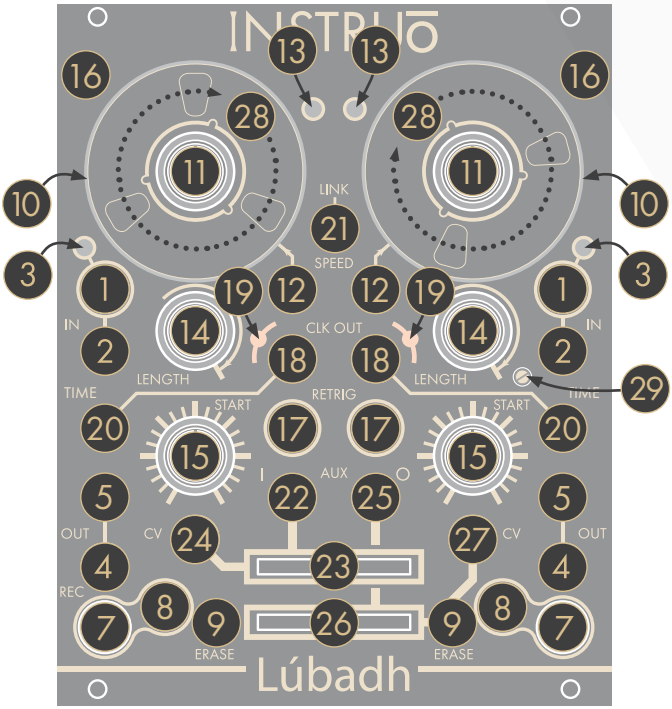
Note:

This module has reverse polarity protection.
Inverted installation of the power cable will not damage the module.

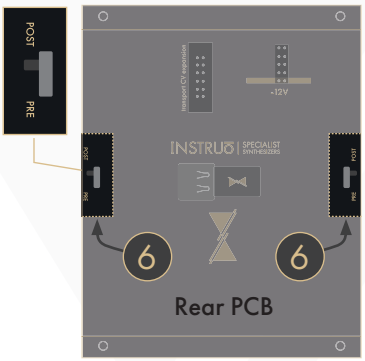
Specifications

- Width: 20 HP Module + 2 HP CV Expansion Module
- Depth: 42mm
- +12V: 250mA
- -12V: 100mA
- Sample Rate: 64kHz
- Bit Depth: 32 Bit

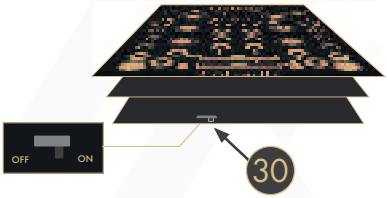
Lúbadh ˈlˠuːbəɣ | verb (willow weaving) loop, link, coil, twist, bend; meander of a river, to be fond of, wrapped up in



Pre/Post Output Level Switch



Capacitive Tape Reel Switch



Key

1. Input
2. Input Level
3. Input Indicator
4. Output
5. Output Level
6. Pre/Post Output Level Switch
7. Record Button
8. Record Gate Input
9. Erase Button
10. Position/Record Indicator
11. Speed
12. Speed CV Input
13. Speed Indicator
14. Length
15. Start
16. Retrigger/Shift Button
17. Retrigger Input
18. Clock Output
19. Time Indicator
20. Time
21. Link Toggle
22. Auxiliary Input
23. Auxiliary Input Crossfade
24. Auxiliary Input Crossfade CV Input
25. Auxiliary Output
26. Auxiliary Output Crossfade
27. Auxiliary Output Crossfade CV Input
28. Capacitive Tape Reel
29. Capacitive Tape Reel Trimmer
30. Capacitive Tape Reel Switch

CV Expansion Module



Key

1. Length CV Input (Left Deck)
2. Start CV Input (Left Deck)
3. Time CV Input (Left Deck)
4. Erase Trigger Input (Left Deck)
5. Length CV Input (Right Deck)
6. Start CV Input (Right Deck)
7. Time CV Input (Right Deck)
8. Erase Trigger Input (Right Deck)

Deck Specific Parameters

These parameters are specific to each deck, but function identically regardless of deck.

Input: AC coupled audio input.

Input Level: The **Input Level** knob sets the level of the signal present at the **Input**.

- If the **Input Level** knob is at its centre position, the signal present at the **Input** will be set to unity gain. Any setting beyond the centre position will add gain to the signal present at the **Input**. High signal levels will experience analogue limiting and saturation keeping the codec from digitally clipping.

Input Indicator: The **Input Indicator** will illuminate amber when a signal is present at the **Input**.

Output: AC coupled audio output.

- The **Output** of deck 1 is normalled to the **Input** of deck 2, and the **Output** deck 2 is normalled to the **Input** of deck 1, creating a feedback path. This allows for the transfer of loops from one deck to the other, as well as feedback, delay, and diffusion effects (See the Delay Mode section for more information).

Output Level: The **Output Level** knob sets the level of the signal present at the **Output**.

Pre/Post Output Level Switch: Two **Pre/Post Output Level Switches** are located on the back of the module. There is one for each deck. These switches determine whether the **Auxiliary Output Crossfade** is set to be pre output level or post output level.

Record Button: The **Record Button** allows for recording, overdubbing, and playback based on the currently selected mode.

- The **Record Button** is also used to enter alternate modes (See the Input Monitoring Modes, Looping & One-Shot Record Modes, Save & Load, and Time Modes sections for more information).

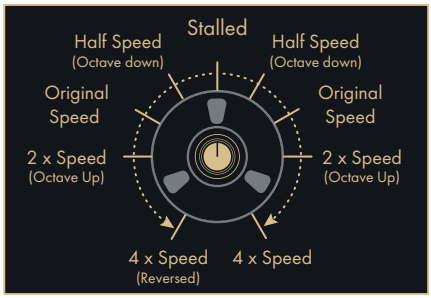
Record Gate Input: Recording, overdubbing, or playback (based on the currently selected mode) will be activated when a trigger or gate signal is present at the **Record Gate Input**.

Erase Button: Any loop in the buffer will be erased when the **Erase Button** is pressed.

- The **Erase Button** is also used to enter alternate modes (See the Latching & Momentary Recording, Looping & One-Shot Playback Modes and Save & Load sections for more information).

Position/Record Indicator: The position of the play head within the loop is shown by the **Position/Record Indicator**.

Speed: The **Speed** knob sets the playback rate of the loop.



When the knob is fully clockwise, the rate of playback will be set to 4x the original speed. When the knob is fully anticlockwise, the rate of playback will be set to 4x the original speed, but playback will be reversed. When the knob is set to its centre position, playback will be stalled. Because this is a vary-speed control, setting the rate of playback to half the original speed will also lower the pitch by one octave.

- Pressing the **Retrigger/Shift Button** and turning the **Speed** knob will mute the knob turn to allow for immediate speed value selection upon release of the **Retrigger/Shift Button**.

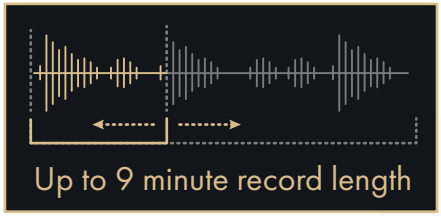
Speed CV Input: The **Speed CV Input** is a bipolar control voltage input for **Speed**.

- Control voltage is summed with the knob position.
- Input range: -/+5V.

Speed Indicator: The **Speed Indicator** will illuminate white when the **Speed** parameter is set to a value that corresponds to the 0.5x playback rate, reversed 0.5x playback rate, original playback rate, reversed original playback rate, 2x playback rate, reversed 2x playback rate, 4x playback rate, reversed 4x playback rate or stalled playback.

Length: The **Length** knob controls how much of the loop is played before resetting to the loop's start position set by the **Start** knob.

- **Lúbadh** can record up to 9 minutes of audio per deck.



- When the knob is fully clockwise, the entire loop will play. When the knob is fully anticlockwise, the loop will be as small as possible, creating a wavetable-esque sound source (scrub through the sample via the **Start** knob for different wavetable-esque effects).

Start: The **Start** knob sets the start position of the loop.

- Moving the knob from anticlockwise to clockwise increments the



start position from the beginning of the loop to the end of the loop.

Retrigger/Shift Button: The loop will reset to the start position set by the **Start** parameter when the **Retrigger/Shift Button** is pressed.

- If deck 2 is out of phase with deck 1 and the **Link Toggle** is enabled, pressing the **Retrigger/Shift Button** of deck 2 will spin the tape in either direction to resynchronize with deck 1.
- The **Retrigger/Shift Button** is also used for entering alternate modes (See the Latching & Momentary Recording, Input Monitoring Modes, Looping & One-Shot Record Modes, Looping & One-Shot Playback Modes, Save & Load, and Time Modes sections for more information).

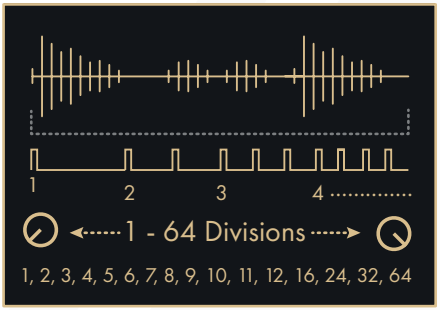
Retrigger Input: The loop will reset to the start position set by the **Start** parameter when a trigger or gate signal is present at the **Retrigger Input**.

Clock Output: The **Clock Output** generates a trigger signal based on the size of the loop and the value set by the **Time** knob.

Time Indicator: The **Time Indicator** illuminates white when a trigger signal is generated at the **Clock Output**. It will also illuminate amber when **Time Modes** are enabled (See the Time Modes section for more information).

Time: The **Time** knob sets the multiplication factor of trigger signals generated at the **Clock Output**.



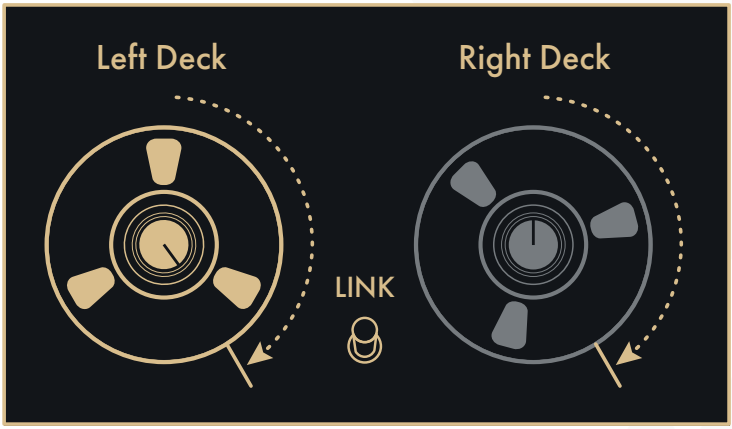


- When the knob is fully anticlockwise, the **Clock Output** will generate one trigger at the end of each loop. When the knob is fully clockwise, the **Clock Output** will generate 64 triggers per loop. Visual indication is shown via the **Position Indicator** upon selection of the multiplication factor.
- The available multiplication factors are 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 16, 24, 32, and 64.
- The **Time** knob also sets the delay time when **Delay Mode** is enabled and tape decay time when **Tape Decay Mode** is enabled. (See the Time Modes section for more information).

Shared Parameters



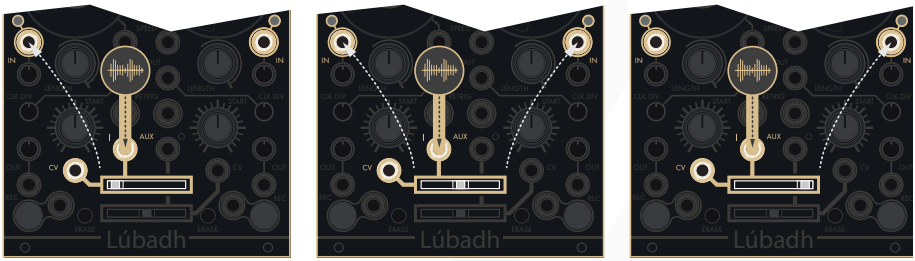
Link Toggle: The **Link Toggle** forces the right deck to mirror the left deck's controls.



Auxiliary Input: The **Auxiliary Input** is an AC coupled audio input that normals to the **Input** of both decks.

Auxiliary Input Crossfade: The **Auxiliary Input Crossfade** determines how much of the signal present at the **Auxiliary Input** gets routed to the **Input** of each deck.

- As the fader moves from fully left to fully right, audio crossfades between the **Inputs** of both decks.



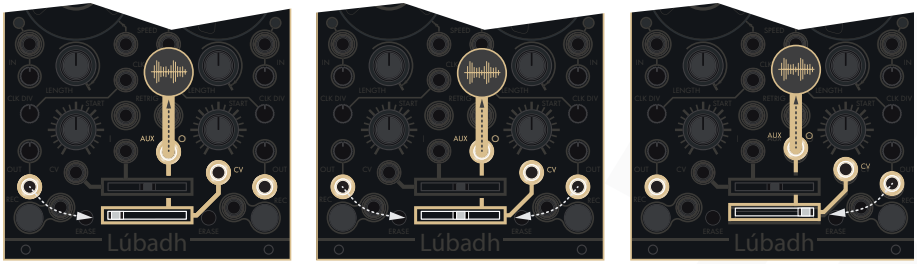
Auxiliary Input Crossfade CV Input: The **Auxiliary Input Crossfade CV Input** is a bipolar control voltage input for the **Auxiliary Input Crossfade**.

- Control voltage is summed with the fader position.
- Input range: -/+5V.

Auxiliary Output: The **Auxiliary Output** is an AC coupled audio output that is normalled from the **Output** of both decks.

Auxiliary Output Crossfade: The **Auxiliary Output Crossfade** determines the audio signal balance of both **Outputs** routed to the **Auxiliary Output**.

- As the fader moves from fully left to fully right, audio from both decks crossfades at the **Auxiliary Output**.



Auxiliary Output Crossfade CV Input: The **Auxiliary Output Crossfade CV Input** is a bipolar control voltage input for the **Auxiliary Output Crossfade.**

- Control voltage is summed with the fader position.
- Input range: -/+5V.

Capacitive Tape Reel

Capacitive Tape Reel: The play head graphic on the front panel is a capacitive touch plate that can be used for warble effects, stalling the loop, and delay time manipulation when the corresponding deck is empty and **Delay Mode** is enabled.

Capacitive Tape Reel Trimmer: The **Capacitive Tape Reel Trimmer** is accessed via the front panel and is used to calibrate the sensitivity of the **Capacitive Tape Reel**.

Capacitive Tape Reel Switch: The **Capacitive Tape Reel Switch** is located on the bottom of the second circuit board and is used for turning the **Capacitive Tape Reel** on and off. By default, the **Capacitive Tape Reel Switch** will be in the on position.



CV Expansion Parameters

Length CV Input: The **Length CV Input** is a bipolar control voltage input for the **Length** parameter.

- Control voltage is summed with the knob position.
- Input range: -/+5V.

Start CV Input: The **Start CV Input** is a bipolar control voltage input for the **Start** parameter.

- Control voltage is summed with the knob position.
- Input range: -/+5V.

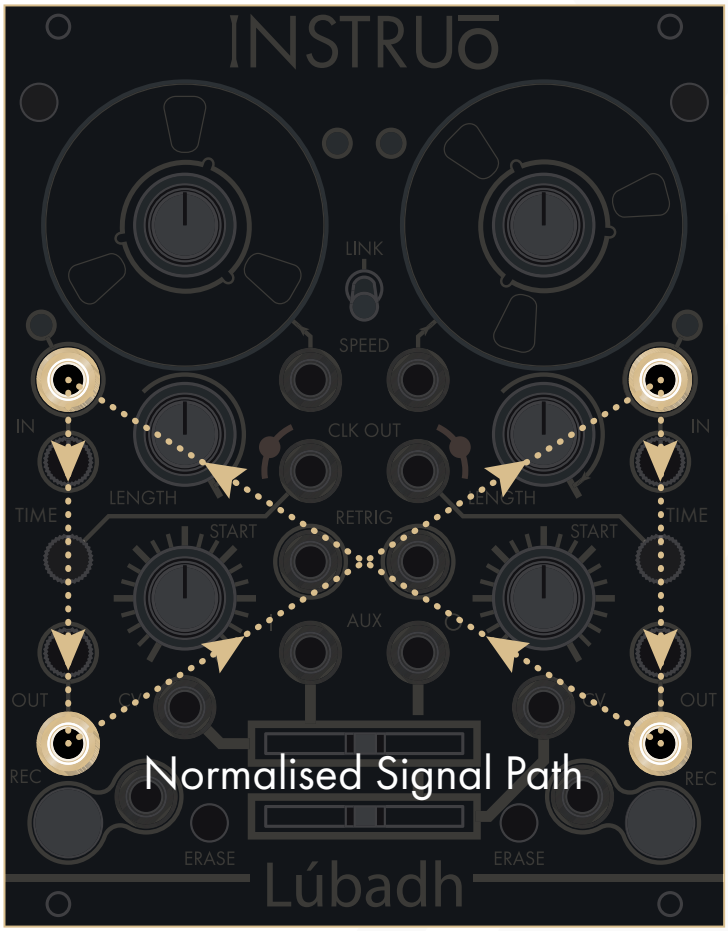
Time CV Input: The **Time CV Input** is a bipolar control voltage input for the **Time** parameter.

- Control voltage is summed with the knob position.
- Input range: -/+5V.

Erase Trigger Input: A trigger or gate signal present at the **Erase Trigger Input** will erase the buffer of the corresponding deck.

Normalisation Path

A feedback path is created between the inputs and outputs on **Lúbadh**. The **Output** of deck 1 is normalled to the **Input** of deck 2, which then passes to the **Output** of deck 2. The **Output** of deck 2 is normalled back to the **Input** of deck 1. This feedback path becomes very useful when bouncing audio from deck to deck or utilising the **Tape Decay** and **Delay** modes (See the Time Modes section for more information).



Normalised Signal Path

Record, Overdub & Erase

The **Lúbadh** currently records 9 minutes of audio per deck.

It is important to note that the record head and the play head are decoupled. For instance, ½ speed playback can be set while full speed recording is taking place.

To record to a deck, connect an audio signal to the **Input** of deck 1 and monitor from the **Output** of deck 1. Set the **Input Level** to its centre position and set the **Output Level** to its fully clockwise. Press the **Record Button** to start recording. The **Position/Record Indicator** will start to pulse, indicating that **Lúbadh** is recording. Press the **Record Button** again to stop recording. Playback of the recorded audio will immediately start and will be indicated by a cycling **Position/ Record Indicator**.

Repeat this process to overdub new audio on the existing recording. The existing recording being overdubbed upon is always rerecorded with an amplitude setting of 0.9 to allow older overdubs to decay over time.

Press the **Erase Button** to erase the recording from the deck.

Punch-In Recording

Punch-In Recording destructively records, completely replacing any audio for the duration of recording.

To **Punch-In Record** on a desired deck, press and hold the **Erase Button** and then press the **Record Button** on the corresponding deck.

This feature can also be used for adding gaps of silence to an existing recording.

Latching & Momentary Recording

The **Record Gate Input** can be configured to **Latching** or **Momentary.** When set to **Latching**, the record state will change with every trigger or gate signal present at the **Record Gate Input**. When set to **Momentary**, the recording will be enabled for as long as a gate signal is held high.

This can be configured by pressing both **Retrigger/Shift Buttons (1 and 2)** and then pressing the **Erase Button (3)** of the deck you wish to alter.

By default, the **Record Gate Input** is set to **Latching**.



Input Monitoring Modes

There are three **Input Monitoring Modes**. To toggle through the three **Input Monitoring Modes**, press and hold the **Retrigger/Shift Buttons (1& 2)** for deck 1 and deck 2, then press the corresponding deck's **Record Button (3)**.

For example, deck 1's **Record Button** is included in the button combination to toggle through **Input Monitoring Modes** for deck 1. Deck 2's **Record Button** is included in the button combination to toggle through **Input Monitoring Modes** for deck 2.



Input Monitoring Enabled Mode



This mode is indicated by a white illuminated **Record Button (1)**.
When this mode is active, input monitoring is always enabled. Audio signals present at the corresponding input will always pass to the output, summing with any recorded loops.
This is the default mode.

Armed Input Monitoring Mode



This mode is indicated by a pulsing white **Record Button (1)**.
When this mode is active, input monitoring is only enabled when the deck is armed or when audio is being recorded. Pressing the **Record Button** once arms the deck and the **Record Button** pulses amber, enabling input monitoring. Pressing the **Record Button** a second time starts recording and keeps input monitoring enabled. Pressing the **Record Button** a third time stops recording, disables input monitoring, and starts playing the recorded loop. When armed, the **Erase Button** will disarm the deck without erasing the loop.

Input Monitoring Disabled Mode



This mode is indicated by an unilluminated **Record Button (1)**.
When this mode is active, input monitoring is disabled and only recorded audio passes to the **Output**.

Looping & One-shot Record Modes

To toggle between **Looping Record Mode** and **One-Shot Record Mode**, Press and hold the **Retrigger/Shift Button** of the desired deck, then press the **Record Button** of the opposite deck.

For example, to toggle between **Looping Record Mode** and **One-Shot Record Mode** on deck 1, press and hold the **Retrigger/Shift Button (1)** of deck 1, then press the **Record Button (2)** of deck 2. To toggle between **Looping Record Mode** and **One-Shot Record Mode** on deck 2, press and hold the **Retrigger/Shift Button** of deck 2, then press the **Record Button** of deck 1.



- **Looping Record Mode** is the default mode.
- In **One-Shot Record Mode**, a loop must be recorded to determine the size of the loop. Any further recording will start from the current playback position and will record for the duration of time set by the first loop along with the **Start** and **Length** parameters. Once the determined duration of time is met, recording will automatically stop. **One-Shot Record Mode** is indicated by an illuminated mixed amber and white **Record Button** when **Input Monitoring Enabled Mode** is active, a pulsing mixed amber and white **Record Button** when **Armed Input Monitoring Mode** is active, and an unilluminated **Record Button** when **Input Monitoring Disabled Mode** is active.

Looping & One-shot Playback Modes

To toggle between **Looping Playback Mode** and **One-Shot Playback Mode**, Press and hold the **Retrigger/Shift Button** of the desired deck, then press the **Erase Button** of the opposite deck.

For example, to toggle between **Looping Playback Mode** and **One-Shot Playback Mode** on deck 1, press and hold the **Retrigger/Shift Button (1)** of deck 1, then press the **Erase Button (2)** of deck 2. To toggle between **Looping Playback Mode** and **One-Shot Playback Mode** on deck 2, press and hold the **Retrigger/Shift Button** of deck 2, then press the **Erase Button** of deck 1.



- **Looping Playback Mode** is the default mode.
- In **One-Shot Playback Mode**, a loop must be recorded to determine the size of the loop. Pressing the **Retrigger/Shift Button** or sending a gate or trigger signal to the **Retrigger Input** will start playback of a full loop determined by the **Start** and **Length** parameters. Playback will automatically stop after each loop. When toggling between these modes, **Looping Playback Mode** is indicated by one white blink of the **Record Button**. **One-Shot Playback Mode** is indicated by one mixed amber and white blink of the **Record Button**.

Time Modes



There are three separate functions for the **Time** knob called **Time Modes**. To toggle through the three **Time Modes** for a desired deck, press and hold the **Retrigger/Shift Button (1)**, then press the corresponding deck's **Record Button (2)**.

For example, to toggle through the **Time Modes** for deck 1, press and hold the **Retrigger/Shift Button** and then press the **Record Button** of deck 1.

To toggle through the **Time Modes** for deck 2, press and hold the **Retrigger/Shift Button** and then press the **Record Button** of deck 2.

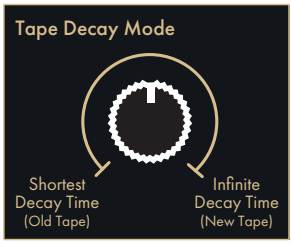
Clock Divisions Mode



This is the default mode.
In this mode, the **Time** knob sets the number of clock divisions per loop. Clock trigger signals can be set between 1 trigger per loop to 64 triggers per loop. This number of triggers per loop is indicated on the **Speed Indicator**.

Clock trigger signals are indicated by white illumination of the **Time Indicator**.

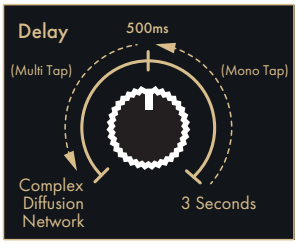
Tape Decay Mode



In this mode, the **Time** knob sets how long recordings take to degrade when being recorded over. This is similar to analogue tape ageing.

This mode is indicated by a pulsing amber **Time Indicator**.

Delay Mode



In this mode, the **Time** knob sets delay time and uses analogue feedback which is dependent upon the monitoring of the normalised signal path.
If the knob is fully anticlockwise, a complex diffusion network is enabled.

The complex diffusion network is post record head.
Moving the knob clockwise will increase delay time from multi taps, to 500ms at the centre position, to mono taps, to 3 seconds of delay time.
The delay line is pre record head.

This mode is indicated by an illuminated amber **Time Indicator**.

Save & Load

Save: To save a recording to internal memory, press and hold the **Retrigger/Shift Button** and the **Erase Button** and then press the **Record Button** of the corresponding deck.

For example, to save a recording from deck 1, press and hold the **Retrigger/Shift Button (1)** and the **Erase Button (2)** of deck 1, then press the **Record Button (3)** of deck 1. To save a recording from deck 2, press and hold the **Retrigger/Shift Button** and the **Erase Button** of deck 2, then press the **Record Button** of deck 2.

Hold this button combination for 2 seconds to export to the USB flash drive.



Load: To load a saved recording from internal memory to a desired deck, press and hold the **Retrigger/Shift Button** and then press the **Erase Button** of the corresponding deck.

For example, to load a saved recording to deck 1, press and hold the **Retrigger/Shift Button (1)** and then press the **Erase Button (2)** of deck 1. To load a saved recording to deck 2, press and hold the **Retrigger/Shift Button** and then press the **Erase Button** of deck 2.

Hold this button combination for 2 seconds to import from the USB flash drive.

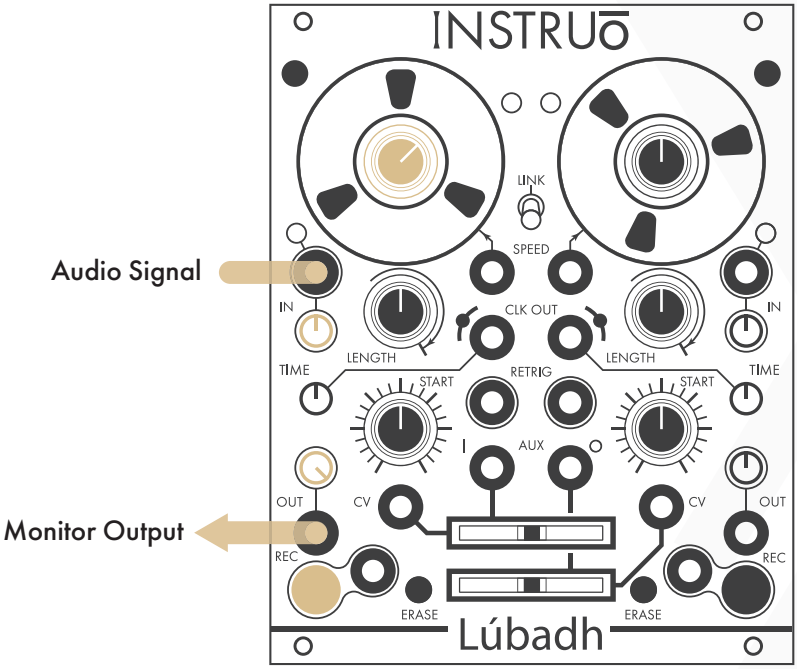
Note: Any audio content settings auto saved from previous sessions will be automatically loaded when powered on.



Patch Examples

Basic Recording:

Summary: Audio is recorded, looped, and then monitored.



Audio Path:

- Connect any audio signal to the **Input**.
- Set the **Input Level** to its centre position and set the **Output Level** fully clockwise.
- Monitor **Output 1**.
- Press the **Record Button** or connect a gate signal to the **Record Gate Input** to start recording audio.

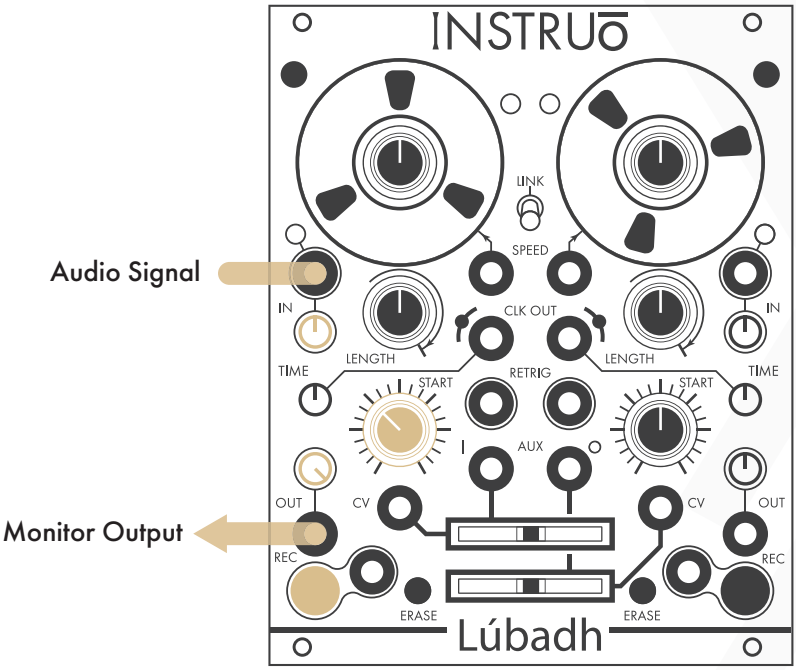
- Recording will be activated until the maximum duration has been met, if the **Record Button** is pressed while recording is activated, or if a gate or trigger signal is present at the **Record Gate Input**.
- The loop will play once recording has stopped.

Control Path:

- Apply control voltage to any of the CV inputs of **Lúbadh**.

Equal Division Retrigger:

Summary: Audio is recorded, looped, and then monitored. The clock generated by the loop will reset the loop to its position determined by the **Start** parameter. This creates equal divisions of the loop without having to use the **Length** parameter.



Audio Path:

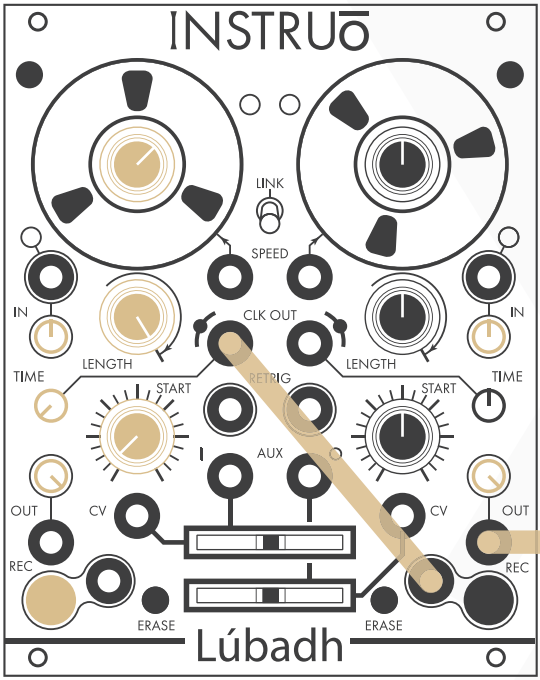
- Repeat the **Audio Path** section of the **Basic Recording** patch.
- Set the **Start** knob to a desired position.

Control Path:

- Set the **Time** knob to a loop division and connect the **Clock Output** to the **Retrigger Input**.

Deck Bouncing:

Summary: Audio is recorded, looped, and edited on deck 1 and then bounced to deck 2.



Audio Path:

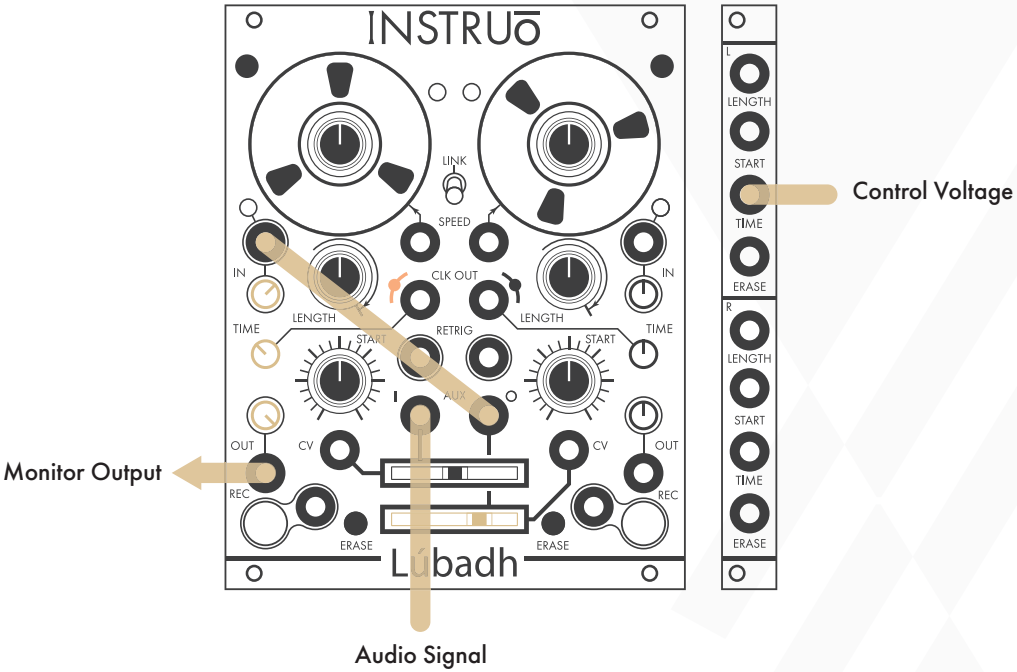
- Repeat the **Audio Path** section of the **Basic Recording** patch.
- Set **Speed**, **Start**, and **Length** parameters to desired positions.
- Make sure that both **Input Level** knobs are in their centre positions and that both **Output Level** knobs are in their fully clockwise positions.
- Monitor from **Output 2** to take advantage of the feedback thru path.
- Disconnect the signal present at the **Input** of deck 1.

Control Path:

- Set the **Time** knob of deck 1 fully anticlockwise to generate one trigger signal per loop.
- Connect the **Clock Output** of deck 1 to the **Record Gate Input** of deck 2. Recording on deck 2 will start at the beginning of the loop on deck 1 and end at the beginning of the next loop on deck 1.

Auxiliary Feedback Delay:

Summary: Delay effect that includes only the wet signal.



Audio Path:

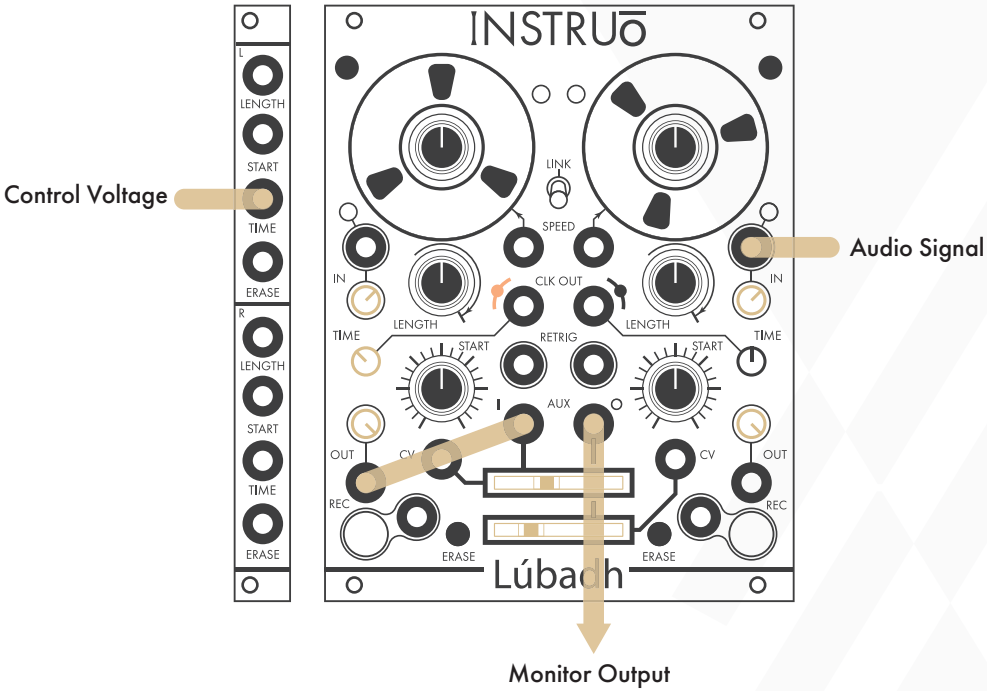
- Set deck 1 to **Delay Mode**.
- Connect an audio signal to the **Auxiliary Input**.
- Set the **Output Level** of deck 1 fully clockwise.
- Monitor from the **Output** of deck 1.
- Set the **Input Level** of deck 1 to a desired position.
- Connect the **Auxiliary Output** to the **Input** of deck 1.
- Use the **Auxiliary Output Crossfade** to set the amount of feedback.
- Set the **Time** parameter of deck 1 to a desired position.

Control Path:

- Apply control voltage to the **Time Input** of deck 1 and **Auxiliary Output Crossfade CV Input** for delay time and feedback modulation.

Dry/Wet Feedback Delay:

Summary: Delay signal with control over delay time, feedback amount, and dry/wet mix.



Audio Path:

- Set deck 1 to **Delay Mode**.
- Connect an audio signal to the **Input** of deck 2.
- Monitor from the **Auxiliary Output**.
- Set the **Output Level** of deck 1 fully clockwise.
- Set the **Output Level** of deck 2 fully clockwise.
- Set the **Input Levels** of deck 1 and deck 2 to desired positions.
- Connect the **Output** of deck 1 to the **Auxiliary Input**.
- Set the **Auxiliary Input Crossfade** to a desired position. This fader acts as a feedback control.

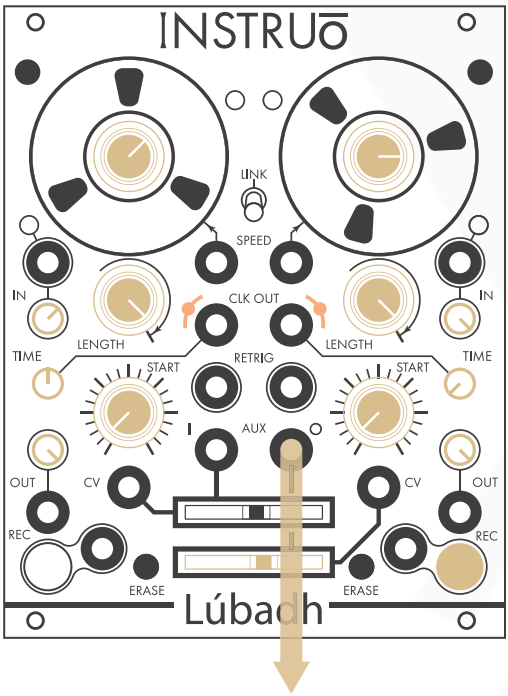
- Set the **Time** parameter of deck 1 to a desired position.
- Set the **Auxiliary Output Crossfade** to a desired position. This fader acts as a dry/wet mix control for the dry signal (deck 2) and the wet signal (deck 1).

Control Path:

- Apply control voltage to the **Time** Input of deck 1 for delay time modulation.

Pitch Shifting Delay:

Summary: Pitch shifting delay effect with control over feedback amount, and dry/wet mix.



Monitor Output

Audio Path:

- Record a sample onto deck 1
- Bounce a fragment of the loop from deck 1 over to deck 2, the length of which determines the maximum delay length
- Set deck 1 to **Delay Mode**.
- Set deck 2 to **Tape Decay Mode**
- Set deck 1 to **Input Monitoring Mode**.
- Set deck 2 to **Input Monitoring Disabled**.
- Monitor from the **Auxiliary Output**.

- Set the **Output Level** of deck 1 fully clockwise.
- Set the **Output Level** of deck 2 fully clockwise.
- Set the **Input Level** of deck 2 to fully clockwise.
- Set **Speed** knob of deck 1 to **Orginal Playback Speed.**
- Set **Speed** knob of deck 2 to **2x Playback Speed.**
- Set the **Auxiliary Output Crossfade** to a desired position. This mixes between the orginal audio and the pitch shifted version.
- Set the **Input Level** of deck 1 to desired position. This knob acts as a feedback control which introduces barber tones.

Control Path:

- Use the **Auxiliary Output Crossfade** to mix the original and pitch shifted audio.

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Manual Design: Dominic D'Sylva

CE This device meets the requirements of the following standards: EN55032, EN55103-2, EN61000-3-2, EN61000-3-3, EN62311.