THYME+

Sequenceable Robot-Operated Digital Tape Machine

BASTL

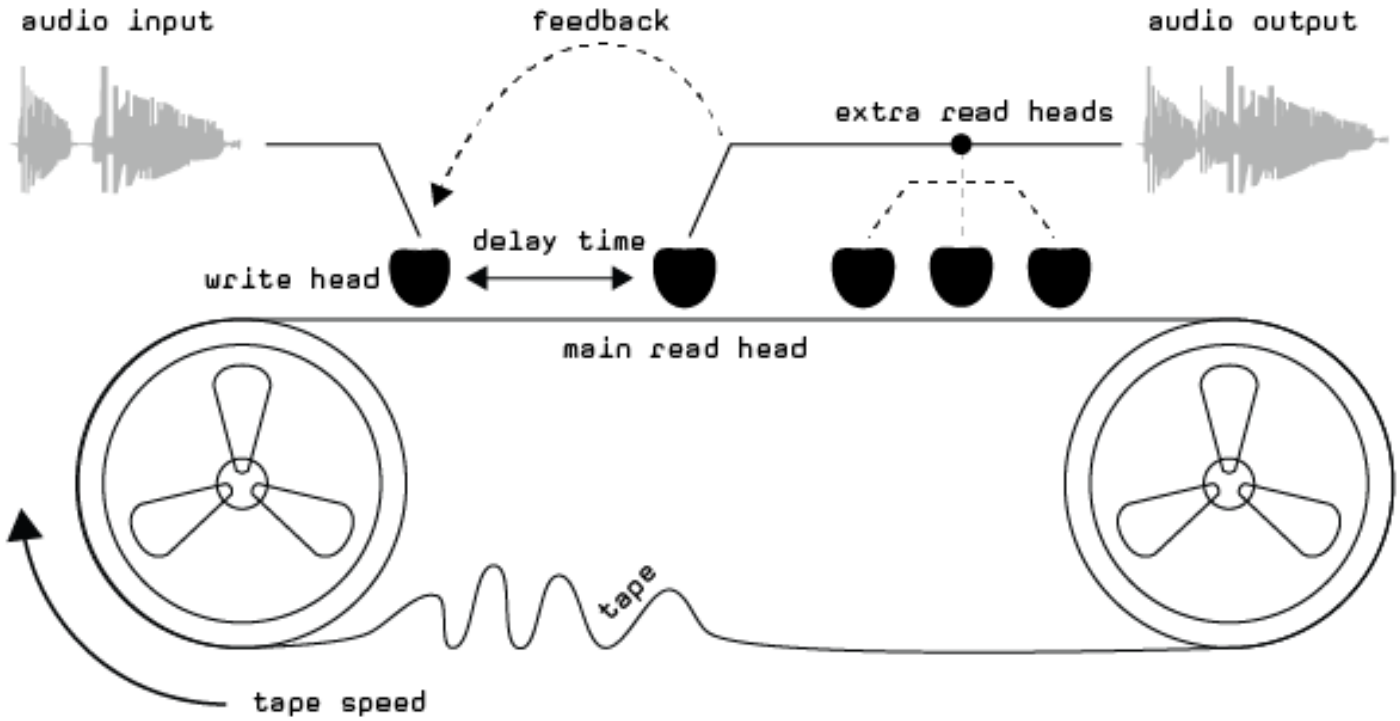
INSTRUMENTS

THYME+

Sequenceable robot-operated digital tape machine

THYME+ is a versatile sound processing unit.
Although a completely digital instrument, THYME+ operates like an analog tape delay machine with adjustable tape speed and adjustable positions of read heads.
The audio signal is first written on the “virtual tape” using the write heads, to be read later with adjustable delay by the read heads.
Multiple read heads can be used, resulting in complex sounds. Additionally, there's a feedback option to create a feedback loop between the write and read heads and a low-pass & high-pass filter.

Here is a simplified depiction of its core functionality:



Each parameter can be tweaked manually or modulated with an LFO robot with a wide range of waveforms and additional exciting sound-processing elements.
THYME+ can store up to 64 presets in its memory that retain your sound.
And last but not least, THYME+ offers a powerful sequencer featuring multiple operating modes.
THYME+ can be also turned into a melodic synthesizer thanks to its integrated function that utilizes the Karplus-Strong method of physical modeling synthesis. And much more...

FEATURES

- hi-fi audio quality
- analog Input Gain knob up to +20dB
- multiple tape read heads
- 9 adjustable parameters with LED signalization
- each parameter has a dedicated modulation source – a Robot
- each Robot is a powerful modulation source: LFO, envelope follower, ext. CV
- options for stereo Robot modulation, phase shifting, and more
- randomization of parameters
- rhythmical quantization of Delay time and Robots
- low-pass & high-pass filter
- FREEZE button for creating Tape Loops
- LINK button compensates for the change in Delay time caused by adjusting the Tape Speed
- tap tempo
- internal or external clock for synchronizing Delay, Robot, or Sequencer
- internal memory for 8 presets organized in 8 banks (64 presets)
- copy & paste presets even between banks
- 32-step sequencer with 4 patterns for sequencing presets
- 2 sequencer modes: Live & Write
- Karplus-Strong synthesis method
- stereo/mono input and output
- MIDI input
- analog clock input
- CV input 0–5V (volt per octave for Tape Speed and Delay Time)
- footswitch jack for BYPASS

INSTRUCTIONS

This document serves as a complete reference manual for THYME+. Refer to it for explanations of specific features or if you prefer to read through manuals before using new equipment. If you're looking for just the essential basics to get you started, check out the Quickstart guide.

There are some symbols in the text indicating different things:

🍰 Follow these easy steps for hands-on guidance. It’s a piece of cake!

🎛️ Button combinations / controls of a function

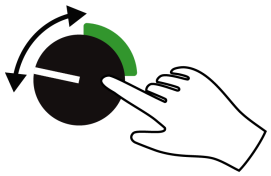
✨ Cool feature to pay attention to

😎 Super cool feature!

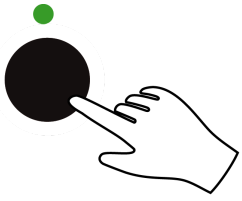
❗ Important piece of information to watch out for

🤓 Extended detailed information that is not strictly necessary to

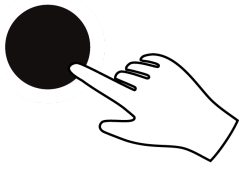
KNOBS AND BUTTONS



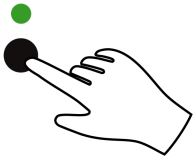
Knob with light indicating parameter intensity



Large button with function light indication



Large button without light indication



Small button with function light indication

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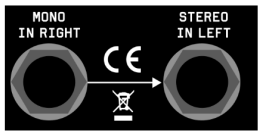
1) POWER

THYME+ turns on automatically when the power adapter is plugged in.

The adapter shipped with THYME+ is the SMI6B-9-4-P5. Use the power adapter provided in the box or other compliant 9V, 400mA (or more), center-positive power adapter with a 5.5 mm x 2.1 mm barrel.

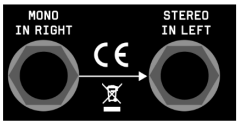
2) AUDIO INPUT

THYME+ works with both mono and stereo inputs.



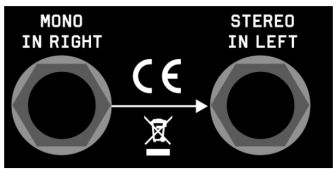
When using a mono signal as the source, use the normalized MONO IN RIGHT 6.3 mm (¼") jack input. The signal is copied to both the left and right channels.

MONO
NORMALIZED
TO BOTH LEFT
AND RIGHT

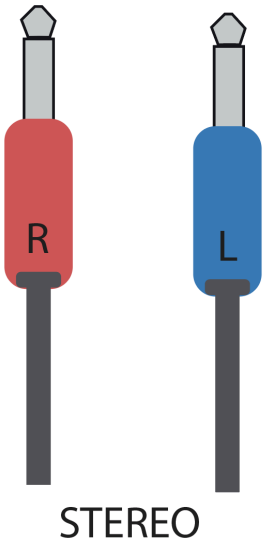


When using a stereo signal with a TRS stereo jack, use the STEREO IN LEFT.

STEREO

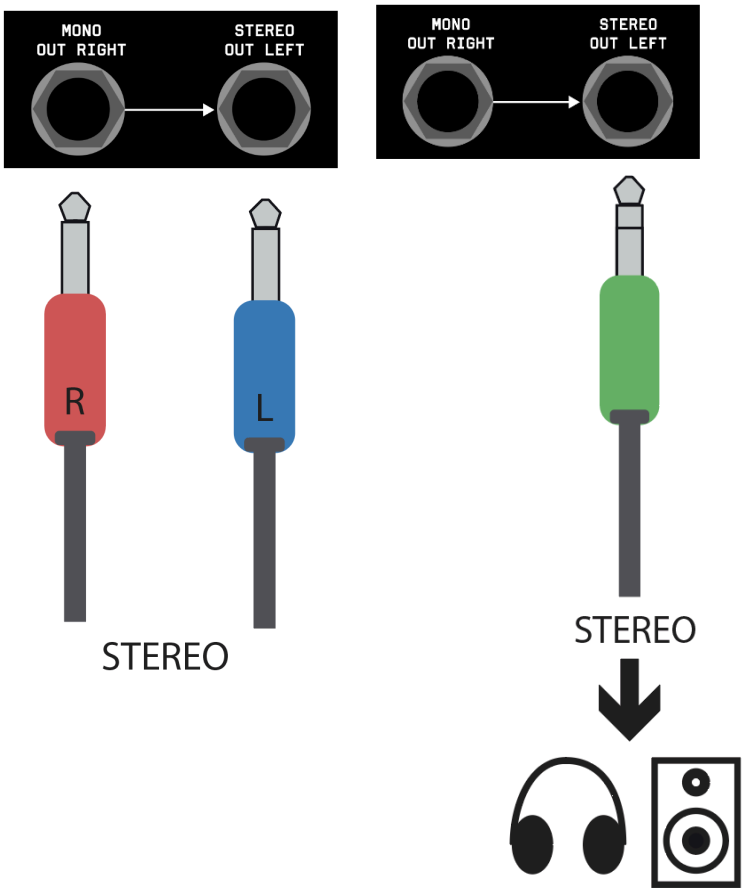


When using two TS mono jacks (left & right, which combined carry stereo signals), use both IN RIGHT and IN LEFT inputs.



3) AUDIO OUTPUT

Similarly, as with the input, the output can be either a stereo signal through the STEREO OUT LEFT or a stereo signal through two mono outs.

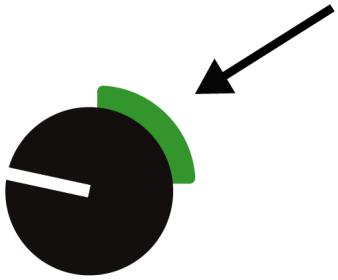


✨ A mono signal can be used on the input, still resulting in stereo processing on the output.

❗ There is no mono downmix on the output, so using only a single mono cable will result in only one channel playing (either left or right).

4) KNOB FREEZING FUNCTION

Before we begin turning any knobs, it is vital to understand the specific yet intuitive way the knobs on THYME+ work.

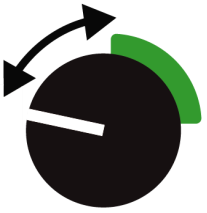


Each knob features a dimmable LED light.

This light always shows the current amount of the parameter value. However, the actual value may be sometimes different from the physical position of the knob.

It's because of the knob freezing function, which prevents immediate overwriting of the original parameter values by a different knob position when switching between presets or sound settings. It may be necessary to first “unfreeze” a knob to modify its parameter value.

You can “unfreeze” a knob in two ways:

Quickly wiggle the knob back and forth. The parameter value will transition to the current value of the physical knob position and will start tracking its movement.	
Move the knob slowly to the frozen parameter value (as indicated by the brightness of the light). After the knob position and value match, the parameter will start tracking the knob movement. This method ensures a very controlled modification of the parameter.	

5) SHIFT BUTTON + LABELS IN SILVER

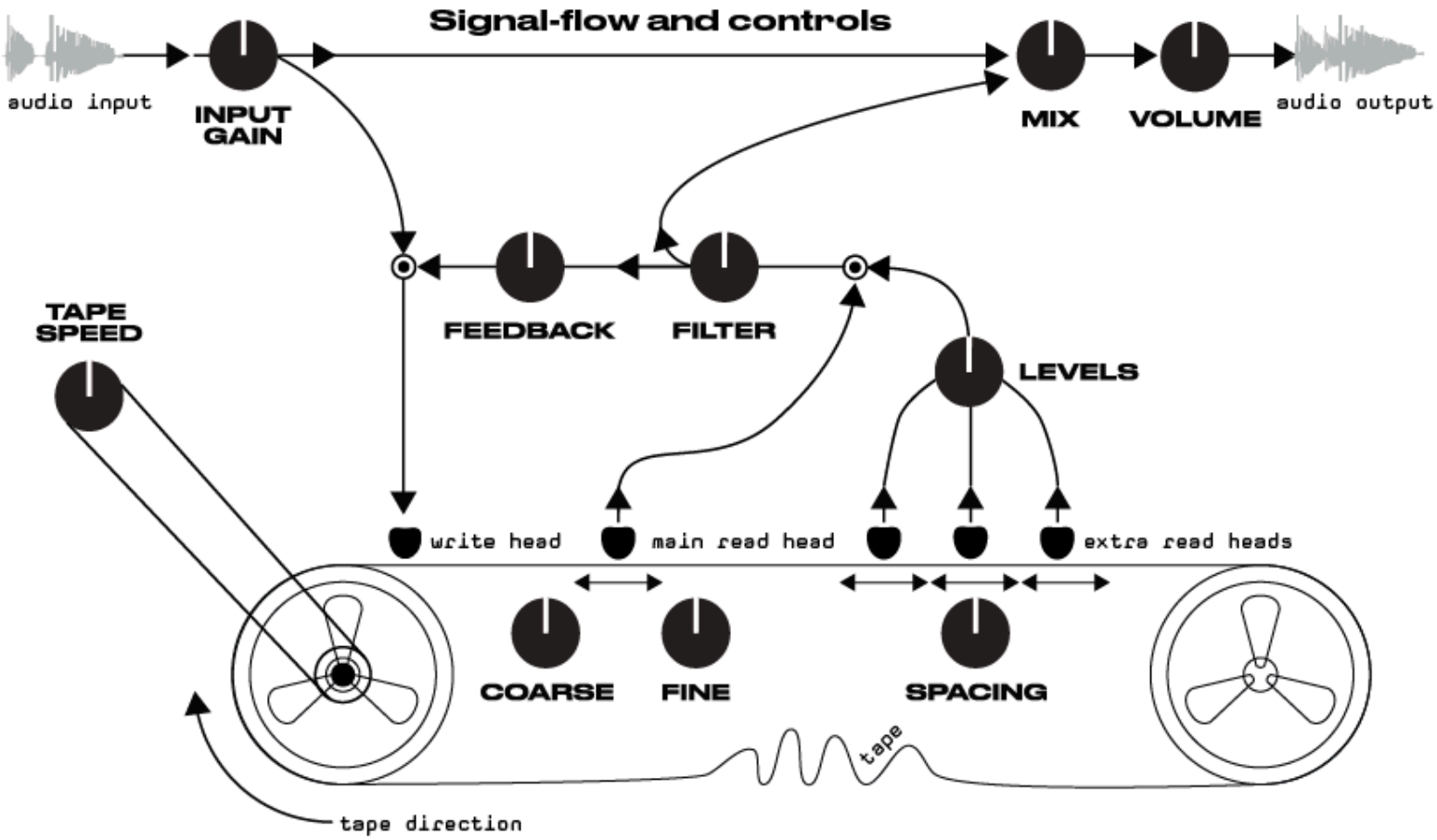
Some of the buttons have dual functionality. You can access the second function indicated by the silver text printed next to its primary function by holding the SHIFT button.

For example:
The primary function of this button is the PRESET function. However, when holding SHIFT, the function changes to the BANK function, as indicated in silver.

6) DIGITAL TAPE MACHINE

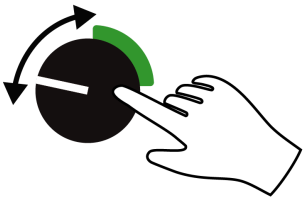
As mentioned at the outset, the primary core element of THYME+ is the digital tape machine. The picture below illustrates its signal path, with each parameter thoroughly explained in its dedicated subchapter.

Follow the 🍰 symbol for simple step-by-step explanations.



INPUT GAIN

The INPUT GAIN knob sets the level of the input signal.



🍰 Begin by routing your audio signal to the input. Starting with repetitive rhythmic sounds will help you discern all the transformations more clearly. Then, adjust the INPUT GAIN until the green light saturates, avoiding the red light. Despite this, you won't hear any sound until you adjust the VOLUME, as explained in the next section.

Green light indicates an incoming signal, while red light indicates that the signal is too loud and clipping (distorted). From here, the input signal is then written to the tape via the write head.

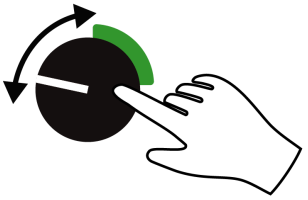
❗ INPUT GAIN is the only parameter one that cannot be controlled by a Robot.

❗ It is a global parameter, which means its setting remains constant for every preset and bank. Set it and forget it.

🤓 This parameter adjusts the gain of the preamplifier. It ranges from complete attenuation of the input signal to a maximum gain of +20dB (10x gain).

VOLUME

The VOLUME knob adjusts the global output volume.



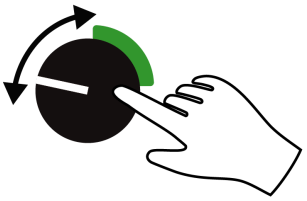
🍰 Begin by slowly turning the VOLUME knob to the right until you hear your signal at the desired loudness. Find the optimal combination of INPUT GAIN and VOLUME levels that best suits your needs.

❗ VOLUME is a global parameter, which means its setting remains constant for every preset and bank.

❗ ✨ However, VOLUME can be modulated with Robots, so different volume modulations may apply in different presets. See the ROBOTS chapter for more information.

MIX

The MIX knob mixes between the original unprocessed signal (dry) and the processed (wet) signal.



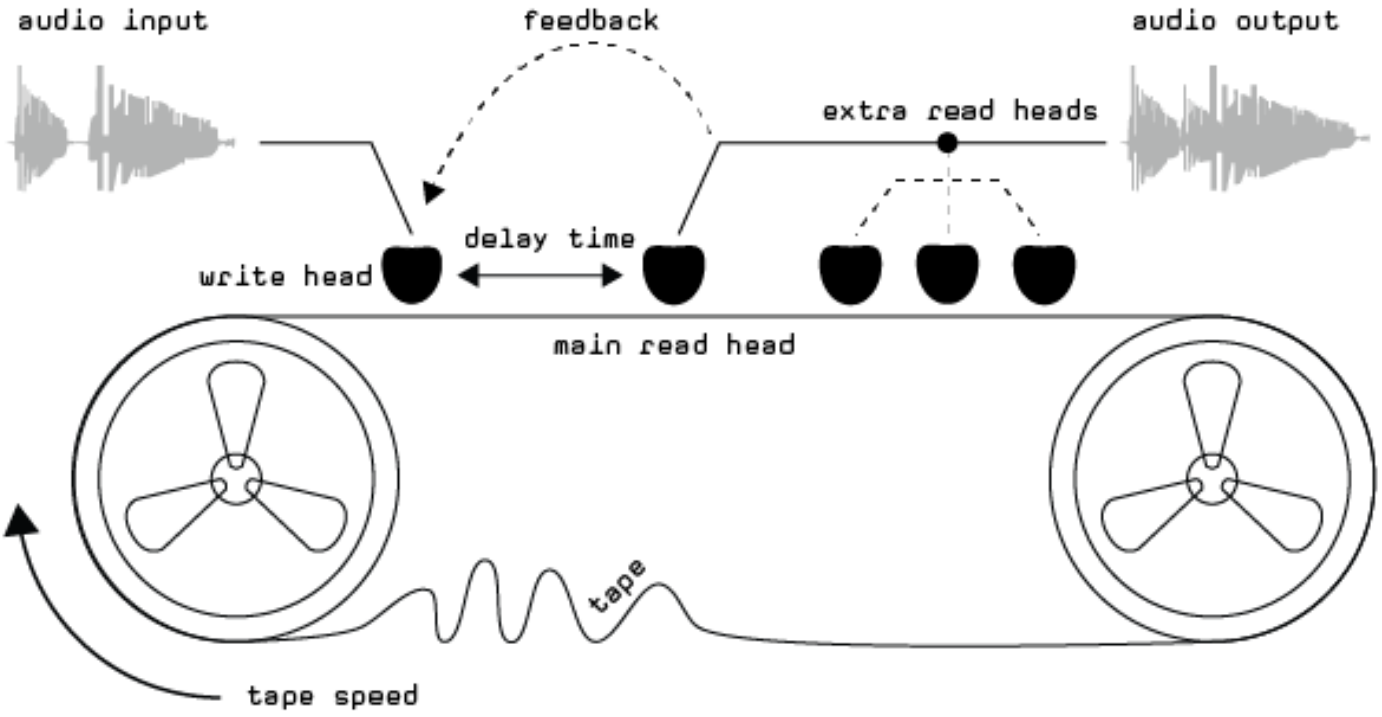
🍰 It is advisable to set the MIX knob first to the middle position to hear a blend of both the original and processed signals. It will allow for easier comparison and understanding of the processing, including the delay effect. In empty presets the MIX is automatically set to the middle position by default.

DELAY

DELAY is the core of THYME+.

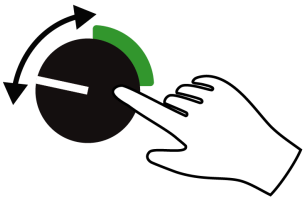
Generally speaking, the delay section regulates the time gap between the write and read heads. It adjusts the position of the read head relative to the write head. As the sound moves along on the tape, when the write head is farther from the read head, it takes longer for the sound to reach the read head, resulting in a longer delay time (and vice versa).

The delay time is adjusted using a combination of the COARSE and FINE knobs, and it is influenced globally by the TAPE SPEED and FEEDBACK settings.



COARSE

The COARSE knob sets the main delay time.



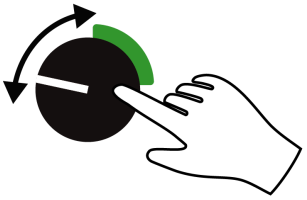
🍰 The optimal delay time depends on the nature of your incoming signal. For a basic delay effect, start with the knob set to around ± 9 o'clock. Experiment with this parameter to achieve the desired sound.
To hear the delay effect clearly, ensure that your MIX setting is balanced between the dry and wet signals.

The COARSE knob adjusts the position of the main read head on the tape relative to the write head, determining the main delay time. When turned fully left, there is no delay.

❗ The COARSE parameter is directly related to the TAPE SPEED parameter.

🤓 With the TAPE SPEED KNOB turned fully right, the COARSE knob ranges from 0 to 2.7 seconds of delay time.

DELAY SYNC



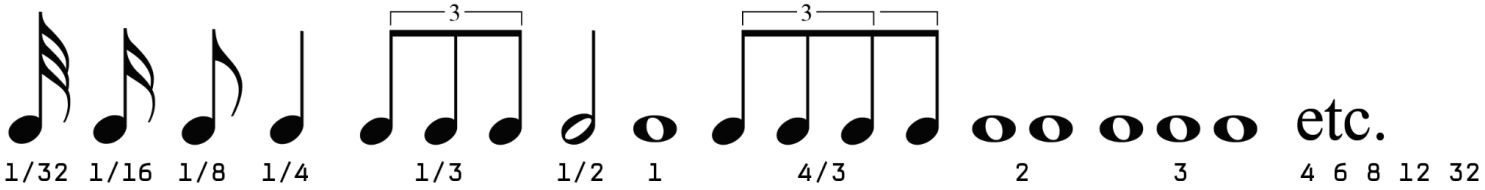
The DELAY SYNC function quantizes the delay time to rhythmical intervals.

🎛️ Activate DELAY SYNC by pressing the SYNC button next to the COARSE knob.

> 🍰 To transform your THYME+ into a rhythmic powerhouse, experiment with the DELAY SYNC function. It synchronizes your delayed sounds to precise rhythm intervals.

The delay time can be freely selected or quantized to rhythmic intervals (eighth notes, quarters, etc.) with the DELAY SYNC function activated. When activated, the position of the read head is automatically adjusted to the nearest available division or multiplication of the tempo.

The possible tempo multiplications and divisions are:



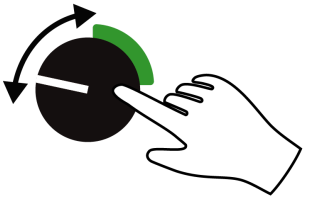
❗ The intervals are derived from the tempo of the main clock. Refer to the CLOCK chapter for instructions on setting this tempo.

✨ The DELAY SYNC function can also be activated for the extra read heads.

❗ The FINE knob remains unaffected by SYNC. It allows you to create synced delays with slightly off timing for extra groove.

FINE

The FINE knob controls minor delay time adjustments.



🍰 To better hear the effect of the FINE knob, temporarily set your COARSE knob to zero. Then, start adjusting the FINE knob.
You'll notice subtle micro-adjustments in your delay time. This can lead to intriguing outcomes, influencing not just the delay itself but also the timbral and spectral qualities of the sounds. (It's also a fun parameter to automate with a Robot, which you'll learn about later!)

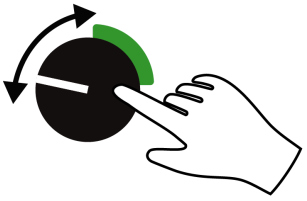
The FINE knob fine-tunes the delay time by adjusting it in increments of milliseconds, supplementing the delay time set by the COARSE knob.

Due to its precise nature, the FINE knob serves various purposes:

- Adjusting the delay time in small amounts enables the creation of desired rhythms.
- When the COARSE knob is set to zero, it facilitates the creation of extremely short delays, which can produce a phaser-like effect or generate pitches with pitch control achievable via the FINE knob.

TAPE SPEED

TAPE SPEED defines how fast the tape moves from the write head to the read head.



🍰 You can start with the TAPE SPEED turned fully right, as this is its most "natural" position. In this setting, THYME+ functions akin to a fully analog tape machine.
Lowering the tape speed allows you to attain longer delay times characterized by a more digital tape character and artifacts.

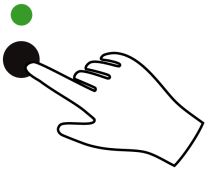
✨🎛️ **Double/half the tape speed (and thereby change the pitch by one octave)**	
½ speed	SHIFT + FREEZE
2x speed	SHIFT + DELAY SYNC
❗ These adjustments cannot exceed the range achievable by the knob alone. The full tape speed and lowest tape speed are the limits. 🤓 The TAPE SPEED parameter operates on a non-linear curve, meaning that halving or doubling the knob position does not directly result in halving or doubling the tape speed.	

🤓 The TAPE SPEED also sets the audio sample rate:
Lower speed = lower sample rate.

EXTENDED SETTING

🎛️🤓✨ **Lo-fi or analog tape**	SHIFT + TAPE SPEED wiggle
Lo-fi tape: When lowering the tape speed, the input signal is merely resampled at a different rate without any additional filtering. This results in intriguing aliasing effects. Moreover, the upsampling process intentionally becomes less accurate at low tape speeds, accentuating this characteristic even more.	TAPE SPEED light turns OFF temporarily (by default)
Analog tape: This implementation more closely resembles the behavior of an analog tape machine. Before resampling, the input signal undergoes low-pass filtering to minimize aliasing. During the upsampling process, linear interpolation is employed.	TAPE SPEED light turns ON temporarily

LINK



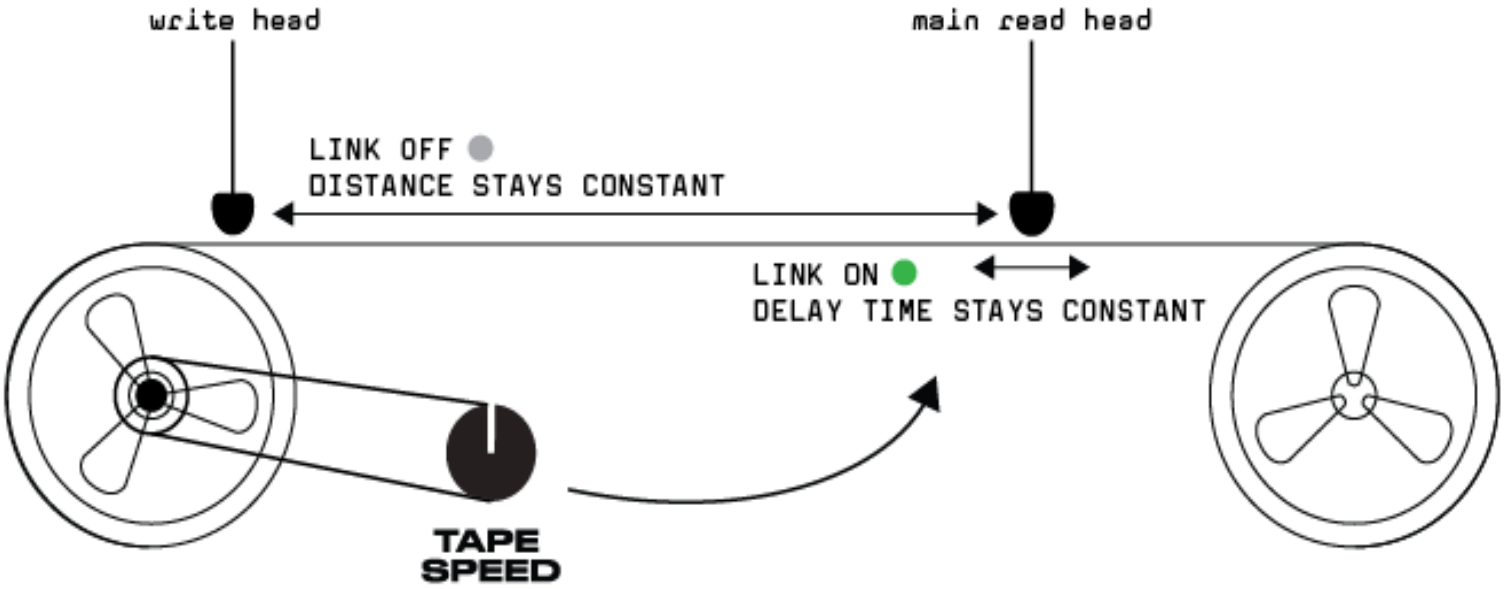
The LINK function prevents TAPE SPEED from affecting the final delay time.

🎛️ Activate the function by pressing the LINK button.

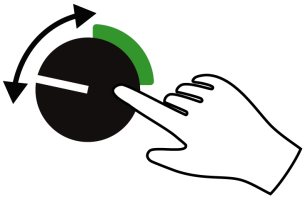
🍰 Tweaking TAPE SPEED alters the time required for the tape to travel the distance between the write head and the read head, thereby producing varying delay times. This behavior mirrors the operation of a standard analog tape machine.
However, if you wish to maintain a constant delay time, you can activate the LINK function. With LINK enabled, adjusting the TAPE SPEED will no longer impact the delay time.

With LINK enabled, the position of the main read head is synchronized with the TAPE SPEED to compensate for any variation in delay time.

❗ However, in extreme scenarios, achieving complete and precise compensation for the delay time may not be possible.



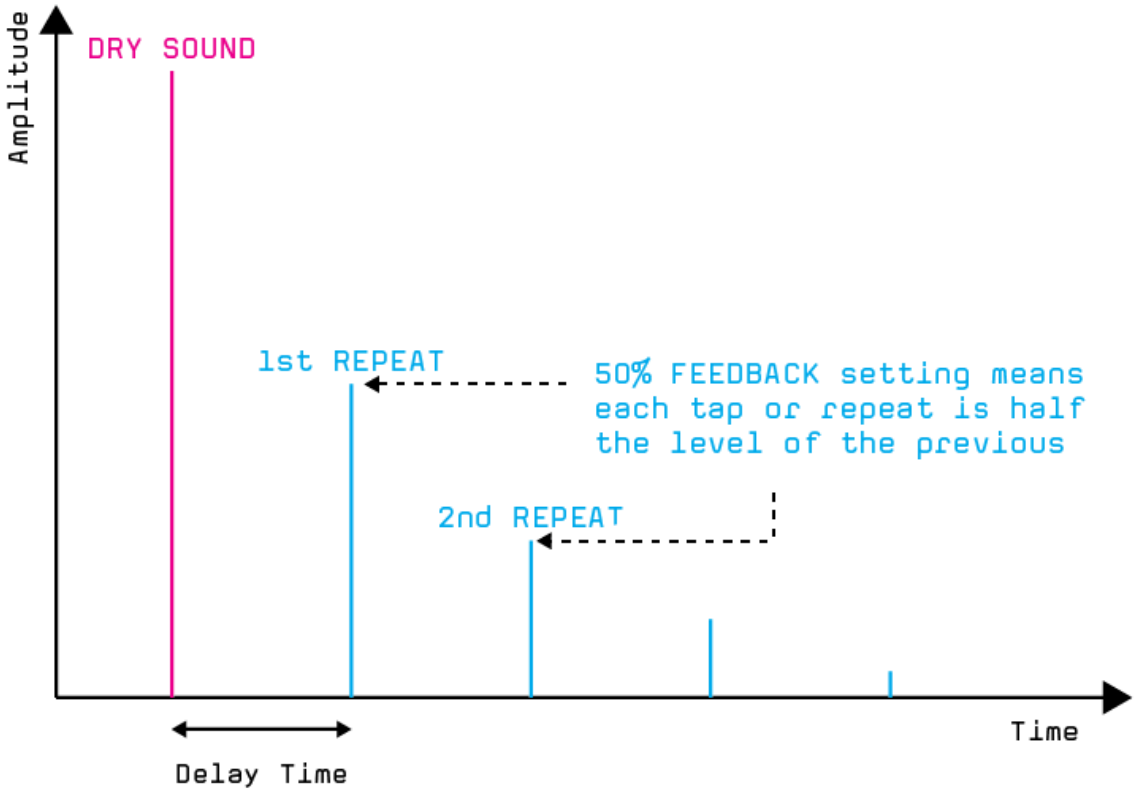
FEEDBACK

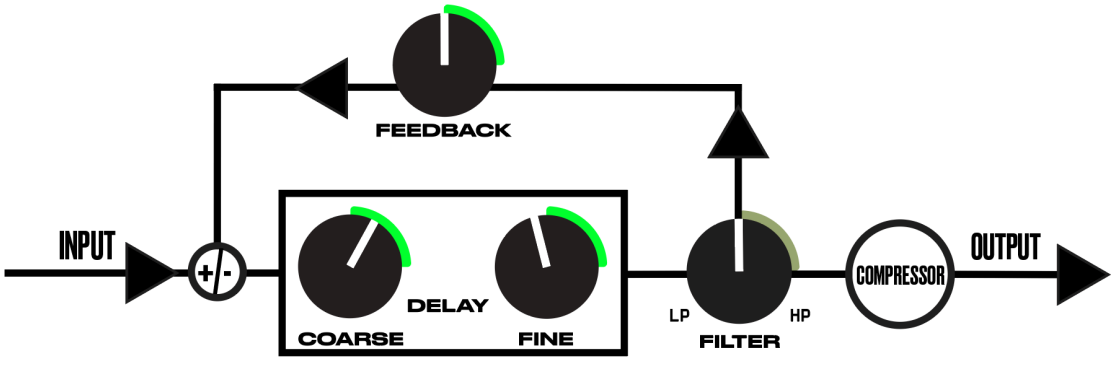


The FEEDBACK function gathers signals from all active read heads and feeds them back into the write head.

🍰 Use the FEEDBACK knob to adjust the amount of echo (the number of repetitions) you desire.

🤓 The FEEDBACK knob scales the sum of all the read heads' signals. When fully turned to the right, you gain exactly one additional full loop (if extra read heads are off).





EXTENDED SETTING

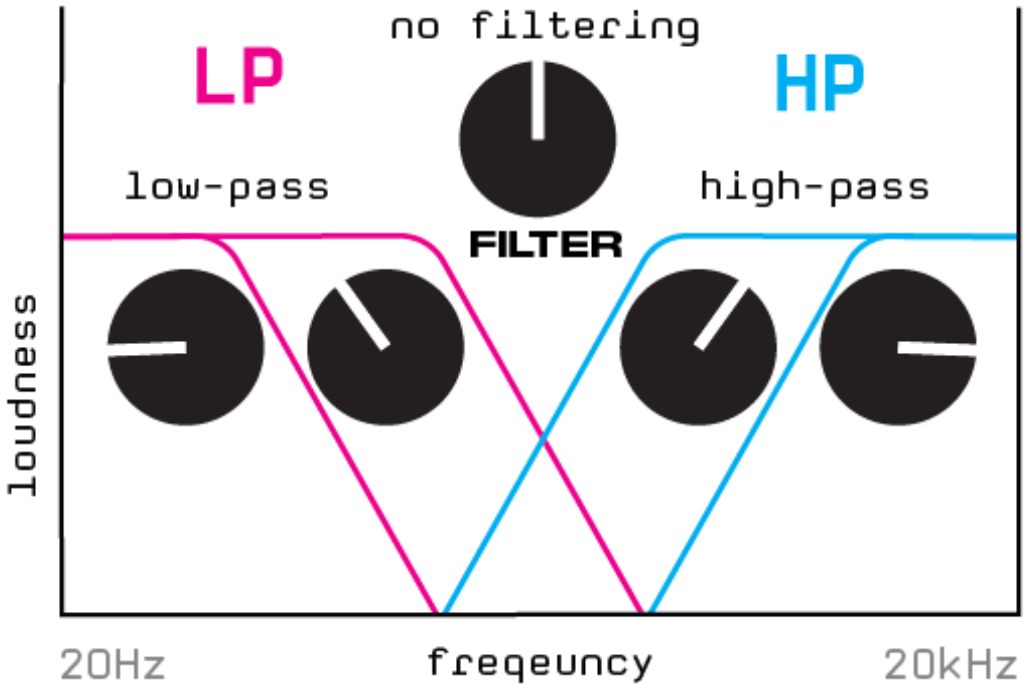
🎛️🤓✨ **Negative or positive feedback**	SHIFT + FEEDBACK wiggle
Negative Feedback: Subtracts the fed-back signal from the input signal, contributing to a stable and clearer sound output.	FEEDBACK light turns OFF temporarily (default)
Positive Feedback: Adds the fed-back signal to the input, resulting in denser and denser sound output over time.	FEEDBACK light turns ON temporarily

🤓 When using THYME+ as a comb filter, these settings will produce either odd or even harmonics.

FILTER

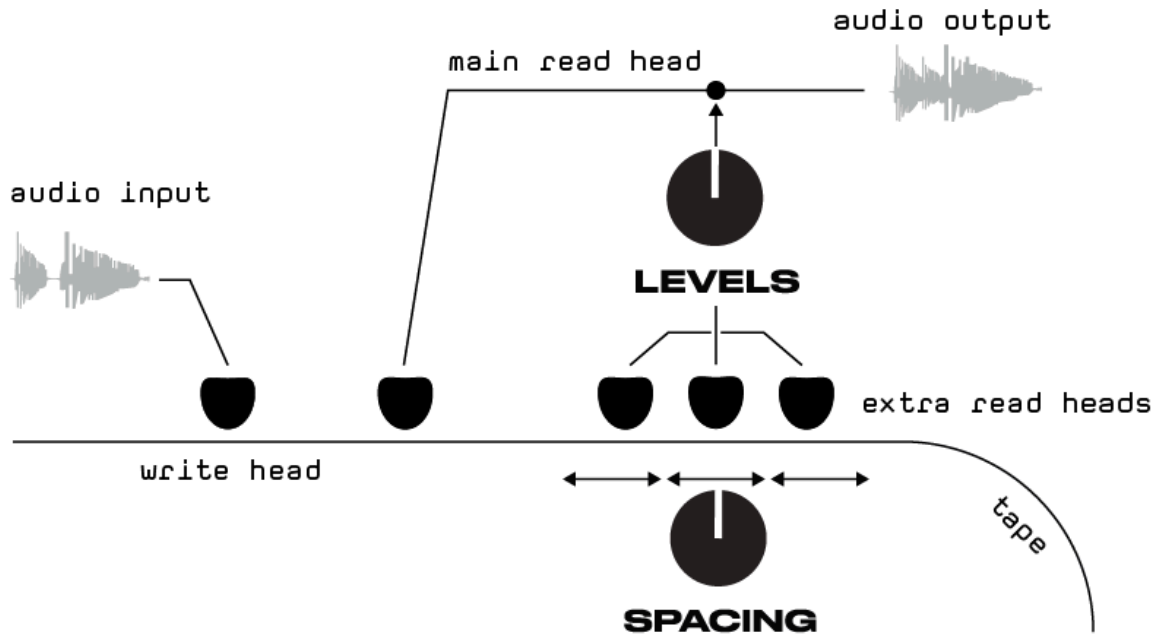
FILTER cuts off specific frequencies.

🍰 It's best to just experiment with this parameter and have some fun with the filtering to grasp how it works. Just be cautious not to leave it fully to the left or right in the end – you may not hear anything then, as everything gets filtered out.



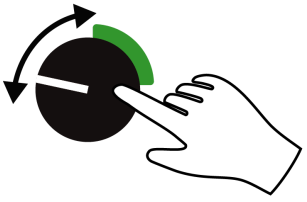
EXTRA READ HEADS

THYME+ offers three additional read heads that you can use, which get added to the main read head signal. Each extra read head has an individual contribution to the feedback and output signal.
With the inclusion of extra read heads, you can achieve denser and richer-sounding effects. You can easily create multi-tap delays. In essence, you can quadruple the density of the delay.
The parameters of the extra read heads can be adjusted using the LEVELS and SPACING knobs.



LEVELS

The LEVELS knob controls the extra read heads volume.

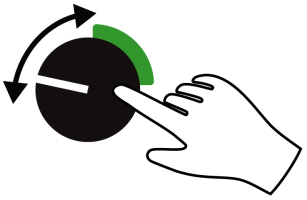


🍰 LEVELS controls the volume of all three read heads at once. If set fully to the left, these read heads are inactive.

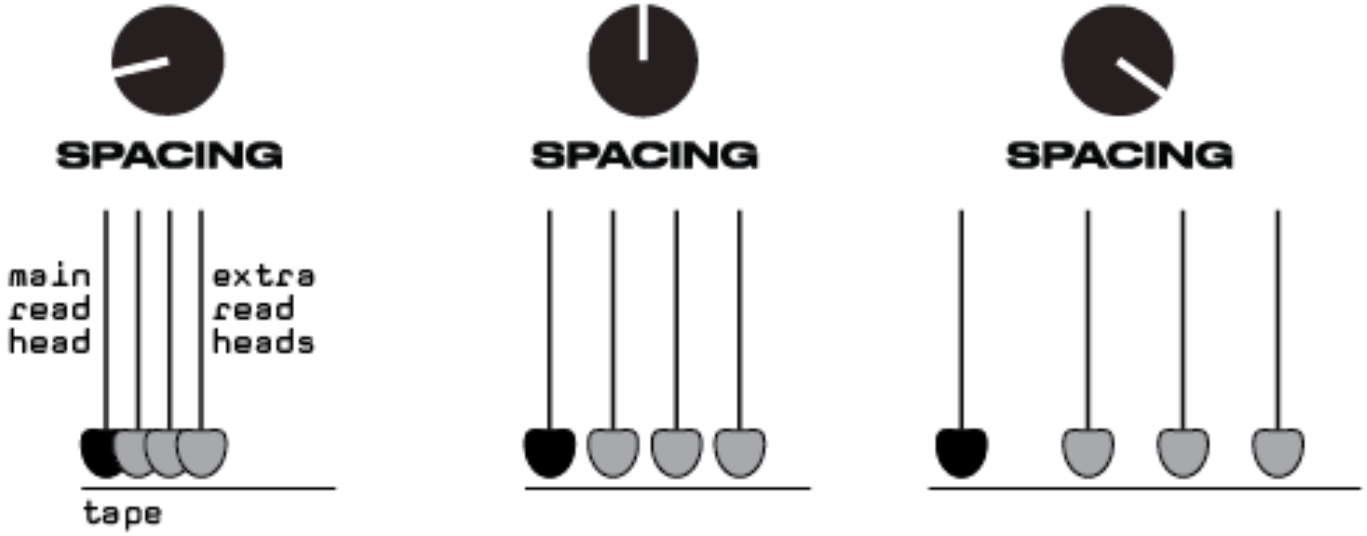
🤓✨ In the last quarter of the knob, the gain is so high that it creates self-excitation.

SPACING

The SPACING knob sets the distance of the read heads.



🍰 Adjust the SPACING knob to manipulate the position of the three extra read heads. While the main read head's position is fixed, the extra read heads always move together.
By adjusting the SPACING knob, you can transition between various configurations, ranging from tonal (smallest distance) to dense (early reflections) to rhythmic multi-tap delay setups.



EXTENDED SETTING

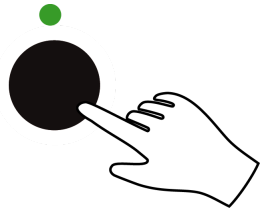
🎛️🤓✨ **Extra read heads sync**	SHIFT + SPACING wiggle
Synced: Extra read heads react to DELAY SYNC.	SPACING light turns OFF temporarily (default)
Not synced: Extra read heads don't react to DELAY SYNC.	SPACING light turns ON temporarily

See the DELAY SYNC section for more info.

✨😎❗ ***RANDOMIZATION OF ALL TAPE MACHINE PARAMETERS***

🎛️ You can randomize all the settings for all the knobs as well as LINK, SYNC & FREEZE by pressing SHIFT + ROBOT + FREEZE

7) BYPASS



🎛️ Press the BYPASS button to circumvent all processing and listen to the unmodified signal. When the BYPASS light is on, the bypass function is active and the outgoing signal remains unprocessed.

✨😎🎛️ Hold SHIFT + BYPASS to temporarily mute the audio input and listen only to the “processing tail”. You can still adjust all knob values, affecting only the processing tail. It's a really cool feature.

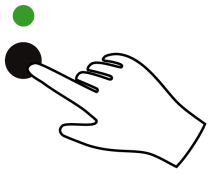
✨ This feature also works while the sequencer is running!

(❗ The SHIFT + BYPASS combo works only on THYME+ hardware, not on the old Thyme.)

❗ Exit the BYPASS mode by selecting one of the PRESETS.

✨ Once you've selected a PRESET, you can toggle between the selected PRESET and the BYPASS mode repeatedly by pressing the BYPASS button.

8) FREEZE



The FREEZE function samples (freezes) a short loop.

🎛️ Activate and deactivate the function by pressing the FREEZE button.

🍰 Press FREEZE and adjust the COARSE knob.

- Generate drones by using longer time frames
- Create "lag" in the sound with shorter ones
- Produce feedback pitches with the shortest delay times
- Or glitch the sound with gradual movement of the delay knobs

Use the FEEDBACK knob to control the intensity of the loop.

The FREEZE mode captures the current sound within a time frame determined by the DELAY setting, creating a short loop. In other words, when you activate the FREEZE mode, the clean input signal is recorded onto the tape for a duration equal to the delay time set by the main read head (COARSE + FINE). The intensity of the loop is controlled by the FEEDBACK knob. When the FEEDBACK knob is fully clockwise, the loop will persist indefinitely. However, if the FEEDBACK knob is set lower, the loop will gradually fade out over time.

✨ The signal from the three extra read heads is not mixed into the loop but only added to the output. Using the first half of the LEVELS knob range, you can spice up your loop with their contribution but also revert to the clean version.

❗ ✨ However! In the second half of the LEVELS knob range, this behavior shifts, and the signal from the extra read heads begins to blend into the loop.

❗ If the delay time is set to 0, the FREEZE mode will not do anything.

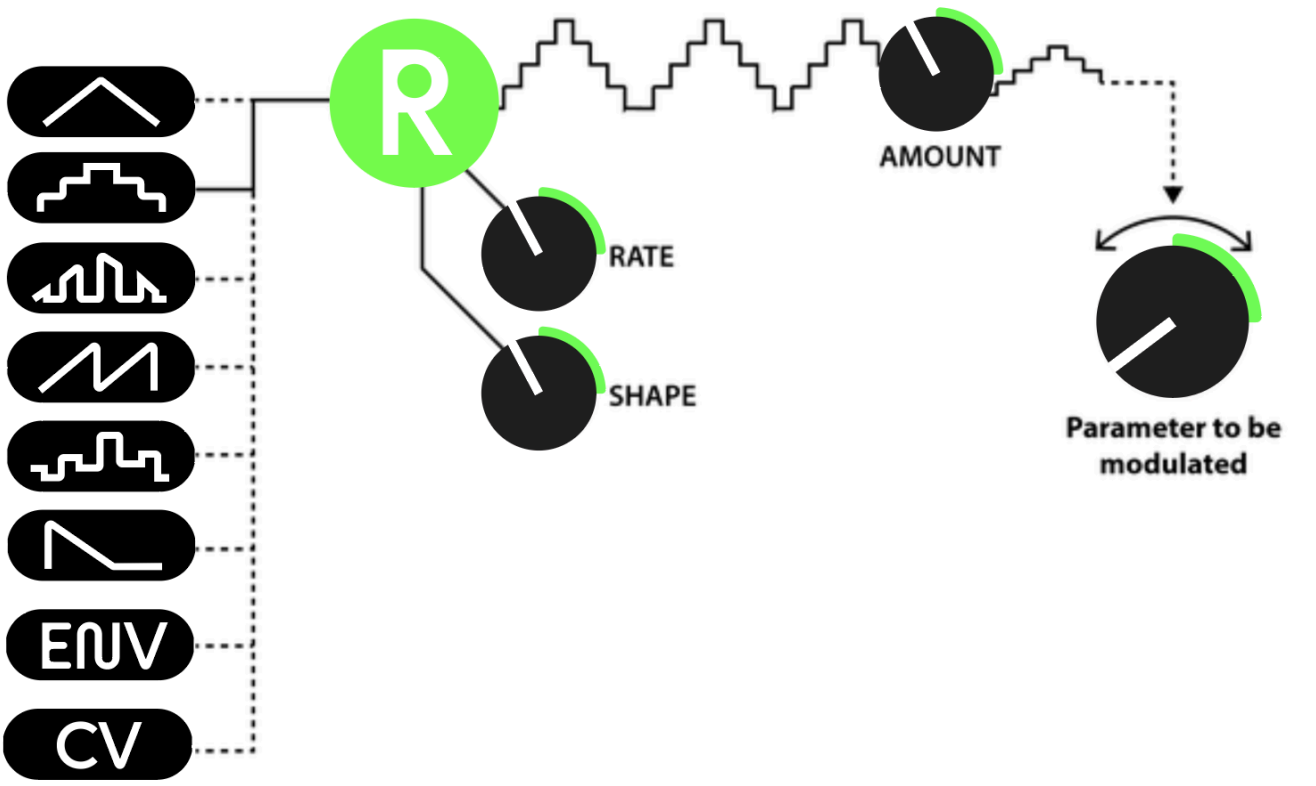
❗ While the FREEZE mode is on, the input signal is disconnected.

❗ When entering the FREEZE mode, the FEEDBACK value is automatically set to the full amount to capture a steady loop. Upon exiting the FREEZE mode, the FEEDBACK parameter returns to its previous value, but only if FEEDBACK was set to maximum when exiting FREEZE.

9) ROBOTS

🍰 Robots can automate your parameters. Learn how below.

There are nine knobs (parameters) that have the option to each use an independent modulation source called a ROBOT. These knobs are TAPE SPEED, COARSE, FINE, FEEDBACK, FILTER, LEVELS, SPACING, MIX, VOLUME.
Each Robot is essentially an LFO with extended features. Its values are adjustable with the RATE, AMOUNT, and SHAPE knobs. The Robot waveforms are selected with the PRESET buttons.
See the signal flow below:

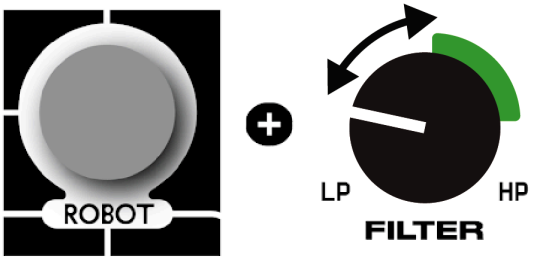


All nine Robots work independently from each other, can have different values and waveforms, and can all run simultaneously.

Each knob has one Robot assigned to it. Each Robot is dedicated to its assigned knob, so one Robot cannot control multiple knobs.
🤓 However, you can bypass this limitation by setting the same values for two separate Robots, each controlling a separate knob.

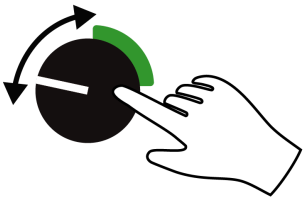
ROBOT SETUP

🍰 Hold down the ROBOT button and slightly wiggle the knob you wish to modulate to assign it a Robot.



The light next to the button will illuminate at full brightness, indicating the knob is now assigned a robot. You can then release the ROBOT button.

AMOUNT

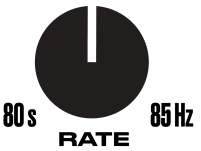


The Amount knob determines the intensity of the Robot modulation.

🍰 Adjust the AMOUNT knob to perceive any effect. The default AMOUNT value is zero.

❗ When AMOUNT is set to zero (default value), the Robot is deactivated. Deactivated Robots are not indicated by the lights of their assigned knobs.

RATE



🍰 Sets the speed of the Robot LFO – how fast the modulation will be.

The LFO range reaches from a minimum of 1 cycle per 80 seconds to a maximum of 85 cycles per second.

🤓 Essentially, the RATE knob adjusts the frequency of the Robot LFO in the oscillator modes. In the ENV mode, the knob controls the frequency range that the envelope generator follows. (It has no effect in the CV mode.)

✨ When pressing the ROBOT button, all knobs with active Robots will briefly flash (Robots with AMOUNT set to zero are not active). Subsequently, the one knob that remains illuminated indicates that it's currently selected.

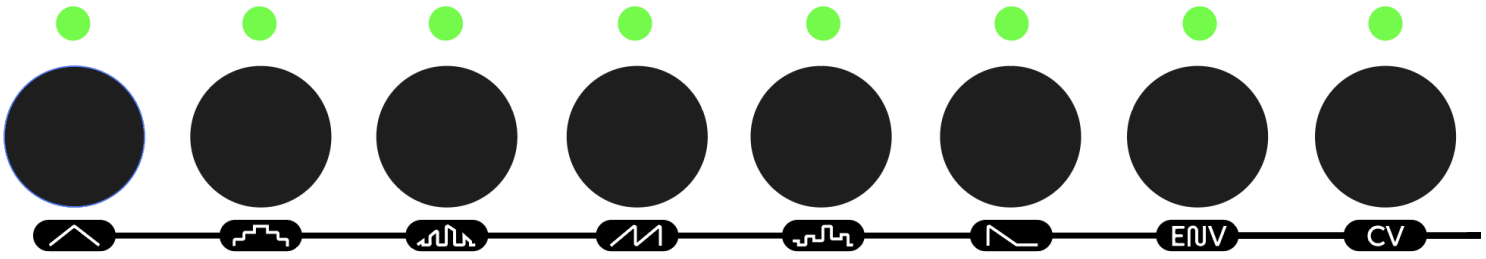
ROBOT DEACTIVATE

🎛️ Press ROBOT + BYPASS to deactivate the currently selected Robot.

The ROBOT light Ⓡ indicates the intensity of modulation for the currently selected Robot.

ROBOT WAVEFORM MODES

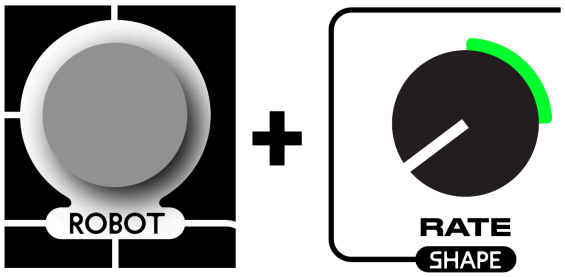
🍰 Use the PRESET buttons to choose from various waveforms for your Robot's LFO.



🎛️ Hold the ROBOT button and press the corresponding PRESET button to select the desired waveform mode for your Robot.
These include internal oscillator modes with six different waveshapes (TRIANGLE, STEPPED TRIANGLE, XOR'D FLOPPING TRIANGLE, STEPPED RAMP, STEPPED RANDOM), or external signal source modes (ONE SHOT DECAY, ENV, CV). Detailed information about each waveform mode can be found in the ROBOT MODES sections below.

SHAPE KNOB

🍰 The SHAPE knob further modulates the different waveforms.



🎛️ Press and hold the ROBOT button, then adjust the RATE knob.

The RATE knob now functions as the SHAPE knob. You can observe the modulation through the Ⓡ light intensity.

ROBOT OSCILLATOR MODES

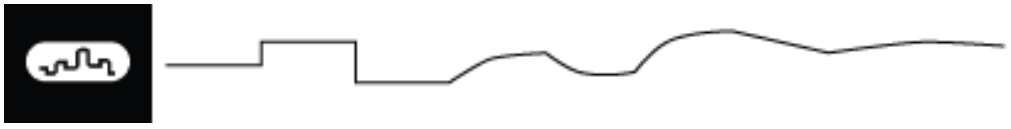
In all these oscillator modes, the RATE knob controls the frequency of the oscillators. However, for visual clarity, the following images show oscillation waveforms with identical fixed RATE and varying SHAPE settings.

From a regular triangle wave to a smooth triangle and finally to a sine wave.

Triangle oscillator resolution control: From a regular triangle, through stairs up and down, to a rectangle.

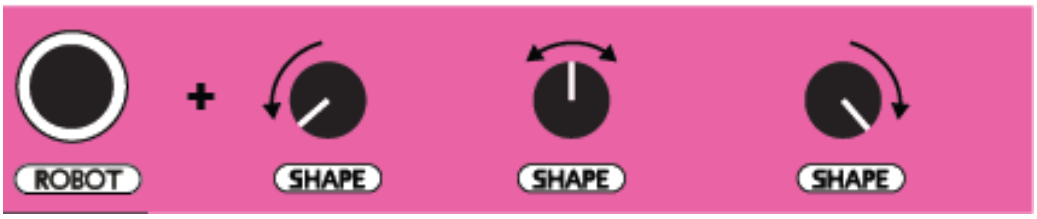
The basic waveshape is a triangle oscillator turned off at regular intervals for half of each period. Then, on top of that, segments of the waveform are inverted with XOR modulation.

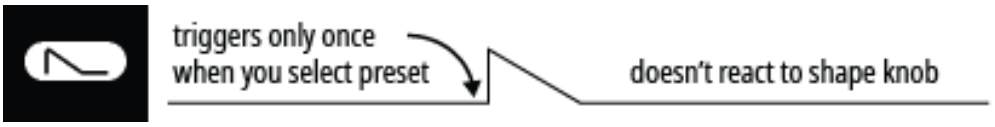
Similar to the Stepped Triangle but with a ramp as the basic waveshape.



Selects a random value at fixed time intervals. The shift between consecutive values can be abrupt (jumping) or smoothed based on your configuration of the SHAPE parameter.

ROBOT NON-OSCILLATOR MODES





Linear decay from full to off. Triggered when you activate the PRESET.

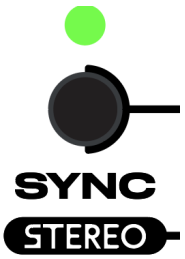
This Robot tracks the amplitude of the input signal within a defined frequency range. You can specify the frequency range you wish to track with the RATE parameter. The ENV mode enables you to modulate any parameter based on the input signal dynamics in the bass, low mid, high mid, or high-frequency range. It promptly responds to peaks and then decays swiftly or gradually, depending on the SHAPE setting. The image demonstrates how different SHAPE settings affect the modulation with a constant RATE position for a specific input signal.

This mode allows you to use external control voltage (inserted into the CV IN jack) to modify a parameter. While the RATE control is inactive, the SHAPE parameter enables you to apply low-pass filtering or slew limiting.

! When you switch to the CV mode, the AMOUNT parameter is automatically set to full. Keep in mind that when selecting a different waveform afterward, the AMOUNT will remain set to full.

ROBOT SYNC

🍰 Sync your Robot's modulation to rhythmical intervals.

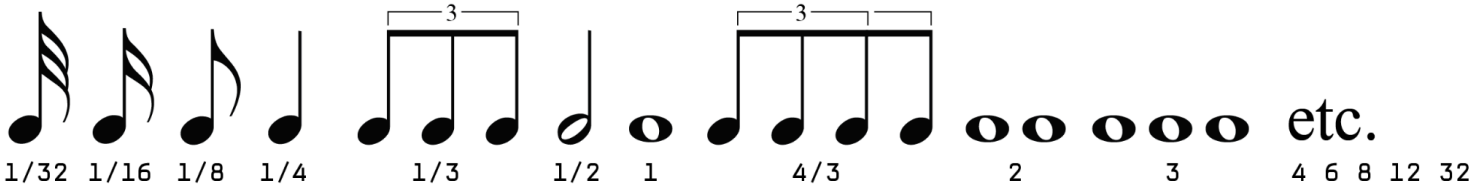


🎛️ Press the SYNC button next to the ROBOT button.

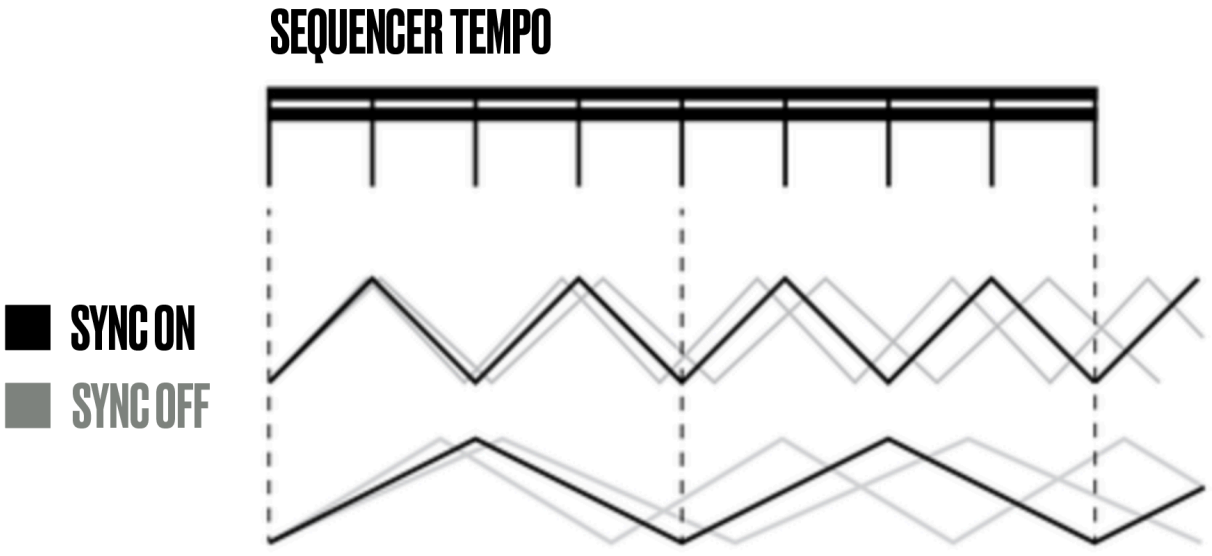
The frequency of the oscillator Robot modes can be quantized (synced) to the main clock tempo. Refer to the CLOCK chapter for more information.

With the SYNC function on, the frequency of the Robots is adjusted automatically to the nearest available division/multiplication of the tempo.

The possible multiplications/divisions of the tempo are:



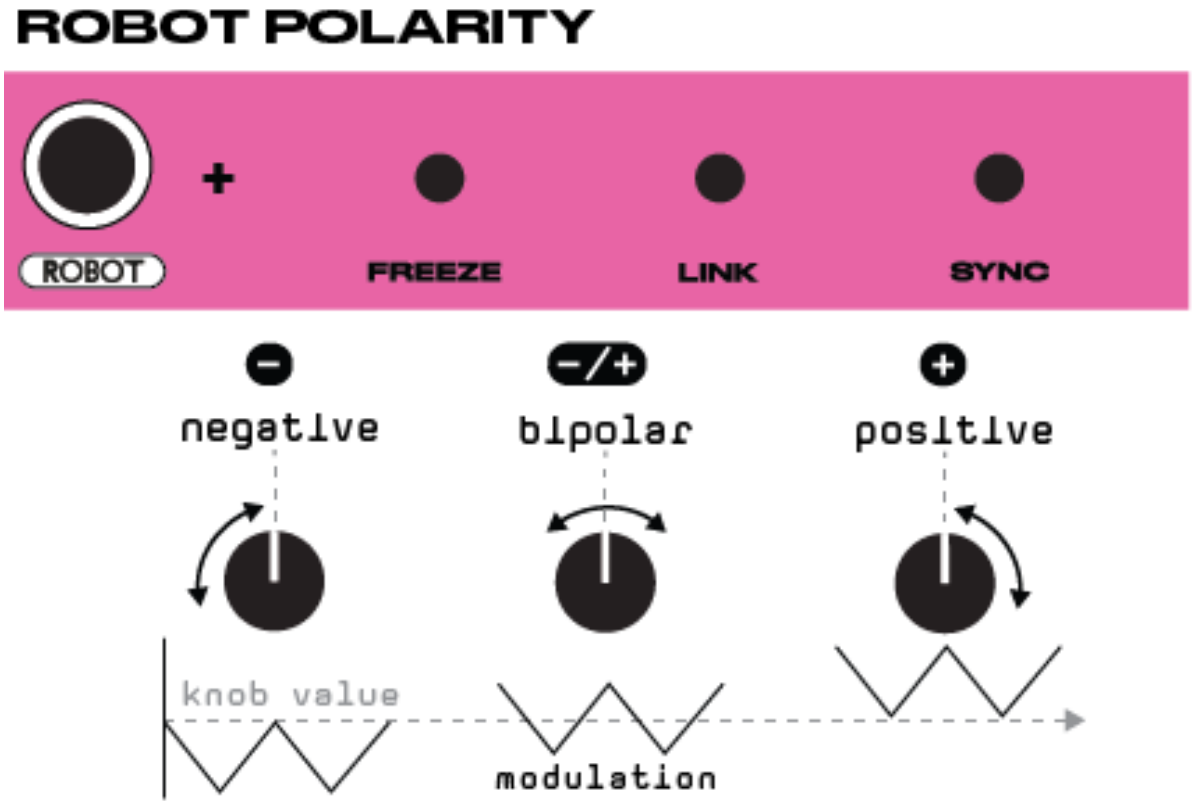
❗ The SYNC function is not available for the Robot ENV and CV modes.



ROBOT POLARITY

🍰 Change the polarity of the Robot's modulation. Determine how it responds to the knob's value.

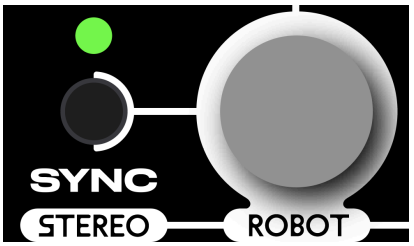
🎛️ Press ROBOT + FREEZE / LINK / DELAY SYNC.
There are three polarity settings available: Negative, Bipolar, and Positive.



Each Robot can modify a parameter in three directions: It can subtract from it, it can modulate around it, or it can add its output to the knob value.

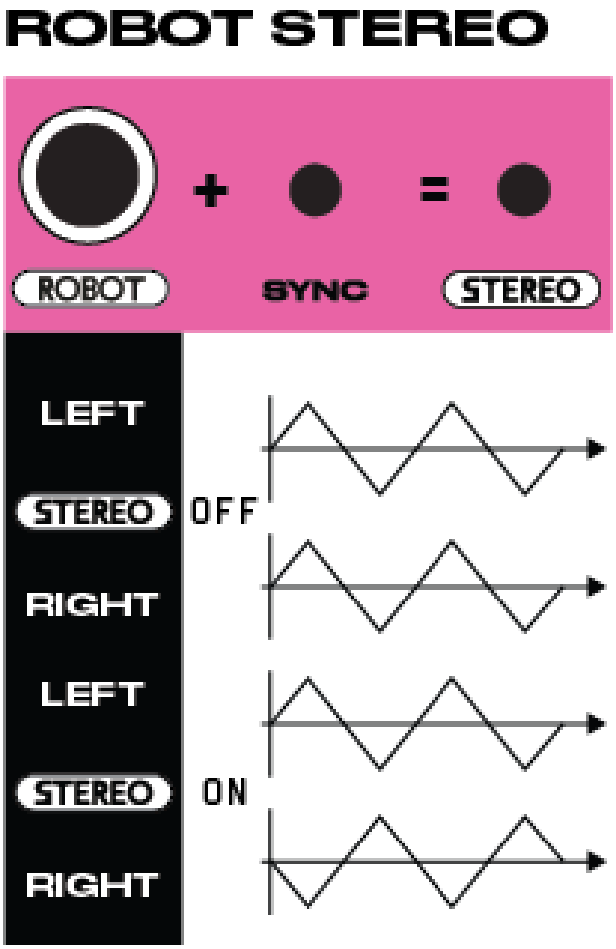
ROBOT STEREO

🍰 This function alters the nature of the Robot's modulation. Determine how it responds to the knob's value.



🎛️ Press ROBOT + ROBOT SYNC.

By default, both stereo channels are processed identically. When you activate ROBOT STEREO (STEREO light on), it will affect the left and right channels in opposite directions. For the oscillator Robot modes, this means phase-shifting the waveform on the right channel by 90º.



In the ENV and CV modes, this entails reversing the polarity (refer to the previous chapter on ROBOT POLARITY).

When the STEREO function is activated, the Robot will add to the knob value on the left channel while subtracting on the right channel.

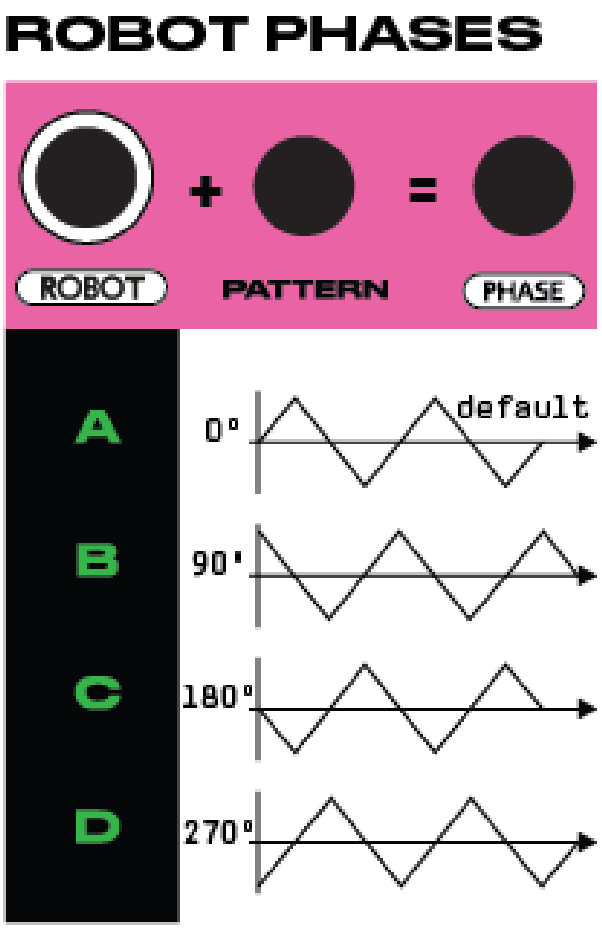
❗ 🤓 In ROBOT STEREO, the lights adjacent to the knobs indicate the current parameter value for the left channel only.

ROBOT PHASE

🍰 Alters the phase (starting point) of the Robot's LFO wave.

🎛️ Press ROBOT + A B C D (one of the four PATTERN buttons).
You'll only hear the effect each time the PRESET with this Robot is activated.

✨ This feature is useful, for instance, in sequencing (which you'll learn about later in the Sequencer chapter) if you prefer your LFO wave to start at a different point than zero, such as at its peak (180 degrees) or in between. It's also handy for offsetting two similarly fast Robots so that one is at its peak while the other is at zero.



✨😎❗ *RANDOMIZE ROBOTS*

🎛️ You can randomize all the settings for all the Robots by pressing SHIFT + ROBOT + LINK.

❗ The randomization will skip the Robot CV mode.

✨😎❗ *RANDOMIZE BOTH ROBOTS & TAPE MACHINE*

🎛️ You can randomize all the settings for all the Robots and the TAPE MACHINE by pressing SHIFT + ROBOT + DELAY SYNC.

❗ However, this only randomizes the values within a certain limited range around the current values. For more significant randomization of both Robots and the TAPE MACHINE, it's better to randomize the two separately.

🤓✨ *ROBOT VOLT-PER-OCTAVE*

When the TAPE SPEED or DELAY FINE parameters are modulated by an external control voltage (by setting their Robots to CV mode), the voltage is interpreted not linearly but as Volt-per-Octave.
It means that when a steady voltage of 1V is applied to the CV IN jack, the tape speed or delay length will be doubled (if the AMOUNT knob is turned fully right). For 2V, the factor will be four, and so on (the CV may range from 0V to 5V, giving a maximum factor of 32).

Depending on the ROBOT POLARITY setting, the modulated parameter is either multiplied or divided by the factor defined by the control voltage.

The mapping is designed so that:

- Positive polarity generally increases the pitch (higher tape speed, shorter delay).
- Negative polarity typically decreases the pitch (lower tape speed, longer delay).

❗ Bipolar polarity cannot be set for Robots in CV mode.

✨ Refer to the section on KARPLUS-STRONG SYNTHESIS in the MIDI chapter for a similar implementation of externally controlling pitches using MIDI.

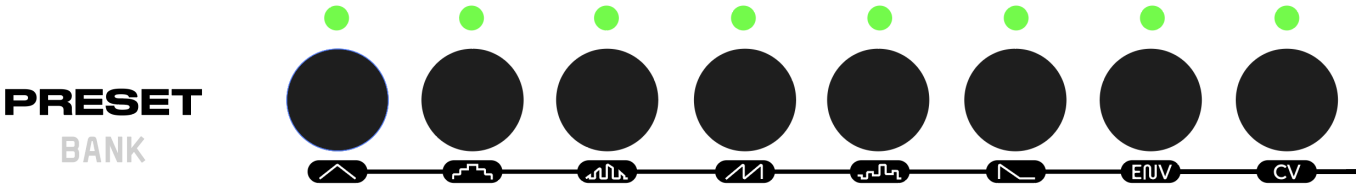
10) MEMORY, PRESETS & BANKS

🎂 THYME+ features memory storage for saving PRESETS, PATTERNS, BANKS, ROBOTS, PARAMETERS, and other general settings.

There are 8 BANKS, each containing 8 PRESETS, providing a total of 64 PRESETS that can be saved and utilized.

PRESETS

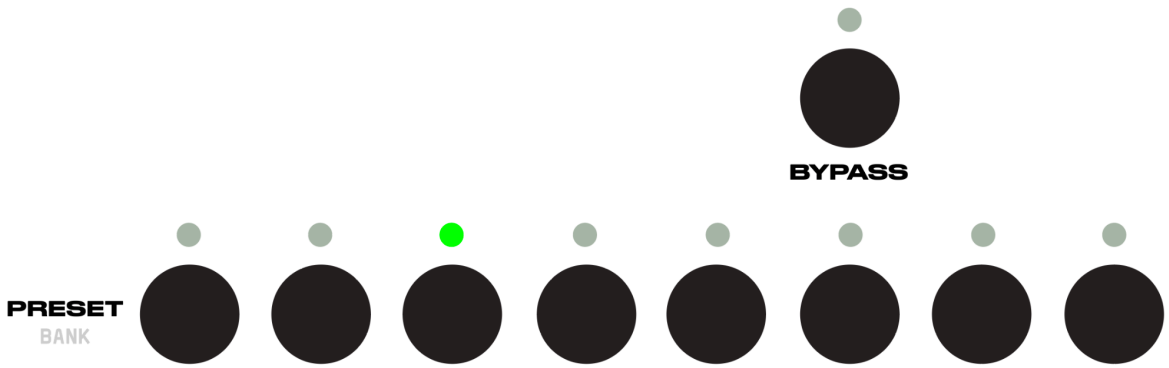
🎂 All current settings and modifications are automatically stored (but not saved) as a PRESET.
🎛️ To save a preset, press SHIFT + SELECT (you are actually saving the entire BANK).



🎛️ Press one of the PRESET buttons or BYPASS to switch between them.

🎛️ Press BYPASS + PRESET to clear a PRESET.

The active PRESET (or BYPASS) is indicated by a light next to the button.



❗ The PRESETS are initially configured to a "clean setting," where all parameters are set to zero and await your adjustments.

COPY AND PASTE PRESETS

🍰 To quickly create and edit PRESETS, you can copy and paste them between different PRESET slots.
✨ You can even copy and paste PRESETS across different BANKS.

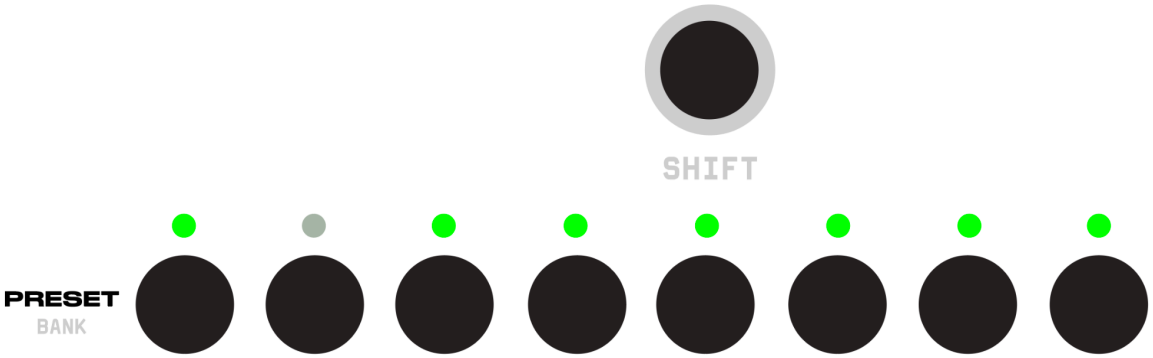
🎛️ 1. Select the PRESET you want to copy.
2. Press SHIFT+WRITE (COPY).
3. Choose the destination PRESET & BANK where you want to paste.
4. Press SHIFT+PLAY (PASTE).

BANKS

🍰 BANKS serve as memory compartments that store all the saved settings related to PATTERNS, PRESETS, and other general configurations. You can switch between a total of 8 BANKS. Opening a new, previously unused BANK is akin to initializing the instrument anew. By default, any changes made will be discarded when you switch BANKS or power off the device. To retain all modifications, you must save the BANK.

🎛️ Press SHIFT + PRESET to select a BANK.
🎛️ Press SHIFT + SELECT to save a BANK.
🎛️ Press BYPASS + SHIFT + PRESET to clear a BANK.

The active BANK is indicated by a switched-off light while holding SHIFT.



❗ When transitioning between different BANKS, the current settings of the presets will not be retained unless you save the BANK. However, if you have extensively modified your presets, switching to another BANK and back can provide a quick and straightforward method to revert to the originally saved settings.

🤓 Please note that although switching BANKS is typically rapid, it may temporarily disrupt the synchronization of the delay time and the oscillator Robots. Nonetheless, the sound processing is guaranteed to remain glitch-free.

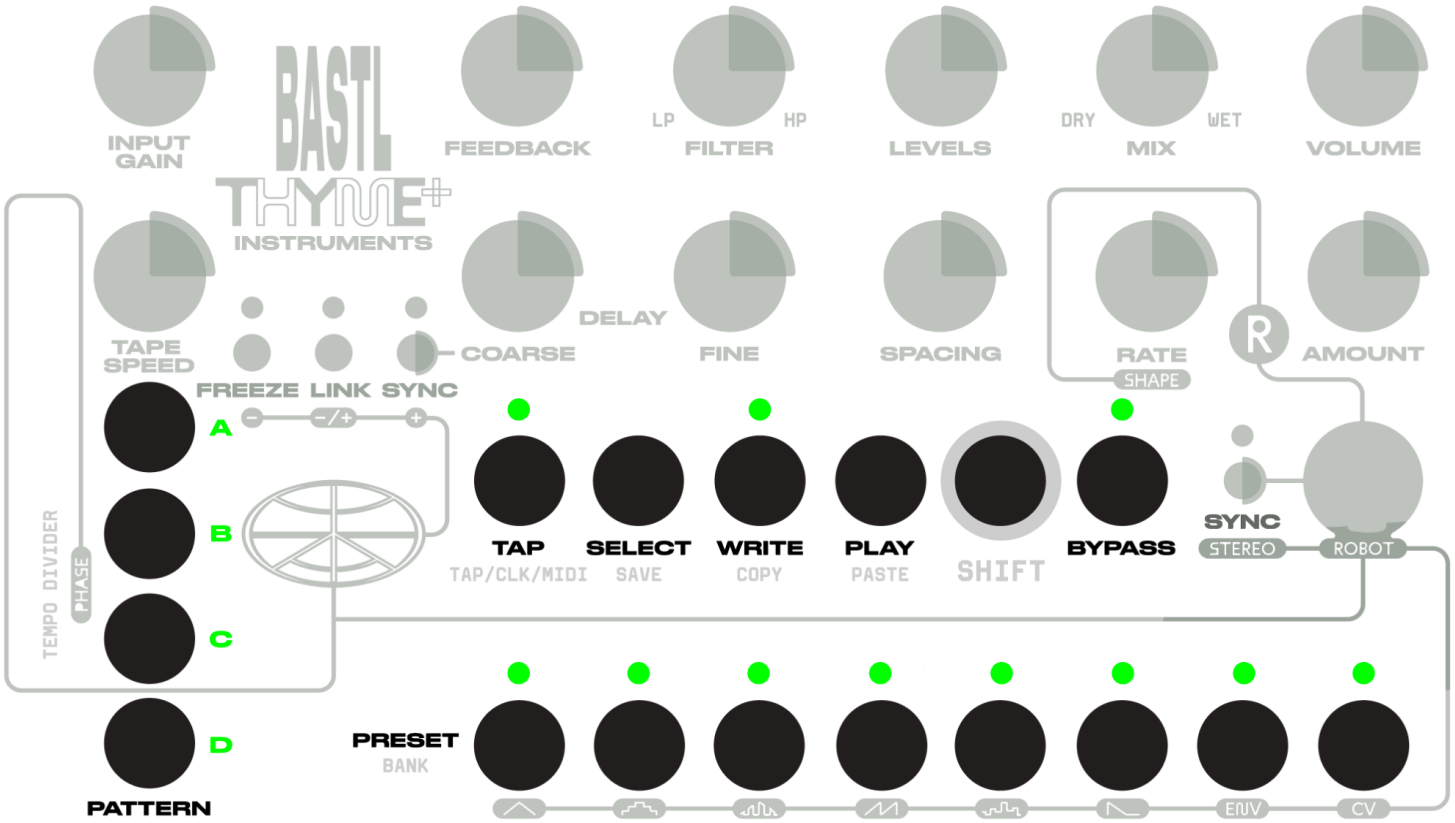
🤓 *PERSISTENT SETTINGS*

❗ Certain settings remain consistent across all banks and are persistently saved in memory, being reloaded upon startup:

- Selected clock source
- Selected divider options for all clock sources
- Speed of tap tempo (saved when starting or stopping the sequencer)
- Selected BANK
- MIDI Channel
- Interpretation or disregard of MIDI Start/Stop messages

11) SEQUENCER

THYME+ features a 32-step sequencer, allowing you to automate the switching between different sounding PRESETS. This enables the creation of intricate and dynamic sequences with a musical character.
The sequencer offers two modes suitable for both live performances and precise composition.
Additionally, you can synchronize the sequencer with external analog or MIDI clocks to integrate it seamlessly into your larger instrument chain.
The sequencer is primarily controlled using the TAP, SELECT, WRITE, PLAY, PATTERN, and PRESET buttons.



❗ The sequence always plays all 32 steps.

❗ If controlled with MIDI, please refer to the MIDI chapter for the start/stop implementation. By default, MIDI Start and Stop messages are ignored.

❗ When starting the sequencer, it will begin at the first step.

❗ When clocked with MIDI, the sequence keeps going in the background and does not start from the beginning (refer to the CLOCK chapter).

There are two operating modes of the sequencer:
The LIVE mode and the WRITE mode.

🎛️ Press the WRITE button to switch between the two modes.

WRITE mode	WRITE light ON
LIVE mode	WRITE light OFF

LIVE MODE

The LIVE mode is the more intuitive and performative mode of the sequencer.
In LIVE mode, you can easily temporarily overwrite the sounds and use live recording.

❗ Before you begin, prepare some PRESETS that you would like to record into the sequence.

RECORDING A SEQUENCE IN LIVE MODE

Make sure the WRITE light is off. If it's on, press the WRITE button to switch to the LIVE mode.

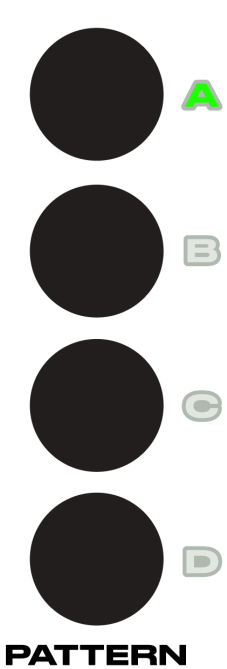
1. 🎛️ Start the sequencer with the PLAY button; the WRITE light will begin to flash.
2. Since no sound has been recorded yet, the sequence will have BYPASS on each step by default.
3. 🎛️ Hold one of the PRESET buttons to listen temporarily to the sound of the selected PRESET.
   🤓You can press multiple PRESET buttons at the same time. The most recent one will always be active (if you hold PRESETS 3+2+4 and release 4, PRESET 2 will become active).
4. When you release the PRESET buttons, the sequencer will continue playing the recorded sequence (which now consists entirely of BYPASS until you record something).

5. 🎛️ Hold WRITE + PRESET to start recording the selected PRESET into the sequence live at the moment when you press the buttons. The PRESET is recorded for as long as the buttons are pressed.
6. Adjust the tempo of your sequence by tapping the TAP button (see the CLOCK chapter for more info).
7. Your recorded sequence is being saved into one of the independent currently selected PATTERNS indicated by the A/B/C/D  light (see the following PATTERNS section for more info).
8. 🎛️ Switch freely between different PATTERNS by pressing the PATTERN buttons.
9. 🎛️ Erase a PATTERN by pressing BYPASS + A/B/C/D PATTERN.
10. Stop the sequencer by pressing the PLAY button again.
11. When the sequencer is stopped, it will leave you in the PRESET (or BYPASS) that was last active in the sequence.
12. If it leaves you in BYPASS, exit it by selecting one of your PRESETS.

✨ All the PATTERN A/B/C/D lights will light up simultaneously when the sequencer is at the first step.

✨❗ 🎛️ To save PATTERNS, PRESETS, and BANKS press SAVE (SHIFT + SELECT).

PATTERNS



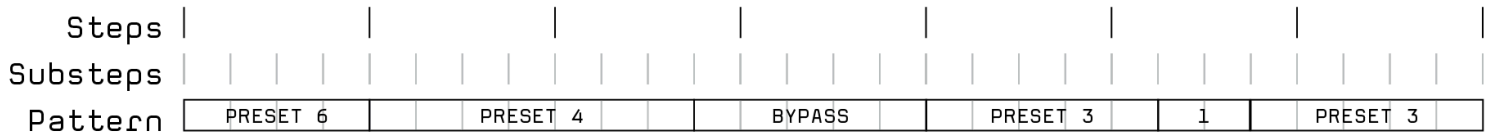
🎛️ Choose between four different sequencer patterns by pressing one of the A B C D PATTERN buttons.

🎛️ Press SAVE (SHIFT + SELECT) to save a PATTERN.

🎛️ Hold A/B/C/D PATTERN + BYPASS to erase a PATTERN

A PATTERN is eight steps long, with steps divided into four substeps, resulting in a sequence length of 32 positions.
Every position contains a reference to one of the eight PRESETS or BYPASS.
Once the sequencer reaches a position with a different PRESET, it activates it.

We have a PATTERN in the example below with five different PRESETS recorded. For the entire first step, it plays PRESET 6, then PRESET 4 for two steps and three substeps, then BYPASS, etc.



✨ While switching between PATTERNS, the sequencer will not reset its position; it will continue from its current step.

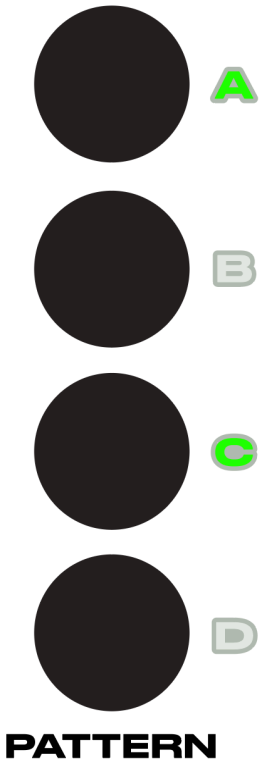
WRITE MODE

The WRITE mode is the more precise and detailed mode of the sequencer. It allows you to precisely edit a pattern, and set individual steps and substeps. Also allows editing while the sequencer is not running.

❗ If a sequence was already recorded in LIVE mode in the selected PATTERN, starting the sequencer in WRITE mode will play the recorded sequence until you overwrite it. In other words, the two modes, WRITE & LIVE, share the same memory of the 4 PATTERNS (and similarly, any sequences recorded in WRITE mode will be accessible in LIVE mode).

RECORDING A SEQUENCE IN WRITE MODE

- 🎛️ Turn on the WRITE mode by pressing the WRITE button; the corresponding light will turn on.
- 🎛️ Start the sequencer by pressing PLAY.
- ✨ The PRESET button lights now indicate the active step of the sequence. Each step has four substeps, indicated by the blinking of each light four times.
- 🎛️ Adjust the tempo of the sequence by tapping the TAP button.
- 🎛️ Hold the SELECT button + press a PRESET button to select a PRESET to work with. The selected PRESET will be indicated by the lit-up light when holding SELECT.
- 🎛️ Now, you can write this PRESET into the sequence by briefly pressing any of the PRESET buttons. This action will write the selected PRESET into the entire step and light up the corresponding light.
- 🎛️ Press the same PRESET button again to clear the selected PRESET from that step.
- 🎛️ To work with the substeps, hold the desired PRESET button. While holding it, the four A B C D PATTERN lights will now indicate which substeps the PRESET is recorded for. Each letter corresponds to a substep (A = substep 1, B = 2, and so on).
- 🎛️ Record or clear a substep, by holding a PRESET button and pressing one of the PATTERN buttons.
- 🎛️ Press PLAY to stop the sequencer. This will leave you on the last active preset (or bypass) in the sequence.



In the example below, when holding the 1–8 button, the selected PRESET is written into only the first (A) and third (C) substep of the selected step. For the second (B) and fourth (D) substeps, the sound is set either to BYPASS or to another PRESET that has been written there previously.

🤓 ✨This means that you can write up to four different presets into four different substeps of one full step. To do so, write the selected preset into the desired substep(s). Next, select a different preset and write it into a different substep(s).
However, you will not see a light indication of which presets are written into which substeps. This is something you will have to remember. You always see only indications related to the currently chosen preset.

❗ *OVERWRITING PRESETS IN A PATTERN*

If a PRESET is already written in a pattern, writing a different PRESET into the same step or substep will overwrite the original PRESET.

✨❗ Multiple PRESETS can occupy one step, but only if written into different substeps.

❗ WATCH OUT! If you overwrite a PRESET in a step/substep and then erase it (by pressing the same button again), it will not revert to the previous PRESET in that step. Instead, it will switch to BYPASS (empty step).

✨ *EDITING with sequencer not running*

To prepare your sequence before playing it without listening (particularly useful during live performances), you can edit the sequence with the sequencer not running.
Just ensure the WRITE light is on, and then it acts as if it was playing. When you're done, simply press PLAY and listen to the prepared sequence.

✨ *TEMPORARY KNOB OVERWRITE*

THYME+ provides a powerful performative option to manually control one or multiple parameters while the sequencer is running in both LIVE and WRITE modes.
This allows the parameters to be temporarily controlled directly by the respective knobs rather than by the PRESETS settings.

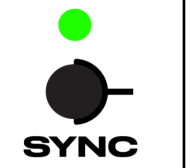
1. Make sure the sequencer is running.
2. 🎛️ Hold down the SELECT button.
3. Wiggle the knob that you want to manually control.
4. The parameter is now tracking the knob's movement rather than the PRESET setting.
5. You can manually control multiple parameters.
6. Once you release the SELECT button, the PRESETS will regain control over all parameters.

✨❗ You can also adjust the parameters of the active PRESETS in real time by tweaking the knobs while the sequencer is running. However, please note that due to knob freezing, this method is only usable when the sequencer is running at a rather slow pace.

12) CLOCK

The tempo of the sequencer is defined by the clock.
There are three different clock sources to choose from.

🎛️ Hold SHIFT and press TAP to cycle through the three options: **TAP/CLK/MIDI**. The **FREEZE/LINK/SYNC** lights will indicate which clock source is selected.

TAP (internal clock)	Internally generated clock with the tempo set by tapping the TAP button. The average time between four button presses will be considered as the time for one step. It responds to tempos from 30 to 300 BPM.	
CLK (external analog clock)	Using rising edges of an analog signal (standard Eurorack 5V logic) incoming into the CLOCK IN jack input to determine the tempo. The tempo can be gradually changed and controlled by external analog instruments.	
MIDI	Using beat clock messages incoming to the MIDI IN. 🤓 Regardless of the active clock source, MIDI clock messages are constantly tracked in the background. Therefore, when switching to the MIDI clock source, the sequencer will be set to the position where it would have been if it had been running on the MIDI clock all the time.	

✨ The tempo of the selected clock is always indicated by the TAP light.

❗🤓✨*MANUAL RESYNC*

Hitting the TAP button once re-synchronizes manually the sequencer clock with the active clock source.

The behavior varies slightly depending on the clock source:

Tap	Sets both the internal clock and sequencer to the closest whole step. This action is also always triggered when tapping the TAP button.
CLK (external analog clock)	Activates the first step immediately.
MIDI	Activates the first step upon receiving the next MIDI clock message.

🤓 *TEMPO DIVIDER*

For each clock source, there are four divider options.

🎛️ To change the divider option, hold SHIFT and select one of PATTERN buttons.

The currently active option is indicated by the A B C D PATTERN button lights when holding SHIFT.

The divider options for different clock sources are as follows:

	Tap	Analog Clock	MIDI
A	2 steps per tap	1 substep per edge	8 substeps per quarter note
B	1 step per tap	1 substep per 2 edges	4 substeps per quarter note
C	2 substeps per tap	1 substep per 4 edges	2 substeps per quarter note
D	1 substep per tap	1 substep per 8 edges	1 substep per quarter note

✨ The dividers are independent of each other. For example, you can have option B activated for Tap tempo and option D for MIDI clock.

❗ The selected clock source and clock dividers are persistently saved into memory and will not be reset by power cycling.

🤓 When the divider option is being changed, the sequencer will remain phase-aligned with the clock.

13) MIDI

Practically each and every parameter on THYME+ can be controlled with MIDI commands using your favorite MIDI controllers. Utilize the MIDI IN input calibrated for TYPE A MIDI jack.

All changes induced by MIDI controlling the instrument are visually indicated on the interface, just as if you were controlling THYME+ manually.

❗ ✨ The MIDI IN input is calibrated to the standard 3.5 mm TRS jack, type A. There are two standards of DIN5 to 3.5 mm TRS jack adapters: type A and type B. Ensure that you use the correct adapter – type A!

✨ To avoid complications, use the DIN5 to 3.5 mm jack adapter included in the package.

❗ THYME+ will not react to MIDI messages unless MIDI is selected as a clock source.

❗ By default, MIDI Start and Stop messages are ignored. However, this behavior can be changed to allow MIDI Start and Stop messages to control the sequencer.

🎛️ To toggle this setting, hold the WRITE button during the startup of THYME+:

WRITE light ON	Start/Stop messages are ignored
WRITE light OFF	Start/Stop messages are interpreted

❗ This setting is saved persistently when the device is turned off.

MIDI CHANNELS

THYME+ listens to MIDI voice messages on a single MIDI channel.

🎛️ To change the MIDI channel, hold the corresponding buttons while powering up the device:

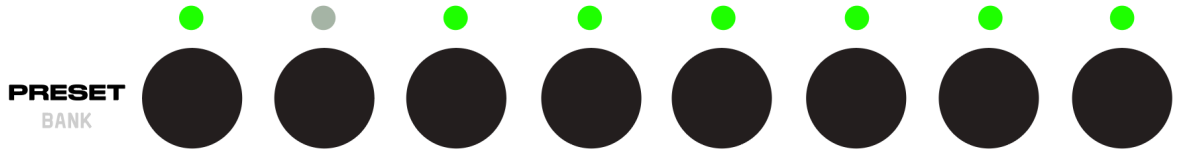
- Channels 1–8: Hold the desired PRESET button.
- Channels 9–16: Hold SHIFT + the desired PRESET button.

The selected channel will be indicated immediately by the PRESET button lights (see below).

❗ The selected MIDI channel is persistently stored in the device's memory.

When the device is powered on, the current MIDI channel is displayed by the PRESET button lights:
If all lights are off except for one, the light ON position indicates a MIDI channel number between 1–8. In the example below, only the third light is ON, indicating Channel 3 is selected.

If all lights are on except for one, the light OFF position indicates a MIDI channel number between 9–16. In the example below, only the second light is off, indicating Channel 10 is selected.



✨✨✨ *KARPLUS-STRONG SYNTHESIS*

You can utilize MIDI Notes to adjust the pitch by adjusting the FINE DELAY time. By manipulating the FINE DELAY, FILTER, and FEEDBACK knob values, THYME+ can be set up for Karplus-Strong Synthesis, enabling separate control over pitch, timbre, and decay time.

🤓 Karplus-Strong is a synthesis technique based on physical modeling of a plucked string: A short delay and a filter are used to generate a resonant loop, mimicking the behavior of a vibrating string. This loop can then be excited with short bursts of noise, emulating the action of plucking the string.

To facilitate its use as a synthesizer, Thyme+ incorporates two-parameter automation:

1. Upon receiving MIDI Note-On messages ranging between 9–127, the FINE delay knob value is set to produce a resonant frequency matching the MIDI note's frequency.
2. In the Karplus-Strong configuration, the decay time depends on both the delay time and feedback amount. To maintain consistent delay time across different MIDI notes, the feedback is automatically attenuated for lower notes. This functionality can be toggled on/off using the MIDI CC89 message.

✨ See the ROBOT VOLT-PER-OCTAVE section for a similar implementation of externally controlling pitches with Robots.

🤓 *CONTROL CHANGE*

With Control Change (CC) Messages, you can manipulate all parameters of the currently selected PRESET.

The data byte of any MIDI control message is interpreted based on the command in one of the following ways:

SCALE	Maps the received value to a set range, typically corresponding to the range set by the parameter knob. For instance, it can adjust VOLUME from off to full.
SELECT	Maps the range of the received value to a few discrete values. For example, it can select one out of eight Robot waveform modes with values ranging from 0 to 127.
SWITCH	A special case of SELECT where high values signify ON and low values signify OFF. For instance, it can turn on/off DELAY SYNC if the value is greater/smaller than 64.
TRIGGER	Triggers a specific action only upon receiving a message of this number and ignores the data byte.

LIST OF COMMANDS

You can download the complete list of CC commands for TYME+ here.

In each Note-Domain (selecting a PRESET and setting the FINE delay time), only one note can be active at a time.

If multiple notes are ON simultaneously (for example, by holding down several keys on a keyboard), only the most recent note will be active.
A history of active notes is tracked, and once you release the latest note, THYME+ reverts to the previously active note.

🤓 *REAL-TIME MESSAGES*

Active Clock Source	Behavior
Tap	Start, Stop, and Clock messages are generated based on the Tap Tempo and the Play status of the sequencer. However, this functionality is only active if THYME+ is the master device on the bus. If any other MIDI Real Time message is received, THYME+ detects a conflict and ceases to generate MIDI Real Time messages. To reset this and resume generating Real Time messages, switch to a different clock source momentarily, then re-select Tap. After that, any MIDI Real Time messages received by THYME+ will not be processed.
Analog Clock	Start and Stop messages are ignored.
MIDI	Start and Stop messages are used to start/stop the sequencer (if allowed by boot setting – see the MIDI chapter).

14) 🤓 HARDWARE TESTS & FACTORY RESET

If you have a suspicion or notice that something in your instrument isn't working as it should, you can perform a hardware test.

ENTERING THE TEST MODE

To run tests you have to boot your device into a dedicated Test mode by holding down all four A B C D PATTERN buttons while powering up the device. The four PATTERN lights ON indicate that you have entered the Test mode.

There are six different hardware tests that can be run either in a row (to perform a general check) or individually (to track down a specific error). There's also an option for formatting the whole memory.

RUNNING THE TESTS

🎛️ To run a single test, hold down the PRESET button corresponding to the desired test and press PLAY. (E. g.: Hold PRESET button 2 to run only test number 2.)
To run all the tests from first to sixth, one after another, press PLAY alone.

If the selected test completes without an error, you will see a light animation traveling through the PRESET lights.

A failure is indicated by some of the PRESET lights being on, corresponding to the failed test and all knob lights flashing. Test 3 also has an individual failure indication that tells you more details about what went wrong. When a test fails, it can be restarted by simply pressing PLAY.

All indications and tests are described in the following table.

THYME+ HARDWARE TESTS

ID	Name	Description	Manual Check	Failure Indication
1	Knobs	During the test, adjust all knobs simultaneously to predetermined positions: off, center, and full. Once all knobs reach their respective target positions, the test will advance to the next set of positions. The lights on the knobs indicate when each knob has reached its target position.	Verify that the knob lights indicate the middle position only when the knobs are set halfway to ensure they have the correct progression curve.	None
2	Knob lights	Knob lights fade in one after another.	Smooth fading	None
3	Buttons	Press the button nearest to the illuminated light, following the natural progression of the buttons. Pressing the wrong button results in an error.	None	The light closest to the unexpectedly triggered button will illuminate.
4	EEPROM	All bytes of the EEPROM are written to, read back, and compared with the expected value. The original data is preserved during this process. Additionally, the test progress is indicated.	None	None
5	External	Connect external testing utility to test CV, analog clock and footswitch. Tests are performed in this order: CV to center; 5 Clock edges; CV to off; 5 Footswitch presses; CV to full.	The unit should not react on its own.	None
6	Bootloader	Tries to apply the bootloader mode.	None	None
7	MIDI	❗ **This procedure applies only to the original Thyme.** Connect the Thyme MIDI input and output using a MIDI cable. Thyme will send random data and check to receive it.	None	None
8	Format EEPROM	The entire EEPROM memory will be formatted, resetting all Sounds, Patterns, and Persistent settings. ❗ Please note that this process does not revert to the factory firmware once the firmware has been updated!	None	None

15) TECHNICAL SPECIFICATIONS

POWER input: 7–12 V, center positive, 5.5 mm/2.1 mm barrel, < 400 mA

POWER consumption: <300 mA

AUDIO input: mono & stereo 6.35 mm (¼") jack, 10kΩ input impedance, -∞ to +20dB gain

AUDIO output: mono & stereo 6.35 mm (¼") jack, 100Ω impedance, capable of driving headphones

FOOTSWITCH input: 3.5 mm mono jack, attach a passive switch that connects the sleeve and tip

CLOCK IN input: 3.5 mm mono, 100kΩ input impedance, trigger threshold at ~0.5 V, rising edge, maximum 5 V

CV IN input: 3.5 mm stereo

Tip: 100kΩ input impedance, range 0–5 V,

Ring: 5 V voltage source for use with an expression pedal (passive voltage divider)

MIDI IN input: 3.5 mm jack, MIDI adapter type A

DELAY RANGE: from 2.7s at 48kHz (full tape speed) to 108s at 1,2kHz (lowest tape speed)

DIMENSIONS: 215 mm x 115 mm x 30 mm (45 mm including knobs), 700 g

16) CREDITS

The original Thyme was produced and designed with Lennart Schierling (Binary Labs).

THYME+

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SUPERVISED BY: Václav Peloušek
MAIN TESTER: John Hornak
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GRAPHIC DESIGN: Anymade Studio

The idea turned into reality
thanks to everyone at Bastl Instruments
and thanks to the immense support
of our fans.
❤️‍🔥

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